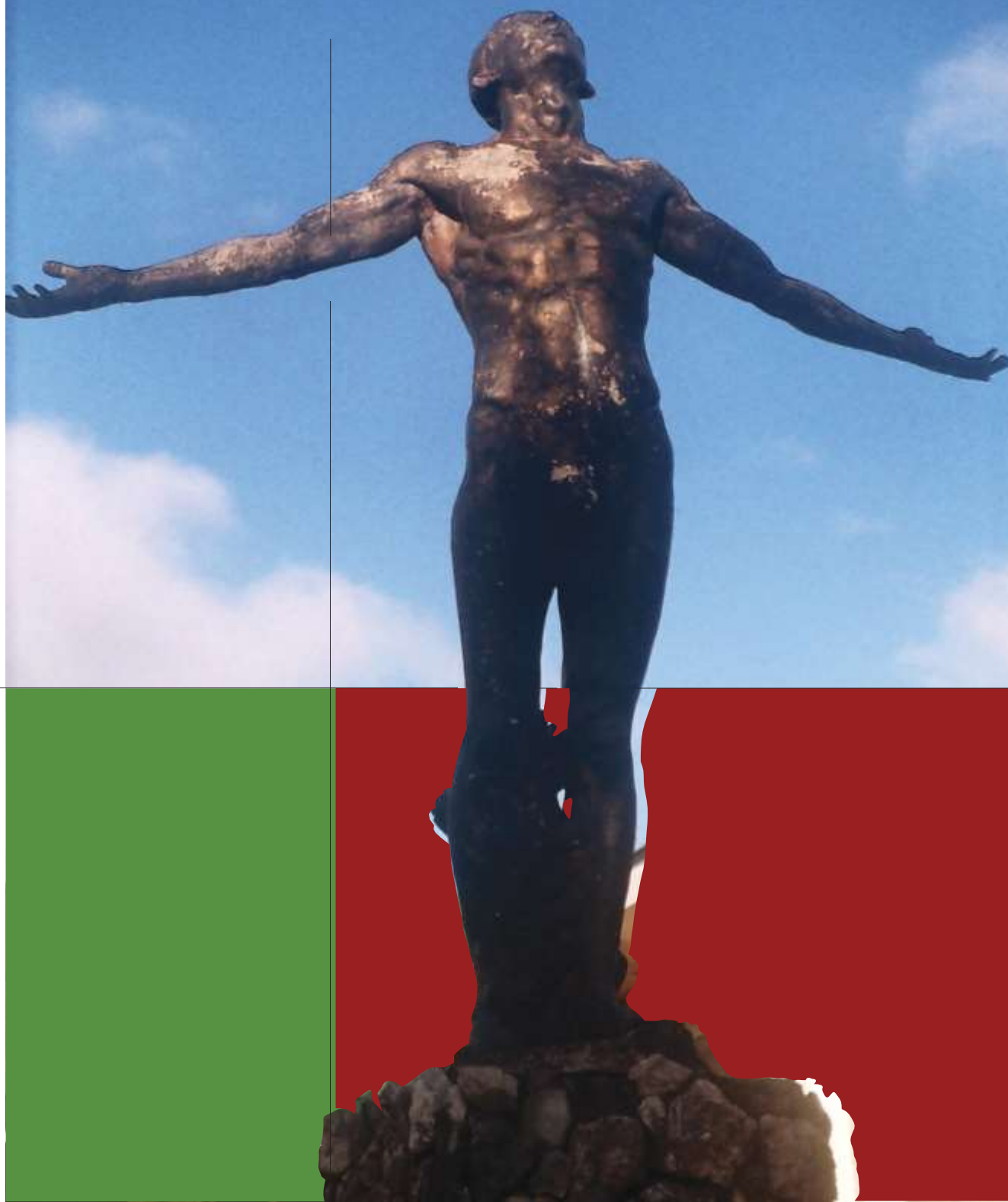




University of the Philippines Los Baños  
CATALOG OF ACADEMIC PROGRAMS 2016



Produced by the  
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## **PREFACE**

The UPLB University Catalogue of Academic Programs covers the institution and revision of degree programs and courses within a ten year period (2006-2016) under three administrations: Chancellor Luis Rey I. Velasco (November 1, 2005-October 31, 2011), Chancellor Rex Victor O. Cruz (November 1, 2011-October 31, 2014) and Chancellor Fernando C. Sanchez Jr. (November 1, 2014-October 31, 2017).

During the inclusive years of the different administrations, the University went through changes such as the shift in the academic calendar to begin in August, policy changes in new freshmen admission and scholarship privileges in support of national thrust and development. It also includes the change in the GE framework to have required GE courses in the undergraduate degree programs.

Curricular revisions and institution of new degree programs and courses remain anchored on the University's niches (i.e. agriculture and forestry, biotechnology, engineering and environmental science) with emphasis on being interdisciplinary/multi-disciplinary to remain relevant in both local and global arenas.

MYRNA G. CARANDANG, Ph.D.  
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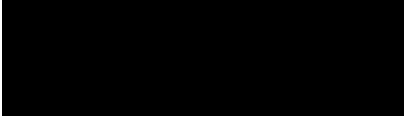
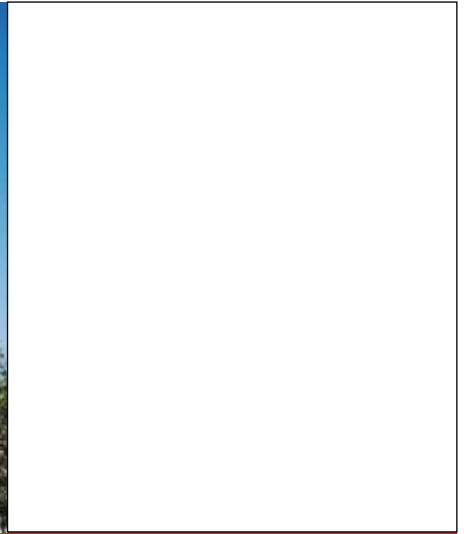
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The University





# THE UNIVERSITY

The University of the Philippines, the first and premier state institution of higher learning in the country, was founded on June 18, 1908 by an act of the First Philippine Legislature. Act No. 1870, otherwise known as the University Charter, specified the functions of the University, which are to provide advanced instruction in literature, philosophy, the sciences, and arts, and to give professional and technical training.

Beginning with the operation of the School (now College) of Fine Arts and the College of Agriculture in 1909 and the transfer of the Philippine Medical School (now College of Medicine) in 1910, the University has since undergone considerable growth. From the initial three colleges, ten more were organized within the first decade. In 1968 or 60 years after its founding, the University had 28 colleges in three campuses in addition to five regional colleges.

Through Presidential Decree No. 52, dated November 20, 1972, the President of the Republic authorized the Board of Regents to establish a University of the Philippines System so that the University may serve as a more effective instrument of national development while maintaining its commitment to the arts, letters, and the humanities, as well as to the pursuit of truth and the highest standards of academic excellence. Such reorganization was effected by preserving the institutional unity and academic integrity of the University while allowing for decentralization of authority and autonomy of the component units. UP Los Baños, the agricultural center for Asia, was designated as the first constituent member. This reorganization was approved by the Board of Regents at its 828<sup>th</sup> meeting on November 21, 1972, effective January 1, 1973.

On November 22, 1973, a presidential decree created the Philippine Center for Advanced Studies as the second constituent member university. It was abolished on July 9, 1979, however, except for its academic programs and two of its institutes, which were retained by the University.

At its 894<sup>th</sup> meeting on October 28, 1977, the Board of Regents approved the establishment of a Health Sciences Center. On January 24, 1979, an executive order provided the mechanism for the establishment of the Health Sciences Center (now UP Manila) as another constituent member of the reorganized University. The UP Visayas (Iloilo) was established by the Board at its 914<sup>th</sup> meeting on May 31, 1979 to be the national center for fisheries.

At its 976<sup>th</sup> meeting on April 23, 1985, the Board of Regents formally established UP Diliman as a constituent university, more than a decade after the reorganization. Diliman being the seat of the UP Administration, the campus was not immediately constituted after 1972 although it was administered, along with the Manila units prior to the organization of the Health Sciences Center, as a *de facto* university.

Today, the University of the Philippines is composed of seven constituent universities: UP Diliman, UP Los Baños,

UP Manila, UP Visayas, UP Open University (for distance education), UP Mindanao, and the recently established UP Baguio. UP Cebu is also an autonomous college under the UP System. Together, these universities and one college are spread in 15 campuses in the archipelago. From an initial enrollment of 50 in 1909, the total count of students had grown to 34,544 by 2014.

## UNIVERSITY OF THE PHILIPPINES LOS BAÑOS

Since its establishment in 1972 as the first constituent university of the UP System, UPLB has evolved into a premier educational and research institution widely known in the country and in the Southeast Asia-Pacific region. Its degree programs have expanded from the traditional fields of agriculture and forestry to the biological and environmental sciences, engineering, mathematics, computer science, and information technology. In recent years, these programs have been offered along with those in the social, economic, and humanistic disciplines.

Nine colleges and two schools now comprise the degree-offering units of UP Los Baños. These are the Colleges of Agriculture (founded in 1909), Veterinary Medicine (1910), Forestry and Natural Resources (1949), Arts and Sciences (1972), Engineering and Agro-Industrial Technology (1983), Human Ecology (1983), Economics and Management (1987), Public Affairs (1998), and Development Communication (1998). The two other degree-granting units are the Graduate School (1972) and the School of Environmental Science and Management (1997).

Up to 13,500 students take courses in 29 undergraduate and 100 graduate programs. These programs are implemented by 964 members of the faculty, supported by 393 research, extension and professional staff (REPS) and 1,385 administrative staff (as of November 2014). Of the total faculty, 98 (10%) are professors, 120 (13%) associate professors, 454 (47%) assistant professors, and 292 (30%) instructors. Of the REPS, 13 have been conferred Scientist Rank under the Philippines Scientific Career System and 15 are REPS-faculty.

UP Los Baños is the host university to a number of international institutions, namely: the International Rice Research Institute (IRRI), the Southeast Asian Ministers of Education Organization (SEAMEO) Regional Center for Graduate Study and Research in Agriculture (SEARCA), the ASEAN Center for Biodiversity (ACB), the World Agroforestry Centre (ICRAF) Philippines, and the International Service for the Acquisition of Agri-biotech Applications (ISAAA). IRRI's offices, research facilities, and experimental fields occupy University land adjacent to the campus. SEARCA's offices as well as its staff housing facilities and those of IRRI's staff are located within the campus. Scholars of SEARCA and IRRI undertake academic and research work in UP Los Baños.

Other national and international research centers established and located on campus are the National Institute of Molecular Biology and Biotechnology (BIOTECH), the National Crop Protection Center

(NCPC), the Postharvest Horticulture Training and Research Center (PHTRC), the Agricultural Machinery and Testing Center (AMTEC), the Asia-Pacific Center for Technology Exchange and Training for Small and Medium Enterprises (ACTETSME), the Ecosystems Research and Development Bureau (ERDB), and the Forest Products Research and Development Institute.

The integrated campus and its adjacent experimental farms sprawl on 15,211 hectares of land that include the Mt. Makiling Forest Reserve (MMFR, 4,244 ha), agricultural areas (583 ha), land grants (9,986 ha) located farther south in Laguna and Quezon provinces, and the campus (397 ha).

The is located at the foot of the MMFR, the 33<sup>rd</sup> ASEAN Heritage Park and only the fifth in the Philippines to hold such distinction. The MMFR is also recognized for its high conservation importance being one of the Philippines' 18 centers of plant diversity and 32 key ecotourism sites. UPLB holds administrative jurisdiction over the MMFR by virtue of Republic Act No. 6967 issued on October 15, 1990.

The UP Los Baños library resources consist of 314,000 books, serials and other materials. The Museum of Natural History, which is part of the lower and upper campus, has more than 300,000 preserved Philippine plants, animals, microorganisms, and other biota that showcase the rich biodiversity of the country.

## **GOVERNMENT OF THE UP SYSTEM**

### **Board of Regents**

The government of the University of the Philippines is vested in its Board of Regents as constituted by law. The administration of the University and the exercise of its corporate powers are vested exclusively in the Board, and insofar as authorized by the Board, in the President of the University as well as in the Chancellors of the constituent universities.

The Board is composed of the Chair of the Commission on Higher Education (CHED), who is *ex officio* Chair; the President of the University, as Vice-Chair; the chairs of the Senate and House Committees on Education; the President of the UP Alumni Association; one representative each from the faculty and student body; and five other

members appointed by the President of the Philippines, at least three of whom are alumni of the University.

The Secretary of the University concurrently serves as the Secretary of the Board of Regents.

### **Officers of the Administration**

The officers of the administration of the University are the President, Vice-President for Academic Affairs, Vice-President for Planning and Finance, Vice-President for Public Affairs, Vice-President for Administration, Vice-President for Development, and the Secretary of the University.

Each constituent university is headed by a Chancellor who is directly responsible to the President in the administration of that constituent university.

### **University Council**

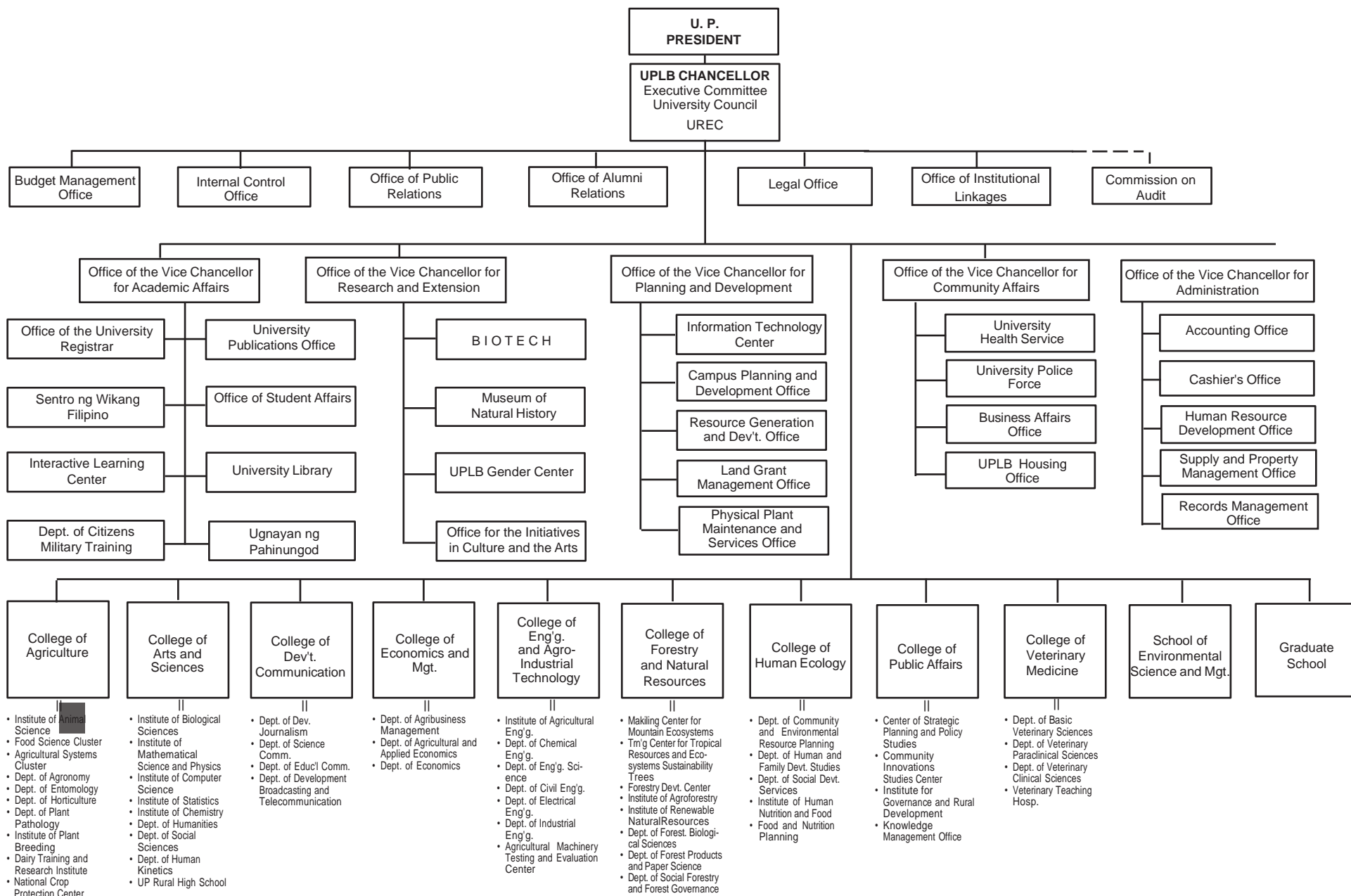
Each constituent university has its own University Council composed of the university professors, professors, associate professors, and assistant professors of the various degree-granting units of that constituent university. The Chancellor serves as Chairperson and the University Registrar as Secretary.

The University Council has the power to prescribe the courses of study and rules of discipline, subject to the approval of the Board of Regents. The Council is also authorized to fix the requirements for admission to any college/unit of the University as well as those for graduation and the receiving of a degree. The Council is empowered to recommend to the Board of Regents students or others to be recipients of degrees. The Council exercises disciplinary power over the students through its Chancellor or Executive Committee within the limits prescribed by the rules of discipline approved by the Board of Regents.

The Executive Committee, which counts as members the Deans of the various degree-granting units of the constituent university, also acts in an advisory capacity to the Chancellors in all matters pertaining to their office for which they seek its advice.

The President of the University is an *ex officio* member of the University Council of each constituent university and presides over its meetings whenever present.

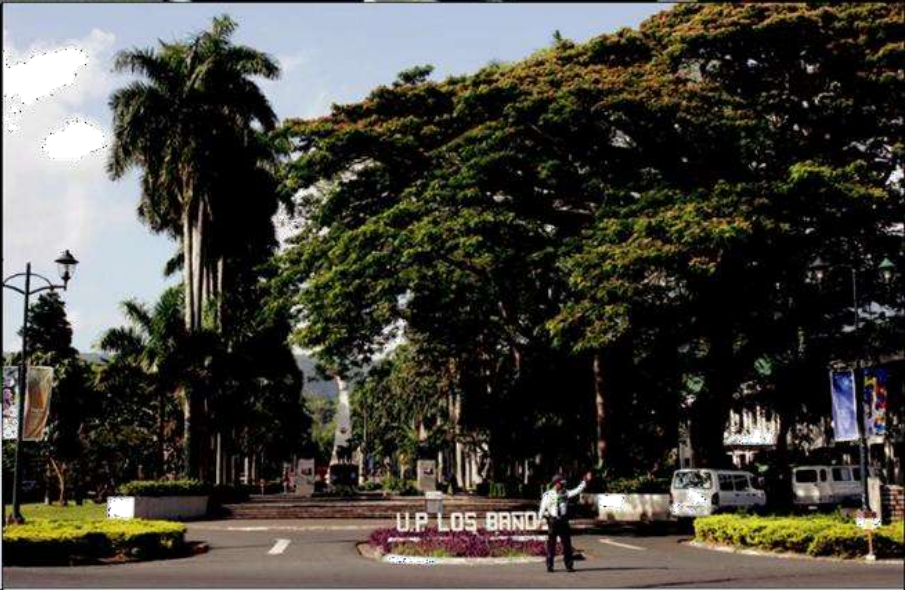
# UPLB ORGANIZATIONAL STRUCTURE







Academic Information





# ACADEMIC INFORMATION

## ACADEMIC YEAR

The Academic Year is divided into two semesters of at least 16 weeks, exclusive of registration and final examination periods. Each semester shall consist of at least one hundred (100) class days. A summer/midyear session of six weeks follows the second semester. Class work in the summer/midyear session is equivalent to class work in one semester.

Beginning SY 2014-2015, the first semester begins in August, the second semester in January, and the midyear session in June.

## COURSE NUMBERING

In general, courses in the lower division (freshman and sophomore years) are numbered 1 to 99; courses in the upper division (junior and senior years) are numbered 100 to 200; and graduate courses are numbered 201-400. Courses numbered 301 and above are generally professional courses in the doctoral program.

## CREDIT UNIT

The unit of credit is the semester hour. Most classes taught at the University meet 3 hours a week; these classes carry 48 hours of instruction and 3 units of credit.

Each unit of credit covers at least 16 semester-hours of instruction in the form of lecture, discussion, seminar, tutorial, or recitation or any combination of these forms within a semester. Laboratory, field or shop work is credited at one unit for each three-hour period.

## ACADEMIC LOAD

For undergraduate students, the academic load is a maximum of 18 non-laboratory units, or 21 units including laboratory, except in programs where the normal semestral load is more than 18 units. However, a graduating student with very good academic record may be permitted to carry a heavier load in his last year. During the midyear session, the normal load is 6 units, but in justifiable cases, the Dean may allow enrollment up to 9 units.

On the graduate level, full-time students are allowed the normal load of 12 units or a maximum load of 14 units. During the midyear session, the normal load is 6 units.

The Dean is empowered to limit the academic load of students who are employed, whether full-time or part-time, outside the University; provided, that no graduate student who is employed on a full-time basis shall be allowed an academic load of more than 10 units, whether in formal courses or in thesis, in any semester unless he has the prior approval of the Dean or administrative head of the graduate unit to which he belongs.

## MEDIUM OF INSTRUCTION

English is generally used as a medium of instruction.

The University Council of UP Los Baños voted on December 17, 1988 for a gradual implementation of the policy towards the full use of Filipino as a medium of instruction for undergraduate courses within a period of ten (10) years beginning June 1989.

On the graduate level, Filipino is initiated and/or sustained as a non-exclusive medium of instruction. English is maintained as a medium of instruction.

## CLASSIFICATION OF STUDENTS

A student, whether undergraduate or graduate, is classified as either regular or non-regular.

A **regular undergraduate** student follows an organized program of study and complies with requirements leading to the bachelor's degree or undergraduate diploma/certificate. S/ He carries the full semestral load called for by his curriculum. On the basis of units completed, a student may be classified as follows:

**Freshman.** A student who has not finished the prescribed subjects of the first year of his/her curriculum or 25 percent of the total number of units required in his/her entire course;

**Sophomore.** A student who has satisfactorily completed the prescribed subjects of the first year of his/her curriculum, or has finished 26 to 50 percent of the total number of units required in his/her entire course;

**Junior.** A student who has completed the prescribed subjects of the first two years of his/her curriculum, or has finished 51 to 75 percent of the total number of units in his/her entire course;

**Senior.** A student who has completed the prescribed subjects of the first three years of his/her curriculum or has finished at least 76 percent of the total number of units in his/her entire course.

A **regular graduate** student is a prospective candidate for the master's or doctoral degree. S/He may either be a part-time or full-time student.

A **non-regular** student may be any of the following: (1) a non-degree student, with credit; (2) a cross-registrant, with credit; or (3) a special student, without credit.

A **non-degree** student is a degree holder or undergraduate student who is not currently enrolled in any other institution of higher learning. He may be

allowed to take courses for credit in the University on the graduate and/or undergraduate levels provided that he satisfies the appropriate requirements for admission. He is not allowed to enroll for more than one semester except by special permission of the Dean of the college concerned and the University Registrar.

*Since a non-degree student does not follow any organized program of study, he is not a prospective candidate for graduation for any degree in the University.*

A **cross-registrant** concurrently takes courses for credit in his mother unit and in some other units of the University. Cross-registration is allowed only for justifiable reasons, and must have the approval of the Dean of the college where the student is primarily enrolled.

A **special student** takes courses for non-credit. He is not allowed to enroll for more than nine units a semester or for more than two years, except by special permission of the Dean concerned. He may register at any time, subject to other regulations of the University.

## **ADMISSION**

No student shall be denied admission to the University System by reason of age, sex, nationality, religious belief or political affiliation.

Every applicant for admission shall undergo a thorough health examination. No person shall be admitted to this University if he is found by the University Health Service to be suffering from a dangerous, communicable or infectious disease or is physically unfit to take courses in any college of the University.

Every student shall, upon admission, sign the following pledge: *"In consideration of my admission to the University of the Philippines Los Baños and of the privileges of a student in this institution, I hereby promise and pledge to abide by and comply with all the rules and regulations laid down by competent authority in the University and in the college or school in which I am enrolled."* Refusal to take this pledge or violation of its terms shall be sufficient cause for summary dismissal or denial of admission.

No person who has not duly matriculated may be admitted to the classes. In exceptional cases, the University Registrar may, on the recommendation of the Dean concerned, authorize the admission of a visitor to a class for not more than five sessions.

## **Freshman Admissions**

### **Through the UP College Admission Test (UPCAT)**

A graduate of an accredited high school may be admitted as freshman to the University of the Philippines Los Baños on the basis of: (1) his performance in the

UP College Admission Test (UPCAT); (2) his weighted average in the first three years of high school; and (3) his choice of UP campus and the quotas for specific degree programs/colleges set by the respective Deans.

The UPCAT consists of 4 subtests: Language Proficiency (English and Filipino), Science, Math and Reading Comprehension (English and Filipino). Standardized scores on these subtests are combined with the weighted average of final grades in the first three years of high school to determine qualification into UP. Moreover, to implement the policy of democratization to make the UP studentry more representative of the nation's population, socio-economic and geographic considerations are factored in the selection of campus qualifiers.

To be eligible to take the UPCAT, specific requirements must be satisfied:

- (1) Must be a senior high school student (e.g. Fourth Year, Grade 12, Senior 6) of DepEd-accredited high school or a secondary school abroad expecting to graduate within the schoolyear; OR
- (2) Graduate of a Dep-Ed accredited high school or secondary school abroad; OR
- (3) Philippine Education Placement Test (PEPT) Certified Eligible for admission to college; AND
- (4) With final grades for three (3) high school years preceeding the year of graduation; AND
- (5) Must not have taken college subject/s prior to taking the UPCAT; AND
- (6) Must not have taken the UPCAT previously.

Filing of UPCAT application can be done manually at the UP System Office of Admissions in UP Diliman campus or online (UPCAT website: <http://upcat.up.edu.ph> or <https://upcatonline.up.edu.ph>).

### *Qualifying for a Campus*

In the application, applicants are asked to choose two campuses, in order of preference, from among ten UP units (Baguio, Cebu, Diliman, Iloilo, Los Baños, Manila, Mindanao, Pampanga, Tacloban and Open University). The choice of two degree programs per campus will also be indicated in the UPCAT application form and ranked in order of preference. The application will be processed according to the campus and course choices and in the order specified.

All UPCAT applicants are ranked based on their UP admission grades, then screened based on the choice of campuses. The top-ranking applicants per campus will qualify based on the campus quota and cut-off grade. If applicants qualify for the first choice campus, they will no longer be considered for the second choice of campus. But if they do not qualify for their first choice, they are automatically considered for the second choice of campus.

### *Qualifying for a Program*

Once qualified to enter a campus, qualifiers are then screened for acceptance into one of the degree programs chosen. Different grade predictors are used for different programs. Campus qualifiers are ranked according to the degree program predictor. Top-ranking qualifiers are accepted according to the number of slots available for that program.

If a campus qualifier makes it to the quota for the first choice of course, s/he will no longer be screened for the second choice. If the qualifier does not make it to the first choice of degree program, s/he will undergo the same screening process for the second choice. If they still do not make it to the second course choice, they will remain qualified for that campus but must find a degree program with available slots (DPWS) in that campus. The University Registrar of the campus will help them find the program.

### *Appeals*

If an UPCAT taker did not qualify to any of the campus choices, they have other options: appeal to the other campuses of the UP System or apply as transfer student. They can file an appeal if the admission grade is within the posted cutoff grade of the campus and they have programs with available slots. The Non-Qualifier's Slip (which will be sent in the mail and which will indicate your admission rating) must be presented to the Office of the University Registrar of the campus. However, there is no guarantee of acceptance as each campus makes its own decisions according to its own criteria.

If no UP campus can accommodate the applicant, they can enroll in a college or university other than UP. After earning 33 academic units with a weighted average of 2.00 or better on the UP marking system, they can apply for transfer into a UP campus. Again, each campus has its own rules on transfer and accepts only a limited number of transfer students. Information regarding transfer to UP may be obtained from the Office of the University Registrar of the respective UP campuses.

### **Through International Qualifications**

International applicants seeking freshman entry to UP are eligible to apply for the UPCAT if they graduated from a high school abroad or will graduate prior to the opening of the following school year, and have not taken college courses.

Filipino and foreign graduates of high schools abroad may be eligible for automatic admission (i.e. without having to take the UPCAT) provided they meet the qualifications based on the Scholastic Aptitude Test (SAT), or the General Certificate of Education Examination (GCE), or the International Baccalaureate Diploma (IB).

For international applicants whose native language or medium of instruction in the secondary school is not English, a minimum score in the Test of English as a Foreign Language (TOEFL) is also required.

### **Through the Iskolar ng Bayan Program**

Filipino graduates from the Top Ten of the graduating classes of public high schools may apply for freshman automatic admission (i.e. without having to take the UPCAT) as provide by a transitory provision of RA 10648, the Iskolar ng Bayan Law of 2014. Applicants who qualify for admission in UP under the Iskolar ng Bayan program, will be entitled to free tuition and other school fees for the first year of college. There are limited slots per campus for the Iskolar ng Bayan program.

### **Quota Programs**

Due to limited facilities, some colleges in UPLB which offer certain degree programs that are popular with students are constrained to limit their freshman enrollment. Admission to any of these quota programs is highly competitive and requires qualifying in the UPCAT.

### **Certificate in Forestry Program**

The University offers the Certificate in Forestry program which does not require an applicant to take the UPCAT. The admission requirements of the program are as follows: 1) a high school diploma from any recognized institution of secondary education; 2) a general weighted average of 88 percent or better in high school or belonging to the upper 30 percent of the graduating class; and 3) evidence of physical fitness. Application to this program should be made directly to the College Secretary, College of Forestry and Natural Resources.

Students starting with the 1972-1973 Certificate in Forestry Curriculum may be allowed to transfer to the B.S. Forestry course by complying with any of the following conditions:

- (1) Completing all the requirements for the Certificate in Forestry with a weighted average of 2.5 or better in all academic units earned; or
- (2) Completing at least all the requirements in the first year program of the Certificate of Forestry curriculum with a weighted average of at least 2.0 in all academic units.

Students admitted to the Certificate in Forestry curriculum who did not qualify for admission on the basis of the admission test and their high school grades may not be favorably indorsed to transfer to any degree program.

### **Advanced Placement Program**

Under the Advanced Placement Program, incoming freshmen may obtain credit by examination for certain

subjects. This scheme avoids repetition of subjects that have been adequately covered at the high school level, thus accelerating the student in finishing his curriculum.

Incoming new freshmen with an average of 90% and above in the four UPCAT subtests are encouraged to take the Advanced Placement Examination given in April. Subject for accreditation are the following:

|                        |                               |
|------------------------|-------------------------------|
| Humanities 1(AH)       | (Literature, Man and Society) |
| Biology 1              | (General Biology I and II)    |
| Mathematics 11         | (College Algebra)             |
| Mathematics 14         | (Plane Trigonometry)          |
| Mathematics 17         | (Algebra and Trigonometry)    |
| Chemistry 16           | (General Chemistry I)         |
| History 1(SSP)         | (Philippine History)          |
| History 2(SSP)         | (Asia and the World)          |
| Natural Science 1(MST) | (The Material Universe)       |

A new freshman who passes the prescribed examination in such freshman courses as mathematics, chemistry, etc., is given credit for these subjects in his academic program. However, the number of accredited units should not exceed six (6) units in any one discipline.

Applications for the Advanced Placement Examinations are processed at the Office of the University Registrar upon submission of the Admission Notice (photocopy), 2 copies of 1 x 1 ID pictures and payment of application and examination fees. The application fee is Php200.00 and the examination fee per subject is Php100.00.

### **Deferment of Enrollment**

A qualified freshman applicant who, for a valid reason, cannot enroll during the semester originally applied for, may apply for deferment of enrollment to the succeeding semester by writing formally to the University Registrar. Such applicant must not have taken any college academic subject prior to enrollment. The maximum period allowed by the University for deferment of enrollment is one year.

### **Transfer Admissions**

#### **Transfer from other Universities & Colleges**

A student with previous college work wishing to transfer to the University must satisfy University rules indicated below on admission of transfer students. There is no entrance test administered for transfer applicants.

A transfer applicant may be admitted provided that:

- (1) he earned at least 33 academic units with a general weighted average of 2.0 or better for all the collegiate academic units he has taken outside the University;
- (2) he will have to complete in the University not less than 50 percent of the units required for his

- (3) program and 75 percent if running with honors; the quota set by the Dean of the college concerned has not been filled up.

Every new transfer applicant should submit the following requirements at least one month prior to registration:

- (1) an official copy of grades or transcript of records from each college attended for evaluation, regardless of his intention to validate his advanced credits;
- (2) an accomplished application form (UPLB Form 3);
- (3) one passport-size photograph; and
- (4) a non-refundable application fee of Php100.00 for Filipino applicants and US\$20.00 for foreign applicants.

Qualified transferees should submit an official transcript of records, certificate of honorable dismissal and birth certificate before the admission slip is issued. If credentials submitted are confirmed to be spurious, the admission will be revoked.

#### *Degree Programs not Accepting Transfer Students from Outside the University*

Due to limited facilities, the following programs are closed to transfer students: BS Computer Science, BS Chemical Engineering, BS Civil Engineering, BS Electrical Engineering and BS Industrial Engineering.

Those interested in taking up any of these programs may apply for some other related program. If, after one year, their performance warrants it, they may apply to shift to the desired quota program. Admission into these quota programs is highly competitive.

#### *Validation of Advanced Credits*

An admitted undergraduate transfer student must validate all subjects he is offering for advanced credits at the rate of at least 18 units a semester from the date of his admission. His admission will be on a probationary basis until he shall have validated or repeated, in accordance with this rule on validation of courses, all subjects taken outside UP which are required for his program. The student will not be allowed to enroll in a subject the prerequisites of which, taken elsewhere, have not yet been validated, or repeated, as the case may be.

Application for advanced credit should be made on the prescribed form to the Dean of the college where s/he has been admitted. Validating tests begin two weeks before the first day of registration at the opening of each semester and end one week after the last day of registration. There is no fee for validating tests during this period. A validating test may be held outside of this period with the consent of the department and approval of the Dean and upon payment of a required fee per subject.



A student transferring from any recognized institution who possesses an Associate in Arts or its equivalent of 66 units of work may be enrolled without validation. Before a student is allowed to major in any discipline, however, the major discipline may prescribe additional courses up to 18 units of general education courses and/or preparatory courses for the major.

The grant of advanced credits for courses which are completed in other institutions, but which have no equivalent in this University, shall be left to the faculty of the unit concerned.

Advanced standing may also be granted by the University Registrar to students who graduated from an institution recognized by the University Council for subjects listed in the course or courses duly recognized. Advanced credit for work constituting only part of courses recognized by the Council shall be awarded by the department or division concerned in accordance with the above provisions on application for advanced credits.

### **Transfer Within UPLB**

A student who has earned at least 30 collegiate academic units and wishes to transfer from one college to another should file at his current college an application for transfer/shifting. The application is referred to the accepting college together with the student's true copy of grades. If the action of the accepting college is favorable, the student gets a college clearance which s/he presents to the accepting college together with the permit to transfer and the true copy of grades.

### **Transfer Within UP**

Students from another UP constituent university, who have earned at least 30 collegiate academic units, may be admitted as transfer students subject to the rules of the admitting college.

### **International Undergraduate Student Admission**

#### ***Freshmen Admissions for Foreign and Filipino Applicants from Secondary Schools Abroad***

A foreign or Filipino applicant who graduated from a high school abroad and has not enrolled in college may be admitted to the freshman class by automatic admission or by taking the UPCAT.

### **Automatic Admission**

An international applicant may apply for automatic admission (i.e. without taking the UPCAT) if s/he meets the following requirements:

- (1) completion of a high school program in the country where s/he had secondary education (including the completion of a one- or two-year pre-university education in a country where such

is a prerequisite for admission to a bachelor's degree program); and

- (2) qualifying in a college-qualifying national or international foreign-administered examination such as the Scholastic Aptitude Test (SAT), or General Certificate of Education (GCE) Examination, or the International Baccalaureate Diploma (IB):

- a) SAT (scores must not have been taken more than 4 years before the application)

| Required Minimum SAT scores                  | Old SAT                     | Redesigned SAT              |
|--|-----------------------------|-----------------------------|
| Total Score                                  | 1200                        | 1270                        |
| Section Scores                               |                             |                             |
| Math   | 600                         | 620                         |
| Critical Reading                             | 600                         | -                           |
| Evidenced-Based Writing and Critical Reading |                             | 650                         |
| APPLICATION PERIOD                           | SY2016-2017/<br>SY2017-2018 | SY2016-2017/<br>SY2017-2018 |

- b) GCE : 3 ordinary level passes and 2 advanced level passes
- c) IBE : International Baccalaureate Diploma

- (3) in the case of an applicant whose native language or whose medium of instruction in the secondary school is not English, a minimum score (500 if paper-based or 173 if computer-based) in the Test of English as a Foreign Language (TOEFL).

The applicant must request that a copy of the scores be sent to the Office of the University Registrar, University of the Philippines Los Baños, 4031 College, Laguna, Philippines.

A Filipino who graduated from a secondary school abroad applying for freshman admission to the University must satisfy the same requirements as those for foreign students.

### **Admission through the UP College Admission Test (UPCAT)**

Filipino or foreign graduates from accredited high schools/homes schools abroad may take the UP College Admission Test (UPCAT) if unable to satisfy the requirements for automatic admission. They must follow the same UPCAT application process with the required supporting documents as all other applicants, and pay the non-refundable application fee (US\$50.00 for non-resident foreign applicants).

If the applicant takes the UPCAT but does not qualify, s/he can no longer be admitted under automatic admission. The student has the option to enter UP as a transferee after satisfying transfer requirements of UP.

A qualified freshman applicant who has taken courses at the advanced level will not be given advanced credits

for these subjects. Diploma or certificate holders of the International Baccalaureate may be granted advanced credits for certain subjects provided that the total credits including automatic credits granted do not exceed 15 units per subject area.

### **Foreign Transfer Admission**

A foreign student with credits for college-level course work should meet the University requirements for transfer students.

A TOEFL score of 500 (paper-based test) or 173 (computer-based test), is required of an applicant whose medium of instruction in school/s he attended is not English. If the applicant is transferring from another Philippine school, s/he should secure a permit to transfer from the Department of Education (DepEd).

### *Non-Quota Programs*

Foreign freshman applicants who qualify under automatic admission (see requirements for Beginning Freshmen, item 2) as well as qualified transfer applicants may choose a degree program only from the non-quota programs.

### **Other Requirements/Regulations for Foreign Applicants**

#### *Requirements for Submission*

Only properly accomplished application forms with all the requirements listed below will be processed:

- (1) accomplished Undergraduate Admission Application Form (UPLB Form No. 3);
- (2) non-refundable application fee of Php150.00 for resident foreign students and US\$20.00 for non-resident foreign students in the form of cashier's or manager's check payable to the University of the Philippines Los Baños;
- (3) official transcript of records from each high school and college attended; and
- (4) official examination certificates, if any (2 copies)
- (5) course syllabus, school catalog and handbook examination;
- (6) certification from a reputable bank in the applicant's country about his capability to finance the travel, educational, personal and other expenses he is expected to incur in his/her studies in the Philippines (2 copies);
- (7) official TOEFL results;
- (8) duly authenticated copy of birth certificate or passport

For evaluation purposes, photocopies of records may be accepted provided they are properly authenticated by the Department of Education or by duly designated authorities in the country of the applicant. Final admission

will be subject to verification of documents submitted against original copies of credentials. Certified English translation should also be submitted, where necessary.

Applications accompanied by photocopies of academic records not properly authenticated will not be processed.

Credentials filed in support of the application become the property of the University of the Philippines and will not be returned to the applicant.

#### *Deadline for Filing Application*

To have ample time to secure the student visa and make necessary arrangements if accepted for admission, a foreign applicant is urged to file the application for admission at least six months prior to registration for the semester applied for, i.e., not later than December 31 for first semester admission and May 31 for second semester admission.

#### *Immigration Requirements*

A foreign student may be allowed to enroll in the University only if s/he has a student visa (9-f) or any of the following types of visa:

- (1) 9(e), 9(e-1) or 9(e-2) : foreign government official or dependent
- (2) 47(a)(2) : exchange fellow or scholar sponsored by an international organization
- (3) 9(g) : pre-arranged employment (working visa)
- (4) PD 218 : foreign investor
- (5) 9(d) : treaty trader
- (6) 13, 13(a) to 13(g) : permanent resident

Visas other than student visa may be applied for at the Philippine Consulate/Embassy in the student's home country. A foreigner with a tourist visa (9-a) will not be allowed to enroll in the University.

The International Students Section (ISS), Office of Student Affairs, assists foreign students in obtaining their study permit and student visa, as well as in their accommodations and arrival. They are likewise assisted in terms of academic and social adjustments in the University. All communications regarding foreign students, aside from admission matters, should be addressed to the Head, International Students Section (ISS), Office of Student Affairs, UP Los Baños, 4031 College, Laguna, Philippines.

#### *Study Permit*

All foreign students should secure a Temporary Study Permit from the ISS office before registering. Old students are required by the ISS to submit a copy of grades for the immediately preceding semester or a verification of their Immigrant Certificate of Registration (ICR).

**Dual Citizenship**

A student holding dual citizenship (e.g. Filipino-American, Filipino-Chinese) who wishes to be considered as Filipino for the purposes of studying in the University of the Philippines must submit prior to admission a copy of the order of the Identification Certificate issued by the Bureau of Immigration. Students who choose to be classified as Filipino during their initial enrolment will be considered Filipino until their graduation. Both male and female students are required to enroll in National Service Training Program (NSTP).

**Non-Regular Admission**Non-Degree Students

A degree holder or undergraduate student who is not currently enrolled in any other institution of higher learning may be allowed to take credit courses on the graduate and/or undergraduate level, respectively, provided that this student satisfies the appropriate requirements for admission to the University. S/He shall not be allowed to enroll for more than one semester, except by special permission of the Dean of the college concerned and the University Registrar.

Since s/he does not follow any organized program of study, a non-degree student is not a prospective candidate for graduation for any degree in the University.

Special Students

A mature student, even if s/he does not fully satisfy the entrance requirements, may be admitted as a special student and may enroll for such subjects which, in the opinion of the instructor and the Dean, s/he has the necessary information and ability to pursue profitably. S/He shall not be allowed to enroll for more than 9 units a semester or to register for more than two years, except by special permission of the Dean. Subjects taken shall be non-credit although work may be reported at the end of each semester as "satisfactory" (S) or "unsatisfactory" (U).

Cross-Registrants

For admission procedures, see subsection on Cross-Registration.

**Readmission**

Rejoining students (those not enrolled during the immediately preceding semester, excluding midyear session and who did not obtain clearance from the University) should first secure written permission from the college where they were last enrolled. They would then proceed to the University Health Service for a physical and medical examination before registering in their respective colleges.

Former students who secured clearance from the University must apply for readmission at the Office of the University Registrar. Students who have attended another institution since attending the University of the Philippines must qualify on the same basis as new transfer students.

**Second Baccalaureate Degree**

Only one baccalaureate degree may be conferred at a time. A holder of a University of the Philippines bachelor's degree may earn another bachelor's degree upon the successful completion of at least 36 additional units prescribed by a discipline, after the previous degree.

**INTERNATIONAL STUDENT EXCHANGE PROGRAM**

The University of the Philippines, as the national university, has a major role in the international academic community. It is expected to develop extensive linkages and undertake cooperative projects with universities abroad. There is an increasing demand for more extensive faculty and research exchange and, lately, also for student exchange, as exemplified by UP's participation in the University Mobility in Asia and the Pacific (UMAP) project and the International Student Exchange Program (ISEP). Following are the guidelines governing international student exchange at the undergraduate level.

Student from Foreign Universities Registering in UP

- (1) Students from foreign partner universities (universities with active student exchange agreements with UP) may enroll in UP as non-degree students, provided they are registered in universities of recognized standing and provided further, that there is a place for them in the college/school where they wish to take courses. As such, they will be given a grade for every course that they are enrolled in, but these are not to be credited for a degree program in UP.
- (2) Arrangements have to be made through the Office of International Linkages (OIL) at least six months prior to the enrollment of the non-degree student. The OIL shall then coordinate with the Office of the University Registrar (OUR) and then the OUR shall endorse the application to the college/school concerned.
- (3) The student must meet all the necessary admission requirements.
  - (a) A general weighted average (GWA) of 2.0 or better for all the undergraduate collegiate units he has taken outside the University. The computation of the GWA shall exclude vocational subjects.
  - (b) Submission of the following at least one month prior to registration:

- (b.1) an official copy of grades or transcript of records from each college attended for evaluation;
  - (b.2) result of the Test of English as a Foreign Language (TOEFL) in the case of an applicant whose native language or medium of instruction in college is not English;
  - (b.3) an accomplished Foreign Undergraduate Admission Application Form (UP Form No. 3);
  - (b.4) two passport-size photographs;
  - (b.5) photocopy of passport and
  - (b.6) photocopy of birth certificate
- (4) The student must present a written endorsement as exchange student from the Dean, Director or Registrar of the college/university where s/he is enrolled at present, stating the total number of units and the subjects which s/he is authorized to register including an alternate set of courses in case the desired courses are not available.
  - (5) S/He must show proof that the prerequisite courses, including the description of these courses, have been taken prior to enrollment.
  - (6) Payment of school fees are waived due to the student exchange agreement with the university concerned. However, the fees due to the processing of student visa shall be shouldered by the inbound exchange student.
  - (7) The student may be enrolled initially for one semester, with possible extension to a maximum of one academic year.
- (4) Courses taken in universities abroad need not be validated for credit towards the student's degree program provided the courses taken are close (if not identical) to the courses in the UP curriculum. Some courses might also be credited as electives. The Vice Chancellor for Academic Affairs, upon the recommendation of the Dean, shall determine which courses will be credited.
  - (5) The student must provide UP with a detailed description of the courses prior to his enrollment abroad, or at the latest, two months after enrollment.
  - (6) The time spent by the student abroad shall be considered as part of his residency in UP.
  - (7) The student may be enrolled initially for one semester with a possible extension up to one academic year.
  - (8) The pertinent rules of UP shall apply in the computation of the GWA for honors.

#### **THE UP GENERAL EDUCATION PROGRAM**

UP develops not only the professional competence of its students but also their "ability to communicate thought effectively, think critically and make relevant judgments." This is accomplished through its General Education Program (GE Program).

The UP GE Program started in 1958 under the term of President Vicente G. Sinco and has been an integral part of UP education since then. Often associated with the "TATAK UP" that all UP graduates bear, the GE Program was perceived as *"essential for the understanding of the age in which we live, for an appreciation of the values of life, and for the recognition of the true, the noble, and the beautiful."*

Specifically, the GE Program aims to provide a well-rounded educational experience for all UP students by offering courses that will equip them with an understanding of the basic areas of knowledge. Thus, with the GE Program, UP produces "educated professionals".

There are two types of courses that UP students take during their stay in the University, namely, the general education courses and the specialized courses. In the sequencing of enrollment of courses, GE courses precede the specialized courses.

The objectives of the GE program, since 1986, have been:

#### Students from UP Registering in Partner Universities Abroad

- (1) The University shall draw up a list of partner universities where UP students may enroll abroad. The list will give priority to universities with which UP already has existing active agreement for student exchange including ISEP and UMAP. Availability of slots for student exchange shall be announced by the OIL.
- (2) The student must have the written permission of the Vice-Chancellor for Academic Affairs upon the recommendation of his Program Adviser, Department Chairman, and Director or Dean of the college. Such recommendation must indicate the number of units and the courses to be taken, including a description of the courses. An alternate set of courses must be provided in case the desired set of courses is not available.
- (3) Cases where the students are permitted to enroll in universities which are not included in



**GENERAL**

- (1) To broaden the student's intellectual and cultural horizon;
- (2) To foster a commitment to nationalism balanced by a sense of internationalism;
- (3) To cultivate a capacity for independent, critical and creative thinking; and
- (4) To infuse a passion for learning with a high sense of moral and intellectual integrity.

**SPECIFIC**

- (1) To enable the student to acquire basic skills and competencies in mathematics, reasoning and communication.
- (2) To make the student develop an awareness, understanding and appreciation of the various disciplines of the natural sciences, social sciences, humanities and philosophy; and
- (3) To help the student develop the ability to integrate and/or adapt the knowledge and skills acquired from the various disciplines.

**The Revitalized General Education Program (RGEP)**

Dr. Francisco Nemenzo Jr., who became UP president in 1999, committed his administration to "develop the student's breadth and depth of wisdom... thus [it is] imperative to restore the liberal arts as the foundation of the undergraduate curriculum hence, the revitalization of the GE program." According to him "[General Education should] not promote a particular line of thought. It is supposed to acquaint the students with the diversity of knowledge and expose them to various ways of appreciating reality so they may think for themselves and form intelligent positions."

After having been scrutinized through "GE conversations" and consultation with various sectors of the University, the Revitalized General Education Program (RGEP), was approved by the UP Board of Regents in 2001.

Unlike the previous versions of GE program, (1960 implementation under Sinco; 1986 revision under Angara), the RGEP follows a semi-structured approach (choice as against prescription) with common goals and learner-customized content. In other words, the students are given the option of choosing their GE courses. The principle is, if the University is to inspire the students to learn, then they are likely to perform better in courses which they choose rather than in courses that they have no interest in but are required to take.

With the RGEP, a student selects the general education courses he wants within the three identified domains of knowledge: Arts and Humanities (AH), Social Sciences and Philosophy (SSP), and Mathematics, Science and Technology (MST). A student must take 15 units in each domain subject to the rules on equivalencies and depending on the requirements of his degree program.

On May 13, 2011, UP President Alfredo E. Pascual approved the following revisions in the GE Framework:

- (1) Allowing at most nine (9) units of required GE courses per domain;
- (2) Inclusion of required GE courses common to all degree programs:
  - (a) Requiring ENG 1 (AH) and ENG 2 (AH) to be taken in series in the first year in all curricula
  - (b) Reclassifying PI 100 as a GE course and making it required in all curricula
  - (c) Requiring 3 units of courses on Philippine Studies
- (3) Change in course prerequisite of ENG 2 (AH)

**Characteristics of a GE course under the RGEP**

Revitalized GE courses are broad-based. These courses provide the basic understanding of the various ways of knowing (that is, the three domains of knowledge) by promoting an active mind constantly growing and acquiring new perspectives. Their application extends to the concerns of society and those of humanity as a whole.

Specifically, a revitalized GE course has at least two of the following objectives: (1) broaden intellectual and cultural horizons, (2) foster a commitment to nationalism balanced with internationalism, and (3) create an awareness of various ways of knowing. Also, it applies one of the following modes of inquiry: interpretive and aesthetic modes, and quantitative and other forms of reasoning

Furthermore, a GE course develops at least two of the following skills: oral and written communication, independent and critical thinking, and creative thinking

A GE course has no prerequisite course.

**RGEP Courses Offered in UPLB****Arts and Humanities Domain**

|  |   |
|--|---|
| *ENG 1 (AH), College English                   | 3 |
| *ENG 2 (AH), College Writing in English        | 3 |
| HUM 1 (AH), Literature, Man and Society        | 3 |
| HUM 2 (AH), Art, Man and Society               | 3 |
| HUM 3 (AH), Reading Film, TV, and the Internet | 3 |
| SPCM 1 (AH), Speech Communication              | 3 |

\*beginning SY 2011-2012, required to be taken in sequence as approved by UP President Alfredo E. Pascual on May 13, 2011

**Social Sciences and Philosophy Domain**

|  |   |
|--|---|
| ECON 10 (SSP), Economics in Social Issues                        | 3 |
| ENTR 1 (SSP), Unleashing the Entrepreneurial Spirit              | 3 |
| HIST 1 (SSP), Philippine History                                 | 3 |
| HIST 2 (SSP), Asia and the World                                 | 3 |
| HUME 10 (SSP), Sexuality in Adolescence                          | 3 |
| PHLO 1 (SSP), Philosophical Analysis                             | 3 |
| POSC 1 (SSP), Reimagining Philippine Politics                    | 3 |
| PSY 1 (SSP), Exploring the Self: Thoughts, Feelings, and Actions | 3 |

|  |   |
|--|---|
| SOSC 1 (SSP), Foundations of Behavioral Sciences     | 3 |
| SOSC 2 (SSP), Social, Economic and Political Thought | 3 |
| SOSC 3 (SSP), Exploring Gender and Sexuality         | 3 |

**Mathematics, Science and Technology Domain**

|   |   |
|---|---|
| IT 1 (MST), Information Technology Literacy         | 3 |
| MATH 1 (MST), Quantitative Reasoning                | 3 |
| MATH 2 (MST), Problem Solving                       | 3 |
| NASC 1 (MST), The Material Universe                 | 3 |
| NASC 2 (MST), The Living Planet                     | 3 |
| NASC 3 (MST), Physics in Everyday Life              | 3 |
| NASC 4 (MST), The World of Life                     | 3 |
| NASC 5 (MST), Environmental Biology                 | 3 |
| NASC 6 (MST), Food and Nutrition for a Healthy Life | 3 |
| NASC 7 (MST), Animals in Human Society              | 3 |
| NASC 8 (MST), Practical Botany                      | 3 |
| NASC 9 (MST), Living with Microbes                  | 3 |
| NASC 10 (MST), Forests as Source of Life            | 3 |
| STS 10 (MST), Exploring Biotechnology               | 3 |

The University Council also approved in its 118th meeting held on December 5, 2011, the following GE courses as Philippine Studies:

- (1) POSC 1 (SSP). Re-imagining Philippine Politics
- (2) SOSC 4 (SSP). Seeing Society in the Lives of Contemporary Filipinos
- (3) HIST 1 (SSP) / KAS 1. Philippine History
- (4) HUM 3 (AH). Reading in Film, TV and the Internet
- (5) NASC 5 (MST). Environmental Biology
- (6) NASC 10 (MST). Forests as Source of Life

*Note:* PI 10. The Life and Works of Jose Rizal, is already a Philippine Studies course.

**PHYSICAL EDUCATION (PE) REQUIREMENTS**

Basic Physical Education (PE) is a prerequisite for graduation. All students should comply with this requirement during their freshman and sophomore years.

Eight units of PE are required of all undergraduates except the following:

- (1) students who hold the Associate in Arts title (or equivalent) or a bachelor's degree;
- (2) those who are members of the ROTC Band;
- (3) those who are 30 years old and above;
- (4) veterans of the armed forces, navy or airforce; and
- (5) those who have served on a fulltime basis for at least two years in the armed forces, navy or airforce.

The 8-unit requirement, which is equivalent to four courses, are broken down as follows:

- PE 1. Foundations of Physical Fitness, required of all students.
- PE 2. Elective physical education activities for beginners.
- PE 3. Elective physical education activities for intermediate students who have taken PE 2 in the same activity.

**Proficiency Examinations in PE (PEPE)**

Proficiency examinations (or credit by examination)

in PE courses are given to enable students who are already skillful in one or more sports activities to acquire advanced units in PE. Any student who passes the PEPE shall be given credit for one or more PE courses.

A regular schedule of PEPE registration and examination every semester is posted by the Department of Human Kinetics for the information of both undergraduate and graduating students who may wish to take the PEPE examination. However, students who failed to register and take the examination on the scheduled dates may opt to enroll in the regular PE courses.

Proficiency examination may be taken in the following areas: *Team Sports* (Basic and Advanced Basketball, Soccer Football, Baseball/Softball and Volleyball); *Individual Sports* (Archery, Bowling and Track and Field); *Dual Sports* (Basic and Advanced courses in Badminton, Chess, Lawn Tennis and Table Tennis); *Combative Sports* (Arnis, Judo, Taekwondo and Karate); *Aquatic Sports* (Basic and Advanced Swimming) and *Dance Courses* (Ballroom Dance, Modern Jazz, Philippine Folk Dance and Street Jazz).

**NATIONAL SERVICE TRAINING PROGRAM (NSTP)**

Instead of the military science courses for males, the NSTP courses for both male and female students have been offered starting first semester, 2002-2003. The NSTP has three components: the Reserve Officers Training Corps (ROTC), the Civic Welfare Training Service (CWTS), and the Literacy Training Service (LTS). Students are required to take two NSTP courses under the component of her/his choice. Grade for NSTP is Pass or Fail. However, this was changed to numerical grades beginning in Second Semester 2014-2015.

**REGISTRATION**

Students are responsible for fulfilling all requirements of the curriculum in which they are enrolled. They should consult with their adviser, College Secretary or the University Registrar in planning their course work. Students should be familiar with the academic rules and requirements as presented in the UPLB Catalog because the Catalog is the official source of information.

Copies of the Catalog are kept for student use in the University Registrar's office, all deans' and college secretaries' offices, the library and all departmental offices.

A student must be officially registered in order to receive credit for course work. The official registration form (UPLB Form 5), which is a record of classes in which the student has enrolled, is filed in the Office of the College Secretary concerned and in the University Registrar's Office.

No student shall be registered in any subject after one week of regular class meetings have been held, unless the Dean, on the basis of the student's scholastic records, permits his registration.

Special students may register at any time without the payment of fine for late registration, subject to other University regulations.

## **CROSS-REGISTRATION**

### Within the UP System

No student shall be registered in any other college of the University System without the permission of the dean or director of the college or school in which he is primarily enrolled. A student who requests permission to cross-register for courses in another college should first complete his registration (including payment of fees) in the college where he is primarily enrolled. The total number of units of credit for which a student may register in two or more colleges in this University should not exceed the maximum number allowed in the rules on academic load.

A student who wants to register in another campus of the University must fill out UP Form 5-B, Cross-Registration Form.

### From Another Institution

A student who registered in another institution and who wishes to cross-register in UP must present a written permit from his Dean/Director or Registrar. The written permit should state the total number of units for which the student is registered and the subjects that he is authorized to take in the University. Admission is subject to availability of slots and must have the approval of the Dean of the unit concerned.

### To Another Institution

The University gives no credit for any course taken by any of its students in any other institution unless taking such course was duly authorized by the Chancellor upon recommendation of the Dean concerned. This written authorization is to be recorded by the University Registrar and should specify the subjects authorized.

## **WAIVER OF PREREQUISITES**

Courses approved by the University Council as prerequisites to other courses may not be waived. However, in meritorious cases, a student who has previously enrolled and fully attended a course that is a prerequisite to another may be allowed to enroll and attend the latter course for credit, without having passed or earned credit for the prerequisite course.

Permission shall be granted only upon application by the student. The application shall be accompanied by a certification from the student's instructor in the prerequisite course that the student had fully attended the said course. The application, furthermore, shall be accompanied by a certification from the Director of Student Affairs that the student's failure to pass or earn credit in the prerequisite course was not due to disciplinary action imposed upon him.

Each college shall be authorized to grant the permission, and shall act through a Dean's committee which shall determine the merit of the application.

The student who is granted permission under these rules is required to enroll in the prerequisite course simultaneously with the course to which the former is a prerequisite, or immediately in the next semester.

The permission which may be granted under these rules does not apply to courses in the Revitalized General Education Program.

## **CHANGE OF MATRICULATION**

All transfers to other classes shall be made only for valid reasons. No change of matriculation involving the taking of a new subject shall be allowed after six percent of regular class meetings have been held. UP Form 26 is filled out for a change of matriculation.

## **DROPPING OF COURSES**

A student may, with the consent of his instructor and the Dean, drop a course by filling out the prescribed UP Form 26 before 3/4 of the hours prescribed for the semester term have elapsed, and not later. Any student who drops a course without the approval of the Dean shall have his registration privileges curtailed or entirely withdrawn.

If a course is dropped after the middle of the term, the faculty member concerned shall indicate the date and the class standing of the student at the time of dropping as either Passing or Failing solely for administrative guidance.

## **SUBSTITUTION OF COURSES**

Every substitution of subjects must be based on at least one of the following:

- (1) when a student is pursuing a curriculum that has been superseded by a new one and the substitution tends to bring the old curriculum in line with the new;
- (2) conflict of hours between two required subjects; or
- (3) when the required subject is not offered during the semester when the student needs it

Every petition for substitution:

- (1) must involve subjects within the same department, if possible; if not, the two subjects concerned must be allied to each other;
- (2) must be between subjects in which the subject substituted carries a number of units equal to or greater than the units of the required subject;
- (3) must be recommended by the adviser and by the heads of departments concerned.

All petitions for substitution must be submitted to the Office of the Dean concerned before 12 percent of the regular class meetings have been held. Any petition submitted thereafter shall be considered for the following semester.

No substitution shall be allowed for any subject prescribed in the curriculum in which the student has a failing grade, except when, in the opinion of the department offering the prescribed subject, or of the faculty in units without any department, the proposed substitute covers substantially the same subject matter as the required subject.

All applications for substitution shall be acted upon by the Dean concerned. In case the action of the Dean is adverse to the recommendation of the adviser and the head of the department concerned, the student may appeal to the Vice-Chancellor for Academic Affairs whose decision shall be final.

## **ATTENDANCE**

Any student who, for unavoidable cause, absents himself from class must obtain an excuse slip from the Dean. The slip must be presented to the instructor concerned not later than the second class session following the student's return. In addition, a certificate must be secured from the UPLB Health Service in case the absence is due to illness.

Excuses are for time missed only. All work covered by the class during the absence shall be made up for to the satisfaction of the instructor within a reasonable time from the date of absence.

When the number of hours lost by absence of a student reaches 20 percent of the hours of recitation, lecture, laboratory or any other scheduled work in one subject, he shall be dropped from the subject. However, a faculty member may prescribe a longer attendance requirement to meet special needs.

If the majority of the absences are excused, the student shall not be given a grade of 5 upon being dropped; otherwise, he shall be given a grade of 5. Time lost by late enrollment shall be considered as time lost by absence.

## **Certificate of Illness**

Students who are absent from classes due to illness are required to get excuse slips from the University Health Service. These certificates are issued to students who consulted or were confined in the Health Service. Illnesses attended to elsewhere causing absences from classes shall be reported to the Health Service within three days after the absences have been incurred. Excuse slips for the above illnesses as well as for other illnesses of which the Health Service has no records are issued only after satisfactory evidences have been presented to the Health Service.

## **INTEGRATION PERIOD**

A division or department chairman, with the approval of the Dean, may authorize any member of his unit to suspend formal classes for a period not exceeding three days before the final examinations to enable students to review. In case of colleges with no divisions or departments, the suspension may be done by any member of the faculty, but also subject to the approval of the Dean.

Faculty members who have been authorized to suspend their classes shall keep regular hours for consultation work.

## **EXAMINATIONS**

The maximum period for each final examination shall be four hours.

## **GRADING SYSTEM**

The performance of students shall be rated at the end of each semester in accordance with the following grading system:

|     |                |     |                       |
|-----|----------------|-----|-----------------------|
| 1   | - Excellent    | 4   | - Conditional Failure |
| 1.5 | - Very Good    | 5   | - Failed              |
| 2   | - Good         | Inc | - Incomplete          |
| 2.5 | - Satisfactory | Drp | - Dropped             |
| 3   | - Passed       |     |                       |

Grades of 1.25, 1.75, 2.25 and 2.75 may also be given but in no case shall they be more detailed than in multiples of 0.25.

For courses not requiring numerical grades, letter grades of S (Satisfactory) and U (Unsatisfactory) are given.

A grade of 4 means conditional failure. It may be made up for by passing a re-examination. No re-enrollment in the course will be allowed unless the student fails in the removal examination. If not removed within the prescribed period (one year), the grade of 4 automatically becomes a 5. Grades will be changed by the University Registrar upon prior information to the



concerned teacher and adviser or in their absence, the department chair or institute director. If the student passes the re-examination, he is given a grade of 3, but if he fails, a 5. Only one re-examination is allowed which must be taken within the prescribed time. If a student does not remove the grade of 4 within the prescribed time, he may earn credit for the course only by repeating and passing it.

A grade of 4 given for the first semester work of a two-semester course shall be converted to a grade of 3 if the student passes the second semester part of the same course in the same academic year; if he fails, the grade of 4 which he received for the first semester work shall be converted to a grade of 5.

The grade of Inc. is given if a student whose class standing throughout the semester is PASSING, fails to take the final examination or fails to complete other requirements for the course, due to illness or other valid reasons. In case the class standing is not passing and the student fails to take the final examination for any reason, a grade of 5 is given. Removal of the Inc. must be done within the prescribed time by passing an examination or meeting all the requirements for the course, after which, the student shall be given a final grade based on his overall performance.

#### RELEASE OF GRADES

Reports of a student's grades are routinely released to the student and mailed to his/her parents at the end of every semester.

#### REMOVAL OF GRADES OF "INC." AND "4"

There shall be a regular period for removing grades of 4 and Inc. before the start of each semester.

Examinations for the removal of grades of Inc. and 4 may be taken without fee: (1) during the regular examination period, if the subject is included in the schedule of examinations, and (2) during the removal examination period, viz., the period covering ten days preceding the registration in each semester during which period, the examination is taken at the time that it is scheduled.

Removal examinations may be taken at other times on the recommendation of the Dean and upon payment of a required fee per subject. Students not in residence shall pay the registration fee on top of the examination fee (where required) in order to be entitled to take the removal examination.

A grade of 4 or Inc. may no longer be improved after the end of the third regular removal period immediately following the semester/term in which the grade was incurred. A grade of 4 received after removing a grade of Inc., however, must be removed within the remaining

portion of the prescribed period for the removal of the original grade of Inc.

#### POLICIES ON THE GRADE OF "4"

##### For BATCH 2001 Students

##### (1) Rule of Removal of "4"

The grade of 4 is removed only by passing a removal examination; no enrollment in the course is necessary, unless the student fails the removal examination.

If not removed within the prescribed period (one year), the grade of 4 automatically becomes 5. The grade will be changed by the University Registrar upon prior confirmation with the concerned teacher and adviser or in their absence, the department chair or institute director.

##### (2) Computation of the General Weighted Average (GWA) with a grade of "4"

To compute the GWA of a student with a grade of 4, use it as an actual grade on the premise that 4 is conditional.

If the student gets a removal grade of 5, this grade is included in the computation of the GWA together with the grade which s/he gets after re-enrolling and passing the course.

The GWA should be the basis for determining whether the student graduates with honors.

##### Effective First Semester 2015-2016

The Board of Regents at its 1310th meeting on 27 August 2015, approved the standardization of the Grading System and the computation of the GWA across CUs for the following:

##### (1) Removal of Grade of 4.0

(a) "3" or "5" after removal exam is taken within the prescribed one academic year.

The grade of "4" is not included in the GWA computation when it is removed. Only the grade of "3" or "5" is included in the GWA computation.

(b) The grade of "4" is automatically changed to "5" when the one-year grace period for removal has lapsed.

The Office of the University Registrar (OUR) will generate a list of un-removed grades of "4" and send the list to the department/institute chairs/directors for feedback. The department/institute chairs/directors will return the signed and updated list to the OUR and the University Registrar will change the grades from "4" to "5" based on the list.

The computation of the GWA for "5" from removal exam or automatically incurred after one-year removal period has lapsed, "5" is included in the GWA computation.

When the course is re-enrolled, the new grade is also included.

(c) "4" is not removed and the course is re-enrolled within the prescribed re-enrollment period.

"4" is included in the computation of the GWA. When the course is re-enrolled, new grade is also included in the computation of the GWA. The number of units of the re-enrolled subject will be added to the total number of units of the program.

#### (2) PE Courses

PE courses are given numerical grades which are not included in the computation of the GWA. If taken through Proficiency Examination in Physical Education (PEPE), a grade of Pass or Fail is issued.

#### (3) NSTP Courses

NSTP courses are given numerical grades which are not included in the computation of the GWA.

#### (4) Undergraduate Thesis

For thesis courses, the 6 units can be broken down as 3+3 units (not 2+2+2), final numerical grade is included in the computation of the GWA.

#### (5) Practicum/On-the-Job Training (OJT)

The Practicum/OJT are given numerical grades which are included in the computation of the GWA.

### **SUBMISSION OF GRADES**

Every faculty member shall submit his report of grades as soon as possible after the final examinations at the end of each term. A period of five days is ordinarily allowed for each section for the grading of papers and the preparation of the report of grades. In case an instructor handles several sections and the interval between the examinations is less than five days, he shall submit the reports of grades for the various sections at the rate of one report at the end of every five-day period after each examination, provided, that all reports of grades must be submitted not later than seven days after the last day of the examination period. In justifiable cases, deviation from the above rules may be authorized by the Vice-Chancellor for Instruction.

#### Penalties for Late Submission of Grades

The following implementing rules and regulations shall govern penalties applicable to faculty members who,

without good reason, fail to submit grades of students within the deadline prescribed above:

- (1) Since the prompt submission of grades is in large part a matter of good management, discipline and enforcement of University regulations, Department Chairmen, College Secretaries and Deans are enjoined to bend all efforts towards compliance with codal provisions regarding deadlines for submission of grades as well as recommendations for graduation of students.
- (2) Faculty members who fail to meet deadlines for the submission of grades should be reported to the appropriate authorities in the University. The delinquencies should be entered in the personnel records of the erring faculty members.
- (3) Upon recommendation of the Dean and subject to the approval of the Chancellor, a faculty member who, without justifiable cause, fails to submit grades on time, shall be liable to any of the following penalties:
  - a) Warning;
  - b) Reprimand;
  - c) Fine of not more than his salary per day or each day of delay; or
  - d) Suspension without pay for a period not exceeding one semester in case of repeated delinquency.
- (4) The procedure for the imposition of any penalty shall consist of the following steps:
  - a) Notification of deadline, including request for an explanation;
  - b) Report of delinquency; and
  - c) Order imposing the penalty.

### **CHANGE OF GRADES**

A student who has received a passing grade in a given course is not allowed re-examination for the purpose of improving his grades.

No faculty member shall change any grade after the report of grades has been filed with the College Secretary or with the University Registrar. In exceptional cases, as where an error has been committed, the instructor may request authority from the faculty of his college to make the necessary change. If the request is granted, a copy of the resolution of the faculty authorizing the change shall be forwarded to the Office of the University Registrar for recording and filing.

Notwithstanding the foregoing provision and to avoid any injustice, the grade on a final examination paper may be revised by a committee of the Dean of the college if it should clearly appear, on the basis of the quality of the scholastic record of the student, that such grade is the result of an erroneous appreciation of the answers or of

an arbitrary or careless decision by the faculty member concerned. Should the change of the grade on said paper affect the final grade of the student, the committee may request authority from the faculty of the college to make the necessary change in the final grade. The request for reconsideration shall be made within 30 days after the receipt of the final grade by the student concerned.

No student shall directly or indirectly ask any person to recommend him to his professor/s for any grade in his class record, examination paper or final report of grades. Any student violating this rule shall lose credit in the subject/s where such recommendation is made. The fact that a student is thus recommended shall be prima facie evidence that the recommendation is made at the request of the student concerned.

## HONORIFIC SCHOLARSHIPS

### University Scholarship

Any undergraduate or graduate student who obtains at the end of the semester a weighted average of 1.45 or better, or 1.25 or better, respectively, is given this honorific scholarship. University scholars are listed in the Chancellor's List of Scholars.

### College Scholarship

Any undergraduate or graduate student who, not being classed as University scholar, obtains at the end of the semester a weighted average of 1.75 or better, or 1.5 or better, respectively, is given this honorific scholarship. College Scholars are listed in the Dean's List of Scholars.

### *Additional Requirements*

In addition to the general weighted average prescribed, a student:

- (1) must have taken during the previous semester at least 15 units of academic credit or the normal load prescribed (in the case of graduate students, not less than 8 units);
- (2) must be up-to-date with all the non-academic requirements;
- (3) must have no grade below 3 in any academic or non-academic subject.

Honorific scholarships do not entitle the holders to any tuition fee waiver, either partial or full.

## SCHOLASTIC DELINQUENCY

The faculty of each college or school shall approve suitable and effective provisions governing undergraduate delinquent students, subject to the following minimum standards:

**Warning.** Any student who, at the end of the semester, obtains final grades below 3 in 25 percent to 49

percent of the total number of academic units for which he is registered will receive a warning from the Dean to improve his work.

**Probation.** Any student who, at the end of the semester, obtains final grades below 3 in 50 percent to 75 percent of the total number of academic units in which he has final grades shall be placed on probation for the succeeding semester and his load shall be limited to the extent to be determined by the Dean.

Probation may be removed by passing with grades of 3 or better in more than 50 percent of the units in which he has final grades in the succeeding semester.

### **Dismissal**

1. Any student who, at the end of the semester, obtains final grades below 3 in more than 75 percent but less than 100 percent of the total number of academic units in which he receives final grades shall be dropped from the rolls of the college.
2. Any student on probation who again fails in 50 percent or more of the total number of units in which he receives final grades shall be dropped from the rolls of the college, subject to the provisions of the following article.
3. Any student dropped from one college shall not ordinarily be admitted to another unit of the University unless, in the opinion of the Director of Student Affairs, his natural aptitude and interest may qualify him in another field of study in which case he may be allowed to enroll in the proper college or department.

### **Permanent Disqualification**

1. Any student who, at the end of the semester, obtains final grades below 3 in 100 percent of the academic units in which he is given final grades shall be permanently barred from readmission to any college or school of the University.
2. Any student who was dropped in accordance with Item 3 above of the rules on Dismissal and again fails so that it becomes necessary to drop him again, shall not be eligible for readmission to any college of the University.
3. Permanent disqualification does not apply to cases where, on recommendations of the instructors concerned, the faculty certifies that the grades of 5 were due to the student's unauthorized dropping of the subjects and not to poor scholarship. However, if the unauthorized withdrawal takes place after the mid-semester and the student's class standing is poor, his grades of 5 shall be counted against him for the purpose of this scholarship rule. The Dean shall deal with these cases on their individual merits in the light of the recommendations of the Director of Student Affairs; provided, that, in no case of readmission to the same or another college, shall the action be lighter than probation.

A grade of Incomplete is not to be included in the computation. When it is replaced by a final grade, the latter is to be included in the grades during the semester when the removal is made.

Required courses in which a student has failed shall take precedence over other courses in his succeeding enrollment.

Students who are dropped for reasons of double probation, dismissal or permanent disqualification must first qualify for readmission before they are allowed to register during the succeeding semester. Applications for readmission are processed at the Office of Student Affairs.

No readmission of dismissed students or disqualified students shall be considered by the College deans without the favorable recommendation of the Director of Student Affairs. Cases in which the action of the College Dean conflicts with the recommendation of the Director of Student Affairs may be elevated to the Vice-Chancellor for Instruction. His decision shall be final.

#### **LEAVE OF ABSENCE**

A leave of absence (LOA) should be requested in a written petition to the Dean. The petition should state the reason for which the leave is desired and should specify the period of the leave. The leave should not exceed one year but may be renewed for at most another year. When not taken in two (2) successive years, the aggregate LOA should not exceed two (2) years.

A student who needs to go on leave of absence beyond the allowable period of two years should be advised to apply for an honorable dismissal without prejudice to readmission.

The college, through the Dean or his duly authorized representative, shall inform the University Registrar and the parents/guardian of every student granted the leave of absence about such leave, indicating the reasons for the same and the amount of money refunded to the student.

For leave of absence availed of during the second half of the semester, the faculty members concerned shall be required to indicate the class standing of the student (passing or failing) at the time of the application for the leave. No application for leave of absence shall be approved without indicating the student's class standing by the instructors concerned. This, however, should not be entered in the official Report of Grades.

If a student withdraws after 3/4 of the total number of hours prescribed for the course has already elapsed, his instructor may give him a grade of 5 if his class standing up to the time of his withdrawal was below 3.

No leave of absence shall be granted later than two weeks before the last day of classes during the semester. If the inability of the student to continue with his classes is due to illness or similar justifiable causes, his absence during this period shall be considered excused. In such case, the student shall be required to present an excuse slip to the faculty members concerned.

A student who withdraws from the college without formal leave of absence shall have his registration privileges curtailed or entirely withdrawn.

#### **MAXIMUM RESIDENCE RULE**

A student must finish the requirements of a course of any college within a period of actual residence equivalent to 1 1/2 times the normal length prescribed for the course, otherwise, he shall not be allowed to register further in that college.

This rule shall not apply to graduate students who are covered by specific rules or to students governed by existing rules regarding a maximum period. Furthermore, account shall be taken of the provision of Article 243 of the Revised University Code which states that members of the faculty, officers and employees of the University have a privilege of enrolling in the University for not more than 6 units a semester at reduced rates of fees.

#### **HONORABLE DISMISSAL**

A student in good standing who desires to sever his connection with the University shall present a written petition to this effect to the University Registrar, signed by his parent or guardian. If the petition is granted, the student shall be given honorable dismissal.

Generally, honorable dismissal is voluntary withdrawal from the University with the consent of the University Registrar or his/her representative. All indebtedness to the University must be settled before a statement of honorable dismissal will be issued. The statement indicates that the student withdrew in good standing as far as character and conduct are concerned. If the student has been dropped from the rolls on account of poor scholarship, a statement to that effect may be added to the honorable dismissal.

A student who leaves the University for reason of suspension, dropping, or expulsion due to disciplinary action shall not be entitled to honorable dismissal. Should s/he be permitted to receive his transcript of record or the certification of his academic status in the University, it shall contain a statement of the disciplinary action rendered against him/her.

#### **GRADUATION**

No student shall be recommended for graduation unless s/he has satisfied all academic and other requirements prescribed thereto.

During the first three weeks after the opening of classes in each semester, each Dean or his duly authorized representative shall certify to the University Registrar a list of candidates for graduation at the next commencement. The University Registrar, in consultation with the chair of divisions or departments concerned, in the case of students majoring in their respective departments or divisions, shall then inquire into the academic record of each candidate with a view to ascertaining whether any candidate in such a list has any deficiency to make up for and whether s/he has fulfilled all other requirements which qualify him/her to be a candidate for graduation. However, footnotes to that effect should be given. Ten weeks before the end of a semester, the University Registrar shall publish a complete list of duly qualified candidates for graduation for that semester.

All candidates for graduation must have their deficiencies made up for and their records cleared not later than five weeks before the end of their last semester, except those in academic subjects and in Physical Education and the National Service Training Program (NSTP), in which the student is currently enrolled during that semester.

No student shall graduate from the University unless he has completed at least one year of residence work which may, however, be extended to a longer period by the proper faculty. The residence work referred to must be done immediately prior to graduation in the case of the following:

- (1) A student transferee from schools other than the University of the Philippines. This residence requirement is in addition to completion of at least 50% of the required units for the course; and
- (2) A student who has been readmitted after being absent without official leave (AWOL).

Candidates for graduation who began their studies under a curriculum which is more than 10 years old shall be governed by the following rules:

- (1) Those who had completed all the requirements of the curriculum but did not apply for, nor were granted the corresponding degree or title shall have their graduation approved as of the date they should have originally graduated.
- (2) Those who had completed all but two or three subjects required by a curriculum shall be made to follow any of the curricula enforced from the time they first attended the University to the present.

Guidelines in Connection with Graduation

The requirements for graduation include the

completion of all academic as well as non-academic requirements such as submission of bound copies of the thesis, if thesis is required.

Students who have completed all requirements for graduation on or before the deadline set for this purpose are listed as candidates for graduation as of the end of that semester.

If, however, some graduation requirements are completed beyond the deadline, the student must register during the succeeding semester in order to be considered a candidate for graduation as of the end of that semester. The deadlines for completion of the requirements for graduation are:

- (1) For those graduating as of the end of summer, the deadline is the day before the first day of regular registration for the first semester.
- (2) For those graduating as of the end of the first semester, the deadline is the day before the first day of regular registration for the second semester.
- (3) For those graduating as of the end of the second semester, the deadline is the day before the college/school faculty meeting to decide the graduation of students.

No student who fails to pay the required graduation fee within the specified period set by the University Registrar shall be conferred any title or degree. Such a student may, however, upon his request and payment of the necessary fees, be given a certified copy of his credentials without specifying his completion of the requirements toward any title or degree.

Clearance as Requirement for Graduation

Students who have completed all the academic requirements for their respective degrees may be recommended for graduation even if they have not processed their clearance. However, the granting of honorable dismissal and the issuance of the transcript/checklist and diploma shall be withheld pending submission of clearance by the student.

**GRADUATION WITH HONORS**

Students who complete their courses with the following absolute minimum weighted average grade shall graduate with honors:

|                      |      |
|----------------------|------|
| Summa cum laude..... | 1.20 |
| Magna cum laude..... | 1.45 |
| Cum laude.....       | 1.75 |

All the grades in all subjects prescribed in the curriculum, as well as subjects that qualify as electives,



shall be included in the computation of the weighted average grade.

Furthermore, in cases where the electives taken are more than those required in the program, the following procedure will be used in selecting the electives to be included in the computation of the weighted average grade:

- (1) For students who did not shift programs, consider the required number of electives in chronological order.
- (2) For students who shifted from one program to another, the electives to be considered shall be selected according to the following order of priority:
  - a) Electives taken in the program where the student is graduating will be selected in chronological order.
  - b) Electives taken in the previous program and acceptable as electives in the second program will be selected in chronological order.
  - c) Prescribed courses taken in the previous program but qualify as electives in the second program will be selected in chronological order.

#### Additional Rules

Candidates for graduation with honors must have completed in the University at least 75 percent of the total number of academic units or hours for graduation and must have been in residence therein for at least two years immediately prior to graduation.

In the computation of the final average of candidates for graduation with honors, only resident credits shall be included.

Students who are candidates for graduation with honors must have taken during each semester not less than 15 units of credit or the normal load prescribed in the curriculum. In cases where such normal load is less than 15 units, unless the lighter load was due to justifiable causes such as health reasons, unavailability of courses needed in the curriculum to complete the full load, or the fact that the candidate is a working student, students cannot be considered for graduation.

To justify underloading, the submission of the following documents is required:

- (1) *For health reasons* - medical certification to be confirmed by the University Health Service.
- (2) *For unavailability of courses* - certification by the major adviser and copy of schedule of classes.
- (3) *For employment* - copy of payroll and appointment papers indicating among others duration of employment.

It is the responsibility of the student to establish beyond reasonable doubt the veracity of the cause(s) of his light loading. It is required in this connection that documents submitted to establish the cause(s) of his loading, such as certificate of employment and/or medical certificate, must be sworn to. These documents must be submitted during the semester of underloading.

#### **COMMENCEMENT EXERCISES**

Attendance in the general commencement exercises shall be optional. Graduating students who choose not to participate in the general commencement exercises must so inform their respective deans or their duly designated representatives at least ten days before the commencement exercises.

Graduating students who absent themselves from the general commencement exercises shall obtain their diplomas, or certificates and transcripts of records from the Office of the University Registrar provided that they comply with the above provision and upon presentation of the receipt of payment of the graduation fee and student's clearance.

#### Academic Costumes

Candidates for graduation with degrees or titles which require no less than four years of collegiate instruction shall be required to wear academic costumes during the baccalaureate service and commencement exercises in accordance with the rules and regulations of the University.

#### **TRANSCRIPT OF RECORDS**

Student records are confidential and information is released only at the request of the student or of appropriate institutions. "Partial" transcripts are *not* issued. Official transcripts of records obtained from other institutions and submitted to the University for admission and/or transfer of credit *become a part of the student's permanent record and are issued as true copies with the UP transcript.*

Application for transcript of records shall be filed at the Office of the University Registrar upon presentation of the student clearance. Graduates are encouraged to request for their transcripts as early as possible to avoid unnecessary delay.

#### **WITHHOLDING OF RECORDS**

When a student has pending financial obligations to the University, or when s/he has been charged with an official disciplinary action, the appropriate University official may request that the student's record, e.g., transcripts, registration forms, be withheld. Departments and offices, for example, submit before the end of each semester the names of students with financial

accountabilities to the students' respective College Secretaries so that the action may be rescinded. The Office of the College Secretary concerned or University Registrar must receive written authorization from the official who originally requested the action, indicating that the student has met the obligation.

#### **UNIVERSITY POLICY ON STUDENT RECORDS**

The University maintains various records of students to document their academic progress as well as to record their interaction with University staff and officials. Students' records are generally considered confidential except the directory of currently registered students which is open to the public. The directory provides information on each student's name, I.D. number, college, course, classification and college address.

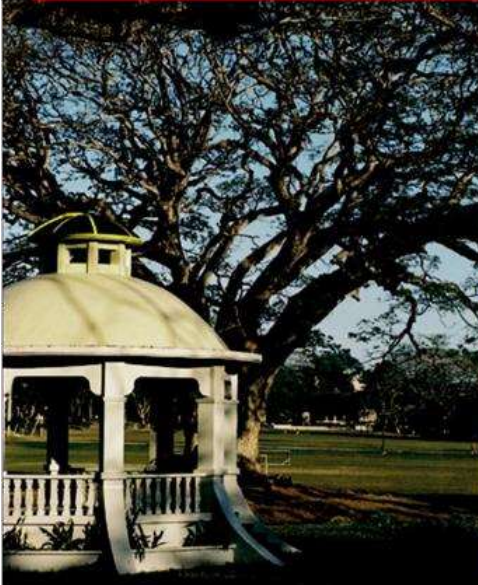
The following policies govern access to student records which are confidential in nature:

- (1) Each type of student record is the responsibility of a designated University official, and only that person or the Dean, Director or Vice-Chancellor to whom that person reports, has authority to release the record.
- (2) Confidential educational records and personally identifiable information from those records will not be released without the written consent of the student involved. However, it shall be released to the University personnel in connection with the student's application for financial aid or in response to a judicial order or subpoena, or in a bonafide health or safety emergency.
- (3) The responsible official may release records to the University personnel who legitimately need the information.
- (4) University personnel who have access to student educational records in the course of carrying out their University responsibilities shall not be permitted to release the record to persons outside the University, unless authorized in writing by the student or as required by a court order. Only the official responsible for the records has the authority to release them.
- (5) All personal information about a student released to a third party will be transferred on condition that no one else shall have access to it except upon the student's consent.





Services and Facilities





# SERVICES AND FACILITIES

## OFFICE OF STUDENT AFFAIRS

Upper Floor, Student Union Building  
Tel. No. 536-2238; Email: do@uplbosa.org

The Office of Student Affairs (OSA) complements the instructional program of the University. The service units under OSA are:

- Counseling and Testing Division (CTD)
- International Students Division (ISD)
- Scholarships and Financial Assistance Division (SFAD)
- Student Organizations and Activities Division (SOAD)
- Student Disciplinary Tribunal (SDT)
- Communication and Information Technology (COMMIT)
- Administrative Support Section of the Director's Office

The services offered under each service unit are geared towards the realization of OSA's vision to be a leader in achieving the goals of UPLB by providing globally competitive programs and services that empower students in meeting their psychosocial, emotional, financial, and academic needs.

## DIRECTOR'S OFFICE/COMMUNICATION AND INFORMATION TECHNOLOGY

The Communication and Information Technology (COMMIT) focuses on the preparation of OSA communication materials and the development and management of OSA systems. The unit also provides centralized technical assistance to all UPLB students availing of OSA services. COMMIT continually creates, maintains, and upgrades OSA systems.

COMMIT manages the Information Technology (IT) Hub at OSA. The IT Hub houses computer units that are used by students who need to access online OSA services for free.

COMMIT handles communication exchange among students and staff members through the centralized knowledgebase and online helpdesk of OSA. At an average, there are about 5,000 individuals using the OSAM System monthly.

COMMIT creates, manages, and administers the ICT resources of OSA. The systems OSA creates streamline and simplify OSA operations based on time and motion studies and workflow analysis. COMMIT re-engineered existing systems and procedures of OSA to recommend shortcuts that reduce bureaucratic red tape and improve processing time of service delivery.

COMMIT is in charge of IT trainings and information dissemination through ICT resources of OSA. The unit coordinates with various stakeholders to ensure that OSAM System support the core mission of the office and the University in providing an effective and efficient student service.

For inquiries, you may e-mail contact@uplbosa.org.

## COUNSELING AND TESTING DIVISION (CTD)

### Program Objective:

The major thrust of the division is on psycho-social assistance given to the students through its guidance program which is anchored on the assumption that every student is of value and has a right for optimum development.

### Specific Objectives:

1. To provide students an opportunity to express and clarify feelings, conflicts, plans affecting any, or all aspects of his life be it educational, career, personal, social, and emotional
2. To develop a better understanding at one's self and awareness of their strengths and limitations with the end view of harnessing one's abilities and likewise facilitate an intelligent decision making
3. To assist students in formulating realistic career goals
4. To maintain linkages with the different units, colleges, campus, agencies and companies for a more responsive and effective services
5. To assist in the staff development programs and extension services

### Counseling

This is the heart of Guidance Services Specialist (GSS) profession. The major goal is to help an individual become the person he is capable of becoming, help him gain the ability to resolve his difficulties, make intelligent choices and adjustments in life.

### Pre-College/Parent's Orientation

This is a fun filled activity for the freshies where they come to meet new acquaintances and discover the UPLB psychosocial environment and lifestyle. It is also an interactive day for freshies and their parents as academic policies, OSA services, student conduct and discipline are discussed.

### Group Growth and Development

Guidance Instruction (GI) sessions are part of the group growth and development program. It is a great, challenging, interesting, and enlightening venue for those who would like to unfold and become a more socially effective individual.

### Career Information and Placement

This aims to assist students in their career planning and decision making by providing them information regarding their course offerings and other requirements, as well as job trends/employment opportunities and referrals through the annual pre-employment seminar workshop and university job fair.



**Readmission**

The Office of Student Affairs, through the Counseling and Testing Division, gives appropriate recommendations to the OSA Director and the Deans of the UPLB colleges on whether or not to readmit scholastically delinquent students. The recommendation is based on the assessment of the student's aptitude, capabilities, and past records.

**Psychological Testing**

It provides more understanding about personality, interest, aptitude, IQ and EQ levels. Psychological tests are provided to aid students and other clients in decision-making in terms of their career and personhood.

**Alay Turo**

This is a peer tutorial program which provides assistance to students with academic difficulties especially in Math, English, Biology, Chemistry, Botany and other subjects. It is a one-on-one or in-group tutorial wherein scholars from different colleges and other students excelling in their subjects are being tapped as tutors.

**Extension Services**

The licensed GSS are often tapped as resource persons, facilitators and consultants in various training programs and seminar/workshops on student or personnel work, human resource development and others not only to serve the needs of individual constituents or UPLB offices, but also to other outside agencies. Community based projects such as the "*Off-the-Street, On-to-School*" is one of its successful projects.

**STUDENT ORGANIZATIONS AND ACTIVITIES DIVISION**

The Student Organization and Activities Division (SOAD) serves as the University's coordinating center, which deals with activities concerning students and student organizations. It envisions itself as a proactive service unit pioneering paperless knowledge management practices through the efficient and effective use of participatory/interpersonal communication and information technology.

Primarily, it facilitates the recognition of student organizations in UPLB. It formulates and implements policies and guidelines affecting organizations' welfare and discipline. It is tasked to monitor and oversee the activities of student organizations to ensure that their resources are wisely used in fulfilling their goals and objectives.

It also plans, organizes, and supervises specific activities enriching the students' socio-cultural values and leadership capabilities.

It processes the nomination and selection of UPLB representatives to various leadership awards and student-related seminars, workshops, and conferences.

The three major activities of the division are the following:

**1. Organization Orientation (OO)**

The OO is usually held between the registration and early classes of the first semester. This is an annual activity for the leaders of all student organizations applying for recognition. This provides leadership training for new leaders and serves as an orientation about the rules and policies of the University regarding student organizations and activities.

**2. Orientation and Convocation Programs**

These programs are instituted to orient the new students about the various academic and administrative services that they can avail of during their stay in the University. The freshmen are also able to familiarize themselves with the officials and staff of the University through these orientation programs.

**3. Recognition Rites**

This annual activity formalizes the recognition of student organizations and provides a venue for awarding certificates of recognition to outstanding student organizations. Among the SOAD's institutionalized programs are the planning and coordination of special events which involve activities of students, and for the students such as the New Students' Orientation Program; Testimonial Ceremony for Recognized Organizations; Conference and Planning Workshop for Student Leaders; Peace Workshop; Loyalty Day participation of Organizations; Clean-UP Drive and building alliance among student organizations such as Inter-Fraternity Council, Inter-Sorority Council.

**INTERNATIONAL STUDENTS DIVISION**

The International Students Division (ISD) is the center of information, activities, and services of the international students of the University. It makes every effort to have a good relationship with the members of the international community. International students can avail of the following:

1. Certifications related to visa renewal or visa extension
2. Study permit
3. Orientation for new undergraduate international students
4. Advising, counseling, and guidance instruction
5. Tutorial services
6. Information services such as but not limited to the history, culture, traditions of the Philippines, and educational system, the different functions, offices, and services of the University
7. Socio-cultural and psycho-educational activities
8. Assistance to the activities of the International Students' Association (ISA)

ISD also encourages and promotes the role of UPLB as an educational institution by pursuing a program of cross-cultural learning and living for global solidarity and peace. As such, some of the division's innovative programs and activities are the following:

1. Induction and Welcome party of the International Students' Association Officers (ISA) - induction of the incoming ISA Officers and welcome party for the new international students
2. International Food Festival – a week-long event showcasing the culinary talents of the international students
3. Sportsfest – a sports day activity for international students
4. Investiture and Commissioning Rites of UPLB Ambassadors – a search for and encouragement to graduating international students to become volunteer UPLB Ambassadors of Goodwill
5. Orientation – a fun-filled “informative-awareness” day about services the international students can avail from UPLB, Office of Student Affairs (OSA), and other institutions
6. Search for the Three Most Outstanding International Students of the Philippines –a nationwide search by the Philippine International Friendship and Understanding Association (PIFUA) for the three most outstanding international students
7. Cultural Night – a night of festival dances, songs, and unique presentations mirroring the culture of the international students' respective countries
8. International Students' Association Election of Officers
9. Recognition Rites – recognition of graduating international students with the highest General Weighted Average (GWA) and other special awards

#### **STUDENT DISCIPLINARY TRIBUNAL**

The Student Disciplinary Tribunal (SDT) is the unit responsible for the implementation of the university rules and regulations on student discipline. It aims to correct the misbehavior of students and let them learn from their mistakes. Penalties imposed ranges from warning as minimum, to expulsion as maximum. It keeps records of incidence/cases and student offenders. The SDT is also tasked to disseminate information, conduct training and workshop about the university rules and regulation on student discipline and other laws pertaining to student misconducts.

#### **OFFICE OF THE UNIVERSITY REGISTRAR**

The Office of the University Registrar (OUR) is a service unit of the University. It attends to the needs not only of the students but also of the faculty, personnel, parents, alumni, and the general public. Furthermore, it serves the students before, during, and after their stay in the University - from the time of application, to admission, to every registration period, through graduation or withdrawal from the University, and even after they leave the University.

In general, the OUR screens undergraduate applications for admission, issues official transcripts of records, maintains records of students, and in coordination with each college administration and other University offices, registers qualified students and attends

to preparations relative to graduation. It also renders secretariat services for the University Council and some of its committees. Moreover, the OUR is in charge of information materials such as the general catalogue and information bulletin.

The OUR maintains the academic records of students enrolled in the University, and evaluate the records of candidates for graduation and for honors. It issues certificates of completion of requirements and units earned. The OUR also processes applications for deferment of enrolment, honorable dismissal and student clearance, prepares and issues transcripts of records.

The billing and assessment aspects of registration and other registration needs of the students are handled by the OUR in collaboration with the colleges and OSA. It prepares statements of accounts for scholars and processes the refund vouchers of students who either withdraw, had a change in STFAP bracket assignment or were overassessed in their registration.

The OUR is also in-charge of the maintenance of all University Council proceedings, as well as excerpts of BOR meetings and such communications that need to be filed for record purposes.

#### **UNIVERSITY HEALTH SERVICE**

The University Health Service (UHS) is one of the oldest support services of UP Los Baños. It was initially created in 1914 as a clinic to address the felt need for medical services of the pioneering few faculty members and students then of the College of Agriculture. Originally named the College Health Service, the clinic was situated in the upper floor of the old Agricultural Economics building at the present site of the Humanities building. It was manned only by one nurse, Mr. Felix Valera, until eventually junior resident doctors from the Philippine General Hospital rotating from a period of 6 months to 1 year were assigned to head the clinic. The very first resident assigned was Dr. Herminio Velarde, Sr., followed by Dr. Jose Villacorta.

#### **Facilities and Services**

The University Health Service provides comprehensive health care through hospitalization, consultation, dispensary, dental care, minor surgery, maternal and child care, X-ray, pharmacy, family planning and referral service to tertiary hospitals in Metro Manila.

Two physicians attend to consultations on week days while one is on 24-hour duty everyday including weekends and holidays. Treatment in the dental unit is by appointment to avoid overcrowding of patients. There are 31 specialty consultants (Cardiology, Pulmonology, OB-Gyne, etc.). The more common specialty services utilized by students, such as Orthopedic Surgery and Internal Medicine, render free out-patient consultation to students.

Admission for confinement is done on a priority basis: emergency cases first; students; faculty and administrative personnel and their immediate dependents; and lastly private patients.

## Fees

Consultations, treatments and room accommodation for ten (10) days per semester are free for students. Nominal fees are charged for laboratory examination and minor surgeries. Charges for other services are based on the kind of services rendered and the patient's classification. Medicines are available at nominal prices upon prescription of the physician.

## Entrance Health Examination (Pre-enrollment Medical/Physical Examination)

All new students are required to undergo chest X-ray and thorough physical examination as pre-requisite to registration. The examination is done before the opening of the semester in order to determine whether the student is physically and mentally fit to undertake his academic program, as well as to give medical assistance to those needing remedial measures for any health problem. Examination is done in the UHS. A physical examination done by an outside physician is not honored. This is to ensure that parameters for health evaluation are uniform and are within the standards set by the UHS.

A chest X-ray (CXR) is a requirement for physical examination. The UHS conducts CXRs at a nominal cost two (2) weeks prior to the pre-enrollment physical examination. A CXR done by an outside Radiology Clinic is honored after validation by UHS radiologist.

## Certificate of Illness

A student who has been absent from his classes and who went for consultation or was treated/confined in the Health Service is required to get a medical certificate from the UHS. If he was attended to by a physician outside the service, he should get a certificate from his attending physician. A student wishing to drop subjects or courses on account of poor health, injury, or illness may also get a medical certificate from his own physician but this has to be validated by the UPLB Health Service.

## Exemption from taking PE/NSTP Courses

Students who wish to request deferment/exemption from taking PE and/or NSTP courses or opt for light duty should be seen by a specialty physician dealing with their health concern (e.g. asthma-pulmonary rheumatic heart disease-cardiology). The UHS Director will endorse the request for exemption/light duty based on the recommendation of their specialist.

## UNIVERSITY LIBRARY

The University of the Philippines Los Baños Library (formerly, the UP College of Agriculture Library) was established at the founding of the College of Agriculture in 1909. It provides materials and services to meet the instructional, research, and extension needs of the various constituents of the University. It has the most extensive collection of agricultural materials in the country and particularly strong in plant and animal sciences. Presently, the University Library is composed of the following libraries:

1. Main Library
2. College of Development Communication (CDC) Library
3. College of Economics and Management (CEM) Library
4. College of Engineering and Agro-Industrial Technology (CEAT) Library
5. College of Forestry and Natural Resources (CFNR) Library
6. College of Human Ecology (CHE) Library
7. College of Public Affairs and Development (CPAF) Library
8. College of Veterinary Medicine/Animal and Dairy Science Cluster (CVM-ADSC) Library
9. National Institute of Molecular Biology and Biotechnology (BIOTECH) Library
10. Postharvest Horticulture Training and Research Center (PHTRC) Library
11. School of Environmental Science and Management (SESAM) Library
12. UP Rural High School (UPRHS) Library

The University Library practices decentralization of library collections; that is, building and strengthening specialized collections relevant to respective College curriculum and research. The Main Library is for the College of Agriculture, College of Arts and Sciences, and the General Education courses.

The University Library's web address is <http://library.uplb.edu.ph/>. Several links to information resources and services can be availed and accessed in this homepage.

## Resources

The University Library uses Library of Congress Classification Scheme and Resource Description and Access (RDA) in organizing its collections and Integrated Library System (iLib) for automation. The total collection of the University Library as of October 2015 stands to 368,124 volumes, which include books/pamphlets/bound periodicals, theses and dissertations, microforms, e-books, and other non-print materials. These resources are searchable and accessible 24/7 via <http://ilib.uplb.edu.ph/>.

The Library subscribes to several online databases, such as EBSCOHost Research Databases, ProQuest Databases, ScienceDirect, ACM, CAB Direct & CABI compendia, Taylor & Francis and among others. These are all accessible at <http://library.uplb.edu.ph/index.php/journal>. While for eBooks, the University has perpetual access to CAB eBooks, GVRL, Wiley e-Books, Springer, Elsevier, Gale databases, etc. and accessible via <http://library.uplb.edu.ph/index.php/ebook>. The University Library also subscribes to EBSCO Discovery Service (EDS). It is a one search box/federated search for easy access and links all online information resources that the University Library subscribed/purchased. Aside from these e-resources, the University Library recently subscribes to Turnitin, a web-based tool for faculty and students that checks originality of written work.

Use of Library resources averaged to 369,624 for the last three years, of which values increased with the



upgrading information resources and physical facilities. The Libraries in the campus are conducive learning place equipped with new IT facilities (WIFI, iPad, Android tablets, PCs, microform reader, scanners, printers, etc.). Different operating systems (Mac, Windows and Lynux) are being maintained for the convenience of our valued clients.

### Services

The University Library practices online library services using trends in ITC such as social media, document delivery and e-resources via library website <http://library.uplb.edu.ph>. It recently implemented paperless borrowing and returning of books thru iLib account of students, faculty, researchers and staff. The UPLib-Users Monitoring System (UPLib-UMS) is also currently implemented to monitor the library usage of the students. The libraries in the campus not only serve the various constituents of the University but also extend their services to Non-UP users such as researchers from other institutions, government offices, and private sector. They are allowed to visit the Library every Monday subject to the University Library rules and regulations.

The UPLB libraries offer the following services:

1. lending services;
2. online document delivery;
3. library orientation, tours, lectures with hands-on demonstration (Information Literacy Program), and other user education services;
4. cataloging and indexing;
5. reference desk online;
6. interlibrary loans;
7. computer and multimedia services;
8. printing and scanning services;
9. readers' advisory services;
10. networking/resource sharing;
11. reference and referrals;
12. trainings;
13. research and publication;
14. power charging stations;
15. round table discussion room;
16. multi-purpose room;
17. wifi and units configuration for connectivity;
18. online resource hub; and
19. Interactive Learning Center (ILC) hub

The Main Library is open from **8:00 am –8:00 pm (Monday to Friday) and 8:00 am – 5:00 pm on Saturday**, thus, operating in 69 hours per week, to better serve the students, faculty, researchers and staff. College/unit libraries are open Monday to Friday, 8:00 am – 12:00 nn, 1:00 pm – 5:00 pm except for CEAT Library which is open from 8:00 am to 7:00 pm Monday to Friday, CVM Library 8:00 am to 5:00 pm Monday to Friday with 8:00 am to 12:00 nn Saturday service, and CPAf Library 8:00 am to 5:00 pm Monday to Saturday.

### LEARNING RESOURCE CENTER

The Learning Resource Center (LRC) at UPLB was established in June 1978 in conjunction with the implementation of the Agricultural and Rural Development Scholarship (ARDS). The UP System LRC

was institutionalized much later on April 17, 1997 by the Board of Regents. It is tasked to supplement, complement and coordinate all learning assistance programs in each campus to ensure that the goal of promoting academic excellence will be realized in a more caring and nurturing environment.

Beginning 2000, the LRC Coordinating Committee took over but with limited functions. It serves as a coordinator of the Summer Bridge Program (SBP). In December 2007, the UPLB LRC was integrated to the Office of Student Affairs (OSA) as Learning Resource Program (LRP).

However, in February 6, 2014, LRP was reverted to LRC in line with UPLB's quest to become a world-class University, in preparation for ASEAN 2015, and to further its goals of promoting and ensuring academic excellence among its students and in producing graduates who are more globally competitive.

With its enhanced and expanded programs, LRC has been mandated to take on the following tasks:

1. Expanding existing academic-related programs and activities to include not only local undergraduate students but also international undergraduate and graduate students; including but not limited to customized academic support systems
2. Institutionalizing and sustaining the UPLB Recruitment Program for the Best and the Brightest Students
3. Providing support services to would-be or international/exchange students including, but not limited to, customized language programs and thesis and journal writing
4. Complementing the Office for Institutional Linkages (OIL) in facilitating exchange programs that would provide opportunities for students to expose themselves to various programs offered by other competent and esteemed universities in the world.

To promote academic excellence, the UPLB LRC has institutionalized the following programs:

1. Instructional Assistance and Enrichment Program which includes Bridge Program (BP), trainings, and tutorials;
2. UPLB Recruitment Program for the Best and the Brightest (RPBB); and
3. Agricultural and Rural Development Scholarship (ARDS) Program.

### Bridge Program (BP)

The Learning Resource Center Coordinating Committee (LRCC) of the University of the Philippines System coordinates the implementation of the Bridge Program (BP). Students who perform below certain cutoff

scores in the UPCAT subtests in Mathematics and English are highly encouraged to take the BP for free before the actual start of classes. The BP aims to assist students in their academic and psychosocial adjustment in the University. Each bridge course is equivalent to a summer course with 48 class hours.

### **Training Programs**

LRC's training programs are needs-based. Local and international students, and student groups and organizations, who need training on certain topics/areas, can request LRC to design and implement such for a given period of time. Also, LRC spearheads echo seminars in which returning students from exchange programs share their learning and experience with the UPLB community.

### **Tutorial Services**

LRC offers tutorials in almost any subject. Services are free of charge and sessions will be available both by appointment and walk-in bases, depending on the subject and on the schedule of tutors. Tutorials are facilitated by students (undergraduate and graduate) and selected faculty members. Students may be tutored individually or in small groups.

The tutorial sessions are as follows:

1. **Special Tutorials.** These sessions are by appointment and are conducted during office hours. Selected faculty members from different colleges render the tutorial assistance to students. These sessions focus on understanding the lesson while developing effective studying strategies.
2. **Peer Tutorials.** This collaborative learning program is a weekly session in which small groups of students work together on lessons and assignments for their classes. The sessions are conducted by student volunteer tutors (undergraduate or graduate students) who have exemplified academic excellence in the course they are tutoring.
3. **Exam Jams: Refresh, Renew, & Review!** Weeks before the scheduled examinations, LRC, in cooperation with selected colleges and student

organizations, conducts course review sessions on subjects like Math, Physics, Chemistry, Biology, and others. Students are given intensive course-specific study sessions alongside opportunities to engage in free, fun, and de-stressing activities that help manage or reduce stress and establish healthy and productive study habits. These sessions are led by either student volunteer tutors or by professors from different colleges.

4. **Self-tutorial through LRC modules/books.** LRC developed modules which are designed for self-tutoring. Learning modules are available at UPLB LRC for the following subjects: Math 11, Math 14, Math 26, Math 36, Natural Science 1, Natural Science 2 and the UPCAT Reviewer.

### **UPLB Recruitment Program for the Best and Brightest (RPBB)**

The UPLB Recruitment Program aims to bring the best and the brightest students of the country to the National University; to promote diversity among its applicants; and to increase the number of enrollees in the three pioneer colleges of UPLB namely College of Agriculture (CA), College of Veterinary Medicine (CVM) and College of Forestry and Natural Resources (CFNR) as well as in all the other colleges of the University.

The recruitment team is led by LRC together with selected faculty members of participating colleges. Frequently asked questions about the university such as admissions, expectations, academic programs, and scholarships and financial assistance programs, among others are addressed by the recruitment team.

### **Agricultural and Rural Development Scholarship (ARDS)**

Since 1977, the Agricultural and Rural Development Scholarship (ARDS), which was created under Presidential Decree 1209, has provided assistance and opportunities to intellectually deserving students of rural poor families to take development-oriented courses in UPLB. UPLB LRC is constantly recruiting scholars and yields fresh graduates of ARDS.

The scholarship program provides stipend and book, transportation, medical, and thesis allowances.





Financial Information





# FINANCIAL INFORMATION

The costs of attending the University of the Philippines Los Baños fall into two categories: (1) tuition and related fees for services provided by the University; and (2) living costs and personal expenses.

UP students play a significant role in fulfilling the University's mandate as agents of national development. As an Iskolar ng Bayan, all UP students are entitled to support through subsidies provided by the National government. This is granted through discounts on tuition and other school fees.

## UNIVERSITY CHARGES

The term matriculation fee includes tuition, laboratory, miscellaneous, and other fees to be paid by students in connection with their enrollment in the University. For certain services or privileges, the University charges a miscellaneous fee over and above the tuition. The miscellaneous fee includes a registration fee to pay part of the costs of general administration. The miscellaneous fee also contributes towards the services given by the libraries and the health service units. In addition, it defrays part of the costs of the physical recreation programs, University cultural offerings, student activities, and student publications.

All students are assessed a laboratory fee for each laboratory subject taken.

All fees charged by the University are subject to change upon the approval by the Board of Regents.

## Matriculation Fee

The following semestral fees are charged to all students enrolled in undergraduate/graduate programs in UP Los Baños.

### Semestral Term

|                    | <i>Undergraduate</i>        | <i>Graduate</i>           | <i>PhD by Research/<br/>Straight PhD</i> |
|--------------------|-----------------------------|---------------------------|--|
| Tuition (per unit) | ₱ 1,000-1,500               | ₱ 1,000                   | ₱ 6,000                                  |
| Miscellaneous Fee  | ₱ 2,000                     | ₱ 1,015                   | ₱ 1,215                                  |
| Library fee        | ₱ 1,100                     | ₱ 800                     | ₱ 1,000                                  |
| Athletic fee       | ₱ 75                        | ₱ 75                      | ₱ 75                                     |
| Medical fee        | ₱ 50                        | ₱ 50                      | ₱ 50                                     |
| Registration fee   | ₱ 40                        | ₱ 40                      | ₱ 40                                     |
| Cultural fee       | ₱ 50                        | ₱ 50                      | ₱ 50                                     |
| Internet           | ₱ 260                       |                           |  |
| Energy             | ₱ 425                       |                           |  |
| Student Fund       | ₱ 45.50                     | ₱ 45.50                   | ₱ 45.50                                  |
| Laboratory Fee     | ₱ 100-5,000/<br>lab subject | ₱ 200-600/<br>lab subject |  |

### Midyear Term

|                    | <i>Undergraduate</i> | <i>Graduate</i> | <i>PhD by Research/<br/>Straight PhD</i> |
|--------------------|----------------------|-----------------|--|
| Tuition (per unit) | ₱ 1,000-1,500        | ₱ 1,000         | ₱ 3,000                                  |
| Miscellaneous Fee  | ₱ 1,337.50           | ₱ 465           | ₱ 565                                    |
| Library fee        | ₱ 550                |                 | ₱ 500                                    |

|                  |                             |                           |      |
|------------------|-----------------------------|---------------------------|------|
| Athletic fee     | ₱ 37.50                     |                           |      |
| Medical fee      | ₱ 25                        |                           | ₱ 25 |
| Registration fee | ₱ 40                        | ₱ 40                      | ₱ 40 |
| Internet         | ₱ 260                       |                           |      |
| Energy           | ₱ 425                       | ₱ 425                     |      |
| Laboratory Fee   | ₱ 100-5,000/<br>lab subject | ₱ 200-600/<br>lab subject |      |

## TRANSFER TUITION

Any student transferring from one college to another in the University after he has paid his matriculation fees must pay an amount corresponding to the difference, if any, in tuition and miscellaneous fees. In addition, he must pay a change of registration fee.

## EDUCATION DEVELOPMENT FEE

All foreign students shall be charged the Education Development Fee (EDF) according to the following schedule:

|                      | <i>Non-Resident<br/>Aliens</i> | <i>Resident<br/>Aliens</i> |
|----------------------|--------------------------------|----------------------------|
| <i>Graduate</i>      |                                |                            |
| Per Semester         | US \$ 500                      | US \$ 250                  |
| Per Summer           | ₱ 200                          | ₱ 100                      |
| For Residency only   | ₱ 100                          | ₱ 50                       |
| <i>Undergraduate</i> |                                |                            |
| Per Semester         | US \$ 300                      | US \$ 150                  |
| Per Summer           | ₱ 120                          | ₱ 60                       |
| For Residency only   | ₱ 60                           | ₱ 30                       |

## SPECIAL FEES

The following fees are imposed under certain conditions:

- change of matriculation (enrollment in additional subject, substitution of one subject for another, or cancellation of a subject) - ₱ 10/subject
- validation test (per unit) - ₱ 50
- removal examination (per subject) taken outside the regular period for removal tests) - ₱ 20
- dropping of subject - ₱ 10 (per unit)
- leave of absence - ₱ 150
- fine for absence without leave - ₱ 225
- fine for late application for graduation - ₱ 100
- certification - ₱ 30 - ₱ 40
- transcript of records  
(local application) - ₱ 50/page  
(foreign application) - US \$30
- English translation of diploma - ₱ 50
- Duplicate diploma - ₱ 300
- Verification/Authentication - ₱ 100

## OTHER FEES

In addition to the matriculation fee, the following financial obligations should be taken into account in the student's budget of expenses for the semester or academic year.

- Entrance - ₱30 (new students only)
- Deposit (refundable when student leaves the university) - ₱100 (new students only)





|                             |         |
|-----------------------------|---------|
| 3. I.D. Card                | - ₱130  |
| 4. Graduation Fee           |         |
| First UP degree             | - ₱ 300 |
| Second UP degree            | - ₱ 280 |
| 5. Application (UPCAT)      |         |
| Filipino                    | - ₱ 450 |
| Foreigner                   |         |
| Resident                    | - ₱ 450 |
| Non-Resident                | - \$ 50 |
| 6. Application (Transferee) |         |
| Filipino                    |         |
| Undergraduate               | - ₱ 100 |
| Graduate                    | - ₱ 250 |
| Foreigner                   |         |
| Undergraduate               |         |
| Resident                    | - ₱ 150 |
| Non-resident                | - \$ 20 |
| Graduate                    |         |
| Resident                    | - ₱ 200 |
| Non-resident                | - \$ 25 |

## LIVING ACCOMMODATION

UPLB has eight residence halls for men and women. Lodging fee per month is as follows:

|                             |       |
|-----------------------------|-------|
| Men's Residence Hall        | ₱ 350 |
| Women's Residence Hall      | ₱ 350 |
| International House         | ₱ 450 |
| Forestry Residence Hall     | ₱ 320 |
| Makiling Residence Hall     | ₱ 320 |
| New Forestry Residence Hall | ₱ 395 |
| Vet. Med. Dorm              | ₱ 700 |
| New Dorm                    | ₱ 750 |

Early application is important in securing residence hall space. Immediately upon receipt of the notification of admission to UP, freshmen students desiring to stay in residence halls should file an application for admission in a residence hall. Reservation deposit equivalent to one month rent and two copies of 2x2 photos are required.

## ESTIMATED PERSONAL EXPENSES

|                                     |                             |
|-------------------------------------|-----------------------------|
|                                     | One Year<br>(Two Semesters) |
| Lodging (₱ 1,500/mo. for 10 months) | ₱ 15,000.00                 |
| Board (₱ 4,000/mo. for 10 months)   | ₱ 40,000.00                 |
| Textbooks                           | ₱ 10,000.00                 |
| Personal Allowances                 | ₱ 15,000.00                 |
| Laundry (₱ 500/mo. for 10 months)   | <u>₱ 5,000.00</u>           |
| <b>Total</b>                        | <b>₱ 85,000.00</b>          |

(This does not include travel, clothing and other miscellaneous allowances).

## SCHOLARSHIPS AND FINANCIAL ASSISTANCE DIVISION

To implement the various assistance programs of the University, the Scholarships and Financial Assistance Division (SFAD) was created by the UP Board of Regents on 28 September 1978. Among the types of assistance are the Socialized Tuition (ST) System, formerly Socialized Tuition and Financial Assistance Program (STFAP), government and private scholarships, student assistantships, and student loans.

Every semester, close to 70 percent of the student population enjoy these types of financial assistance. The Board of Regents approved during its 1294<sup>th</sup> meeting on 13 December 2013 the Socialized Tuition System which was implemented beginning this 1<sup>st</sup> Semester, Academic Year 2014 – 2015.

## FINANCIAL ASSISTANCE

For a financially needy student, the University offers a number of financial assistance programs. Some of these are: the Socialized Tuition System; the UP Government Scholarships Program; various scholarships and study grants offered by government and private companies or individuals; student undergraduate assistantships and student loans.

For more detailed information on these, write to the Scholarships and Financial Assistance Division, Office of Student Affairs, University of the Philippines Los Baños, College, Laguna or to the Committee on Scholarships of the various colleges.

### 1. SOCIALIZED TUITION SYSTEM

In the University of the Philippines (UP), all students receive financial support from the National Government since the full tuition is much lower than the actual cost of education in the University. Given that students in UP come from all walks of life, there are those who may not be able to afford paying the full tuition. So UP created the ST System which provides tuition discount at rates that are based on the assessment of the paying capacity of the household to which a student belongs. This assessment looks at the income as well as the socio-economic characteristics of the household.

The current ST was approved by the UP Board of Regents on 13 December 2013 replacing previously implemented STFAP.

### Tuition Discounts

UP students who wish to apply for tuition discounts under the Socialized Tuition must supply the information about the income and socio-economic characteristics of their household. The application is done online. Using the information submitted by the students, the University may grant tuition discounts and, in certain cases, monthly stipends, according to the table below:

| Tuition Discount Level  | Tuition Discount | Tuition in ± | Other Financial Assistance  |
|-------------------------|------------------|--------------|---|
| Partial Discount - 33%  | 33%              | ± 1,000/unit |   |
| Partial Discount - 60%  | 60%              | ± 600/unit   |   |
| Partial Discount - 80%  | 80%              | ± 300/unit   |   |
| Full Discount           | 100%             | Free tuition | Free miscellaneous fees;<br>Free laboratory fees                  |
| Full Discount + Stipend | 100%             | Free tuition | Free miscellaneous fees;<br>Free laboratory fees; Monthly Stipend |

Tuition discounts and other financial assistance shall be for one academic year, renewable annually.

Students admitted starting AY 2014-2015 who will be granted Full Discount + Stipend will receive Php3500 monthly allowance for two semesters. Said monthly allowance may be in the form of cash, dormitory privilege, and/or meal coupon.

Students admitted to the university before AY 2014-2015 are covered by the regulations of the previous STFAP stipend benefits and shall still receive Php2400 monthly allowance.

To qualify for tuition discounts, the student must:

1. Be a Filipino;
2. Be a bonafide undergraduate student. Except for students of Law and Medicine, the applicant must not have a bachelor's degree. For new students, the applicant must have an admission slip;
3. Never have been adjudged guilty of any offense that carries a penalty of more than 30 days suspension; and
4. Be in need of financial assistance as determined by the University.

#### Application Process

1. Students should visit [www.sts.up.edu.ph](http://www.sts.up.edu.ph) and log in using your credentials (student number and 5-digit PIN, indicated in the UP Admission Slip). Upperclass students must use their up.edu.ph mail account to log-in.
2. Indicate your intent to apply and your consent to the terms and conditions of ST.
3. Complete your Student Profile with information about yourself and your parents/guardian and siblings.
4. Answer the Household characteristics questionnaire.
5. Accomplish the Household Income form.
6. Review all entries before proceeding to submission. You cannot view or change your answers after you submit your applications.
7. Confirm your submission of your ST application.

Applicants are not required to submit any documents (e.g., income tax return, employment contract, etc.) to complete the application process.

Results will be released according to the posted schedule. You may view the results by logging into <http://sts.up.edu.ph/> using your account. Check out the Announcements tab for any updates during the application period.

#### System Accounts

#### NEW STUDENTS

All new students will use their Student No. and 5-digit PIN to access the system. Your 5-digit PIN is indicated on your Admission Slip.

New students include the following:

- UPCAT Qualifiers
- Incoming freshmen with newly issued Admission Slips
- Incoming freshmen who deferred enrolment in previous years
- Incoming MD [from UP College of Medicine] and JD [from UP College of Law] students
- Transferees from other schools
- Students without Admission Slips but have been duly accepted by a UP unit as an incoming undergraduate student

If you were not issued one, contact the Helpdesk in your campus for assistance. Contact details are in the Helpdesk tab.

#### UPPERCLASSMEN

Upperclassmen will use their UP Mail account (e.g. [jpdelaacruz@up.edu.ph](mailto:jpdelaacruz@up.edu.ph)) to access the system. There is no need to request for a 5-digit PIN. UP Mail is a new e-mail service that will consolidate all UP employees and students from all Constituent Universities (CUs) into a single e-mail domain. This is different from your CU specific web mails (e.g. [@upd.edu.ph](mailto:@upd.edu.ph), [@uplb.edu.ph](mailto:@uplb.edu.ph), [@upb.edu.ph](mailto:@upb.edu.ph); do not use these emails when logging in to the system. If you're from Diliman, you may get your account from the eUP helpdesk at Room 308, 3/F Vidal A. Tan Hall, UP Diliman, Quezon City. If you're from another campus, visit your respective Computer/IT Center for assistance. Present your latest Form 5 and/or UP ID for identity verification. If you're asking for assistance via email ([helpdesk@up.edu.ph](mailto:helpdesk@up.edu.ph)), send your:

- Student number
- Complete name
- Campus
- A scanned copy of your latest Form 5 and UP ID

Please do not send more than one request. Your requests are given ample attention upon receipt.

Check out <http://e.up.edu.ph/general-mail-faq/> for more information about UP Mail.

#### Appeal Process

Applicants may be in special situations where they may need additional financial assistance. They may file an APPEAL to inform the UP Office of Student Financial Assistance about these circumstances and to request these to be considered in the grant of tuition discounts.

Students may submit their appeals online after the release of the application results. Freshmen use their student numbers and 5-digit PIN. Upperclass students use their UP Mail accounts.

To file an appeal, follow these steps:

1. View announcements on appeal process at <http://sts.up.edu.ph/>
2. Log in using your ST account.

3. Indicate your consent with the terms and conditions of ST.
4. Fill out the ST Appeal questionnaire.
5. Indicate your complete permanent address, vicinity map, and landmarks near your home.
6. Save your appeal and review your entries.
7. Review all entries before submitting the appeal. You cannot view or change your answers after you submit your appeal.
8. Confirm submission of your appeal.

Results will be released according to the schedule set by the UP Office of Student Financial Assistance and the OSA/OSSS in your campus. Students can view results by logging into <http://sts.up.edu.ph/> using their student number and PIN.

### **Terms and Conditions before applying for tuition discount**

The University reserves the right to determine whether the student deserves financial assistance, and the amount and form of assistance. The UP Office of Student Financial Assistance, in coordination with the Offices of Student Affairs (OSAs) and the Office of Scholarship and Student Services (OSSS), will organize a fact-finding team to check information submitted by the applicants. Privileges may be withdrawn when a student withholds or gives false information, without prejudice to other penalties that may be imposed by the University.

All information supplied in the application will be kept secure and confidential. All information may be used by the University for research, with the assurance that personal details of the applicant will be kept secure.

## **2. STUDENT ASSISTANTSHIP**

The Student Assistant Program provides undergraduate students the opportunity to work and earn on campus while pursuing their studies in the University. Aside from the compensation, students under the SA Program are able to gain work experience that could help prepare them for employment, entrepreneurship, and community service after they leave the university. The University, on the other hand, is able to engage the students in fulfilling its academic and operational functions.

### **Allocation of slots**

One (1) slot is equivalent to one hundred twenty (120) working hours. Considering the balance between current academic load and prospective work load of applicants, requesting units and offices may propose subdividing SA slots, subject to approval by the head of the unit or office, as follows:

- a. Two (2) sub-slots, where each is equivalent to a maximum of sixty (60) working hours;
- b. Two (2) sub-slots, where one sub-slot is equivalent to a maximum of ninety (90) working hours and another is equivalent to a maximum of thirty (30) working hours;
- c. Three (3) sub-slots, where each sub-slot is equivalent to a maximum of forty (40) working hours;

- d. Three (3) sub-slots, where one sub-slot is equivalent to a maximum of sixty (60) working hours and each of two remaining sub-slots is equivalent to a maximum of thirty (30) working hours; or
- e. Four (4) sub-slots, where each sub-slot is equivalent to a maximum of thirty (30) working hours.

### **Eligibility**

Eligibility for SAs:

1. Must be a continuing student, eligible to enroll during the term when appointed as SA.
2. For freshman students, must have finished at least one (1) semester in the CU.
3. For students below 18 years old, must have secured prior written consent from a parents or guardian to serve as an SA for a term.
4. Must not be enrolled in more than twenty one (21) units during the semester of appointment.

When appointed, a SA must be an undergraduate student enrolled in at least twelve (12) units during the semester. A student who is enrolled in less than twelve (12) units during a semester may be appointed as SA, provided that his/her College expects him/her to graduate at the end of the current term. The applicant must submit a certification issued by his/her College Secretary stating he/she is a candidate for graduation in the said term. A student who is enrolled in less than twelve (12) units during a semester due to reasons other than being candidates for graduation may be appointed as SA, provided that he/she submits a valid justification issued by his/her College. The justification must be issued by a faculty adviser, endorsed by the Department Chair/College Secretary, and confirmed by the Dean of the College where the student is currently enrolled.

### **Appointment**

Students are not allowed to render service while their appointment papers as SAs are still in process. No appointment shall take effect earlier than the date of approval of appointment papers.

### **Payment of hourly rates**

Payments for the hourly rates of SAs shall be based on the number of hours of services rendered in the unit or office of assignment. Work hours must be reflected in the Daily Time Records (DTRs) of SAs, with signature by the SA, endorsement of the supervisor, and approval by the head of unit or office. Supervisors of SAs shall endorse payments equivalent to the actual number of hours for services rendered. SAs must submit monthly DTRs on or before the 5th day of the month after services are rendered. Payments for hourly rates of SAs shall be through Automatic Teller Machines (ATMs), with credit to the bank account of the student.

### **General Guidelines**

The maximum work hours per month will be based primarily on the academic load of students and the workload to be assigned by requesting units and offices.

Assignment of work hours shall be in conformity with the table below.

**Table 1. Prescribed work hours and academic load per semester**

| SA                   | Prescribed work hours per month |
|----------------------|---------------------------------|
| 12 units or less     | 30 hours to 120 hours           |
| 13 units to 18 units | 30 hours to 90 hours            |
| 19 units to 21 units | 30 hours to 60 hours            |

**SA Types**

- **Office Assistant:** 8am-12nn; 1pm-5pm Mon-Sat
- **Class Assistant:** 7am-12nn; 1pm -7pm Mon-Sat (during class hours)
- **Laboratory Assistant (Research):** 8am-12nn; 1pm-10pm Mon-Sat including holidays
- **Library Assistant:** 8am-12, 1pm-8pm; Mon-Sat
- **Museum Assistant:** 8am-12; 1pm-5pm Mon-Sat
- **Dorm Assistant:** 8am-12nn; 1pm-10pm Mon-Sun including holidays
- **SUPSA (University Performers):** 8am-12nn; 1pm-10pm Mon-Sun including holidays

### SPECIAL UNIVERSITY PERFORMERS-STUDENT ASSISTANTSHIP (SUPSA)

SUPSA is a special student assistantship program designed to give support to special university performers in recognition of their performances and contributions specifically during special university events.

Existing policies for SAs are also applicable to SUPSA members.

### NON-REPORTING/RESIGNATION OF SA

SAs who have not reported for duty for ten (10) consecutive assigned days, without prior notice to the unit or office, or without any valid and verified excuse, shall deemed resigned and ineligible as SAs in future slots.

The Resignation/Termination form for "non-reporting for duty" of a student assistant may be downloaded at OSAM website [www.uplbosa.org/downloads](http://www.uplbosa.org/downloads). It should be filled out and submitted to SFAD Rm. 6, Window 1, 2/F SU Building to allow replacement.

### CERTIFICATE OF SERVICE RENDERED

Students may request certificate of service rendered, provided that they have a copy of their SA appointment.

**Source: Administrative Order No. PAEP 15-84 dated 14 August 2015. "Consolidated Rules and Regulations for Students Assistants and Graduate Assistants (SAGA CRR)**

### 3. STUDENT LOAN PROGRAMS

Student may avail of several loan facilities to defray their tuition or other education-related expenses. Student loans come into two-types:

- a) The **tuition loan, Student Loan Board (SLB)**, that can be used for payment of matriculation fees only, and
- b) The **emergency cash loan** which are classified into the following:

#### 1. The long term emergency cash loan, CHED

SAFE Loan, is an interest-free loan available to 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or college graduating students with General Weighted Average (GWA) of 3.0 or better. Loanable amount is to P8,000.00 per student, and

2. **The short term emergency cash loan** that ranges from P1,000.00 to P5,000.00 depending on the course and academic standing of the applicant/student. Basically, an applicant for emergency cash loan must have a good academic standing or at least a warning status. Also, the loans must be paid within the current semester at very minimal interests that ranges from four (4) to eight (8) percent per annum.

### A. STUDENT LOAN BOARD (SLB)

Among the student loan programs implemented by the University is the Student Loan Board (SLB) Program. It was established for payment of matriculation fees of the students wherein 80% of the student's assessed fees may be loaned with an interest rate of 6% per annum. Loans under the Student Loan Board may, with the approval of the Chancellor, be granted in the amounts beyond the cap currently observed in the concerned campus and up to 100% of total assessed fees. As an incentive for prompt payment of loans, interest shall be waived on loans which are paid within four (4) months from the dates on which they are made. To avail of SLB, visit [www.uplbosa.org/page-slb](http://www.uplbosa.org/page-slb).

### B. EMERGENCY CASH LOAN

As of 2015, the University offers fifteen (15) emergency cash loan both under the long-term emergency cash loan and the short-term emergency cash loan. These are the following:

#### a. Long-term Emergency Cash Loan

##### 1. CHED SAFE Loan

The CHED Student Assistance Fund for Education for Loan (CHED SAFE Loan) was established on October 9, 2008 through the initiative of the Commission on Higher Education (CHED) wherein they donated seed money amounting to P1,000,000.00. The loan program aims to provide assistance of P8,000.00 to financially needy 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or graduating college students with General Weighted Average (GWA) of 3.0 or better. To qualify, applicants must be officially enrolled students in the College of Agriculture under the BS Agriculture and BS Food Technology curriculum; College of Arts and Sciences under the BS Applied Mathematics, BS Applied Physics, BS Biology, BS Chemistry, BS Computer Science, BS Mathematics, BS Math and Science Technology, and BS Statistics curriculum; in the College of Engineering and Agro-Industrial Technology under the BS Industrial Engineering, BS Agricultural Biosystem Engineering, BS Civil Engineering, BS Chemical Engineering, and BS Electrical Engineering curriculum; in the College of Economics and Management under the BS Agri-Business Management and BS Agricultural Economics curriculum;



in the College of Forestry and Natural Resources under the BS Forestry curriculum; in the College of Human Ecology under the BS Nutrition curriculum; in the College of Veterinary Medicine under the Doctor of Veterinary Medicine curriculum; and in the CA-CAS joint program under the BS Agricultural Chemistry curriculum. The loan is interest-free payable two (2) to five (5) years after graduation.

## **b. Short-term Emergency Cash Loan**

### **1. PCIBank UPLB Student Financial Assistance Program (PCIB-UPLB SFAP)**

The loan program was created and implemented on September 24, 1984 through the initiative and goodwill of the Philippine Commercial and International Bank (PCIB). They donated a sum of money to be utilized solely as financial assistance to any enrolled UPLB student thru a loan. The loan is open to undergraduate financially needy student of UPLB except incoming freshman and transferee. An applicant must be a Filipino citizen who is of good moral character, must be a bonafide student (at least a second semester freshman or a sophomore, junior or senior student), academic status should not be lower than warning and must be financially needy as certified by his parents and/or guardian. The loanable amount ranges from PhP1,000.00 to PhP3,000.00 a semester depending on the student's need with an interest rate of eight (8) percent per annum. A promissory note will be accomplished by all qualified applicants attesting to their willingness to pay back the amount being loaned plus the interest not to go beyond the end of the semester (last day of classes). An interest rate of twelve (12) percent per year (from due date until the loan is paid) is charged, if a student is unable to pay his loan on time.

### **2. Pacita F. Yaptenco Student Financial Assistance Fund (PFY SFAP)**

The loan fund was established on December 11, 1990 through the generosity of the family of Prof. Pacita F. Yaptenco. It was created for the purpose of providing emergency financial assistance to students of UPLB. The loan is open to all UPLB Filipino undergraduate and graduate students except for incoming freshmen, transferees, and cross registrants. Applicant must be of good moral character and have passed at least 60 percent of their enrolled courses in the previous semester. The loanable amount ranges from PhP1,000.00 up to a maximum of PhP3,000.00 a semester depending on the student's need with an interest rate of eight (8) percent per year. A loan should be paid on or before the end of the semester during which it was borrowed. An interest rate of twelve (12) percent per year is charged, if a student is unable to pay his loan on time.

### **3. PNB-UPLB Educational Assistance Fund (PNB-UPLB EAF)**

The loan grant was established on July 10, 1991 through a mutual agreement between the Philippine National Bank and UPLB. PNB donated a sum of money for the establishment of an educational assistance fund with the purpose of providing financial assistance by way

of short term loans to students of UPLB. The short term loan is available to undergraduate and graduate UPLB students except for incoming freshmen, transferees, and cross registrants. To qualify for loan, applicants must be a Filipino citizen, of good moral character and a bona fide UPLB student. Applicant must have passed at least 60 percent of his/her subjects for the previous semester to qualify for loan. The loanable amount that may be borrowed by the student ranges from PhP1,000.00 to PhP3,000.00 a semester with an interest of eight (8) percent per annum. A borrower has to settle his account before the semester ends. An interest rate of twelve (12) percent per year is charged, if a student is unable to pay his loan on time.

### **4. Dr. Fernando C. Ordoveza Veterinary Student Loan Grant (FCO VSLG)**

The loan grant was established on February 23, 1993 thru the College of Veterinary Medicine eagerness to perpetuate the memory of its alumnus, the late Dr. Fernando C. Ordoveza, DVM 1931. It was created through the initiative of the Ordoveza family who generously donated a sum of PhP100,000.00 for the purpose of providing financial assistance to CVM UPLB students by way of loan. The loan is open to all bona fide veterinary student of UPLB who are currently enrolled, of good moral character and of good academic standing. Loanable amount ranges from PhP3,000.00 to PhP5,000.00 a semester with an interest rate of four (4) percent per annum. If payment is made after due date, a penalty of eight (8) percent per annum is also charged.

### **5. Senator Jose D. Lina Educational Assistance Fund (JDL EAF)**

The loan fund was established on September 6, 1994 with the purpose of providing financial assistance to any enrolled student of UPLB thru loan. Sen. Jose D. Lina, Jr. put up seed money in the sum of PhP100,000.00 for the implementation of the program. This loan is open to any enrolled UPLB student (freshman, sophomore, junior, and senior) for emergency needs. An applicant must be a Filipino citizen, bona fide undergraduate student of good moral character, currently enrolled and of good academic standing. The loanable amount ranges from PhP1,000.00 up to a maximum of PhP3,000 a semester/summer per student except for incoming freshman/transferee who are allowed for only up to a maximum of P1,500.00. Payment must be made in full including interest of eight (8) percent per annum or before the end of classes during which the loan is made. For payments made after due date, an additional interest of twelve (12) percent per annum is charged.

### **6. Dr. Gaudencio R. Lapuz, DVM'55 Veterinary Student Loan Grant (GRL VSLG)**

The loan grant was established on December 20, 1994 through the donation of Dr. Narciso R. Lapuz, DVM'53. **The Dr. Gaudencio R. Lapuz Veterinary Student Loan Grant** is open to all bona fide veterinary student of UPLB who are currently enrolled, of good moral character and of good academic standing. Loanable amount ranges from PhP3,000.00 to PhP5,000.00 a semester with an interest

rate of four (4) percent per annum. If payment is made after due date, a penalty of eight (8) percent per annum is also charged.

**7. Senator Francisco S. Tatad Educational Assistance Program (FST EAP)**

The loan program was established on July 1, 1996 through the desires of the donor to support needy students in the country. Sen. Francisco S. Tatad allocated a sum of PhP200,000.00 for the implementation of the loan program to be able to provide financial assistance thru loan to the needy students. The loan is open to any enrolled UPLB student (except incoming freshman and transferee) who is a Filipino citizen, currently enrolled, of good academic standing and good moral character. Loanable amount ranges from P1,000.00 to a maximum of PhP3,000.00 a semester/summer per student. Payment must be made in full including interest of eight (8) percent per annum or before the end of classes during which the loan is made. For payments made after due date, an additional interest of twelve (12) percent per annum is charged.

**8. Zeta Beta Rho Mussaenda Student Financial Assistance Program (ZBR-M SFAP)**

The loan program was established on January 24, 2000 through the initiative of the Zeta Beta Honor Fraternity and Mussaenda Honor Sorority. It was primarily created to provide financial aid to CFNR students by way of loan. To avail of loan, applicants must be currently enrolled and of good moral character. Applicant's academic status should not be lower than warning and must not be a current beneficiary of similar assistance from another program under the administration of UPLB's OSA SFAD. Loanable amount ranges from PhP1,000.00 to P3,000.00 a semester bearing an interest rate of four (4) percent per year. A student who is unable to settle the loan on time shall be charges an additional interest of eight (8) percent per year from due date until the loan is paid.

**9. Dr. Teresita Marquez Hernandez-Sollano, DVM'79 Veterinary Student Loan Grant (TMSH VSLG)**

The loan grant was established on May 26, 2000 to provide for the educational needs of UPLB CVM students such as purchase of books, uniforms, laboratory instruments, thesis expenses, etc. This loan is open to all bona fide veterinary student of UPLB who are currently enrolled, of good moral character and of good academic standing. Loanable amount ranges from PhP3,000.00 to PhP5,000.00 a semester with an interest rate of four (4) percent per annum. If payment is made after due date, a penalty of eight (8) percent per annum is also charged.

**10. Allen Torrenueva Student Financial Assistance Program (AT SFAP)**

The loan program was established on August 12, 2002 by the College of Forestry and Natural Resources Alumni Association (CFNRAA) to give financial aid to needy undergraduate students in the College of Forestry and Natural Resources. This loan is exclusively for College of Forestry and Natural Resources (CFNR) students who are

currently enrolled and of good moral character. Applicant's academic status should not be lower than warning and must not be a current beneficiary of similar assistance from another fund under the administration of UPLB's OSA SFAD. Maximum loanable amount is PhP3,000.00 except for freshman who will be allowed for only PhP1,500.00 maximum loan a semester. Interest rate is at four (4) percent per annum. A student who is unable to settle the loan on time shall be charges an additional interest of eight (8) percent per year from due date until the loan is paid.

**11. Dr. Edelwina C. Legaspi Student Financial Assistance Program (ECL SFAP)**

The loan program was established on February 26, 2004. It is open to any enrolled UPLB student (except incoming freshmen) who is a Filipino citizen, currently enrolled, is of good moral character and academic status should not be lower than warning. Loanable amount ranges from PhP1,000.00 to PhP3,000.00 a semester/summer per student. Payment must be made in full including interest of eight (8) percent per annum or before the end of classes during which the loan is made. For payments made after due date, an additional interest of twelve (12) percent per annum is charged.

**12. UPAA Sacramento and Vicinity Student Loan Fund (UPAA SAV SLF)**

Established on September 25, 2009, this loan program is open to students of the College of Agriculture (CA) and College of Veterinary Medicine (CVM) who are currently enrolled and of good moral character. Applicant's academic status should not be lower than warning and must not be a current beneficiary of similar assistance from another fund under the administration of UPLB's OSA SFAD. Loanable amount ranges from PhP1,000.00 to PhP3,000.00 a semester bearing an interest rate of three (3) percent per year. A student who is unable to settle the loan on time shall be charges an additional interest of four (4) percent per year from due date until the loan is paid.

**13. UPLBAAA Loreto E. Oliva and Josefina Malang-Hsiao Student Emergency Loan Fund (UPLBAAA-LEO-JMH SELF)**

Established on March 3, 2011 through a US\$12,000.00 grant via UPLBAAA from Dr. Editha Orlino-Oliva, this loan is open to any enrolled undergraduate UPLB student (except incoming freshmen) who is a Filipino citizen, currently enrolled and of good moral character. Maximum loanable amount is PhP5,000.00 per semester to students with good academic standing and PhP3,000.00 to students with warning status. Interest rate of five (5) percent per annum is charged if loan is paid within the due date and an additional interest of six (6) percent per annum is also charged if student pays after due date.

**14. The UPLB Alumni Group in America Lifetime Members Student Emergency Loan Fund (UPLBAGA LIME SELF)**

The program was established on November 26, 2014 and was implemented during the Second Semester A.Y. 2014-2015. UPLBAGA donated US\$25,000.00 for the

implementation of the program. This loan is open to any enrolled undergraduate UPLB student (except incoming freshmen) who is a Filipino citizen, currently enrolled and of good moral character. Maximum loanable amount is PhP5,000.00 per semester to students with good academic standing and PhP3,000.00 to students with warning status. Interest rate of five (5) percent per annum is charged if loan is paid within the due date and an additional interest of six (6) percent per annum is also charged if student pays after due date.

#### 4. SCHOLARSHIP PROGRAMS

Scholarship programs funded by private individuals, corporations or organizations, or by government agencies are available to good and deserving students. To qualify for a vacant slot, an applicant is required to go through a selection process that includes: pre-screening, written examination, and panel interview. The scholar is finally selected by the Scholarship Committee.

A scholarship package varies depending on the sponsor or funding agency and usually includes matriculation fee discount and cash benefits such as monthly stipend, allowance for books, clothing and transportation, thesis support and graduation expenses. Vacant slots are posted in UPLB bulletin boards and OSA website: [www.uplbosa.org](http://www.uplbosa.org).

#### Scholarships/Fellowships and Study Grants

##### *Private Scholarships Administered at UPLB*

Agribiz Travellers Inc., Veterinary Undergraduate Scholarship Grant  
 BASF Agricultural Research Foundation, Inc. Scholarship Grant  
 Dan Minnick Scholarship Grant  
 Dr. Eulalio Baltazar Memorial Scholarship  
 East West Seed Co. Inc. Undergraduate Scholarship  
 Estores, Tianzon and Angeles Memorial Scholarship  
 Fostering Education and Environment for Development Inc. (FEED) Thesis Research Grant  
 Foundation for Philippine Progress Undergraduate Fellowship Grant  
 Francisco J. Nicolas Scholarship  
 IRRI-Landbank Gawad Patnubay Scholarship Program  
 Masako and Hiromitsu Katoh Veterinary Undergraduate Scholarship Grant  
 Menzi Program for Research and Training Scholarship  
 National Cockers Association Undergraduate Student Scholarship Grant  
 NESCAFE Coffee University of the Philippines (NESCAFE CUPS) Scholarship  
 Philchema Scholarship Grant  
 Philippine Canine Club, Inc. Scholarship Grant  
 Philsan Undergraduate Scholarship Grant  
 Phinma Foundation Undergraduate Scholarship Grant  
 Rebisco Foundation's Financial Assistance for Tertiary Education  
 Sugar Regulatory Administration Scholarship  
 Univet Nutrition and Animal Healthcare Co. Undergraduate Scholarship Grant  
 UP Varrons Undergraduate Thesis Writing Grant  
 Venerable Knights Veterinarian Fraternity Scholarship

Vicente B. Bello Scholarship Program  
 UPAA GC Scholarship Grant

##### ***UP Diliman Private and Government Scholarships Open to UPLB Students***

Cayo Alzona Scholarship Grant  
 Congressman Neptali Gonzales II Educational Support Program  
 Dr. E.R. Violago Scholarship  
 Enhanced Students' Grant-in-Aid Program for Poverty Alleviation (ESGP-PA) for 4Ps  
 GSIS Scholarship  
 Health, Education, Environment and Discipleship Foundation, Inc. Scholarship  
 Maximo F. Gimenez Family Scholarship Grant  
 Philippine S&T Development Foundation – Manila, Inc. Science and Engineering Scholarship Grant  
 Representative Juan Edgardo Angara Scholarship Program  
 Rexponsableng Scholar Scholarship  
 Rufus Rodriguez and Abante Mindanao Partylist Scholarship Program  
 Scholarship Program for Foreign Students  
 Science of Mind Center, Inc. Scholarship  
 UPAA Hongkong Scholarship  
 UP Alumni in Washington Scholarship  
 UP Alumni Quesada-Fulgado and Friends Scholarship Program  
 UP Oblation Scholarship  
 UP Presidential Scholarship Program - Undergraduate  
 UP Presidential Scholarship Program – Masteral and PhD  
 UP Presidential Leadership - Undergraduate  
 Upsilon Sigma Phi North America (USPNA)

##### **Adopt-a-Student Program**

A financial assistance program conceived for low income students of UPLB, giving priority to ST recipients under PD80 or FD and other beneficiaries of scholarship programs who need supplemental financial assistance. The program provides financial assistance by pooling monetary contributions from institutional and individual donors who may choose to support in full, partial, supplementary or one-time donation for the living allowance of the selected qualified student. Selection of grantees will be conducted by the UPLB Committee on Scholarships and Financial Assistance (UPLB-CSFA).

##### **REFUNDS**

A student who has paid his matriculation fees and who withdraws his registration, or is granted honorable dismissal or leave of absence shall be entitled to a refund of his matriculation fees, except entrance and registration fees, in accordance with the following schedule:

|   |           |
|---|-----------|
| Before the opening of classes   | 100%      |
| Within one week from the opening of classes                           | 80%       |
| Within the second, third, and fourth week from the opening of classes | 50%       |
| After the fourth week   | No refund |

Laboratory fees will not be refunded after one week from the opening of classes where voluntary change is made from one course to another. Refund of tuition for a subject may be allowed only in the case of forced dropping of the subject.

Any student who is drafted for trainee instruction, in accordance with the National Defense Act by reason of his ineligibility to be a regular member of the ROTC of the University, may be refunded the proportional part of the total amount he paid for his matriculation fees for the term during which he is drafted.

#### OTHER FORMS OF FINANCIAL ASSISTANCE

#### STUDY PRIVILEGES FOR U.P. PERSONNEL AND DEPENDENTS

##### A. Privileges of U.P. Personnel

1. ALL FULL-TIME UNIVERSITY PERSONNEL shall be entitled to 100 percent waiver of tuition and miscellaneous fees (except student fund fees) in any U.P. college or unit. This applies to all full-time personnel - permanent or temporary, regular incumbents or substitutes, casual or contractual personnel, including project personnel, regardless of the source of funds for their salaries as long as the funds either belong to the regular budget of the University or are institutional grants to the University, provided only that their appointments issued by the University are at least coextensive with the semester or term.
2. ALL REGULAR PART-TIME FACULTY (with at least one year of continuous service) shall be entitled to 100 percent waiver of tuition and miscellaneous fees (except student fund fees) in any U.P. college or unit provided the field of study is one of the academic thrusts of the faculty member's home department or college. This applies to all part-time faculty - permanent or temporary, regular incumbents or substitutes.

If the regular part-time faculty has less than one year of service or is enrolled in a field which is not one of the academic thrusts of his/her home department or college, the privilege shall be 50 percent waiver on tuition and miscellaneous fees (except student fund fees). It is to be noted that lecturers and Clinical Professors without compensation are not classified as regular faculty members.

3. In No. 1 and 2 above it is understood that prior to the enrollment of the U.P. personnel, he/she shall first seek the approval of the immediate supervisor, the head of the unit and the Chancellor.
4. The tuition and miscellaneous fees privilege may be renewed for a succeeding semester subject to the satisfactory scholastic performance of the employee concerned in the previous semester. THE EMPLOYEE SHALL SUBMIT TRUE COPIES OF HIS/HER GRADES TO THE HRDO AND TO THE DEAN OR HEAD OF UNIT OF THE

EMPLOYEE. THIS SHALL BE A PREREQUISITE FOR RENEWAL OR EXTENSION OF THE PRIVILEGE.

##### B. Privileges of Non-Earning Dependents of U.P. Personnel

1. Non-earning DEPENDENTS OF REGULAR FULL-TIME PERSONNEL (permanent or if temporary, with at least five (5) years of aggregate service in the U.P. System) shall be entitled to 100 percent waiver of tuition and miscellaneous fees (except student fund fees).
2. Non-earning DEPENDENTS OF REGULAR PART-TIME FACULTY (permanent or if temporary, with at least five (5) years of AGGREGATE service in the U.P. System) shall be entitled to 50 percent discount of tuition and miscellaneous fees (except student fund fees). It is to be noted that lecturers and Clinical Professors without compensation are not classified as regular faculty.
3. As a general rule, this privilege shall apply only to dependents of personnel in actual service to the University and shall not apply when personnel are on leave without pay or on secondment without U.P. pay outside the University, except if the U.P. personnel is on:
  - 3.1 Secondment to another government agency; or
  - 3.2 Secondment outside the country or on academic assignment; or
  - 3.3 Sick leave with or without pay.

The non-earning dependents shall be entitled to the privileges for as long as the UP personnel is still deemed to be on official approved leave from the University.

4. The continued entitlement of a dependent shall be subject to his/her passing at least 60 percent of all units enrolled in the previous semester or term, unless the dependent's failure to meet the condition is due to illness — in which case the full entitlement shall still be given in the next semester or term.
 

If the dependent fails to pass at least 60 percent of all units enrolled and illness is not a reason, then the dependent shall pay bracket 7 rates for the number of units enrolled in but not passed in the previous semester or term — before the entitlement is resumed in a succeeding semester or term.
5. The duration of the privilege for any dependent cannot exceed the maximum residency rule.

##### C. Non-Earning Dependents of U.P. Retirees

1. The non-earning dependents of U.P. personnel who retire upon reaching the compulsory retirement age or who, at the time of death or permanent disability are deemed retireable under University rules, shall continue to



be entitled to the tuition and miscellaneous fees privileges they were entitled to prior to the retirement.

If any non-earning dependent is already enrolled in a U.P. college at the time of the personnel's retirement, death or disability, then the dependent shall be entitled to the privileges until he/she finishes the degree in progress.

If any non-earning dependent is not enrolled in a U.P. college at the time of retirement, death or disability of the employee, then the dependent shall be entitled to the privileges if and when the dependent earns admission into the University (pre-collegiate or collegiate level) until he/she is able to finish his/her first undergraduate U.P. degree.

2. If a U.P. employee avails himself/herself of optional retirement (i.e. before reaching compulsory retirement age), or dies or incurs permanent disability while in the service after having served U.P. an aggregate of at least ten (10) years, then his/her non-earning dependents who are already enrolled in a U.P. college at the time of retirement, death or disability shall be allowed to continue enjoying the privileges until the degree in progress is completed.

3. The same academic rules, including the maximum residency rule, imposed on dependents of U.P. personnel in active service shall apply to dependents of U.P. retirees or those who die or incur permanent disability while in the service of U.P.

#### **LOCAL GOVERNMENT CODE OF 1991**

The Local Government Code of 1991 covers the Study Grant Program for barangay officials and their legitimate children dependents attending State Colleges and Universities to avail of educational benefits and privileges on the payment of tuition and matriculation fees.

To qualify for the study grant, the applicant must be legitimate dependent child of an incumbent barangay official (Punong Barangay, Barangay Kagawad, Barangay Secretary or Barangay Treasurer); and should be 21 years old or below.

Documents required for submission each semester are as follows:

- 1) Accomplished Application Form (issued by the Office of the University Registrar)
- 2) Certification from the Commission on Election
- 3) Certification from the Municipality/City Mayor attested by the Local Government Operations Office
- 4) Photocopy of the student's NSO Birth Certificate
- 5) Income Tax Return (ITR)/Non-filer Certificate
- 6) High School Report Card (F138) for new student

#### **UP GOVERNMENT SCHOLARSHIPS**

Pursuant to R.A. 5549, the University annually offers UP Government Scholarship for financially and scholastically deserving students. The basis for choosing scholars is through competitive examinations administered by the Office of Admissions.

Generally, each scholar shall be free to choose his own field of study. However, the awarding shall be subject to two limitations:

1. number of scholarships available each year; and
2. internal regulations based on the statutory allocation of 60 percent of the scholarships to the following fields: natural and physical sciences; engineering; agriculture; fisheries; forestry; economics and public administration.

The scholarship intends to cover the costs of education until a student finishes his degree program.

#### **AGRICULTURAL AND RURAL DEVELOPMENT SCHOLARSHIP PROGRAM**

This program was created under PD 1209 in 1977. It aims to provide opportunities to intellectually-deserving children of rural poor families to take development-oriented courses in the University of the Philippines Los Baños (UPLB).

#### **Qualifications:**

1. must pass the UPCAT;
2. must have an STFAP bracket assignment but not above bracket 4;
3. must be willing to render a 2 year-special project;
4. must be willing to sign a contract.

#### **PHILIPPINE VETERANS**

Exemption from the payment of tuition and other fees is enjoyed by a Philippine veteran who is entitled to educational benefits under the amended Republic Act. No. 65. The Philippine Veterans Administration (PVA) recommends, certifies and determines the tenure of exemption. The University shoulders 30 percent of the total matriculation fees while the PVA handles 70 percent.

#### **U.S. VETERANS**

Under Chapter 34 or 35, titled 38, United States Code, U.S. veterans or their children are entitled to receive educational assistance allowance provided they carry at least 14 units a semester. The amount is to be determined by the USVA.

#### **FACULTY FELLOWSHIPS**

Faculty fellowships are created based on the greatest need of and usefulness to the University. The appointment of fellows is limited to the most able, promising and deserving in the line of study selected on the basis of the qualifications.

#### **LOCAL FELLOWSHIP**

A local fellow gets a monthly stipend equivalent to his salary, a book allowance of P400 each semester and thesis allowance of P500. Tuition and all other authorized school fees are paid by the University. Since the faculty fellow is required to devote full time to his study, he is relieved of his teaching load.

**TEACHING ASSOCIATES**

Teaching Associates refer to M.A./M.S./PhD. students who are assigned to teach six (6) to nine (9) units of undergraduate courses. They are required to enroll in six (6) to nine (9) units of graduate course work or six (6) units of thesis work in addition to their teaching assignment.

Faculty members whose departments do not have M.A./M.S./PhD. programs may be appointed as Teaching Associates/Fellows provided they enroll in six (6) to nine (9) units of graduate course work or six (6) units of thesis work towards an M.A./M.S. degree in addition to their teaching load of 6 to 9 units in their home departments. They should enroll in graduate programs that are in accordance with their home department's priority fields of study and subject to the recommendation of their Department Chair and approval by the Dean.

Teaching Associates are entitled to the following compensation, benefits and privileges: a stipend, a book allowance, a waiver of tuition and miscellaneous fees except student fees, a thesis grant of P10,000.

**TEACHING FELLOWS**

Teaching Fellows refer to Ph.D. students who are assigned to teach six (6) to nine (9) units of undergraduate courses. Teaching Fellows are required to enroll in six (6) to nine (9) units of graduate course work or twelve (12) units of dissertation work.

Faculty members whose departments do not have Ph.D. programs may be appointed as Teaching Fellows provided they enroll in graduate programs in accordance with their home department's priority fields of study and subject to the recommendation of their Department Chair and approval by the Dean. They are required to enroll in six (6) to nine (9) units of graduate course work or twelve (12) units of dissertation work (towards the Ph.D. degree) in addition to their teaching assignment of six (6) to nine (9) units in their home departments.

Teaching Fellows receive a stipend, a book allowance, a waiver of tuition and miscellaneous fees except student fees and a dissertation grant of P10,000.

**TEACHING ASSOCIATE/TEACHING FELLOW**

A teaching associate/teaching fellow is entitled to a book allowance of P3,000 per semester, a waiver of tuition and miscellaneous fees except student fees and a thesis/dissertation grant of at least P10,000 but not more than P50,000 to be paid in accordance with University regulations. He will also receive a standard summer honoraria based on his equivalent rank, in case they are given teaching assignments during summer session.

**PART-TIME STUDY PRIVILEGE**

A faculty member on part time privilege gets a reduced rate for matriculation fees, book allowance proportional to the number of units registered ( e.g., P 125 for six units) and thesis allowance.

**STUDENT ASSISTANTSHIPS**

Undergraduate student assistantships are available to bonafide UPLB students, with a general weighted average of 3.0 or better. Work hours of student assistants are limited to 100, 75 and 50 hours/month depending on the student's academic load per semester.

The student must be enrolled during the period covered by the appointment. The assistantship pays P25 per hour for a maximum of 100 hours of service each month.

**GRADUATE STUDENT ASSISTANTSHIPS**

Graduate student assistantships which pay P16.00 per hour are available to bonafide graduate students who show very satisfactory academic work and whose academic load is not less than 6 units and not more than 8 units during the semester he is working. The maximum working hours per month is 100 hours.

**GRADUATE ASSISTANTSHIPS**

The UPLB has several graduate assistantships/fellowship programs which are open to deserving graduate students who are expected to participate in undergraduate teaching or research activities.



College of Agriculture University of the Philippines Los Baños





# COLLEGE OF AGRICULTURE

Enrico P. Supangco, *Dean*  
 Tonette P. Laude, *Associate Dean*  
 Maria Cynthia R. Oliveros, *College Secretary*  
 Pablito M. Magdalita, *CA Research Unit Head*  
 Mafeo B. Bejo, *CA Extension Unit Head*  
 Florentino C. Monsalud, *Director, Agricultural Systems Cluster*  
 Elpidio M. Agbisit, Jr., *Director, Animal and Dairy Sciences Cluster*  
 Teresita U. Dalisay, *Director, Crop Protection Cluster*  
 Lotis E. Mopera, *Director, Food Science Cluster*  
 Pompe C. Sta. Cruz, *Director, Crop Science Cluster*  
 Mafeo B. Bejo, *Station Manager, Central Experiment Station*  
 Rustico C. Morales, *Station Manager, La Granja Research and Training Station*  
 Christian Joseph R. Cumagun, *Editor, Philippine Agricultural Scientist*

## OBJECTIVES

The objectives of the College are to:

1. train and develop the manpower required for agricultural and rural development of the country;
2. undertake research on immediate and long-term problems of Philippine agriculture for the advancement of agricultural science and technology; and
3. disseminate research findings and technology in a form or package suitable for adoption by extension workers and farmers; help train/retrain extension workers; provide the technical background to extension technicians in the field whenever necessary; and conduct pilot action/research projects on agriculture and rural development.

To carry out these functions, the College has five functional clusters, namely: Agricultural Systems Cluster; Animal and Dairy Sciences Cluster; Crop Protection Cluster; Crop Science Cluster; and Food Science Cluster; The College also manages a Central Experiment Station and the La Granja Research and Training Station.

## DEGREE PROGRAMS OFFERED

The College of Agriculture offers the following degree programs: Bachelor of Science in Agriculture (BSA); Bachelor of Science in Agricultural Biotechnology (BSABT); and Bachelor of Science in Food Technology (BSFT). The program leading to the degree of Bachelor of Science in Agricultural Chemistry (BSAC) is jointly offered with the College of Arts and Sciences. The BSA, BSABT, and BSFT programs are four-year programs, while BSAC is a five-year program.

## Bachelor of Science in Agriculture

This program aims to educate students towards a career in scientifically-based sustainable agriculture, to enable them to develop and effectively manage a self-reliant and economically viable agriculture-related enterprise, and to prepare them to become professionals with social commitment. Students may opt for a program with a thesis or one with a major practice in any of the following internship options- teaching, research, entrepreneurship, farm/plant or extension/community. This career can be pursued in any of the following major areas and fields of specialization.

*Agricultural Extension*

*Agricultural Systems*

*Agronomy*

Crop Production and Management  
 Plant Breeding  
 Weed Science  
 Seed Science and Technology

*Animal Science*

Animal Breeding  
 Animal Nutrition  
 Animal Physiology  
 Animal Production and Management  
 Meat Science  
 Dairy Technology

*Entomology*

IPM/Economic Entomology  
 Biological Control  
 Insecticide Toxicology  
 Host Plant Resistance to Insects  
 Insect Molecular Biology  
 Insect Physiology and Biochemistry  
 Insect Pathology and Microbiology  
 Medical and Veterinary Entomology  
 Insect Transmission of Plant Pathogen  
 Acarology  
 Pesticide Chemistry  
 Insect Taxonomy/Systematics

*Horticulture*

Crop Breeding  
 Crop Production and Management  
 Tissue Culture  
 Postharvest/Primary Processing  
 Landscaping (for ornamentals)  
 Seed Technology (for vegetables)  
 Crop Physiology

*Landscape Agroforestry*

*Plant Pathology*

Biological Control  
 Disease Management  
 Epidemiology and Disease Modeling  
 Fungal Physiology and Genetics  
 Phytobacteriology  
 Postharvest Pathology  
 Genetics of Host-Pathogen Interaction  
 Mycology  
 Molecular Plant Pathology  
 Phytonematology  
 Plant Virology

*Soil Science*

Soil Survey and Classification  
 Land Use  
 Soil Microbiology  
 Soil Physics  
 Soil Chemistry  
 Soil Fertility/Plant Nutrition  
 Soil Conservation and Management





### **Bachelor of Science in Agricultural Biotechnology**

This program aims to produce graduates who: shall have acquired knowledge and developed skills in the application of biotechnology, genetic control, and environmental manipulation technologies to improve agricultural production and maintain quality agro-environments; shall have been trained in the new emerging scientific concepts; shall be able to discuss issues and concerns related to biotechnology and form science-based decisions; shall have been trained in technology innovation and bioentrepreneurship; and shall be able to work independently, as well as be productive members of interdisciplinary teams. The program initially has four majors: Plant Biotechnology; Animal Biotechnology; Food Biotechnology; and Crop Protection Biotechnology.

### **Bachelor of Science in Food Technology**

This program is designed to address the demand of the food industry and academic research institutions for highly trained manpower in this field. This technology-based curriculum is relevant and responsive to the needs of the modern times and society towards sustained economic development. This will provide students technical and entrepreneurial knowledge and skills to face the continuing challenges in the food industry. The students may opt for a program with thesis or with practicum and special problem. Fields of Specialization are Food Chemistry, Food Microbiology, and Food Engineering.

**BACHELOR OF SCIENCE IN AGRICULTURE\***

| <i>First Semester</i>                                      | <i>Units</i> | <i>Second Semester</i>   | <i>Units</i> |
|--|--------------|--|--------------|
| <i>FIRST YEAR</i>  |              |  |              |
| AGRI 11, Introduction to Agriculture                       | 1            | AEC 1, Agricultural Extension Communication                      | 3            |
| BOT 1, Introduction to Plant Science                       | 3            | ANSC 1, Introduction to Animal Science                           | 3            |
| ENG 1 (AH), College English                                | 3            | CHEM 15, Fundamentals of Chemistry                               | 3            |
| G.E. (SSP)   | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory                  | 2            |
| G.E. (SSP)   | 3            | CRSC 1, Fundamentals of Crop Science I                           | 3            |
| MATH 11, College Algebra                                   | 3            | ENG 2 (AH), College Writing in English                           | 3            |
| ZOO 1, General Zoology                                     | 3            | MATH 14, Plane Trigonometry                                      | 3            |
| PE 1, Foundations of Physical Fitness                      | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                              | <u>(2)</u>   |
|  | 19           |  | 20           |
| <i>SECOND YEAR</i>   |              |  |              |
| ANSC 2, Intro. to Livestock & Poultry Production           | 3            | BOT 20, Elementary Plant Physiology                              | 3            |
| CRPT 1, Principles of Crop Protection                      | 3            | BIO 30, Genetics   | 3            |
| CRSC 2, Fundamentals of Crop Science II                    | 3            | CRPT 2, Pest Management  | 3            |
| SPCM 1 (AH), Speech Communication                          | 3            | ECON 11, General Economics                                       | 3            |
| G.E. (MST)   | 3            | PI 10 (SSP), The Life and Works of Jose Rizal                    | 3            |
| SOIL 1, Principles of Soil Science                         | 3            | G.E. (MST)   | 3            |
| PE 2 or 3, Basic or Advanced Course                        | (2)          | STAT 1, Elementary Statistics                                    | 3            |
| NSTP 1, National Service Training Program I                | <u>(3)</u>   | PE 2 or 3, Basic or Advanced Course                              | <u>(2)</u>   |
|  | 18           | NSTP 2, National Service Training Program II                     | <u>(3)</u>   |
|  |              |  | 21           |
| <i>THIRD YEAR</i>  |              |  |              |
| AECO 111, Farm Management                                  | 3            | ABE 1, Fundamentals of Agricultural and Biosystems Engineering I | 3            |
| AGRI 111, Introduction to Farming Systems                  | 3            | AGRI 121, Introduction to Ecological Agriculture                 | 3            |
| G.E. (AH)  | 3            | G.E. (SSP)   | 3            |
| PHYS 3, General Physics I                                  | 3            | Elective   | 3            |
| G.E. (AH)  | 3            | Major core course  | 3            |
| Major core course  | 3            | Major core course  | 3            |
| Major core course  | <u>3</u>     | Major core course  | <u>3</u>     |
|  | 21           |  | <u>3</u>     |
|  |              |  | 21           |
| <i>FOURTH YEAR</i>   |              |  |              |
| Elective   | 3            | AGRI 199, Colloquium in Agriculture                              | 1            |
| Major core course  | 3            | Thesis/Option to Thesis  | 3            |
| Specialized course 1                                       | 3            | Specialized course 3   | 3            |
| Specialized course 2                                       | 3            | Specialized course 4   | 3            |
| AGRI 195, Research Methods in Agriculture and Food Science | 3            | Elective   | 3            |
| Undergraduate Seminar                                      | 1            | STS 10 (MST), Exploring Biotechnology                            | 3            |
| Thesis/Option to Thesis                                    | <u>3</u>     | G.E. (SSP)   | <u>3</u>     |
|  | 19           |  | 19           |

**TOTAL NUMBER OF UNITS ..... 157**

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

**BACHELOR OF SCIENCE IN AGRICULTURAL BIOTECHNOLOGY\***

| <i>First Semester</i>   | <i>Units</i> | <i>Second Semester</i>  | <i>Units</i> |
|---|--------------|---|--------------|
| <i>FIRST YEAR</i>   |              |   |              |
| ABT 11, Introduction to Agricultural Biotechnology                | 1            | AEC 1, Agricultural Extension Communication                     | 3            |
| BOT 1, Introduction to Plant Science                              | 3            | ANSC 1, Introduction to Animal Science                          | 3            |
| ENG 1 (AH), College English                                       | 3            | CHEM 15, Fundamentals of Chemistry                              | 3            |
| HIST 1 (SSP), Philippine History                                  | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory                 | 2            |
| G.E. (MST)  | 3            | CRSC 1, Fundamentals of Crop Science I                          | 3            |
| MATH 11, College Algebra  | 3            | ENG 2 (AH), College Writing in English                          | 3            |
| ZOO 1, General Zoology  | 3            | MATH 14, Plane Trigonometry                                     | 3            |
| PE 1, Foundations of Physical Fitness                             | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                             | <u>(2)</u>   |
|   | 19           |   | 20           |
| <i>SECOND YEAR</i>  |              |   |              |
| ANSC 2, Intro. to Livestock & Poultry Production                  | 3            | ABT 101, Fundamentals of Agricultural Biotechnology             | 3            |
| BIO 30, Genetics  | 3            | CRPT 2, Pest Management   | 3            |
| CHEM 40, Basic Organic Chemistry                                  | 3            | G.E. (MST)  | 3            |
| CHEM 40.1, Basic Organic Chemistry Laboratory                     | 1            | MATH 26, Analytical Geometry and Calculus I                     | 3            |
| CRPT 1, Principles of Crop Protection                             | 3            | MCB 1, General Microbiology                                     | 3            |
| CRSC 2, Fundamentals of Crop Science II                           | 3            | STAT 1, Elementary Statistics                                   | 3            |
| SPCM 1 (AH), Speech Communication                                 | 3            | PE 2 or 3, Basic or Advanced Course                             | <u>(2)</u>   |
| PE 2 or 3, Basic or Advanced Course                               | <u>(2)</u>   | NSTP 2, National Service Training Program II                    | <u>(3)</u>   |
| NSTP 1, National Service Training Program I                       | <u>(3)</u>   |   | 18           |
|   | 19           |   |              |
| <i>THIRD YEAR</i>   |              |   |              |
| ABT 105, Experimental Techniques in<br>Agricultural Biotechnology | 3            | ABT 107, Recombinant DNA Technology                             | 3            |
| BOT 20, Elementary Plant Physiology                               | 3            | AGRI 161, Innovations and Entrepreneurship<br>in Agriculture    | 3            |
| CHEM 160, Introductory Biochemistry                               | 3            | CHEM 160.1, Introductory Biochemistry Laboratory                | 2            |
| CMSC 11, Introduction to Computer Science                         | 3            | G.E. (AH)   | 3            |
| G.E. (AH)   | 3            | G.E. (SSP)  | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal                     | 3            | PHYS 3, General Physics I (Mechanics and Heat)                  | 3            |
| SOIL1, Principles of Soil Science                                 | <u>3</u>     | STAT 162, Experimental Designs I                                | <u>3</u>     |
|   | 21           |   | 20           |
| <i>FOURTH YEAR</i>  |              |   |              |
| ABT 106, Molecular Markers  | 3            | ABT 108, Issues and Regulation of Agricultural<br>Biotechnology | 3            |
| ABT 200/200a, Undergraduate Thesis/<br>Options to Thesis          | 3            | ABT 199, Undergraduate Seminar                                  | 1            |
| AGRI 199, Colloquium in Agriculture                               | 1            | ABT 200/200a, Undergraduate Thesis/<br>Options to Thesis        | 3            |
| G.E. (SSP)  | 3            | G.E. (SSP)  | 3            |
| G.E. (MST)  | 3            | Elective  | 3            |
| Specialized course 1  | 3            | Specialized course 3  | <u>3</u>     |
| Specialized course 2  | <u>3</u>     |   | 15           |
|   | 18           |   |              |
| <b>TOTAL NUMBER OF UNITS ..... 150</b>                            |              |   |              |

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.



**BACHELOR OF SCIENCE IN FOOD TECHNOLOGY\***

| <i>First Semester</i>  | <i>Units</i> | <i>Second Semester</i>                                   | <i>Units</i> |
|--|--------------|--|--------------|
| <i>FIRST YEAR</i>  |              |  |              |
| BIO 1, General Biology I                                       | 3            | BIO 2, General Biology II                                | 3            |
| CHEM 16, General Chemistry I                                   | 3            | CHEM 17, General Chemistry II                            | 3            |
| CHEM 16.1, General Chemistry I Laboratory                      | 2            | CHEM 17.1, General Chemistry II Laboratory               | 2            |
| FST 11, Fundamentals of Food Science<br>and Technology         | 3            | CRSC 1, Fundamentals of Crop Science I                   | 3            |
| ENG 1 (AH), College English                                    | 3            | ENG 2 (AH), College Writing in English                   | 3            |
| G.E. (SSP)   | 3            | PI 10 (SSP), The Life and Works of Jose Rizal            | 3            |
| MATH 11, College Algebra                                       | 3            | MATH 14, Plane Trigonometry                              | 3            |
| PE 1, Foundations of Physical Fitness                          | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                      | <u>(2)</u>   |
|  | 20           |  | 20           |
| <i>SECOND YEAR</i>   |              |  |              |
| ANSC 1, Introduction to Animal Science                         | 3            |  |              |
| CHEM 40, Basic Organic Chemistry                               | 3            | CHEM 32, Quantitative Inorganic Analysis                 | 3            |
| CHEM 40.1, Basic Organic Chemistry Laboratory                  | 1            | CHEM 32.1, Quantitative Inorganic Analysis<br>Laboratory | 2            |
| G.E. (MST)   | 3            | ECON 11, General Economics                               | 3            |
| G.E. (MST)   | 3            | FST 101, Food Chemistry I                                | 3            |
| MATH 26, Analytic Geometry and Calculus I                      | 3            | MATH 27, Analytic Geometry and Calculus II               | 3            |
| PHYS 3, General Physics I                                      | 3            | MCB 1, General Microbiology                              | 3            |
| PE 2 or 3, Basic or Advanced Course                            | (2)          | PHYS 13, General Physics II                              | 3            |
| NSTP 1, National Service Training Program I                    | <u>(3)</u>   | PE 2 or 3, Basic or Advanced Course                      | (2)          |
|  | 19           | NSTP 2, National Service Training Program II             | <u>(3)</u>   |
|  |              |  | 20           |
| <i>THIRD YEAR</i>  |              |  |              |
| FST 111, Food Chemistry II                                     | 3            | SPCM 1 (AH), Speech Communication                        | 3            |
| FST 130, Food Engineering I                                    | 3            | FST 102, Food Analysis                                   | 4            |
| CHEM 160, Introductory Biochemistry                            | 3            | FST 131, Food Engineering II                             | 3            |
| G.E. (SSP)   | 3            | FST 140, Food Processing I                               | 3            |
| MCB 180, Introduction to Food Microbiology                     | 3            | FST 141, Food Processing II                              | 3            |
| STAT 1, Elementary Statistics                                  | <u>3</u>     | FST 161, Sensory Evaluation of Food Products             | 3            |
|  | 18           | FST 190, Special Problems: Non-thesis students           | (3)          |
|  |              | FST 200, Undergraduate Thesis                            | <u>2</u>     |
|  |              |  | 21(22)       |
| <i>Summer</i>  |              |  |              |
|  |              | FST 198, Practicum                                       | 3            |
|  |              | FST 200, Undergraduate Thesis                            |              |
| <i>FOURTH YEAR</i>   |              |  |              |
| MGT 1, Introduction to the Enterprises and<br>Entrepreneurship | 3            | AGRI 199, Colloquium in Agriculture<br>Elective          | 1<br>3       |
| AGRI 195, Research Methods in Agriculture<br>and Food Science  | 3            | FST 170, Food Processing Management                      | 3            |
| G.E. (SSP)   | 3            | FST 199, Undergraduate Seminar                           | 1            |
| G.E. (AH)  | 3            | STS 10 (MST), Exploring Biotechnology                    | 3            |
| Elective   | 3            | G.E. (AH)  | 3            |
| Elective   | 3            | G.E. (SSP)   | <u>3</u>     |
| FST 200, Undergraduate Thesis<br>(thesis/non-thesis students)  | <u>2</u>     |  | 17           |
|  | 20(18)       |  |              |
| <b>TOTAL NUMBER OF UNITS..... 157</b>                          |              |  |              |

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

## C O U R S E S

### AGRICULTURAL SYSTEMS CLUSTER

#### Agricultural Education and Rural Studies

**AERS 141. Community Survey and Program Planning (3).** A survey of economic and social conditions in rural communities, formulation of a program of education for the use of agricultural teachers, extension agents, adult and education workers. 3 hrs (class). PR. COI. (1,2)

**AERS 142. Concepts and Processes in Agricultural and Natural Resources Knowledge Systems (3).** Concepts and processes in the utilization and exchange of knowledge in agriculture and natural resources. 3 hrs (class). PR. COI. (1)

**AERS 154. Community Organization (3).** Theory, practice, issues and problems in organizing community groups, and their implications for rural development. 3 hrs (class). PR. COI. (1,2)

**AERS 160. Rural Sociology (3).** Analysis of rural communities and rural institutions as they respond to and are affected by technological, social, economic and environmental policies and factors both within and outside the rural sector. 3 hrs (class). PR. SOSC 1 (SSP) or COI. (1,2)

**AERS 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**AERS 191 Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**AERS 199. Undergraduate Seminar (1).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**AERS 200. Undergraduate Thesis. (1-6).** (1,2,S)

**AERS 200a. Major Practice (6).** (1,2,S)

#### Agricultural Extension Communication

**AEC 1\*. Agricultural Extension Communication (3).** Principles and methods of extension communication in agriculture. 3 hrs (2 class, 1 recit). (1,2)

#### Agriculture

**AGRI 11. Introduction to Agriculture (1).** Overview of agriculture with emphasis on Philippine agriculture. 1 hr (class). (1,2)

**AGRI 161. Introduction to Innovation and Entrepreneurship in Agriculture (3).** Introduction to the

concepts and practices of innovation and entrepreneurship in agriculture. 3 hrs (class). PR. COI. (2)

**AGRI 195. Research Methods in Agriculture and Food Science (3).** Research methodologies in agriculture and food science. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**AGRI 199. Colloquium in Agriculture (1).** 1 hr (class). PR. Senior standing. (1,2)

#### Agricultural Systems

**ASYS 101. Introduction to Sustainable Agricultural Systems (3).** Issues, properties, components and models of sustainable agricultural systems. 3 hrs (class). PR. None. (1)

**ASYS 120. Crop-Animal Systems (3).** Principles and practices of crop-animal systems. 5 hrs (2 class, 3 lab). PR. CRSC 1 and ANSC 1. (2)

**ASYS 145. Participatory Methodologies in Agricultural Systems Research and Extension (3).** Concepts, elements and impacts of participatory approaches in agricultural systems research and extension. 5 hrs (2 class, 3 lab). PR. AEC 1 and AGR 111, or COI. (1,2)

**ASYS 146. Agricultural Systems Analysis and Modeling (3).** Systems analysis and modeling and their applications in agriculture. 5 hrs (2 class, 3 lab). PR. CRSC 1 and ANSC 1. (2)

**ASYS 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**ASYS 191 Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**ASYS 199. Undergraduate Seminar (1).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**ASYS 200. Undergraduate Thesis (1-6).** (1,2,S)

**ASYS 200a. Options to Undergraduate Thesis (6).** Farm Practice, Research Internship, Teaching Internship, Extension/Community Internship, Entrepreneurial Internship. (1,2,S)

#### Landscape Agroforestry

**AF 199. Undergraduate Seminar (1).** Seminar in Landscape Agroforestry. (1,2)

**AF 200. Undergraduate Thesis (1-6).** (1,2,S)

**AF 200a. Options to Undergraduate Thesis (6).** Farm Practice, Research Internship, Extension Internship, Teaching Internship, Entrepreneurship Internship. (1,2,S)

\*- Offered by the Agricultural Systems Cluster and the College of Development Communication

## Soil Science

**SOIL 1. Principles of Soil Science (3).** Nature, properties and management of soils. 5 hrs (2 class, 3 lab). PR. CHEM 15 or CHEM 16. (1,2)

**SOIL 10. Agricultural Geology (3).** Common soil-forming rocks and minerals, geologic processes and agencies and landforms in relation to agriculture. 5 hrs (2 class, 3 lab). PR. SOIL 1. (1)

**SOIL 110. Soil Survey and Classification (3).** Survey and classification of soils based on their morphology, genesis and properties. application in agriculture, resource use and development. 5 hrs (2 class, 3 lab). PR. SOIL 10 or COI. (2)

**SOIL 111. Soil and Land Use (3).** Soil and land resources data and information for land use planning, their interpretation and application, planning and environmental assessment of land use. 5 hrs (2 class, 3 lab). PR. SOIL 1 or COI. (1)

**SOIL 120. Soil Microbiology (3).** Nutritional and metabolic properties of major groups of soil microorganisms, comparative ecology, selective isolation and cultivation of soil microorganisms, biochemical activities of soil microflora in relation to soil fertility. 5 hrs (2 class, 3 lab). PR. SOIL 1 or COI. (1)

**SOIL 130. Soil Physics (3).** Physical properties of soils in relation to plant growth, their measurement and analysis. 5 hrs (2 class, 3 lab). PR. SOIL 1 or COI. (2)

**SOIL 140. Soil Chemistry (3).** Nature and composition of soils, physico-chemical properties and reactions; chemical processes including ionic equilibria. 3 hrs (class). PR. SOIL 1 or COI. (2)

**SOIL 142. Fertilizers and their Reaction with the Soil (3).** Manufacture, processing and properties of fertilizers. their reaction with and the residual effect on the soil. 3 hrs (class). PR. SOIL 1 or COI. (2)

**SOIL 150. Soil Fertility (3).** Soil nutrient elements and their availability in relation to soil properties, evaluation of soil fertility status, use of fertilizers and other soil amendments. 3 hrs (class). PR. SOIL 1 or COI. (1,2)

**SOIL 151. Soil Fertility Evaluation (3).** Concepts and techniques in assessing soil fertility, soil and plant analysis. pot and field fertilizer experiments, nutrient deficiency symptoms. 7 hrs (1 class, 6 lab). PR. SOIL 140 and SOIL 150 or COI. (2)

**SOIL 160. Aerial Photo Interpretation for Land Use (3).** Photogrammetry and aerial photographs as applied to land resource analysis and use. 3 hrs (class). PR. SOIL 1 or COI. (1)

**SOIL 170. Soil Conservation and Management (3).** Soil deterioration and its control, maintenance and improvement of soil fertility and productivity. 5 hrs (2 class, 3 lab). PR. SOIL 1 or COI. (1)

**SOIL 190. Special Problems in Soil Science (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2,S)

**SOIL 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**SOIL 199. Undergraduate Seminar (1).** Review and discussion of current literature in soil science. 1 hr (class). (1,2)

**SOIL 200. Undergraduate Thesis (6).** (1,2,S)

**SOIL 200a. Options to thesis (6).** Farm Practice, Research Internship, Teaching Internship, Entrepreneurial Internship, Extension/Community Internship. (1,2,S)

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## ANIMAL AND DAIRY SCIENCES CLUSTER

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### Animal Science

**ANSC 1. Introduction to Animal Science (3).** Principles of breeding, physiology and nutrition in relation to production, processing, and marketing of animal products. 5 hrs (2 class, 3 lab). PR. BIO 1 or ZOO 1. (1,2)

**ANSC 2. Introduction to Livestock and Poultry Production (3).** Management of farm animals for the efficient production of meat, milk, eggs and other animal products. 5 hrs (2 class, 3 lab). PR. ANSC 1. (1,2)

**ANSC 101. (formerly ANSC 160) Anatomy and Physiology of Farm Animals (3).** Comparative anatomy and physiology of livestock and poultry. 5 hrs (2 class, 3 lab). PR. ANSC 2 or COI. (1,2)

**ANSC 102. (formerly ANSC 170) Principles of Animal Nutrition (3).** Composition, functions, and metabolism of various nutrients; nutritive requirements for maintenance, growth, reproduction, lactation, and other body functions of farm animals. 3 hrs (class). PR. CHEM 17 or COI. (1,2)

**ANSC 103. (formerly ANSC 65) Principles of Animal Breeding (3).** Genetics and statistical bases of animal improvement; topics in reproduction, including artificial insemination. 5 hrs (2 class, 3 lab). PR. ANSC 2 and BIO 30. (1,2)

**ANSC 104. (formerly ANSC 180) Livestock Sanitation and Disease Control (3).** Principles and practices in the prevention and control of common diseases in livestock. 5 hrs (2 class, 3 lab). PR. ANSC 101 or COI. (1,2)

**ANSC 105. (formerly ANSC 181) Poultry Sanitation and Disease Control (3).** Prevention and control of common diseases of poultry. 5 hrs (2 class, 3 lab). PR. ANSC 101 or COI. (1,2)

**ANSC 106. (formerly ANSC 151) Slaughter and Meat Evaluation (3).** Antemortem and post-mortem inspection of slaughter animals, slaughtering, carcass evaluation and meat hygiene. 5 hrs (2 class, 3 lab). PR. ANSC 2 or COI. (1,2)

**ANSC 111. (formerly ANSC 110) Swine Production (3).** Breeding, feeding, and management of swine; economics of swine production. 5 hrs (2 class, 3 lab). PR. ANSC 2 or COI. (1,2)

**ANSC 116. (formerly ANSC 140) Poultry Production (3).** Principal factors in commercial poultry production. 5 hrs (2 class, 3 lab). PR. ANSC 2 or COI. (1,2)

**ANSC 117. (formerly ANSC 141) Poultry Management (2).** Practices of incubation, breeding, rearing, feeding, judging, selection, and layer management. 6 hrs (lab). PR. ANSC 116 or COI. (1,2)

**ANSC 121. (formerly ANSC 120) Beef Production (3).** Breeding, feeding and management of beef cattle and carabaos in the range and in confinement; economics of beef production. 5 hrs (2 class, 3 lab). PR. ANSC 2 or COI. (1,2)

**ANSC 122. (formerly DSC 130) Dairy Production (3).** Breeding, feeding, and management of dairy animals; milking methods and the production of clean milk. 5 hrs (2 class, 3 lab). PR. ANSC 2 or COI. (1,2)

**ANSC 131. (formerly ANSC 150) Meat Processing (3).** Meat selection, identification of standard cuts, meat curing and other meat preservation methods. 5 hrs (2 class, 3 lab). PR. ANSC 2 or COI. (1,2)

**ANSC 132. (formerly ANSC 152) Comminuted Meat Products (3).** Structure, chemical composition and processing, characteristics of meat; and processing of comminuted products. 5 hrs (2 class, 3 lab) PR. CHEM 15 or CHEM 17 and ANSC 1 or COI. (1,2)

**ANSC 135. (formerly DSC 135) Introduction to Dairy Technology (3).** Fundamentals of milk and milk products processing. 5 hrs (2 class, 3 lab). PR. CHEM 40 or COI. (1,2)

**ANSC 136. (formerly DSC 136) Milk Hygiene (3).** Hygiene in milk production, processing, and distribution. 5 hrs (2 class, 3 lab). PR. ANSC 135. (1)

**ANSC 137. (formerly DSC 137) Cheese Technology (3).** Principles and techniques in the manufacture of natural and processed cheese. 5 hrs (2 class, 3 lab). PR. ANSC 135 or COI. (1)

**ANSC 142. (formerly ANSC 171) Nutritional Diseases of Farm Animals (3).** Recognition and management of disease and disorders attributed to nutrient deficiencies and toxicities affecting farm animals. 5 hrs (2 class, 3 lab). PR. ANSC 102 or COI. (2)

**ANSC 143. (formerly ANSC 70) Livestock and Poultry Feeding (3).** Composition and use of feeds for farm animals; formulation of rations and feeding practices. 5 hrs (2 class, 3 lab). PR. ANSC 116 or COI. (1,2)

**ANSC 161. (formerly ANSC 165) Methods in Animal Breeding (3).** Measurement and inheritance of economically important traits of farm animals; systems of breeding and selection; inbreeding and hybridization in farm animals. 3 hrs (class). PR. ANSC 103 or COI. (1,2)

**ANSC 172. (formerly ANSC 185) The Fundamentals of Animal Climatology (3).** Mechanics of thermo-regulation and animal adaptations; thermal stress; the problems associated with the improvement of livestock production in tropical climate. 5 hrs (2 class, 3 lab). PR. ANSC 101 or COI. (1,2)

**ANSC 173. (formerly ANSC 162) Reproduction in Farm Animals (3).** Anatomy and physiology of reproduction and techniques for improving reproductive efficiency in farm animals. 5 hrs (2 class, 3 lab). PR. ANSC 101 or COI. (1)

**ANSC 190. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ANSC 191. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ANSC 199. Undergraduate Seminar (1).** (1,2)

**ANSC 200. Undergraduate Thesis (6).** (1,2,S)

**ANSC 200a. Major Practice (6).** (1,2,S)



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## CROP PROTECTION CLUSTER

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### Crop Protection

**CRPT 1. \* Principles of Crop Protection (3).** Identification, biology, and ecology of different pests and their natural enemies. 5 hrs (2 class, 3 lab). (1,2)

**CRPT 2.\* Pest Management (3).** Philosophies, strategies and methods in pest management. 5 hrs (2 class, 3 lab). PR. CRPT 1. (1,2)

### Entomology

**ENT 101. General Entomology (3).** Introduction to insect adaptations; structural, functional and developmental systems; taxonomy and ecology. 5 hrs (2 class, 3 lab). PR. BIO 2 or BIO 3 or ZOO 1. (1,2)

**ENT 110. Insect Morphology (3).** Phylogenetic study of the external and internal structures of insects and other arthropods. 7 hrs (1 class, 6 lab). PR. ENT 101 or COI. (1,2)

**ENT 120. Insect Physiology (3).** Comparative physiology of insects; functional mechanisms and physiological bases of behavior. 5 hrs (2 class, 3 lab). PR. ENT 101 or COI and CHEM 40. (1)

**ENT 125. Insecticide Toxicology (3).** Chemical and physical properties, formulations, biological effects and behavior of insecticides. 5 hrs (2 class, 3 lab). PR. ENT 101 or COI. (2)

**ENT 137 (or BIO 137). Insect Genetics (3).** Genetic concepts and mechanisms in insects, and their application in taxonomy, pest management, and genetic improvement of beneficial species. 5 hrs (2 class, 3 lab). PR. ENT 101 and BIO 30 or COI. (1,2)

**ENT 140. Insect Taxonomy (3).** Classification, biology and evolutionary relationships among insect taxa; taxonomic methods; curating insect collections. 7 hrs (1 class, 6 lab). PR. ENT 110 or COI. (2)

**ENT 146. Acarology (3).** The taxonomy and evolutionary relationships of the Acari; their habitats, trophic functions, life cycles, behavior and distribution. 5 hrs (2 class, 3 lab). PR. ENT 101 and COI. (2)

**ENT 151. Insect Ecology (3).** Dynamics of insect population, specifically their abundance, regulation, distribution and mensuration; community theories pertaining to natural control of pest species. 5 hrs (2 class, 3 lab). PR. ENT 140 or COI. (2)

**ENT 170. Crop Protection Entomology (5).** Bionomics and control of the major agricultural insect and mite pests of crop plants. 9 hrs (3 class, 6 lab). PR. CRPT 2 or COI. (1)

**ENT 172. Biological Control of Insect Pests (3).** Principles and methods of biological control of insect pests. 5 hrs (2 class, 3 lab). PR. CRPT 2 or COI. (2)

**ENT 174. Postharvest and Storage Pests (3).** Biology, identification and control of major and potential postharvest/storage pests of grains, vegetables and fruits, ornamental and medicinal crops. 5 hrs (2 class, 3 lab). PR. CRPT 2 or CRSC 2 or COI. (2)

**ENT 176. Medical and Veterinary Entomology (3).** Bionomics, identification and control of the major arthropods affecting man and domestic animals. 5 hrs (2 class, 3 lab). PR. ENT 101 or COI. (1)

**ENT 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.(1,2,S)

**ENT 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.(1,2,S)

**ENT 195. Entomological Techniques (3).** Principles of insect micrology and general insect rearing methods. 7 hrs (1 class, 6 lab). PR. ENT 101 or COI. (2)

**ENT 199. Undergraduate Seminar (1).** May be taken twice. (1,2,S)

**ENT 200. Undergraduate Thesis (6).** (1,2,S)

**ENT 200a. Major Practice (6).** (1,2,S)

### Plant Pathology

**PPTH 101. Principles of Plant Pathology (3).** History, nature, and causes of plant diseases; development, analysis, forecasting, assessment, and control of disease in plant populations. 3 hrs (class). PR. CRPT 1 or MCB 1. (1,2)

**PPTH 102. Control of Plant Diseases (3).** Theories and practices in plant disease control. 5 hrs (2 class, 3 lab). PR. PPTH 101 or CRPT 2. (1)

**PPTH 103. Introductory Phytobacteriology (3).** Nature and biology of bacterial pathogens of plants; their classification, life cycles in relation to disease development, host physiological responses to infection, ecology, and control. 5 hrs (2 class, 3 lab). PR. CRPT 1 or MCB 1. (1,2)

**PPTH 104. General Mycology (3).** Morphology, life cycles and taxonomy of fungi. 5 hrs (2 class, 3 lab). PR. BIO 2 or BIO 3 or BOT 1. (1,2)

**PPTH 106. Principles of Phytonematology (3).** Introduction to methodology, morphology, taxonomy, ecology, pathogenesis, and control of plant parasitic nematodes. 5 hrs (2 class, 3 lab). PR. CRPT 1 or ZOO 1. (1,2)

**PPTH 112. Biological Control of Plant Pathogens (3).** Nature, mechanisms, and interaction involved in the biological control of plant pathogens. 5 hrs (2 class, 3 lab). PR. PPTH 101. (2)

**PPTH 114. Introduction to Fungal Plant Pathogens (3).** Identification and biology of plant pathogenic fungi, disease cycles, and control. 5 hrs (2 class, 3 lab). PR. CRPT 1 or COI. (1,2)

**PPTH 115. Introductory Plant Virology (3).** Nature of plant viruses and symptoms of diseases produced; principles and techniques of transmission; purification, serology, and electron microscopy. 5 hrs (2 class, 3 lab). PR. CRPT 1 or MCB 1. (1,2)

**PPTH 121. Postharvest Pathology (3).** The nature, pathogenesis, and control of postharvest diseases of crops. 5 hrs (2 class, 3 lab). PR. PPTH 101. (1)

**PPTH 131. Research in Plant Pathology (3).** Research methods in plant diseases. 7 hrs (1 class, 6 lab). PR. PPTH 101. (2)

**PPTH 141. Principles of Plant Disease Epidemiology (3).** Elements of plant disease, theory of epidemic system, effects of environment, pathogen dispersal and disease spread, basic epidemic models, genetic basis of epidemics. 5 hrs (2 class, 3 lab). PR. PPTH 101 or COI. (1,2)

**PPTH 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2,S)

**PPTH 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2,S)

**PPTH 199. Undergraduate Seminar (1).** May be taken for additional unit, not to exceed a total of 2 units. (1,2)

**PPTH 200. Undergraduate Thesis (6).** (1,2,S)

**PPTH 200a. Major Practice (6).** (1,2,S)

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## CROP SCIENCE CLUSTER

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### Agricultural Biotechnology

**ABT 11. Introduction to Agricultural Biotechnology (1).** Overview of agricultural biotechnology; implications on Philippine and global agriculture. 1 hr (class). PR. None. (1,2)

**ABT 101 . Fundamentals of Agricultural Biotechnology (3).** Principles and applications of agricultural biotechnology. 3 hrs (class). PR. BIO 30 and CHEM 40. (1,2)

**ABT 105. Experimental Techniques in Agricultural Biotechnology (3).** Laboratory tools, procedures, and protocols in plant, animal, food and crop protection biotechnology. 7 hrs (1 class, 6 lab). PR. ABT 101 or COI. (1,2)

**ABT 106. Molecular Markers (3).** Principles and applications of molecular marker technologies in agriculture, medicine, industry, and environment. 5 hrs (2 class, 3 lab). PR. ABT 101 or COI. (1,2)

**ABT 107. Recombinant DNA Technology (3).** Principles and applications of recombinant DNA technology. 3 hrs (class). PR. ABT 101 or COI. (1,2)

**ABT 108. Issues and Regulation of Agricultural Biotechnology (3).** Technological and social issues and science-based assessment and regulation of agricultural biotechnology. 3 hrs (class). PR. ABT 107 or COI. (1,2)

**ABT 115. (or FST 115) Fundamentals of Food Biotechnology (3).** Principles and applications of food biotechnology. 3 hrs (class). PR. MCB 1 and CHEM 160. (1)

**ABT 120. Animal Biotechnology (3).** Fundamentals of animal biotechnology as applied to livestock and poultry production. 3 hrs (class). PR. ABT 101 or COI. (2)

**ABT 140. Biotechnology in Crop Protection (3).** Principles and applications of biotechnology in the management of insect pests, plant diseases, and weeds. 3 hrs (class). PR. CRPT 2 and BIO 30 or COI. (2)

**ABT 190. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. None. (1,2)

**ABT 191. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. None. (1,2)

**ABT 199. Undergraduate Seminar (1).** (1,2)

**ABT 200/200a. Undergraduate Thesis/Major Practice (6).** (1,2,S)

## Agronomy

**AGR 50. Principles of Plant Breeding (3).** Development, evaluation, and maintenance of improved crop plants. 3 hrs (class). PR. STAT 1 and BIO 30. (1,2)

**AGR 110. Grain Crops Production (3).** Culture and management of grain crops with emphasis on rice, corn, wheat, sorghum, soybean, and mungbean. 5 hrs (2 class, 3 lab). PR. CRSC 1. (1,2)

**AGR 112. Methods in Crop Research (3).** Experimental methods for developing and evaluating crop production technology. 3 hrs (class). PR. STAT 1 and CRSC 1 or COI. (1,2)

**AGR 114. Annual Industrial Crops Production (3).** Culture and management of selected industrial field crops, with emphasis on sugar cane, cotton, ramie, jute, kenaf, sunflower, sesame, and tobacco. 5 hrs (2 class, 3 lab). PR. CRSC 1. (2)

**AGR 116. Multiple Cropping (3).** Concepts, production technologies, and research methodology in multiple cropping. 5 hrs (2 class, 3 lab). PR. CRSC 1 and CRSC 2. (2)

**AGR 118. Pasture and Feed Crops Production (3).** Culture and management of crops intended for feed and pasture and forage crops. 5 hrs (2 class, 3 lab). PR. CRSC 1. (1)

**AGR 132. Biology of Weeds (3).** Establishment, reproduction, and dispersal of weeds; relationship with other plants and changes in weed population. 5 hrs (2 class, 3 lab). PR. BOT 20 or COI. (1)

**AGR 133. Weeds and their Control (3).** Weed identification, methods of weed control, and introduction to herbicides and factors influencing their use. 5 hrs (2 class, 3 lab). PR. COI. (1,2)

**AGR 141. Field Crop Physiology (3).** Physiological concepts and processes and their relationship with crop yield, with emphasis on major field crop. 5 hrs (2 class, 3 lab). PR. CRSC 2 or BOT 20. (1,2)

**AGR 150. Methods in Plant Breeding I (3).** Methods

and techniques in the improvement of crop plants. 5 hrs (2 class, 3 lab). PR. AGR 50. (1,2)

**AGR 152. Plant Genetic Resources Conservation and Management (3).** Concepts and methods of plant genetic resources collection, conservation, evaluation, documentation, and use. 5 hrs (2 class, 3 lab). PR. AGR 50. (2)

**AGR 153. Methods in Plant Breeding II (3).** Mutation breeding, wide hybridization, and application of advances in biotechnology in crop improvement. 5 hrs (2 class, 3 lab). PR. AGR 150. (1)

**AGR 170. Fundamentals of Seed Technology (3).** Concepts and methodologies in seed production, processing, storage, distribution, and quality control. 5 hrs (2 class, 3 lab). PR. CRSC 1 and CRSC 2, CRPT 2 and BOT 20 or COI. (1,2)

**AGR 172. Seed Storage (3).** Principles and methods of seed storage. 5 hrs (2 class, 3 lab). PR. CRSC 2 or COI. (1)

**AGR 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.(1,2,S)

**AGR 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.(1,2,S)

**AGR 199. Undergraduate Seminar (1).** May be taken twice. 1 hr (class). PR. COI. (1,2)

**AGR 200. Undergraduate Thesis (6).** (1,2,S)

**AGR 200a. Major Practice (6).** PR. COI. (1,2,S)

## Agriculture

**AGRI 111. Introduction to Farming Systems (3).** Principles and determinants of farming systems; procedures for designing and evaluating location-specific farming systems options. 5 hrs (2 class, 3 lab). PR. CRSC 2 and ANSC 2 or COI. (1,2)

**AGRI 121. Introduction to Ecological Agriculture (3).** Principles and practices of ecological agriculture. 3 hrs (class). PR. CRSC 2 or COI. (1,2)

## Crop Science

**CRSC 1. \*\*Fundamentals of Crop Science I (3).** Introduction to crop science and basic concepts in crop production. 5 hrs (2 class, 3 lab). PR. BIO 1 or BOT 1. (1,2)

**CRSC 2. \*\* Fundamentals of Crop Science II (3).** Principles and practices of crop production. 5 hrs (2 class, 3 lab). PR. CRSC 1. (1,2)

### Horticulture

**HORT 20. Principles of Vegetable Production (3).** Principles of vegetable production, with emphasis on tropical and some temperate vegetables. 5 hrs (2 class, 3 lab). PR. CRSC 1 and CRSC 2. (1,2)

**HORT 30. Principles of Fruits and Plantation Crops Production (3).** Principles underlying the practices in the production and management of fruits and plantation crops. 5 hrs (2 class, 3 lab). PR. CRSC 1 and CRSC 2. (1,2)

**HORT 40. Ornamental Horticulture (3).** Principles of growing ornamentals and their utilization on landscape design. 5 hrs (2 class, 3 lab). PR. CRSC 1 and CRSC 2. (1,2)

**HORT 106. Plant Propagation and Nursery Management (3).** Principles and practices in the sexual and asexual propagation of woody and herbaceous plants; care and management of nurseries. 5 hrs (2 class, 3 lab). PR. CRSC 1 and CRSC 2 or COI. (1,2)

**HORT 109. Postharvest Handling and Storage of Perishable Crops (3).** Postharvest deterioration; technology of handling and storage of perishable crops. 3 hrs (class). PR. BOT 20 or COI. (1,2)

**HORT 109.1. Postharvest Handling and Storage of Perishable Crops Laboratory (2).** 6 hrs (lab). PR. HORT 109 or COI. (1,2)

**HORT 113. Plant Tissue Culture (3).** Principles and practices in the *in vitro* culture of plants. 5 hrs (2 class, 3 lab). PR. BOT 20 or COI. (2)

**HORT 115. Regulatory Processes in Horticultural Crop Production Practices (3).** Physiological, ecological and genetic bases of the various crop production techniques in horticulture. 5 hrs (2 class, 3 lab). PR. CRSC 2 and BOT 20 or COI. (2)

**HORT 116. Therapeutic Horticulture (3).** Utilization of horticulture for human health and well-being. 5 hrs (2 class, 3 lab). PR. CRSC 1 or COI. (2)

**HORT 118. Organic Horticulture (3).** Principles and practices in the utilization of farm wastes and other biological materials in horticulture. 5 hrs (2 class, 3 lab). PR. HORT 20 or HORT 30 or HORT 40 or COI. (2)

**HORT 119. Urban Horticulture (3).** Production and management practices for horticultural crops in urban areas. 5 hrs (2 class, 3 lab). PR. CRSC 2 or COI. (2)

**HORT 120. Commercial Vegetable Production (3).** Technologies in vegetable production and management and their relationships to physical environments, biological, and socio-economic factors. 5 hrs (2 class, 3 lab). PR. HORT 20 or its equivalent. (1,2)

**HORT 123. Vegetable Variety Identification, Maintenance and Evaluations (3).** Classification of vegetable species and varieties with emphasis on adaptation, principles, and practices in variety maintenance; field postharvest and consumer acceptability evaluations. 7 hrs (1 class, 6 lab). PR. HORT 20 or COI. (2,S)

**HORT 125. Production and Handling of Tropical Vegetable Seeds (3).** Production and handling of vegetable seeds; environmental and genetic factors affecting seed production. 5 hrs (2 class, 3 lab). PR. HORT 20 or COI. (2)

**HORT 130. Major Tropical Fruits (3).** Botany, production, and management of major tropical fruits. 5 hrs (2 class, 3 lab). PR. HORT 30 or COI. (2)

**HORT 131 (or BOT 131). Inorganic Plant Nutrition (3).** Principles of mineral nutrition of higher plants. 5 hrs (2 class, 3 lab). PR. BOT 20. (1,2)

**HORT 132 (or BOT 132). Plant Growth (3).** The nature and processes of growth in plants, including the role played in the process by phytohormones. 5 hrs (2 class, 3 lab). PR. BOT 20. (1,2)

**HORT 135. Plantation Crop Production and Management (3).** Botany, production, and management of plantation crops, with emphasis on coconut, abaca, coffee, cacao and rubber. 5 hrs (2 class, 3 lab). PR. HORT 30 or COI. (1)

**HORT 139. Handling, Processing and Grading of Plantation Crop Products (3).** Handling, processing, and grading of plantation crop products, with emphasis on coconut, abaca, coffee, cacao and rubber. 5 hrs (2 class, 3 lab). PR. HORT 30 or COI. (2)

**HORT 140. Major Ornamental Plants in the Tropics (3).** Botany, culture, and ecophysiology of the major ornamental crops in the tropics. 5 hrs (2 class, 3 lab). PR. HORT 40 or COI. (1)



**HORT 141. Plant Arts (3).** Principles and techniques of utilizing horticultural plants or plant parts in arts. 7 hrs (1 class, 6 lab). PR. CRSC 1 or COI. (2)

**HORT 142. Orchids and their Culture (3).** Botany, breeding, and culture of commercial and botanical orchids. 5 hrs (2 class, 3 lab). PR. HORT 132 (or BOT 132) or COI. (2)

**HORT 145. Landscape Horticulture (3).** Theories and practices in landscaping, site planning, design analysis, construction, maintenance, and nursery management. 5 hrs (2 class, 3 lab). PR. CRSC 1 and CSRC 2 or COI. (2)

**HORT 146. Fundamentals of Turfgrass Management (3).** Principles and practices in sod production nursery, turfgrass utilization, establishment, and maintenance. 5 hrs (2 class, 3 lab). PR. CRSC 1 and CRSC 2 or COI. (1)

**HORT 147. Landscape Establishment and Maintenance (3).** Principles and practices of managing man-made landscapes. 5 hrs (2 class, 3 lab). PR. HORT 145 or COI. (1)

**HORT 148. Interior Landscaping (3).** Principles and practices of interior landscaping. 5 hrs (2 class, 3 lab). PR. HORT 145 or COI. (1)

**HORT 149. Plantscape-Hardscape Relations (3).** Integration of plants with physical structures in landscaping. 5 hrs (2 class, 3 lab). PR. HORT 145 or COI. (2)

**HORT 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.(1,2)

**HORT 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.(1,2)

**HORT 199. Undergraduate Seminar (1).** May be taken twice. PR. COI. (1,2)

**HORT 200. Undergraduate Thesis (6).** (1,2,S)

**HORT 200a. Major Practice (6).** (1,2,S)

#### Science, Technology and Society

**STS 10. Exploring Biotechnology (3).** Concepts and applications of biotechnology; issues and concerns. 3 hrs (class). PR. None. (1,2)

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## FOOD SCIENCE CLUSTER

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### Food Science and Technology

**FST 11. Fundamentals of Food Science and Technology (3).** Introduction to food science and technology; basic principles of food science. 3 hrs (class). PR. None. (1,2)

**FST 101. Food Chemistry I (3).** Chemical composition of foods and its effect on texture, flavor, color and nutritive value. 5 hrs (2 class, 3 lab). PR. CHEM 40 and CHEM 40.1. (1,2)

**FST 102. Food Analysis (4).** Application of chemical, physical, biological, and sensory analysis of foods and food products, with reference to the laboratory operations of a food manufacturing plant. 8 hrs (2 class, 6 lab). PR. FST 101 and CHEM 32 and CHEM 32.1. (1,2)

**FST 111. Food Chemistry II (3).** Physico-chemical aspects of the processes and interactions that occur during the manufacture, handling, and storage of foods. 3 hrs (class). PR. FST 101, MATH 27, and PHYS 3. (1,2)

**FST 115. Fundamentals of Food Biotechnology (3).** Principles and applications of food biotechnology. 3 hrs (class). PR. MCB 1 and CHEM 160. (1)

**FST 122. Fundamentals of Food Fermentation (3).** Types of fermentation; pathways, and processing of fermented food products. 5 hrs (2 class, 3 lab). PR. CHEM 160 and MCB 1. (1)

**FST 130. Food Engineering I (3).** Principles of mass and heat transfer applied to food processing; physical properties of food materials. 5 hrs (2 class, 3 lab). PR. MATH 27 and PHYS 3. (1,2)

**FST 131. Food Engineering II (3).** Thermal processing, dehydration, chilling and freezing, evaporation, size reduction and packaging and handling of food materials. 5 hrs (2 class, 3 lab). PR. FST 130 and PHYS 13. (1,2)

**FST 132. Food Engineering III (3).** Principles of steam generation, extraction, food extrusion, process control, food processing plant, waste and by-products management. 5 hrs (2 class, 3 lab). PR. FST 130. (2)

**FST 140. Food Processing I (3).** Principles of food processing; food fermentation, thermal processing, dehydration and low temperature preservation. 5 hrs (2 class, 3 lab). PR. MCB 180 and FST 130. (1,2)

**FST 141. Food Processing II (3).** Principles of food processing; water activity, concentration processes, use of food additives, food packaging and food laws. 5 hrs (2 class, 3 lab). PR. MCB 180 and FST 130. (1,2)

**FST 145. Fruits and Vegetables Processing (3).**

Principles of fruit and vegetable processing, canning, drying, dehydration, freezing, and sugar concentration. 5 hrs (2 class, 3 lab). PR. FST 101. (1)

**FST 147. Principles of Product and Process Development (3).**

Systematic way of product and process development from product idea generation to screening, to product formulation, and viability testing. 3 hrs (class). PR. FST 140 and FST 141 or COI. (2)

**FST 148. Food Packaging (3).** Food Packaging: Systems

and interactions, properties of packaging material, labeling, issues and trends. 5 hrs (2 class, 3 lab). PR. FST 141 or COI. (2)

**FST 161. Sensory Evaluation of Food Products (3).**

Fundamental aspects of subjective and objective evaluation of food quality; certain basic influences in food acceptance patterns. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**FST 166. Food Hygiene and Sanitation (3) .**

Fundamentals of food hygiene and evaluation of





College of Arts and Sciences



University of the Philippines Los Baños





# COLLEGE OF ARTS AND SCIENCES

Felino P. Lansigan, *Dean*  
Myrna S. Rodriguez, *Associate Dean*  
Ivan Marcelo A. Duka, *College Secretary*  
Girlie Nora A. Abrigo, *Assistant College Secretary*  
Merlyn S. Mendiolo, *Director, Institute of Biological Sciences*  
Hidelisa P. Hernandez, *Director, Institute of Chemistry*  
Jaime M. Samaniego, *Director, Institute of Computer Science*  
Chryslina Margus N. Piñol, *Director, Institute of Mathematical Sciences and Physics*  
Conсорcia E. Reaño, *Director, Institute of Statistics*  
Leonora M. Fajutagana, *Chair, Department of Humanities*  
Naomi M. Enriquez, *Chair, Department of Human Kinetics*  
Dwight David A. Diestro, *Chair, Department of Social Sciences*  
Liza C. Carascal, *Principal, UP Rural High School*  
Rolando G. Panopio, *Coordinator, Mathematics and Science Teaching Program*

## OBJECTIVES

The College has three major responsibilities. First, it takes charge of general education courses required of every UPLB undergraduate, regardless of the student's area of specialization. These courses deal with art and literature, history, social, political and economic systems as well as the relationship of these systems to the environment. Moreover, they aim to deepen the student's understanding of science as an intellectual process. Second, the College offers various undergraduate curricula. In each curriculum, teacher and student conduct research on humanities and science courses in the student's chosen field. Some of these courses may be taken in other U. P. units. For instance, the B. S. Biology (major in ecology) program is an interdisciplinary, inter-unit curriculum that enables the student to enroll in subjects offered not only in the College, but also in the College of Agriculture, College of Forestry and Natural Resources, and College of Human Ecology. The third major responsibility of the College involves teaching graduate courses. These activities are also relevant to national and Southeast Asian regional development.

## UNDERGRADUATE PROGRAMS

The undergraduate degree programs are:

**1. Bachelor of Arts in Communication Arts.** This program seeks to produce graduates who demonstrate critical understanding and rigorous application of the various theories of language, literature, communication and performance, and who are driven by the spirit of social responsibility. Students are exposed not only to the fields of public relations and advertising, but are adequately trained in the program's areas of concentration: writing, speech communication, and theatre arts. Students may choose to conduct a thesis or do practicum work in various media outfits and communication offices.

**2. Bachelor of Arts in Philosophy.** This program

harnesses the student's critical thinking, creativity, innovativeness, and sensitivity to Philippine issues. The program is also designed to give emphasis on the application of philosophy to the Philippine context (with 18 units of applied philosophy courses). The thrust of the program is to produce graduates who will exert pioneering efforts to uncover, highlight, and examine indigenous Filipino thought through speculative analysis. The program emphasizes the role of research and extension in uncovering the richness of the Filipino mind embedded in Philippine culture, arts, politics, and folkways throughout Philippine history. This program is an effective preparatory course for law and related graduate programs.

**3. Bachelor of Arts in Sociology.** The program, which has thesis/practicum and non-thesis options, complements the science and technology-oriented programs of the technical colleges and institutes of UPLB. It seeks to combine the breadth of the liberal arts tradition, the depth of specialization in the field of sociology, and the flexibility of a wide range of electives in the social sciences.

**4. Bachelor of Science in Applied Mathematics.** This is a four-year program that aims to produce graduates proficient in the use of Mathematics in modeling complex natural and social phenomena critical to the solution of vital problems facing the nation. Students are made to choose from a wide variety of elective courses in Operations Research, Actuarial Science, Biomathematics, Mathematical Finance, and other fields.

**5. Bachelor of Science in Applied Physics.** This is a four-year curriculum designed to train students in the use of fundamental physics concepts and principles for practical problem solving. Currently, the program has three areas of specialization - Computational Physics, Experimental Physics and Instrumentation Physics. Each provides students with a specific set of knowledge and technical skills needed to approach problems in astrophysics, bio- and environmental physics, condensed matter materials physics, and other disciplines.

**6. Bachelor of Science in Biology.** The curriculum provides the students with a holistic view of life through the integration of the biological sciences, such as zoology, botany, and microbiology with the physical sciences, such as physics and chemistry. It allows the student to choose a major from the following areas and disciplines of biology: Ecology, Genetics, Cell and Molecular Biology, Microbiology, Plant Biology, Systematics, Wildlife Biology, and Zoology. To meet the major requirements, the student may select any one of the following options: (1) 6 units of thesis plus a minimum of 24 units of major course work; (2) 3 units of special problem plus a minimum of 27 units of course work; (3) 3 units of practicum plus a minimum of 27 units of major course work (for microbiology majors only); or (4) a minimum of 30 units of course work in a major area.

**7. Bachelor of Science in Chemistry.** The four-year degree program is designed to produce





highly trained chemistry practitioners for industry as well as for academic and research institutions who can engage in industry practice, teaching, research, development and extension work in all areas of basic and applied chemistry. The program requires at least 74 units of chemistry, far more than the 60 units of chemistry courses set by the Professional Regulation Commission as the minimum requirement for taking the Chemistry Licensure Examination. The rigorous preparation enables graduates to become professional chemists who can secure employment in top academic, industrial and government institutions as chemists or pursue further studies in chemistry, material science and other allied fields, or even pursue medicine or law.

#### **8. Bachelor of Science in Computer Science.**

The program aims to produce graduates highly capable of working in the computer industry and who are well-equipped to pursue graduate studies in computer science by providing a broad-based and coherent coverage of computer science. Students develop a reasonable level of understanding about the subject areas of the discipline, as well as an appreciation of the interrelationships among these areas. Students are also trained in the methodologies of computing in research and development. Specialized courses are offered as electives to ensure depth of study in some subject areas.

**9. Bachelor of Science in Mathematics.** This program represents the breadth and depth of mathematics, from classical to contemporary, from the theoretical to the applied. The curriculum will enhance the students' mathematical and critical thinking skills, and develop in them a greater appreciation and understanding of the importance of mathematics in history and in the modern world.

**10. Bachelor of Science in Mathematics and Science Teaching.** The BS MST program is designed to produce versatile teachers who can teach all high school mathematics and science courses with proficiency, and who can perform action researches using current technology, strategies, and methods. A joint program of IBS, IC and IMSP, this curriculum is a strong version of the BS Education program as far as mathematics and science teaching is concerned. It comprises of 27-30 units of major (all content) courses and three minor areas that carry 9-12 units each.

**11. Bachelor of Science in Statistics.** The program provides students with a solid foundation in statistics and mathematics through core and major courses, and an exposure to various fields where Statistics may be applied. The program is designed to produce graduates who can do very well in any field where they may find employment regardless of whether the institution or agency is research, industry or academic in orientation.

The curriculum includes 39 units of RGEP courses, 18 units of mathematics courses, 9 units of legislated courses, and 61 units of statistics courses, for a total of 153 units. Foundation courses in biology, physics, and chemistry were included to expose students to some basic concepts and practices in scientific investigation; while the core course in economics exposes the students to the social relevance of statistics. The advantage of UPLB Statistics graduates being good programmers is ensured with the inclusion of programming courses in computer science.

**12. Bachelor of Science in Agricultural Chemistry.** This five-year program is jointly offered by the College of Arts and Sciences and the College of Agriculture. The program prepares its students to become full-fledged chemists who are specially trained to tackle chemistry problems related to food and agriculture in support of the agricultural and rural development thrusts of the country. Students in this program take at least 77 units of chemistry, far more than the 60 units of chemistry courses set by the Professional Regulation Commission as the minimum requirement for taking the Chemistry Licensure Examination. The program also requires 15 units of specialization courses that the student can utilize to satisfy the minimum requirement for taking the Agriculture Licensure Examination. Thus, through a judicious use of specialization courses, a graduate of this program may be eligible to take both the Chemistry and Agriculture Licensure Examinations. Moreover, the rigorous preparation enables graduates of this interdisciplinary degree program to become professional chemists who can secure employment in top academic, agro-industrial and government institutions as chemists; and pursue an academic or research career or graduate studies in chemistry, biochemistry, physiology, nutrition or other food and agricultural fields allied with the chemical sciences.

**BACHELOR OF ARTS IN COMMUNICATION ARTS\***  
118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>                                    | <i>Units</i> | <i>Second Semester</i>                        | <i>Units</i> |
|--|--------------|---|--------------|
| <i>FIRST YEAR</i>  |              |   |              |
| FIL 20, Mga Piling Katha ng mga Manunulat na Pilipino    | 3            | ENG 2 (AH), College Writing in English        | 3            |
| ENG 1 (AH), College English                              | 3            | MATH 2 (MST), Problem Solving                 | 3            |
| SPCM 1 (AH), Speech Communication                        | 3            | G.E. (MST)                                    | 3            |
| IT 1 (MST), Information Technology Literacy              | 3            | G.E. (SSP)                                    | 3            |
| PHLO 1 (SSP), Philosophical Analysis                     | 3            | SOC 130, Social Psychology                    | 3            |
| G.E. (SSP)   | 3            | Elective (Language)                           | 3            |
| PE 1, Foundations of Physical Fitness                    | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course           | <u>(2)</u>   |
|  | 18           |   | 18           |
| <i>SECOND YEAR</i>                                       |              |   |              |
| COMA 101, Language and Communication                     | 3            | COMA 104, Language and Culture                | 3            |
| G.E. (AH)  | 3            | ENG 4, Masterpieces in World Literature       | 3            |
| G.E. (MST)   | 3            | FIL 21, Poklorikong Filipino                  | 3            |
| G.E. (AH)  | 3            | G.E. (SSP)                                    | 3            |
| Elective (Language)                                      | 3            | SPCM 102, Voice and Diction                   | 3            |
| Elective (NASC)  | 3            | Elective (NASC/MATH)                          | 3            |
| PE 2 or 3, Basic or Advanced Course                      | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course           | <u>(2)</u>   |
| NSTP 1, National Service Training Program I              | <u>(3)</u>   | NSTP 2, National Service Training Program II  | <u>(3)</u>   |
|  | 18           |   | 18           |
| <i>THIRD YEAR</i>  |              |   |              |
| COMA 192, Introduction to Research                       | 3            | ENG 102, Business & Professional Reports      | 3            |
| COMA 105, Principles of Public Relations and Advertising | 3            | HUM 170, Philippine Art and Society           | 3            |
| ENG 101, English Prose Style                             | 3            | PI 10 (SSP), The Life and Works of Jose Rizal | 3            |
| THEA 107, Theater Communication                          | 3            | SPCM 104, Occasional Speeches                 | 3            |
| Elective (SOSC)  | 3            | Elective (Scientific/Technical Writing)       | 3            |
| Major  | <u>3</u>     | Major   | <u>3</u>     |
|  | 18           |   | 18           |
| <i>FOURTH YEAR</i>                                       |              |   |              |
| COMA 193, Workshop                                       | 3            | COMA 200/200a, Thesis/Practicum               | 6            |
| G.E. (SSP)   | 3            | G.E. (MST)                                    | 3            |
| Elective (PHLO)  | 3            | Major   | 3            |
| Elective (SOSC)  | 3            | Major   | 3            |
| THEA 101, History of the Theater                         | 3            | Major   | <u>3</u>     |
| Major  | <u>3</u>     |   | 18           |
| Major  | 18           |   |              |
| <b>TOTAL NUMBER OF UNITS..... 144</b>                    |              |   |              |

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF ARTS IN PHILOSOPHY \***  
*(First Three Years Common to Thesis and Non-Thesis Options)*  
 118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <b>First Semester</b>   | <b>Units</b> | <b>Second Semester</b>                         | <b>Units</b> |
|---|--------------|--|--------------|
| <i>FIRST YEAR</i>   |              |  |              |
| IT 1 (MST), Information Technology Literacy                         | 3            | ENG 2 (AH), College Writing in English         | 3            |
| ENG 1 (AH), College English   | 3            | G.E. (SSP)                                     | 3            |
| G.E. (SSP)  | 3            | G.E. (MST)                                     | 3            |
| G.E. (SSP)  | 3            | ECON 11, General Economics <i>or</i>           |              |
| PHLO 1 (SSP), Philosophical Analysis                                | 3            | POSC 10, Principles of Government and Politics | 3            |
| PSY 1 (SSP), Exploring the Self: Thoughts, Feelings,<br>and Actions | 3            | PHLO 9, Logic                                  | 3            |
| PE 1, Foundations of Physical Fitness                               | <u>(2)</u>   | SPEC, Readings in Speculative Thought          | 3            |
|   | 18           | PE 2 or 3, Basic or Advanced Course            | <u>(2)</u>   |
|   |              |  | 18           |

*SECOND YEAR*

|   |            |  |            |
|---|------------|--|------------|
| HUM 1 (AH), Literature, Man and Society       | 3          | G.E. (AH)                                    | 3          |
| G.E. (AH)                                     | 3          | G.E. (MST)                                   | 3          |
| G.E. (MST)                                    | 3          | PHLO 111, Medieval Philosophy                | 3          |
| PI 10 (SSP), The Life and Works of Jose Rizal | 3          | PHLO 120, Philosophical Reasoning            | 3          |
| PHLO 110, Ancient Philosophy                  | 3          | PHLO 150, Epistemology                       | 3          |
| PHLO 197, Philosophic Problems                | 3          | PHLO 171, Ethics                             | 3          |
| PE 2 or 3, Basic or Advanced Course           | <u>(2)</u> | PE 2 or 3, Basic or Advanced Course          | <u>(2)</u> |
| NSTP 1, National Service Training Program I   | <u>(3)</u> | NSTP 2, National Service Training Program II | <u>(3)</u> |
|   | 18         |  | 18         |

*THIRD YEAR*

|                                  |          |                                    |          |
|----------------------------------|----------|------------------------------------|----------|
| PHLO 112, Modern Philosophy      | 3        | G.E. (MST)                         | 3        |
| PHLO 173, Practical Ethics       | 3        | PHLO 113, Contemporary Philosophy  | 3        |
| PHLO 174, Biomedical Ethics      | 3        | PHLO 160, Philosophy of Science    | 3        |
| PHLO 181, Aesthetics             | 3        | PHLO 182, Philosophy and Semiotics | 3        |
| PHLO 195, Philosophy of Language | 3        | Cognate <sup>2</sup>               | 3        |
| Elective                         | <u>3</u> | Other Major <sup>1</sup>           | <u>3</u> |
|                                  | 18       |                                    | 18       |

**A.**

**Thesis Option**

*FOURTH YEAR*

|  |          |                                |    |
|--|----------|--------------------------------|----|
| Other Major  | 3        | PHLO 184, Feminist Philosophy  | 3  |
| PHLO 176, Social and Political Philosophy                  | 3        | PHLO 200, Undergraduate Thesis | 6  |
| SFFG 120, Environment and Natural Resources<br>World Views | 3        | Elective <sup>3</sup>          | 3  |
| Cognate <sup>2</sup>                                       | 3        | Other Major <sup>1</sup>       | 3  |
| Elective <sup>3</sup>                                      | <u>3</u> |                                | 15 |
|  | 15       |                                |    |

**TOTAL NUMBER OF UNITS.....138**

**B.**

**Non-thesis Option**

*FOURTH YEAR*

|  |          |                               |    |
|--|----------|-------------------------------|----|
| Other Major  | 3        | PHLO 184, Feminist Philosophy | 3  |
| PHLO 176, Social and Political Philosophy                  | 3        | PHLO 190, Directed Study      | 3  |
| PHLO 190, Directed Study                                   | 3        | Cognate <sup>2</sup>          | 3  |
| SFFG 120, Environment and Natural Resources<br>World Views | 3        | Elective <sup>3</sup>         | 3  |
| Cognate <sup>2</sup>                                       | 3        | Other Major <sup>1</sup>      | 3  |
| Elective <sup>3</sup>                                      | <u>3</u> | Other Major <sup>1</sup>      | 3  |
|  | 18       |                               | 18 |

**TOTAL NUMBER OF UNITS.....144**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

<sup>1</sup> Any of the following other major courses: PHLO 100, PHLO 102, PHLO 125, PHLO 126, PHLO 175

<sup>2</sup> Cognates must be taken in only one discipline

<sup>3</sup> Any three-unit course credited within the UP System



**BACHELOR OF ARTS IN SOCIOLOGY\***  
**(First Two Years Common to Thesis/Practicum and Non-Thesis Options)**  
 118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>   | <i>Units</i> | <i>Second Semester</i>                                    | <i>Units</i> |
|---|--------------|---|--------------|
| <i>FIRST YEAR</i>   |              |   |              |
| ENG 1 (AH), College English   | 3            | ENG 2 (AH), College Writing in English                    | 3            |
| MATH 2 (MST), Problem Solving                                       | 3            | NASC 5 (MST), Environmental Biology                       | 3            |
| SOC 10 (SSP), General Principles of Sociology                       | 3            | SOC 100, Social Organization                              | 3            |
| POSC 10, Principles of Government and Politics                      | 3            | MATH 11, College Algebra                                  | 3            |
| SOSC 1 (SSP), Foundations of Behavioral Sciences                    | 3            | PHLO 1 (SSP), Philosophical Analysis                      | 3            |
| PE 1, Foundations of Physical Fitness                               | (2)          | G.E. (SSP)  | 3            |
|   | <u>15</u>    | PE 2 or 3, Basic or Advanced Course                       | (2)          |
|   |              |   | <u>18</u>    |
| <i>SECOND YEAR</i>  |              |   |              |
| ECON 11, General Economics  | 3            | AERS 160, Rural Sociology                                 | 3            |
| SPCM 1 (AH), Speech Communication                                   | 3            | ANTH 10, Introduction to Social and Cultural Anthropology | 3            |
| G.E. (AH)   | 3            | PI 10 (SSP), The Life and Works of Jose Rizal             | 3            |
| STAT 1, Elementary Statistics                                       | 3            | SOC 110, Sociology of the Family                          | 3            |
| SOC 116, Sociology of Religion                                      | 3            | STAT 166, Statistics for the Social Sciences              | 3            |
| SOC 105, Social Stratification                                      | 3            | SOC 170, Social Problems or                               |              |
| PE 2 or 3, Basic or Advanced Course                                 | (2)          | SOC 175, Deviance   | 3            |
| NSTP 1, National Service Training Program I                         | (3)          | PE 2 or 3, Basic or Advanced Course                       | (2)          |
|   | <u>18</u>    | NSTP 2, National Service Training Program II              | (3)          |
|   |              |   | <u>18</u>    |
| <i>THIRD YEAR</i>   |              |   |              |
| STS 1 (MST), Science, Technology and Society                        | 3            | G.E. (AH)   | 3            |
| SOC 107, Gender Relations   | 3            | SOC 140, Introduction to Demography                       | 3            |
| SOC 151, Classical Sociological Theories                            | 3            | SOC 152, Contemporary Sociological Theories               | 3            |
| SOC 195, Research Methodologies in the Social Sciences              | 2            | SOC 166, Social Program Evaluation                        | 3            |
| SOC 195.1, Research Methodologies in the Social Sciences Laboratory | 1            | SOC 192, Introduction to Qualitative Social Research      | 3            |
| G.E. (MST)  | 3            | Elective  | <u>3</u>     |
| Elective  | <u>3</u>     |   | <u>18</u>    |
|   | <u>18</u>    |   |              |
| <i>FOURTH YEAR</i>  |              |   |              |
| SOC 114, Sociology of Economic Life                                 | 3            | SOC 112, Sociology of Politics                            | 3            |
| SOC 120, Urban Sociology  | 3            | SOC 160, Social Change or                                 |              |
| SOC 130, Social Psychology or                                       |              | SOC 165, Sociology of Development                         | 3            |
| SOC 135, Attitudes and Persuasion                                   | 3            | SOC 200, Undergraduate Thesis or                          |              |
| SOC 180, Collective Behavior  | 3            | SOC 200a, Practicum                                       | 3            |
| SOC 191, Special Topics   | 3            | G.E. (SSP)  | 3            |
| G.E. (MST)  | 3            | Elective  | 3            |
| SOC 200, Undergraduate Thesis or                                    |              | SOC 199, Undergraduate Seminar                            | <u>1</u>     |
| SOC 200a, Practicum   | <u>3</u>     |   | <u>16</u>    |
|   | <u>21</u>    |   |              |

**TOTAL NUMBER OF UNITS .....142**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum. Students should be advised to take SOSC 1 and PSY 1 as GE electives in the First Semester, First Year and Second Semester, First Year, respectively.

**BACHELOR OF ARTS IN SOCIOLOGY (continued)**  
 118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>   | <i>Units</i> | <i>Second Semester</i>                               | <i>Units</i> |
|---|--------------|--|--------------|
| <b>B. Coursework Option</b>   |              |  |              |
| <i>THIRD YEAR</i>   |              |  |              |
| STS 1 (MST), Science, Technology and Society                        | 3            | G.E. (AH)  | 3            |
| SOC 115, Social Gerontology   | 3            | G.E. (SSP)   | 3            |
| SOC 107, Gender Relations   | 3            | SOC 152, Contemporary Sociological Theories          | 3            |
| SOC 151, Classical Sociological Theories                            | 3            | SOC 166, Social Program Evaluation                   | 3            |
| SOC 120, Urban Sociology  | 3            | SOC 192, Introduction to Qualitative Social Research | 3            |
| SOC 195, Research Methodologies in the Social Sciences              | 2            | Elective   | <u>3</u>     |
| SOC 195.1, Research Methodologies in the Social Sciences Laboratory | 1            |  | 18           |
| G.E. (MST)  | <u>3</u>     |  |              |
|   | 21           |  |              |
| <i>FOURTH YEAR</i>  |              |  |              |
| G.E. (MST)  | 3            | HFDS 122, Migration                                  | 3            |
| SOC 114, Sociology of Economic Life                                 | 3            | SOC 160, Social Change <i>or</i>                     |              |
| SOC 191, Special Topics   | 3            | SOC 165, Sociology of Development                    | 3            |
| SOC 130, Social Psychology <i>or</i>                                |              | SOC 112, Sociology of Politics                       | 3            |
| SOC 135, Attitudes and Persuasion                                   | 3            | SOC 119, Industrial Sociology                        | 3            |
| SOC 180, Collective Behavior  | 3            | SOC 129, Race and Ethnic Relations                   | 3            |
| Elective  | 3            | SOC 140, Introduction to Demography                  | 3            |
|   | 18           | SOC 199, Undergraduate Seminar                       | 1            |
|   |              | Elective   | <u>3</u>     |
|   |              |  | 22           |

**TOTAL NUMBER OF UNITS.....148**

**BACHELOR OF SCIENCE IN APPLIED MATHEMATICS\***  
118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>                        | <i>Units</i>        | <i>Second Semester</i>                        | <i>Units</i> |
|--|---------------------|---|--------------|
| <i>FIRST YEAR</i>                            |                     |   |              |
| AMAT 19, Finite Mathematics                  | 3                   | ENG 2 (AH), College Writing in English        | 3            |
| ENG 1 (AH), College English                  | 3                   | G.E. (SSP)                                    | 3            |
| G.E. (MST)                                   | 3                   | G.E. (MST)                                    | 3            |
| G.E. (SSP)                                   | 3                   | MATH 36, Mathematical Analysis I              | 5            |
| MATH 17, Algebra and Trigonometry            | 5                   | STAT 1, Elementary Statistics                 | 3            |
| PE 1, Foundations of Physical Fitness        | (2)                 | PE 2 or 3, Basic or Advanced Course           | (2)          |
|  | <u>17</u>           |   | <u>17</u>    |
| <i>SECOND YEAR</i>                           |                     |   |              |
| AMAT 150, Computer Programming               | 3                   | AMAT 110, Mathematical Modeling               | 3            |
| G.E. (SSP)                                   | 3                   | PI 10 (SSP), The Life and Works of Jose Rizal | 3            |
| SPCM 1 (AH), Speech Communication            | 3                   | G.E. (MST)                                    | 3            |
| G.E. (MST)                                   | 3                   | G.E. (AH)                                     | 3            |
| MATH 37, Mathematical Analysis II            | 5                   | MATH 38, Mathematical Analysis III            | 3            |
| MATH 101, Logic and Set Theory               | 3                   | MATH 120, Linear Algebra                      | 3            |
| PE 2 or 3, Basic or Advanced Course          | (2)                 | PE 2 or 3, Basic or Advanced Course           | (2)          |
| NSTP 1, National Service Training Program I  | (3)                 | NSTP 2, National Service Training Program II  | (3)          |
|  | <u>20</u>           |   | <u>18</u>    |
| <i>THIRD YEAR</i>                            |                     |   |              |
| Major Elective                               | 3                   | Major Elective                                | 3            |
| Major Elective                               | 3                   | Major Elective                                | 3            |
| Major Elective                               | 3                   | Major Elective                                | 3            |
| MATH 174, Numerical Analysis I               | 3                   | MATH 175, Numerical Analysis II               | 3            |
| MATH 181, Introduction to Probability Theory | 3                   | MATH 195, Research Methods in Mathematics     | 3            |
| MATH 151, Ordinary Differential Equations    | <u>3</u>            | Elective                                      | <u>3</u>     |
|  | 18                  |   | 18           |
| <i>SUMMER</i>                                |                     |   |              |
|  | AMAT 198, Practicum | 3   |              |
| <i>FOURTH YEAR</i>                           |                     |   |              |
| Major Elective                               | 3                   | Major Elective                                | 3            |
| G.E. (SSP)                                   | 3                   | Major Elective                                | 3            |
| G.E. (AH)                                    | 3                   | AMAT 190, Special Problems                    | 3            |
| G.E. (MST)                                   | 3                   | Elective                                      | 3            |
| Elective                                     | 3                   | AMAT 199, Undergraduate Seminar               | 1            |
| Elective                                     | <u>3</u>            | Elective                                      | <u>3</u>     |
|  | 18                  |   | 16           |
| <b>TOTAL NUMBER OF UNITS .....145</b>        |                     |   |              |

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF SCIENCE IN APPLIED PHYSICS\***  
118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>                         | <i>Units</i>        | <i>Second Semester</i>                          | <i>Units</i> |
|---|---------------------|---|--------------|
| <i>FIRST YEAR</i>                             |                     |   |              |
| G.E. (MST)                                    | 3                   | CMSC 11, Introduction to Computer Science       | 3            |
| ENG 1 (AH), College English                   | 3                   | ENG 2 (AH), College Writing in English          | 3            |
| G.E. (SSP)                                    | 3                   | G.E. (AH)                                       | 3            |
| G.E. (SSP)                                    | 3                   | G.E. (MST)                                      | 3            |
| MATH 17, Algebra and Trigonometry             | 5                   | G.E. (SSP)                                      | 3            |
| PE 1, Foundations of Physical Fitness         | (2)                 | MATH 36, Mathematical Analysis I                | 5            |
|   | 17                  | PE 2 or 3, Basic or Advanced Course             | (2)          |
|   |                     |   | 20           |
| <i>SECOND YEAR</i>                            |                     |   |              |
| PI 10 (SSP), The Life and Works of Jose Rizal | 3                   | CHEM 15, Fundamentals of Chemistry              | 3            |
| SPCM 1 (AH), Speech Communication             | 3                   | CHEM 15.1, Fundamentals of Chemistry Laboratory | 2            |
| MATH 37, Mathematical Analysis II             | 5                   | PHYS 111, Mathematical Physics I                | 3            |
| PHYS 81, Fundamental Physics I                | 5                   | G.E. (SSP)                                      | 3            |
| STAT 1, Elementary Statistics                 | 3                   | MATH 38, Mathematical Analysis III              | 3            |
| PE 2 or 3 Basic or Advanced Course            | (2)                 | PHYS 82, Fundamental Physics II                 | 5            |
| NSTP 1, National Service Training Program I   | (3)                 | PE 2 or 3, Basic or Advanced Course             | (2)          |
|   | 19                  | NSTP 2, National Service Training Program II    | (3)          |
|   |                     |   | 19           |
| <i>THIRD YEAR</i>                             |                     |   |              |
| APHY 101, Physics in Scientific Instruments   | 3                   | PHYS 115, Computational Physics I               | 3            |
| APHY 102, Physics of Electronic Devices       | 3                   | PHYS 121, Theoretical Mechanics I               | 3            |
| PHYS 83, Fundamental Physics III              | 5                   | PHYS 132, Electromagnetic Theory II             | 3            |
| PHYS 112, Mathematical Physics II             | 3                   | PHYS 192, Experimental Physics I                | 3            |
| PHYS 131, Electromagnetic Theory I            | 3                   | Specialization Course **                        | 3            |
| PHYS 195, Research Methods in Physics         | 3                   | Specialization Course **                        | 3            |
|   | 20                  |   | 18           |
| <i>Summer</i>                                 |                     |   |              |
|   | APHY 198, Practicum | 3   |              |
| <i>FOURTH YEAR</i>                            |                     |   |              |
| APHY 200, Undergraduate Thesis                | 3                   | APHY 191, Special Topics                        | 3            |
| PHYS 141, Quantum Physics I                   | 3                   | APHY 199, Undergraduate Seminar                 | 1            |
| PHYS 151, Statistical Physics I               | 3                   | APHY 200, Undergraduate Thesis                  | 3            |
| Specialization Course **                      | 3                   | Free Elective                                   | 3            |
| Specialization Course **                      | 3                   | Free Elective                                   | 3            |
| Free Elective                                 | 3                   | G.E. (AH)                                       | 3            |
|   | 18                  | G.E. (MST)                                      | 3            |
|   |                     |   | 19           |

**TOTAL NUMBER OF UNITS.....153**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

\*\* To be taken from Required Specialization Courses and Possible Electives.

Required Specialization Courses: Computational Physics: AMAT 110, AMAT 150, APHY 140, PHYS 116

Experimental Physics: APHY 150, APHY 160, PHYS 170, PHYS 193

Instrumentation Physics: APHY 103, APHY 104, APHY 105, APHY 132



**BACHELOR OF SCIENCE IN BIOLOGY\***  
118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>                                 | <i>Units</i> | <i>Second Semester</i>                       | <i>Units</i> |
|---|--------------|--|--------------|
| <i>FIRST YEAR</i>                                     |              |  |              |
| BIO 1, General Biology I                              | 3            | BIO 3, Biodiversity                          | 5            |
| CHEM 16, General Chemistry I                          | 3            | CHEM 17, General Chemistry II                | 3            |
| CHEM 16.1, General Chemistry I Laboratory             | 2            | CHEM 17.1, General Chemistry II Laboratory   | 2            |
| ENG 1 (AH), College English                           | 3            | ENG 2 (AH), College Writing in English       | 3            |
| HIST 1 (SSP), Philippine History                      | 3            | G.E. (SSP)                                   | 3            |
| MATH 11, College Algebra                              | 3            | MATH 14, Plane Trigonometry                  | 3            |
| PE 1, Foundations of Physical Fitness                 | (2)          | PE 2 or 3, Basic or Advanced Course          | (2)          |
|   | <u>17</u>    |  | <u>19</u>    |
| <i>SECOND YEAR</i>                                    |              |  |              |
| BIO 70, Earth's Processes & Biological Systems        | 3            | BIO 30, Genetics                             | 3            |
| BOT 3, Intermediate Botany                            | 3            | BIO 150, Principles of Ecology               | 3            |
| CHEM 40, Basic Organic Chemistry                      | 3            | CHEM 160, Introductory Biochemistry          | 3            |
| CHEM 40.1, Basic Organic Chemistry Laboratory         | 1            | G.E. (SSP)                                   | 3            |
| MATH 26, Analytic Geometry and Calculus I             | 3            | G.E. (MST)                                   | 3            |
| MCB 1, General Microbiology                           | 3            | ZOO 3, Intermediate Zoology                  | 3            |
| PHYS 3, General Physics 1 (Mechanics and Heat)        | 3            | PE 2 or 3, Basic or Advanced Course          | (2)          |
| PE 2 or 3, Basic or Advanced Course                   | (2)          | NSTP 2, National Service Training Program II | (3)          |
| NSTP 1, National Service Training Program I           | (3)          |  | <u>18</u>    |
|   | <u>19</u>    |  |              |
| <i>THIRD YEAR</i>                                     |              |  |              |
| BIO 101, Introductory Molecular Biology               | 3            | BIO 120, Cell Biology                        | 3            |
| G.E. (MST)  | 3            | BIO 140, Evolutionary Biology                | 3            |
| SPCM 1 (AH), Speech Communication                     | 3            | ENG 10, Writing of Scientific Papers         | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal         | 3            | G.E. (AH)                                    | 3            |
| STAT 1, Elementary Statistics                         | 3            | Major**                                      | 3            |
| Major**   | 3            | Major**                                      | 3            |
| Major**   | <u>3</u>     | Major**                                      | 3            |
|   | 21           |  | 21           |
| <i>FOURTH YEAR</i>                                    |              |  |              |
| BIO 199, Undergraduate Seminar in Biology             | 1            | BIO 199, Undergraduate Seminar in Biology    | 1            |
| FIL 20, Mga Piling Katha ng mga Manunulat na Pilipino | 3            | G.E. (MST)                                   | 3            |
| G.E. (AH)   | 3            | Elective                                     | 3            |
| G.E. (SSP)  | 3            | Elective                                     | 3            |
| Elective  | 3            | Major**                                      | 3            |
| Major**   | 3            | Major**                                      | 3            |
| Major**   | <u>3</u>     | Major**                                      | 3            |
|   | 19           |  | 19           |

**TOTAL NUMBER OF UNITS ..... 153**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

\*\*Possible major options: 6 units of thesis + 24 units of major courses; 3 units of special problem + 27 units of major courses; 3 units of practicum + 27 units of major courses (major in microbiology only); or 30 units of major courses  
Possible major fields: Cell and Molecular Biology, Ecology, Genetics, Microbiology, Plant Biology, Systematics, Wildlife Biology, and Zoology.

**BACHELOR OF SCIENCE IN CHEMISTRY\***  
118<sup>th</sup> UPLB UC 12/5/11; President's Approval

| <i>First Semester</i>   | <i>Units</i> | <i>Second Semester</i>   | <i>Units</i> |
|---|--------------|--|--------------|
| <i>FIRST YEAR</i>   |              |  |              |
| BOT 1, Introduction to Plant Science or<br>BIO 1, General Biology I | 3            | BIO 2, General Biology II or<br>ZOO 1, General Zoology                         | 3            |
| CHEM 16, General Chemistry I  | 3            | CHEM 17, General Chemistry II  | 3            |
| CHEM 16.1, General Chemistry I Laboratory                           | 2            | CHEM 17.1, General Chemistry II Laboratory                                     | 2            |
| ENG 1 (AH), College English   | 3            | ENG 2 (AH), College Writing in English   | 3            |
| HIST 1 (SSP), Philippine History                                    | 3            | G.E. (SSP)   | 3            |
| MATH 17, Algebra and Trigonometry                                   | 5            | G.E. (SSP)   | 3            |
| PE 1, Foundations of Physical Fitness                               | (2)          | MATH 26, Analytic Geometry and Calculus I                                      | 3            |
|   | <u>19</u>    | PE 2 or 3, Basic or Advanced Course  | <u>(2)</u>   |
|   |              |  | 20           |
| <i>Summer</i>   |              |  |              |
|   |              | CHEM 32, Quantitative Inorganic Analysis                                       | 3            |
|   |              | CHEM 32.1, Quantitative Inorganic Analysis Laboratory                          | <u>2</u>     |
|   |              |  | 5            |
| <i>SECOND YEAR</i>  |              |  |              |
| G.E. (MST)  | 3            | CMSC 11, Introduction to Computer Science or<br>AMAT 150, Computer Programming | 3            |
| SPCM 1 (AH), Speech Communication                                   | 3            | CHEM 44, Organic Chemistry II  | 3            |
| CHEM 43, Organic Chemistry I  | 3            | CHEM 44.1, Organic Chemistry II Laboratory                                     | 2            |
| CHEM 43.1, Organic Chemistry I Laboratory                           | 2            | MATH 28, Analytic Geometry and Calculus III                                    | 3            |
| MATH 27, Analytic Geometry and Calculus II                          | 3            | MCB 1, General Microbiology  | 3            |
| PHYS 81, Fundamental Physics I                                      | 5            | PHYS 82, Fundamental Physics II  | 5            |
| PE 2 or 3, Basic or Advanced Course                                 | (2)          | PE 2 or 3, Basic or Advanced Course  | (2)          |
| NSTP 1, National Service Training Program I                         | <u>(3)</u>   | NSTP 2, National Service Training Program II                                   | (3)          |
|   | 19           |  | 19           |
| <i>Summer</i>   |              |  |              |
|   |              | STAT 1, Elementary Statistics  | 3            |
|   |              | G.E. (MST)   | <u>3</u>     |
|   |              |  | 6            |
| <i>THIRD YEAR</i>   |              |  |              |
| CHEM 111, Physical Chemistry I                                      | 3            | CHEM 111.1, Physical Chemistry I Laboratory                                    | 2            |
| CHEM 140, Organic Analysis  | 4            | CHEM 112, Physical Chemistry II  | 3            |
| CHEM 161, General Biochemistry                                      | 4            | CHEM 120, Inorganic Chemistry  | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal                       | 3            | CHEM 137, Modern Analytical Chemistry  | 3            |
| PHYS 83, Fundamental Physics III                                    | <u>5</u>     | CHEM 161.1, General Biochemistry Laboratory                                    | 2            |
|   | 19           | CHEM 192, Chemical Information, Literature<br>and Communication                | 3            |
|   |              | G.E. (AH)  | <u>3</u>     |
|   |              |  | 19           |
| <i>FOURTH YEAR</i>  |              |  |              |
| CHEM 112.1, Physical Chemistry II Laboratory                        | 2            | CHEM 171, Industrial Chemistry   | 3            |
| CHEM 115, Physical Chemistry III                                    | 3            | CHEM 180, General Environmental Chemistry                                      | 3            |
| CHEM 120.1, Inorganic Chemistry Laboratory                          | 2            | CHEM 199, Undergraduate Seminar  | 1            |
| CHEM 137.1, Modern Analytical Chemistry<br>Laboratory               | 2            | CHEM 200, Undergraduate Thesis   | 3            |
| CHEM 200, Undergraduate Thesis                                      | 3            | G.E. (MST)   | 3            |
| G.E. (AH)   | 3            | Elective   | <u>3</u>     |
| G.E. (MST)  | <u>3</u>     |  | 16           |
|   | 18           |  |              |
| <b>TOTAL NUMBER OF UNITS ..... 160</b>                              |              |  |              |

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF SCIENCE IN COMPUTER SCIENCE\***  
 118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14  
 (First Three Years Common to Thesis /Special Problem/Practicum Options)

| <i>First Semester</i>                     | <i>Units</i> | <i>Second Semester</i>   | <i>Units</i> |
|---|--------------|--|--------------|
| <i>FIRST YEAR</i>                         |              |  |              |
| MATH 17, College Algebra and Trigonometry | 5            | CMSC 2, Introduction to the Internet                               | 3            |
| ENG 1 (AH), College English               | 3            | CMSC 11, Introduction to Computer Science                          | 3            |
| G.E. (SSP)                                | 3            | CMSC 56, Discrete Mathematical Structures<br>in Computer Science I | 3            |
| G.E. (MST)                                | 3            | MATH 26, Analytic Geometry and Calculus I                          | 3            |
| G.E. (SSP)                                | 3            | ENG 2 (AH), College Writing in English                             | 3            |
| PE 1, Foundations of Physical Fitness     | <u>(2)</u>   | G.E. (MST)   | 3            |
|   | 17           | PE 2 or 3, Basic or Advanced Course                                | <u>(2)</u>   |
|   |              |  | 18           |

|   |            |   |            |
|---|------------|---|------------|
| <i>SECOND YEAR</i>  |            |   |            |
| CMSC 21, Fundamentals of Programming                                | 3          | MATH 28, Analytic Geometry and Calculus III             | 3          |
| CMSC 57, Discrete Mathematical Structures<br>in Computer Science II | 3          | CMSC 22, Object-Oriented Programming                    | 3          |
| MATH 27, Analytic Geometry and Calculus II                          | 3          | CMSC 123, Data Structures                               | 3          |
| STAT 1, Elementary Statistics                                       | 3          | CMSC 130, Logic Design and Digital Computer<br>Circuits | 3          |
| G.E. (AH)   | 3          | G.E. (MST)  | 3          |
| G.E. (MST)  | 3          | G.E. (SSP)  | 3          |
| PE 2 or 3, Basic or Advanced Course                                 | (2)        | PE 2 or 3, Basic or Advanced Course                     | (2)        |
| NSTP 1, National Service Training Program I                         | <u>(3)</u> | NSTP 2, National Service Training Program II            | <u>(3)</u> |
|   | 18         |   | 18         |

|  |          |   |          |
|--|----------|---|----------|
| <i>THIRD YEAR</i>  |          |   |          |
| CMSC 100, Web Programming  | 3        | CMSC 125, Operating Systems                       | 3        |
| CMSC 124, Design and Implementation of<br>Programming Languages                  | 3        | CMSC 128, Introduction to Software Engineering    | 3        |
| CMSC 127, File Processing and Database Systems                                   | 3        | CMSC 132, Computer Architecture                   | 3        |
| CMSC 131, Introduction to Computer Organization<br>and Machine Level Programming | 3        | CMSC 170, Introduction to Artificial Intelligence | 3        |
| SPCM 1 (AH), Speech Communication  | 3        | ENG 10, Writing of Scientific Papers              | 3        |
| Free Elective  | <u>3</u> | Free Elective                                     | <u>3</u> |
|  | 18       |   | 18       |

**A. Thesis Option**

|   |          |   |          |
|---|----------|---|----------|
| <i>FOURTH YEAR</i>                            |          |   |          |
| CMSC 137, Data Communications and Networking  | 3        | CMSC 142, Design and Analysis of Algorithms   | 3        |
| CMSC 141, Automata and Language Theory        | 3        | CMSC 200, Undergraduate Thesis                | 3        |
| CMSC 150, Numerical and Symbolic Computations | 3        | PI 10 (SSP), The Life and Works of Jose Rizal | 3        |
| CMSC 199, Undergraduate Seminar               | 1        | G.E. (MST)                                    | 3        |
| CMSC 200, Undergraduate Thesis                | 3        | G.E. (AH)                                     | 3        |
| G.E. (SSP)                                    | 3        | Free Elective                                 | <u>3</u> |
| Free Elective                                 | <u>3</u> |   | 18       |
|   | 19       |   |          |

**TOTAL NUMBER OF UNITS ..... 144**

**B. Special Problem and Practicum Option**

|   |          |   |          |
|---|----------|---|----------|
| <i>Summer</i>                                 |          |   |          |
|   |          | CMSC 198, Practicum                           | 3        |
| <i>FOURTH YEAR</i>                            |          |   |          |
| CMSC 137, Data Communications and Networking  | 3        | CMSC 142, Design and Analysis of Algorithms   | 3        |
| CMSC 141, Automata and Language Theory        | 3        | CMSC 190, Special Problems                    | 2        |
| CMSC 150, Numerical and Symbolic Computations | 3        | PI 10 (SSP), The Life and Works of Jose Rizal | 3        |
| CMSC 190, Special Problems                    | 1        | G.E. (MST)                                    | 3        |
| CMSC 199, Undergraduate Seminar               | 1        | G.E. (AH)                                     | 3        |
| G.E. (SSP)                                    | 3        | Free Elective                                 | <u>3</u> |
| Free Elective                                 | <u>3</u> |   | 17       |
|   | 17       |   |          |

**TOTAL NUMBER OF UNITS..... 144**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF SCIENCE IN MATHEMATICS\***  
118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>                         | <i>Units</i> | <i>Second Semester</i>                       | <i>Units</i> |
|---|--------------|--|--------------|
|   |              | <i>FIRST YEAR</i>                            |              |
| ENG 1 (AH), College English                   | 3            | G.E. (MST)                                   | 3            |
| MATH 20, The Landscape of Mathematics         | 3            | ENG 2 (AH), College Writing in English       | 3            |
| G.E. (SSP)                                    | 3            | G.E. (SSP)                                   | 3            |
| G.E. (SSP)                                    | 3            | STAT 1, Elementary Statistics                | 3            |
| MATH 17, Algebra and Trigonometry             | 5            | MATH 36, Mathematical Analysis I             | 5            |
| PE 1, Foundations of Physical Fitness         | (2)          | PE 2 or 3, Basic or Advanced Course          | (2)          |
|   | <u>17</u>    |  | <u>17</u>    |
|   |              | <i>SECOND YEAR</i>                           |              |
| SPCM 1 (AH), Speech Communication             | 3            | G.E. (MST)                                   | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal | 3            | AMAT 150, Computer Programming               | 3            |
| G.E. (MST)                                    | 3            | MATH 38, Mathematical Analysis III           | 3            |
| MATH 37, Mathematical Analysis II             | 5            | MATH 120, Linear Algebra                     | 3            |
| MATH 101, Logic and Set Theory                | 3            | MATH 103, Elementary Theory of Numbers       | 3            |
| PE 2 or 3, Basic or Advanced Course           | (2)          | MATH 130, Metric Geometry                    | 3            |
| NSTP 1, National Service Training Program I   | (3)          | PE 2 or 3, Basic or Advanced Course          | (2)          |
|   | <u>17</u>    | NSTP 2, National Service Training Program II | (3)          |
|   |              |  | <u>18</u>    |

**A. Special Problem Option**

|   |           |                                      |           |
|---|-----------|--------------------------------------|-----------|
|   |           | <i>THIRD YEAR</i>                    |           |
| MATH 111, Modern Algebra I                | 3         | MATH 138, Introductory Topology      | 3         |
| MATH 141, Introductory Combinatorics      | 3         | G.E. (AH)                            | 3         |
| MATH 151, Ordinary Differential Equations | 3         | Major Elective                       | 3         |
| MATH 155, Advanced Calculus I             | 3         | Major Elective                       | 3         |
| MATH 195, Research Methods in Mathematics | 3         | Major Elective                       | 3         |
| Major Elective                            | 3         | Free Elective                        | 3         |
|   | <u>18</u> |                                      | <u>18</u> |
|   |           | <i>FOURTH YEAR</i>                   |           |
| G.E. (SSP)                                | 3         | G.E. (MST)                           | 3         |
| G.E. (AH)                                 | 3         | MATH 190, Special Problems           | 3         |
| MATH 165, Complex Analysis I              | 3         | MATH 192, Foundations of Mathematics | 3         |
| G.E. (MST)                                | 3         | MATH 199, Undergraduate Seminar      | 1         |
| Major Elective                            | 3         | Free Elective                        | 3         |
| Free Elective                             | 3         | Free Elective                        | 3         |
|   | <u>18</u> |                                      | <u>16</u> |

**B. Thesis Option**

|   |           |                                      |           |
|---|-----------|--------------------------------------|-----------|
|   |           | <i>THIRD YEAR</i>                    |           |
| MATH 111, Modern Algebra I                | 3         | MATH 138, Introductory Topology      | 3         |
| MATH 141, Introductory Combinatorics      | 3         | G.E. (AH)                            | 3         |
| MATH 151, Ordinary Differential Equations | 3         | MATH 200, Undergraduate Thesis       | 2         |
| MATH 155, Advanced Calculus I             | 3         | Major Elective                       | 3         |
| MATH 195, Research Methods in Mathematics | 3         | Major Elective                       | 3         |
| Major Elective                            | 3         | Free Elective                        | 3         |
|   | <u>18</u> |                                      | <u>17</u> |
|   |           | <i>FOURTH YEAR</i>                   |           |
| G.E. (MST)                                | 3         | G.E. (MST)                           | 3         |
| G.E. (AH)                                 | 3         | G.E. (SSP)                           | 3         |
| MATH 165, Complex Analysis I              | 3         | MATH 192, Foundations of Mathematics | 3         |
| MATH 200, Undergraduate Thesis            | 2         | MATH 199, Undergraduate Seminar      | 1         |
| Major Elective                            | 3         | MATH 200, Undergraduate Thesis       | 2         |
| Free Elective                             | 3         | Free Elective                        | 3         |
|   | <u>17</u> | Free Elective                        | 3         |
|   |           |                                      | <u>18</u> |

**TOTAL NUMBER OF UNITS ..... 139**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.



**BACHELOR OF SCIENCE IN MATHEMATICS AND SCIENCE TEACHING\***  
(Biology Major)

118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <b>First Semester</b>  | <b>Units</b> | <b>Second Semester</b>  | <b>Units</b> |
|--|--------------|---|--------------|
| <i>FIRST YEAR</i>  |              |   |              |
| ENG 1 (AH), College English  | 3            | ENG 2 (AH), College Writing in English                              | 3            |
| CHEM 16, General Chemistry I   | 3            | CHEM 17, General Chemistry II                                       | 3            |
| CHEM 16.1, General Chemistry I Laboratory                                | 2            | CHEM 17.1, General Chemistry II Laboratory                          | 2            |
| BIO 1, General Biology I   | 3            | BIO 3, Biodiversity   | 5            |
| MATH 11, College Algebra   | 3            | MATH 14, Plane Trigonometry   | 3            |
| G.E. (MST)   | 3            | G.E. (SSP)  | 3            |
| G.E. (SSP)   | 3            | G.E. (SSP)  | 3            |
| PE 1, Foundations of Physical Fitness                                    | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                                 | <u>(2)</u>   |
|  | 20           |   | 22           |
| <i>SECOND YEAR</i>   |              |   |              |
| SPCM 1 (AH), Speech Communication  | 3            | BIO 150, Principles of Ecology                                      | 3            |
| G.E. (MST)   | 3            | EDUC 144, Evaluating Learning Outcomes                              | 3            |
| BIO 30, Genetics   | 3            | EDUC 102, Theories and Principles of Education                      | 3            |
| CHEM 40, Basic Organic Chemistry   | 3            | G.E. (AH)   | 3            |
| CHEM 40.1, Basic Organic Chemistry Laboratory                            | 1            | MATH 18, College Geometry   | 3            |
| EDUC 111, Educational Psychology   | 3            | MATH 26, Analytic Geometry and Calculus I                           | 3            |
| STAT 1, Elementary Statistics  | 3            | MST 101b, Field Study II  | 1            |
| MST 101a, Field Study I  | 1            | STAT 166, Statistics for Social Sciences                            | 3            |
| PE 2 or 3, Basic or Advanced Course                                      | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                                 | <u>(2)</u>   |
| NSTP 1, National Service Training Program I                              | <u>(3)</u>   | NSTP 2, National Service Training Program II                        | <u>(3)</u>   |
|  | 20           |   | 22           |
| <i>THIRD YEAR</i>  |              |   |              |
| BOT 3, Intermediate Botany   | 3            | BIO 70, Earth's Processes and Biological Systems                    | 3            |
| EDUC 122, Principles and Methods of Teaching                             | 3            | PHYS 13, General Physics II   | 3            |
| CHEM 160, Introductory Biochemistry                                      | 3            | BIO 180, Biological Microtechnique                                  | 3            |
| MST 101c, Field Study III  | 1            | HFDS 12, Human Physiology   | 3            |
| MST 40/DEVC 40, Fundamentals of Educational Communication and Technology | 3            | MST 123, The Teaching of Mathematics and Science                    | 5            |
| PHYS 3, General Physics I  | 3            | MST 101d, Field Study IV  | 1            |
| ZOO 3, Intermediate Zoology  | 3            | MCB 1, General Microbiology   | 3            |
| SOC 195/MST 195, Research Methodologies in the Social Sciences           | <u>3</u>     | MST 195.1, Research Methodologies in the Social Sciences Laboratory | 1            |
|  | 21           |   | 22           |
| <i>FOURTH YEAR</i>   |              |   |              |
| MST 190, Special Problems  | 3            | G.E. (SSP)  | 3            |
| MST 200a, Student Teaching I   | 3            | G.E. (AH)   | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal                            | 3            | G.E. (MST)  | 3            |
| PHYS 23, Optics and Modern Physics                                       | <u>3</u>     | MST 199, Undergraduate Seminar                                      | 1            |
|  | 12           | MST 200b, Student Teaching II                                       | <u>3</u>     |
|  |              |   | 13           |
| <b>TOTAL NUMBER OF UNITS ..... 152</b>                                   |              |   |              |

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF SCIENCE IN MATHEMATICS AND SCIENCE TEACHING\***  
(*Chemistry Major*)

118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>  | <i>Units</i> | <i>Second Semester</i>  | <i>Units</i> |
|--|--------------|---|--------------|
| <i>FIRST YEAR</i>  |              |   |              |
| ENG 1 (AH), College English  | 3            | ENG 2 (AH), College Writing in English                              | 3            |
| CHEM 16, General Chemistry I   | 3            | CHEM 17, General Chemistry II                                       | 3            |
| CHEM 16.1, General Chemistry I Laboratory                                | 2            | CHEM 17.1, General Chemistry II Laboratory                          | 2            |
| BIO 1, General Biology I   | 3            | BIO 3, Biodiversity   | 5            |
| MATH 11, College Algebra   | 3            | MATH 14, Plane Trigonometry   | 3            |
| G.E. (MST)   | 3            | G.E. (SSP)  | 3            |
| G.E. (SSP)   | 3            | G.E. (SSP)  | 3            |
| PE 1, Foundations of Physical Fitness                                    | (2)          | PE 2 or 3, Basic or Advanced Course                                 | (2)          |
|  | <u>20</u>    |   | <u>22</u>    |
| <i>SECOND YEAR</i>   |              |   |              |
| SPCM 1 (AH), Speech Communication  | 3            | PHYS 13, General Physics II   | 3            |
| PHYS 3, General Physics I  | 3            | EDUC 144, Evaluating Learning Outcomes                              | 3            |
| MATH 26, Analytic Geometry and Calculus I                                | 3            | CHEM 32, Quantitative Inorganic Chemistry                           | 3            |
| CHEM 40, Basic Organic Chemistry   | 3            | CHEM 32.1, Quantitative Inorganic Chemistry Laboratory              | 2            |
| CHEM 40.1, Basic Organic Chemistry Laboratory                            | 1            | MATH 27, Analytic Geometry and Calculus II                          | 3            |
| EDUC 111, Educational Psychology   | 3            | G.E. (SSP)  | 3            |
| STAT 1, Elementary Statistics 1  | 3            | MST 101b, Field Study II  | 1            |
| MST 101a, Field Study I  | 1            | STAT 166, Statistics for Social Sciences                            | 3            |
| PE 2 or 3, Basic or Advanced Course                                      | (2)          | PE 2 or 3, Basic or Advanced Course                                 | (2)          |
| NSTP 1, National Service Training Program I                              | (3)          | NSTP 2, National Service Training Program II                        | (3)          |
|  | <u>20</u>    |   | <u>21</u>    |
| <i>THIRD YEAR</i>  |              |   |              |
| SOC 195/MST 195, Research Methodologies in the Social Sciences           | 2            | MST 123, The Teaching of Mathematics and Science                    | 5            |
| BIO 30, Genetics   | 3            | BIO 150, Principles of Ecology                                      | 3            |
| EDUC 122, Principles and Methods of Teaching                             | 3            | CHEM 102, Elementary Physical Chemistry                             | 3            |
| CHEM 160, Introductory Biochemistry                                      | 3            | CHEM 180, General Environmental Chemistry                           | 3            |
| PHYS 23, Optics and Modern Physics                                       | 3            | EDUC 102, Theories and Principles of Education                      | 3            |
| MST 101c, Field Study III  | 1            | MST 195.1, Research Methodologies in the Social Sciences Laboratory | 1            |
| MST 40/DEVC 40, Fundamentals of Educational Communication and Technology | 3            | MST 101d, Field Study IV  | 1            |
| MATH 18, College Geometry  | 3            |   | 19           |
|  | <u>21</u>    |   |              |
| <i>FOURTH YEAR</i>   |              |   |              |
| G.E. (AH)  | 3            | PI 10 (SSP), The Life and Works of Jose Rizal                       | 3            |
| MST 190, Special Problems  | 3            | G.E. (AH)   | 3            |
| MST 200a, Student Teaching I   | 3            | G.E. (MST)  | 3            |
| G.E. (MST)   | 3            | MST 199, Undergraduate Seminar                                      | 1            |
|  | 12           | MST 200b, Student Teaching II                                       | 3            |
|  |              |   | 13           |
| <b>TOTAL NUMBER OF UNITS ..... 148</b>                                   |              |   |              |

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF SCIENCE IN MATHEMATICS AND SCIENCE TEACHING\***  
(*Mathematics Major*)

118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>  | <i>Units</i> | <i>Second Semester</i>  | <i>Units</i> |
|--|--------------|---|--------------|
| <i>FIRST YEAR</i>  |              |   |              |
| ENG 1 (AH), College English  | 3            | ENG 2 (AH), College Writing in English                              | 3            |
| CHEM 16, General Chemistry I   | 3            | CHEM 17, General Chemistry II                                       | 3            |
| CHEM 16.1, General Chemistry I Laboratory                                | 2            | CHEM 17.1, General Chemistry II Laboratory                          | 2            |
| BIO 1, General Biology I   | 3            | BIO 3, Biodiversity   | 5            |
| MATH 11, College Algebra   | 3            | MATH 14, Plane Trigonometry   | 3            |
| G.E. (MST)   | 3            | G.E. (SSP)  | 3            |
| G.E. (SSP)   | 3            | G.E. (SSP)  | 3            |
| PE 1, Foundations of Physical Fitness                                    | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                                 | <u>(2)</u>   |
|  | 20           |   | 22           |
| <i>SECOND YEAR</i>   |              |   |              |
| SPCM 1 (AH), Speech Communication  | 3            | BIO 30, Genetics  | 3            |
| MATH 20, The Landscape of Mathematics                                    | 3            | EDUC 144, Evaluating Learning Outcomes                              | 3            |
| PHYS 3, General Physics I  | 3            | PHYS 13, General Physics II   | 3            |
| STAT 1, Elementary Statistics  | 3            | G.E. (AH)   | 3            |
| EDUC 111, Educational Psychology   | 3            | G.E. (SSP)  | 3            |
| MATH 18, College Geometry  | 3            | MATH 26, Analytic Geometry and Calculus I                           | 3            |
| MST 101a, Field Study I  | 1            | MST 101b, Field Study II  | 1            |
| PE 2 or 3, Basic or Advanced Course                                      | <u>(2)</u>   | STAT 166, Statistics for Social Sciences                            | 3            |
| NSTP 1, National Service Training Program I                              | <u>(3)</u>   | PE 2 or 3, Basic or Advanced Course                                 | <u>(2)</u>   |
|  | 19           | NSTP 2, National Service Training Program II                        | <u>(3)</u>   |
|  |              |   | 22           |
| <i>THIRD YEAR</i>  |              |   |              |
| BIO 150, Principles of Ecology   | 3            | MST 123, The Teaching of Mathematics and Science                    | 5            |
| EDUC 122, Principles and Methods of Teaching                             | 3            | EDUC 102, Theories and Principles of Education                      | 3            |
| MATH 101, Logic and Set Theory   | 3            | MATH 28, Analytic Geometry and Calculus III                         | 3            |
| PHYS 23, Optics and Modern Physics                                       | 3            | AMAT 150, Computer Programming                                      | 3            |
| MST 101c, Field Study III  | 1            | PI 10 (SSP), The Life and Works of Jose Rizal                       | 3            |
| MST 40/DEVC 40, Fundamentals of Educational Communication and Technology | 3            | MST 195.1, Research Methodologies in the Social Sciences Laboratory | 1            |
| SOC 195/MST 195, Research Methodologies in the Social Sciences           | 2            | MST 101d, Field Study IV  | <u>1</u>     |
| MATH 27, Analytic Geometry and Calculus II                               | <u>3</u>     |   | 19           |
|  | 21           |   |              |
| <i>FOURTH YEAR</i>   |              |   |              |
| G.E. (MST)   | 3            | G.E. (MST)  | 3            |
| MST 190, Special Problems  | 3            | G.E. (AH)   | 3            |
| MST 200a, Student Teaching I   | 3            | MATH 103, Elementary Theory of Numbers                              | 3            |
| MATH 120, Linear Algebra or  |              | MST 199, Undergraduate Seminar                                      | 1            |
| MATH 151, Ordinary Differential Equations                                | <u>3</u>     | MST 200b, Student Teaching II                                       | <u>3</u>     |
|  | 12           |   | 13           |

**TOTAL NUMBER OF UNITS ..... 148**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF SCIENCE IN MATHEMATICS AND SCIENCE TEACHING\***  
**(Physics Major)**

118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>  | <i>Units</i> | <i>Second Semester</i>  | <i>Units</i> |
|--|--------------|---|--------------|
| <i>FIRST YEAR</i>  |              |   |              |
| ENG 1 (AH), College English  | 3            | ENG 2 (AH), College Writing in English                              | 3            |
| CHEM 16, General Chemistry I   | 3            | CHEM 17, General Chemistry II                                       | 3            |
| CHEM 16.1, General Chemistry I Laboratory                                | 2            | CHEM 17.1, General Chemistry II Laboratory                          | 2            |
| BIO 1, General Biology I   | 3            | BIO 3, Biodiversity   | 5            |
| MATH 11, College Algebra   | 3            | MATH 14, Plane Trigonometry   | 3            |
| G.E. (MST)   | 3            | G.E. (SSP)  | 3            |
| G.E. (SSP)   | 3            | G.E. (SSP)  | 3            |
| PE 1, Foundations of Physical Fitness                                    | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                                 | <u>(2)</u>   |
|  | <u>20</u>    |   | <u>22</u>    |
| <i>SECOND YEAR</i>   |              |   |              |
| SPCM 1 (AH), Speech Communication  | 3            | BIO 150, Principles of Ecology                                      | 3            |
| BIO 30, Genetics   | 3            | EDUC 144, Evaluating Learning Outcomes                              | 3            |
| EDUC 102, Theories and Principles of Education                           | 3            | EDUC 122, Principles and Methods of Teaching                        | 3            |
| MATH 26, Analytic Geometry and Calculus I                                | 3            | PHYS 81, Fundamental Physics I                                      | 5            |
| STAT 1, Elementary Statistics  | 3            | MATH 27, Analytic Geometry and Calculus II                          | 3            |
| EDUC 111, Educational Psychology   | 3            | MST 101b, Field Study II  | 1            |
| MATH 18, College Geometry  | 3            | STAT 166, Statistics for Social Sciences                            | 3            |
| MST 101a, Field Study I  | 1            | PE 2 or 3, Basic or Advanced Course                                 | <u>(2)</u>   |
| PE 2 or 3, Basic or Advanced Course                                      | <u>(2)</u>   | NSTP 2, National Service Training Program II                        | <u>(3)</u>   |
| NSTP 1, National Service Training Program I                              | <u>(3)</u>   |   | <u>21</u>    |
|  | <u>22</u>    |   |              |
| <i>THIRD YEAR</i>  |              |   |              |
| G.E. (AH)  | 3            | MST 123, The Teaching of Mathematics and Science                    | 5            |
| PI 10 (SSP), The Life and Works of Jose Rizal                            | 3            | PHYS 83, Fundamental Physics III                                    | 5            |
| PHYS 82, Fundamental Physics II  | 5            | G.E. (SSP)  | 3            |
| MATH 28, Analytic Geometry and Calculus III                              | 3            | G.E. (AH)   | 3            |
| MST 101c, Field Study III  | 1            | G.E. (MST)  | 3            |
| MST 40/DEVC 40, Fundamentals of Educational Communication and Technology | 3            | MST 195.1, Research Methodologies in the Social Sciences Laboratory | 1            |
| SOC 195/MST 195, Research Methodologies in the Social Sciences           | <u>2</u>     | MST 101d, Field Study IV  | <u>1</u>     |
|  | <u>20</u>    |   | <u>21</u>    |
| <i>FOURTH YEAR</i>   |              |   |              |
| MST 190, Special Problems  | 3            | G.E. (MST)  | 3            |
| MST 200a, Student Teaching I   | 3            | APHY 104, Digital Computer Electronics                              | 3            |
| APHY 101, Physics in Scientific Instruments                              | 3            | PHYS 192, Experimental Physics I                                    | 3            |
| APHY 102, Physics of Electronic Devices                                  | <u>3</u>     | MST 199, Undergraduate Seminar                                      | 1            |
|  | <u>12</u>    | MST 200b, Student Teaching II                                       | <u>3</u>     |
|  |              |   | <u>13</u>    |

**TOTAL NUMBER OF UNITS..... 151**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.



**BACHELOR OF SCIENCE IN STATISTICS\***  
118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>                            | <i>Units</i> | <i>Second Semester</i>                        | <i>Units</i> |
|--|--------------|---|--------------|
| <i>FIRST YEAR</i>                                |              |   |              |
| ENG 1 (AH), College English                      | 3            | ENG 2 (AH), College Writing in English        | 3            |
| G.E. (MST)                                       | 3            | G.E. (MST)                                    | 3            |
| PHYS 1, Introductory Physics                     | 3            | CMSC 11, Introduction to Computer Science     | 3            |
| G.E. (SSP)                                       | 3            | MATH 36, Mathematical Analysis I              | 5            |
| MATH 17, Algebra and Trigonometry                | 5            | STAT 1, Elementary Statistics                 | 3            |
| BIO 1, General Biology 1                         | 3            | BIO 2, General Biology II                     | 3            |
| PE 1, Foundations of Physical Fitness            | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course           | <u>(2)</u>   |
|  | 20           |   | 20           |
| <i>SECOND YEAR</i>                               |              |   |              |
| CMSC 21, Fundamentals of Programming             | 3            | G.E. (SSP)                                    | 3            |
| G.E. (SSP)                                       | 3            | MATH 38, Mathematical Analysis III            | 3            |
| MATH 37, Mathematical Analysis II                | 5            | ECON 11, General Economics                    | 3            |
| STAT 101, Statistical Methods                    | 3            | BIO 30, Genetics                              | 3            |
| CHEM 15, Fundamentals of Chemistry               | 3            | G.E. (MST)                                    | 3            |
| CHEM 15.1, Fundamentals of Chemistry Laboratory  | 2            | PE 2 or 3, Basic or Advanced Course           | (2)          |
| PE 2, Basic or Advanced Course                   | (2)          | NSTP 2, National Service Training Program II  | <u>(3)</u>   |
| NSTP 1, National Service Training Program I      | <u>(3)</u>   |   | 18           |
|  | 19           |   |              |
| <i>THIRD YEAR</i>                                |              |   |              |
| SPCM 1 (AH), Speech Communication                | 3            | PI 10 (SSP), The Life and Works of Jose Rizal | 3            |
| G.E. (SSP)                                       | 3            | STAT 145, Introductory Statistical Theory II  | 3            |
| STAT 135, Logic and Matrix Algebra in Statistics | 3            | STAT 151, Applied Regression & Correlation    | 3            |
| STAT 144, Introductory Statistical Theory I      | 3            | STAT 163, Survey Designs                      | 3            |
| STAT 172, Experimental Designs II                | 3            | STAT 182, Statistical Packages                | 3            |
| CMSC 22, Object-Oriented Programming             | <u>3</u>     | STAT 191, Special Topics                      | <u>3</u>     |
|  | 18           |   | 18           |
| <i>THIRD YEAR</i>                                |              |   |              |
| MATH 111, Modern Algebra I                       |              | 3   |              |
| <i>FOURTH YEAR</i>                               |              |   |              |
| ENG 10, Writing Scientific Papers                | 3            | G.E. (AH)                                     | 3            |
| STAT 146, Introductory Statistical Theory III    | 3            | G.E. (AH)                                     | 3            |
| STAT 165, Categorical Data Analysis              | 3            | STAT 147, Introduction to the Theory of       |              |
| STAT 173, Survey Operations                      | 3            | Nonparametric Statistics                      | 3            |
| STAT 175, Analysis of Multivariate Data          | 3            | STAT 156, Introductory Time Series Analysis   | 3            |
| STAT 181, Statistical Computing                  | 3            | STAT 167, Statistical Quality Control         | 3            |
| STAT 190, Special Problems                       | <u>1</u>     | STAT 190, Special Problem                     | 2            |
|  | 19           | STAT 199, Undergraduate Seminar               | <u>1</u>     |
|  |              |   | 18           |
| <b>TOTAL NUMBER OF UNITS. ....153</b>            |              |   |              |

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF SCIENCE IN AGRICULTURAL CHEMISTRY\***  
( A joint program of the College of Agriculture and the College of Arts and Sciences)  
118<sup>th</sup> UPLB UC 12/5/11; President's Approval 4/3/14

| <i>First Semester</i>   | <i>Units</i>                  | <i>Second Semester</i>   | <i>Units</i> |
|---|-------------------------------|--|--------------|
| <b>FIRST YEAR</b>   |                               |  |              |
| ZOO 1, General Zoology I or<br>BIO 1, General Biology I                         | 3                             | BOT 1, Introduction to Plant Science or<br>BIO 2, General Biology II | 3            |
| CHEM 16, General Chemistry I  | 3                             | CHEM 17, General Chemistry II  | 3            |
| CHEM 16.1, General Chemistry I Laboratory                                       | 2                             | CHEM 17.1, General Chemistry II Laboratory                           | 2            |
| ENG 1 (AH), College English   | 3                             | ENG 2 (AH), College Writing in English                               | 3            |
| HIST 1 (SSP), Philippine History  | 3                             | G.E. (AH)  | 3            |
| MATH 17, Algebra and Trigonometry   | 5                             | G.E. (SSP)   | 3            |
| PE 1, Foundations of Physical Fitness   | (2)                           | MATH 26, Analytic Geometry and Calculus I                            | 3            |
|   | <u>19</u>                     | PE 2 or 3, Basic or Advanced Course                                  | (2)          |
|   |                               |  | <u>20</u>    |
| <b>SECOND YEAR</b>  |                               |  |              |
| BOT 20, Elementary Plant Physiology   | 3                             | ANSC 1, Introduction to Animal Science                               | 3            |
| CHEM 32, Quantitative Inorganic Analysis  | 3                             | CHEM 43, Organic Chemistry I   | 3            |
| CHEM 32.1, Quantitative Inorganic Analysis<br>Laboratory                        | 2                             | CHEM 43.1, Organic Chemistry I Laboratory                            | 2            |
| CRSC 1, Fundamentals of Crop Science I  | 3                             | CRSC 2, Fundamentals of Crop Science II                              | 3            |
| MATH 27, Analytical Geometry and Calculus II                                    | 3                             | MATH 28, Analytical Geometry and Calculus III                        | 3            |
| PHYS 3, General Physics I   | 3                             | PHYS 13, General Physics II  | 3            |
| PE 2 or 3, Basic or Advanced Course   | (2)                           | PE 2or 3, Basic or Advanced Course                                   | (2)          |
| NSTP 1, National Service Training Program I                                     | (3)                           | NSTP 2, National Service Training Program II                         | (3)          |
|   | <u>17</u>                     |  | <u>17</u>    |
| <b>Summer</b>   |                               |  |              |
|   | G.E. (MST)                    | 3  |              |
|   | STAT 1, Elementary Statistics | <u>3</u>   |              |
|   |                               | 6  |              |
| <b>THIRD YEAR</b>   |                               |  |              |
| ANSC 2, Introduction to Livestock and Poultry<br>Production                     | 3                             | CHEM 111, Physical Chemistry I                                       | 3            |
| CHEM 44, Organic Chemistry II   | 3                             | CHEM 131, Technical Analysis I                                       | 4            |
| CHEM 44.1, Organic Chemistry II Laboratory                                      | 2                             | CHEM 161, General Biochemistry                                       | 4            |
| G.E. (AH)   | 3                             | CRPT 1, Principles of Crop Protection                                | 3            |
| G.E. (SSP)  | 3                             | SOIL1, Principles of Soil Science                                    | 3            |
| MCB 1, General Microbiology   | 3                             | PI 10 (SSP), The Life and Works of Jose Rizal                        | <u>3</u>     |
| PHYS 23, Optics and Modern Physics  | <u>3</u>                      |  | <u>20</u>    |
|   | 20                            |  |              |
| <b>FOURTH YEAR</b>  |                               |  |              |
| CMSC 11, Introduction to Computer Science or<br>AMAT 150, Computer Programming, | 3                             | BIO 30, Genetics   | 3            |
| CHEM 111.1, Physical Chemistry I Laboratory                                     | 2                             | CHEM 112, Physical Chemistry II                                      | 3            |
| CHEM 137, Modern Analytical Chemistry   | 3                             | CHEM 137.1, Modern Analytical Chemistry<br>Laboratory                | 2            |
| CHEM 161.1, General Biochemistry Laboratory                                     | 2                             | CHEM 140, Organic Analysis   | 4            |
| G.E. (AH)   | 3                             | CHEM 185, Structure and Reactivity of Agricultural<br>Chemicals      | 3            |
| Specialization  | 3                             | CHEM 192, Chemical Information, Literature and<br>Communication      | 3            |
| Specialization  | 3                             | Specialization   | <u>3</u>     |
|   | <u>19</u>                     |  | <u>21</u>    |
| <b>FIFTH YEAR</b>   |                               |  |              |
| ACHM 200, Undergraduate Thesis  | 3                             | ACHM 200, Undergraduate Thesis                                       | 3            |
| CHEM 112.1, Physical Chemistry II Laboratory                                    | 2                             | AGRI 199, Colloquium in Agriculture                                  | 1            |
| CHEM 120, Inorganic Chemistry   | 3                             | CHEM 180, General Environmental Chemistry                            | 3            |
| CHEM 133, Technical Analysis II   | 4                             | G.E. (MST)   | 3            |
| CHEM 199, Undergraduate Seminar   | 1                             | G.E. (SSP)   | 3            |
| Specialization  | 3                             | Specialization   | <u>3</u>     |
| G.E. (MST)  | <u>3</u>                      |  | <u>16</u>    |
|   | 19                            |  |              |
| <b>TOTAL NUMBER OF UNITS ..... 194</b>  |                               |  |              |

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

# C O U R S E S

## INSTITUTE OF BIOLOGICAL SCIENCES

### Biology

**BIO 1. General Biology I (3).** Principles of biology, with emphasis on the molecular, cellular, tissue-organ, and organismic levels of organization of life. 5 hrs (2 class, 3 lab). (1,2)

**BIO 2. General Biology II (3).** Principles of biology with emphasis on the organismic, population, and community levels of organization of life; the biosphere in perspective. 5 hrs (2 class, 3 lab). PR. BIO 1. (1,2)

**BIO 3. Biodiversity (5).** Systematic survey of the diversity of life, with emphasis on functional organization, maintenance and integration, reproduction and development; evolution of the major groups of microorganisms, plants and animals; interrelationships of organisms with the environment. 9 hrs (3 class, 6 lab) PR. BIO 1. (1,2)

**BIO 30. Genetics (3).** Mechanisms of heredity and variation, cytogenetics, mutation, nature of genes, population genetics, and quantitative genetics; biometrical procedures. 5 hrs (2 class, 3 lab). PR. BIO 2 or BIO 3 or BOT 1 and ZOO 1. (1,2)

**BIO 70. Earth's Processes and Biological Systems (3).** The earth's processes and their relationship to the evolution, diversity, and distribution of various communities of plants and animals. 3 hrs (class). PR. BIO 2 or BIO 3 or BOT 1 & ZOO 1 and CHEM 15 or CHEM 16. (1,2)

**BIO 101. Introductory Molecular Biology (3).** Structure, properties, functions and interactions of biomolecules in basic cellular processes, with emphasis on the processes involving the genetic material. 3 hrs (class). PR. BIO 30 and CHEM 160 or CHEM 161. (1,2)

**BIO 102. Cytology (3).** The cell as a basic evolutionary and structural unit of life; cellular diversity and behavior in relation to development, senescence/aging, and death. 5 hrs (2 class, 3 lab). PR. BIO 30. (1,2)

**BIO 120. Cell Biology (3).** Nature and function of ultrastructure components and possible relationships to such processes as chemical energy transformations, transport, excitation, movement, and growth. 5 hrs (2 class, 3 lab). PR. BIO 30 and CHEM 160. (1,2)

**BIO 121. Developmental Cell Biology (3).** Molecular and cellular basis of cell determination, differentiation, morphogenesis, and cells of aberrant modes of development. 3 hrs (class). PR. BIO 120 or COI. (1)

**BIO 130a. Advanced Genetics I (3).** The nature and behavior of the genetic material as expressed in the development of the individual. 3 hrs (class). PR. BIO 30. (1,2)

**BIO 130b. Advanced Genetics II (3).** The nature and behavior of the genetic material as expressed in the population. 3 hrs (class). PR. BIO 30 and STAT 1. (2)

**BIO 131. Cytogenetics (3).** The chromosomal bases of heredity; variations in chromosome structure and number; hybridization; apomixis and chromosomes in sex determination. 5 hrs (2 class, 3 lab). PR. BIO 30. (2)

**BIO 137 (or ENT 137). Insect Genetics (3).** Genetic concepts and mechanisms in insects, and their application in taxonomy, pest management, and genetic improvement of beneficial species. 5 hrs (2 class, 3 lab). PR. ENT 101 and BIO 30 or COI and CHEM 40. (1,2)

**BIO 138. Molecular Genetics (3).** The nature, functions and interactions of molecules in heredity; the molecular basis of certain biological phenomena in relation to the genetic material. 3 hrs (class). PR. BIO 101. (1)

**BIO 139. Human Genetics (3).** Physical and molecular bases of genetics of human traits, the application of DNA technology in human biology, and its implications to biosocial issues. 3 hrs (class). PR. BIO 30. (1)

**BIO 140. Evolutionary Biology (3).** The basic concepts on the theory of evolution, with emphasis on the processes and mechanisms as revealed in genetics, systematics, ecology, ethology, and historical geology. 3 hrs (class). PR. BIO 30. (1,2)

**BIO 142. Principles of Systematic Biology (3).** The concept of species and the higher taxa and categories in plants, animals and microorganisms; individual and geographic variation; taxonomic characters, identification, classification; biological nomenclature. 3 hrs (class). PR. BIO 2 or BIO 3 or BOT 1 and ZOO 1. (1)

**BIO 150. Principles of Ecology (3).** Plants and animals in relation to environment; plant and animal associations, population dynamics, ecosystems. 5 hrs (2 class, 3 lab). PR. BIO 2 or BIO 3 or BOT 1 and ZOO 1. (1,2)

**BIO 151. Environmental Management (3).** Principles of environmental management; technological development and activities affecting the environment and pertinent case studies. 3 hrs (class). PR. BIO 150 or COI. (2)

**BIO 154. Cave Ecology (3).** Cave ecosystems, biodiversity, and adaptations of organisms. 5 hrs (2 class, 3 lab). PR. BIO 150 or COI. (2)

**BIO 155. Biology of Pollution (3).** Interactions of biota with polluted environments. 5 hrs (2 class, 3 lab). PR. BIO 150 or COI. (1)

**BIO 159. Conservation Biology in the Tropics (3).** Conservation and values of tropical biological diversity, threats, and pertinent policies, methods and strategies in conserving biodiversity. 3 hrs (class). PR. BIO 150 or COI. (2)

**BIO 180. Biological Microtechnique (3).** Collection and preparations of whole mounts and tissue sections

of plants and animals; preservation and storage. 7 hrs (1 class, 6 lab). PR. BOT 3, ZOO 3, and CHEM 40. (2,S)

**BIO 190. Special Problems (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) (1,2,S)

**BIO 191. Special Topics (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units). (1,2)

**BIO 192. Museum Herbarium Curatorship (3).** Methods and procedures pertaining to the establishment, maintenance, and management of museums and herbaria; collection and preservation of biological materials for research and reference. 7 hrs (1 class, 6 lab). PR. ZOO 140 and BOT 140. (1,2)

**BIO 195. Research Methods in Biological Sciences (3).** Methods and approaches in conducting and communicating researches in the biological sciences. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**BIO 199. Undergraduate Seminar in Biology (1).** (May be taken twice. PR. Senior standing or COI.) (1,2)

**BIO 200. Undergraduate Thesis in Biology (6).** (1,2,S)

## Botany

**BOT 1. Introduction to Plant Science (3).** Structures, functions, adaptation, and phylogenetic relationships of plants. 5 hrs (2 class, 3 lab). (1,2)

**BOT 3. Intermediate Botany (3).** Phylogenetic study of structure and function of plant allies, lower plant forms, and vascular plants. 5 hrs (2 class, 3 lab). PR. BIO 2 or BIO 3 or BOT 1 and ZOO 1. (1,2)

**BOT 11. Veterinary Botany (3).** General principles of botany, with special emphasis on forage, medicinal, and poisonous plants important in veterinary science. 5 hrs (2 class, 3 lab). (1,2)

**BOT 20. Elementary Plant Physiology (3)** . Photosynthesis, respiration, nutrition, water relations, transport of materials, and growth of plants. 5 hrs (2 class, 3 lab). PR. BOT 1 or BIO 2 or BIO 3 and CHEM 16 or CHEM 15. (1,2)

**BOT 101. Phycology (3).** Classification, ecology, morphology, physiology, and economic importance of algae. 5 hrs (2 class, 3 lab). PR. BOT 1 or BIO 2 or BIO 3. (2)

**BOT 110. Morphology and Anatomy of Plants (3).** Structure, function, development, adaptation, and phylogenetic relationships of vascular plants. 5 hrs (2 class, 3 lab). PR. BOT 1 or BIO 3 or COI. (1)

**BOT 111. Bryophytes and Vascular Cryptogams (3).** Structure, development, and systematics of bryophytes, psilopsids, lycopods, sphenopsids and selected ferns. 5 hrs (2 class, 3 lab). PR. COI. (2)

**BOT 120. Advanced Plant Physiology (3).** Plant function, behavior, and metabolism of primary and secondary plant products and physiological ecology. 5 hrs (2 class, 3 lab). PR. BOT 20 or COI. (2)

**BOT 131 (or HORT 131). Inorganic Plant Nutrition (3).** Principles of mineral nutrition of higher plants. 5 hrs (2 class, 3 lab). PR. BOT 20. (1,2) (see also *Crop Science Cluster, CA*)

**BOT 132 (or HORT 132). Plant Growth (3).** The nature and processes of growth in plants, including the role played in the process by phytohormones. 5 hrs (2 class, 3 lab). PR. BOT 20. (1,2)

**BOT 140. Systematics of the Spermatophytes (3).** The identification, nomenclature, and classification of the principal families of seedplants, with emphasis on their geographic distribution and economic importance. 7 hrs (1 class, 6 lab). PR. COI. (1,2)

**BOT 142. Economic Botany (3).** Origin, history, botanical relationships, and uses of plants of the Philippines, with emphasis on wild species of economic value. 5 hrs (2 class, 3 lab). PR. COI. (1,2)

**BOT 150. Plant Ecology (3).** Principles of plant environment interactions in relation to distribution, structure and functioning of plant communities. 5 hrs (2 class, 3 lab). PR. BOT 3 or COI. (2)

**BOT 152. Phytogeography (3).** Principles, patterns, causes, and barriers of plant distribution and migration on land evolution of world vegetations and floristic provinces. 3 hrs (class). PR. BOT 150 or COI. (2)

**BOT 191. Special Topics (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.)

**BOT 192. Plant Histochemistry (3).** Histochemical analysis of plants, with special emphasis on medicinal, wild food and pesticidal plants, and their active constituents. 5 hrs (2 class, 3 lab). PR. CHEM 40 or COI and BOT 110. (1)

## Natural Science

**NASC 1 (MST). The Material Universe (3).** (also under *the Institute of Chemistry*). Fundamental concepts, principles, and theories of physics and chemistry. 3 hrs (class). PR. None. (1,2)

**NASC 2 (MST). The Living Planet (3).** Concepts, principles, and theories of the earth and life sciences. 3 hrs (class). (1,2)

**NASC 3 (MST). Physics in Everyday Life (3).** (also under *the Institute of Mathematical Sciences and Physics*). Physics, concepts, laws, and principles behind natural phenomena and their applications to technology. 3 hrs (class). (1,2)

**NASC 4 (MST). The World of Life (3).** Biological concepts and their applications to common life phenomena. 3 hrs (class). (1,2)



**NASC 5 (MST). Environmental Biology (3).** Concepts in ecology and environmental biology and their applications in Philippine settings. 3 hrs (2 class, 1 recit). (1,2)

**NASC 8 (MST). Practical Botany (3).** Plants and their uses. 3 hrs (class). PR. None. (1,2)

**NASC 9 (MST). Living with Microbes (3).** Microorganisms and their effects on humans, society, and the environment. 3 hrs (class). PR. None. (1,2)

## Microbiology

**MCB 1. General Microbiology (3).** Biology of major groups of microorganisms, with emphasis on bacteria and an introduction to applied microbiology. 5 hrs (2 class, 3 lab). (1,2)

**MCB 101. Microbial Identification Techniques (3).** Principles and techniques for the morphological, cultural, and physiological characterization of selected groups of microorganisms. 7 hrs (1 class, 6 lab). PR. MCB 1. (1,2)

**MCB 102. General Virology (3).** The physical, chemical, and biological properties of plant, animal, and bacterial viruses. 3 hrs (class). PR. MCB 1. (1,2)

**MCB 103. Introductory Medical Microbiology (3).** The role and control of medically important microorganisms in human disease development. 3 hrs (class). PR. MCB 1. (1,2)

**MCB 120. Microbial Physiology (3).** Physiological processes in microorganisms including a study of structure, energy production, macromolecular biosynthesis, nutrition, and growth. 3 hrs (class). PR. MCB 1 and CHEM 160. (1,2)

**MCB 130. Microbial Genetics (4).** The principles of heredity in microbial systems and their applications in microbiology and molecular biology. 8 hrs (2 class, 6 lab). PR. MCB 101 and BIO 101 or COI. (1,2)

**MCB 150. Microbial Ecology (3).** An introduction to the basic principles of microbial ecology; interrelationships of bacteria, fungi, algae, and protozoa in natural systems. 5 hrs (2 class, 3 lab). PR. MCB 1. (1,2)

**MCB 160. Industrial Microbiology (3).** Microorganisms, principles, and processes involved in industrial fermentation. 3 hrs (class). PR. MCB 1 and CHEM 160. (1,2)

**MCB 160.1. Industrial Microbiology Laboratory (2).** Techniques in industrial fermentation. 6 hrs (lab). PR. MCB 101 and MCB 160. (can be taken concurrently with MCB 160). (1)

**MCB 180. Introductory Food Microbiology (3).** An introduction to the microbiological aspects of food processing, preservation, spoilage and quality control; food-borne microorganisms of public health importance. 5 hrs (2 class, 3 lab). PR. MCB 1. (1,2)

**MCB 181. Dairy Microbiology (3).** Microorganisms in milk and milk products, their growth, destruction and utilization, and methods in microbiological quality control. 5 hrs (2 class, 3 lab). PR. MCB 1. (2)

**MCB 198. Microbiology Practicum (3).** 36 hrs per wk for 4 wks (144 hrs). PR. MCB 101 and MCB 180. (1,2,S)

## Wildlife

**WLDL 101. Introduction to Philippine Wildlife (3).** Survey of Philippine flora and fauna; biology and ecology of selected species. 5 hrs (2 class, 3 lab). PR. BOT 1 and ZOO 1 or BIO 2 or BIO 3. (1)

**WLDL 150. (formerly WLDL 155) Wildlife Ecology (3).** Ecological factors that influence abundance in the tropical ecosystems. 3 hrs (class). PR. WLDL 101. (2)

**WLDL 198. Wildlife Practicum (3).** 144 hrs. PR. WLDL 101. (S)

## Zoology

**ZOO 1. General Zoology (3).** Biological principles as related to zoology; general life history, morphological characteristics, and relationships of representatives of the more important animal phyla. 5 hrs (2 class, 3 lab). (1,2)

**ZOO 3. Intermediate Zoology (3).** A phylogenetic study of the structure and form, functions, and life history of representatives of the different animal phyla. 5 hrs (2 class, 3 lab). PR. BIO 2 or BIO 3 or ZOO 1. (1,2)

**ZOO 11. Fundamentals of Zoology (5).** Introduction to the cellular basis of animal life; organization and function of animal tissues and organ-systems; morphology and life history of representative forms of the major animal phyla; introductory animal ecology and evolution. 9 hrs (3 class, 6 lab). (1,2)

**ZOO 91. Zoological Techniques (3).** Collection, preservation, mounting, and slide preparation of zoological materials. 7 hrs (1 class, 6 lab). PR. ZOO 1 or BIO 2 or BIO 3. (1,2)

**ZOO 113. Comparative Vertebrate Anatomy (5).** Comparative and phylogenetic study of vertebrate organ systems; their development, structures, and functions. 9 hrs (3 class, 6 lab). PR. ZOO 1 or BIO 2 or BIO 3. (1,2)

**ZOO 115. Animal Histology (3).** Detailed study of types, structure, and functions of vertebrate tissues, selected glands and organs; principle of histochemistry. 5 hrs (2 class, 3 lab). PR. ZOO 113. (1,2)

**ZOO 117. Developmental Zoology (3).** Patterns of growth, differentiation and morphogenesis from molecule to organism; control mechanisms of development; animal life cycles. 5 hrs (2 class, 3 lab). PR. ZOO 1 or ZOO 3. (1,2)

**ZOO 120. Animal Physiology (5).** Mechanisms involved in the functional processes of animals; sources of energy;

its distribution and utilization; environmental relations; nervous integration and animal activity; reproduction and development. 9 hrs (3 class, 6 lab). PR. ZOO 113 and CHEM 160. (1,2)

**ZOO 122. Animal Behavior (3).** Behavior patterns of animals, their nervous and endocrine control mechanisms; evolutionary significance of behavior adaptations. 5 hrs (2 class, 3 lab). PR. ZOO 1 or ZOO 3. (1)

**ZOO 140. Animal Taxonomy (3).** Principles of animal taxonomy; taxonomic literature and catalogs, with special reference to Philippine fauna. 5 hrs (2 class, 3 lab). PR. ZOO 1 or BIO 2 or BIO 3. (1,2)

**ZOO 142. Invertebrate Zoology (3).** Systematics, ecology, and evolutionary relationships of invertebrates. 5 hrs (2 class, 3 lab). PR. ZOO 3. (1,2)

**ZOO 145. Herpetology (3).** Taxonomy of Philippine reptiles and amphibians; biology and ecology of important species; collection and preparation for scientific study. 7 hrs (1 class, 6 lab). PR. ZOO 3. (1)

**ZOO 146. Ornithology (3).** Taxonomy of Philippine birds; biology and ecology of important species; collection and preparation for scientific study. 7 hrs (1 class, 6 lab). PR. ZOO 3. (2)

**ZOO 148. Mammalogy (3).** Taxonomy of Philippine mammals; biology and ecology of important species; collection and preparation for scientific study. 7 hrs (1 class, 6 lab). PR. ZOO 3. (2)

**ZOO 149. Biology of Marine Mammals (3).** Life history, systematics ecology, and conservation of marine mammals of the world, with emphasis on those found within the Philippine waters. 3 hrs (class). PR. ZOO 3 or COI. (1)

**ZOO 150. Animal Ecology (3).** Fundamental factors of the environment, population dynamics, community concepts and principal habitats of animals. 7 hrs (1 class, 6 lab). PR. ZOO 1 or BIO 2 or BIO 3. (1,2)

**ZOO 151. Marine Zoology (5).** Taxonomy and ecology of marine invertebrates and vertebrates; collection, preservation, and storage of marine ecological specimens. 11 hrs (2 class, 9 lab). PR. ZOO 3 and BIO 150 or ZOO 150. (S)

**ZOO 152. Freshwater Zoology (3).** Ecology and taxonomy of the freshwater fauna. 7 hrs (1 class, 6 lab). PR. ZOO 3 and BIO 150 or ZOO 150. (1,2)

**ZOO 155. General Limnology (3).** Origin, classification, and structures of inland waters; their physical, chemical, and biological processes. 3 hrs (class). PR. COI. (1)

**ZOO 160. General Malacology (3).** Morpho-taxonomy, ecology, and physiology of different molluscan classes, with emphasis on economically and medically important species. 5 hrs (2 class, 3 lab). PR. ZOO 3 and BIO 150 or ZOO 150. (1)

**ZOO 173 . Introduction to Parasitology ( 3 ) .** Fundamental principles of parasitology, with reference to man and other animals. 5 hrs (2 class, 3 lab). PR. ZOO 1 or BIO 2 or BIO 3. (1,2)

**ZOO 177. Vertebrate Pests (3).** Identification of rodents and bird pest species; mechanical, chemical, biological and cultural control methods; specificity, synergism, modes of action and hazards of modern pesticides; pest resistance; pesticide laws. 7 hrs (1 class, 6 lab). PR. ZOO 1 or BIO 2 or BIO 3. (1,2)

**ZOO 180. Ichthyology (3).** Basic fish anatomy, functional morphology, and physiology; taxonomy of important fishes. 5 hrs (2 class, 3 lab). PR. ZOO 1 or BIO 3. (2)

**ZOO 185. Introduction to Aquaculture (3).** Basic principles and practices of aquaculture. 3 hrs (class). PR. ZOO 1 and BOT 1, or BIO 3, or COI. (1,2)

**ZOO 191. Special Topics (1-3).** (May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units.) (1,2)

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## INSTITUTE OF CHEMISTRY

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### Agricultural Chemistry

**ACHM 190. Special Problems (1-3).** (May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units.) PR. COI.

**ACHM 200. Undergraduate Thesis (6).** (1,2,S)

### Chemistry

**CHEM 14. Basic Chemistry (3).** Basic ideas and principles of chemistry developed through experimentation and thought. 5 hrs (2 class, 3 lab). (2)

**CHEM 15. Fundamentals of Chemistry (3).** Basic principles of chemistry, atomic, molecular structure, chemical bonding, quantitative relationship; descriptive organic chemistry and survey of biomolecules. 3 hrs (class). PR. MATH 11 or MATH 17. Co-requisite: CHEM 15.1. (1,2)

**CHEM 15.1. Fundamentals of Chemistry Laboratory (2).** 6 hrs (3 hrs lab, 2x a week). PR. MATH 11 or MATH 17. Co-requisite: CHEM 15. (1,2)

**CHEM 16. General Chemistry I (3).** Fundamental chemical concepts and principles. 3 hrs ( class). Co-requisite: CHEM 16.1. (1,2)

**CHEM 16.1 General Chemistry I Laboratory (2).** 6 hrs (3 hrs lab, 2x a week). Co-requisite: CHEM 16. (1,2)

**CHEM 17. General Chemistry II (3).** Chemistry of the elements; introduction to qualitative chemical analysis. 3 hrs (class). PR. CHEM 16 and CHEM 16.1 and MATH 11 or MATH 17. Co-requisite: CHEM 17.1. (2,S)

**CHEM 17.1 General Chemistry II Laboratory (2).** 6 hrs (3 hrs lab, 2x a week). Co-requisite: CHEM 17. (2,S)

**CHEM 32. Quantitative Inorganic Analysis (3).** Basic principles and practice of quantitative inorganic chemical analysis. 3 hrs (class). PR. CHEM 17 and CHEM 17.1 and MATH 14 or MATH 17. Co-requisite: CHEM 32.1. (1,2,S)

**CHEM 32.1. Quantitative Inorganic Analysis Laboratory (2).** 6 hrs lab/wk. PR. MATH 14 or MATH 17, CHEM 17 and CHEM 17.1. Co-requisite: CHEM 32. (1,2,S)

**CHEM 40. Basic Organic Chemistry (3).** Elementary organic structural theory and functional group chemistry; introduction to carbohydrates, fats, and proteins. 3 hrs(class). PR. CHEM 15 and CHEM 15.1 or CHEM 17 and CHEM 17.1. (1,2)

**CHEM 40.1. Basic Organic Chemistry Laboratory (1).** 3 hrs lab/wk. PR. CHEM 40 (can be concurrent). (1,2)

**CHEM 43. Organic Chemistry I (3).** Organic structural theory, basic reaction mechanism, stereochemistry, elementary organic synthesis, and ultraviolet-visible and infrared spectroscopy; structure, properties, nomenclature and reactions of hydrocarbons, alkyl halides and aryl halides. 3 hrs (class). PR. CHEM 17 and CHEM 17.1. (1,2)

**CHEM 43.1. Organic Chemistry I Laboratory (2).** 6 hrs lab/wk. PR. CHEM 43 (can be concurrent). (1,2)

**CHEM 44. Organic Chemistry II (3).** Structure, properties, nomenclature and reactions of alcohols, phenols, ethers, epoxides, ketones, aldehydes, amines, carboxylic acids and derivatives; introduction to biomolecules; elementary organic synthesis; basic mass spectrometry and nuclear magnetic resonance spectroscopy. 3 hrs class. PR. CHEM 43 and CHEM 43.1. (1,2)

**CHEM 44.1. Organic Chemistry II Laboratory (2).** 6 hrs lab/wk. PR. CHEM 44 (can be concurrent). (1,2)

**CHEM 102. Elementary Physical Chemistry (3).** Elements of thermodynamics, chemical equilibria, chemical kinetics, and electrochemistry. 3 hrs (class). PR. CHEM 17 and CHEM 17.1 (or CHEM 15 and CHEM 15.1); MATH 27 and PHYS 13. (1,2)

**CHEM 111. Physical Chemistry I (3).** Fundamental laws of gases; elementary principles of thermodynamics and thermochemistry; the liquid state and properties of solutions; chemical equilibria. 3 hrs (class). PR. CHEM 32, CHEM 32.1 and PHYS 13 or PHYS 81 concurrent with MATH 28 or MATH 38. (1,2)

**CHEM 111.1 Physical Chemistry I Laboratory (2).** 6 hrs (lab/wk). PR. CHEM 111. (1,2)

**CHEM 112. Physical Chemistry II (3).** Non-ideal solutions; electrolytes and electrode processes; chemical kinetics; the crystalline state. 3 hrs (class). PR. CHEM 111, MATH 28 or MATH 38 and PHYS 13 or PHYS 82. (1,2)

**CHEM 112.1 Physical Chemistry II Laboratory (2).** 6 hrs (lab/wk). PR. CHEM 112 and CHEM 111.1. (1,2)

**CHEM 115. Physical Chemistry III (3).** Introduction to classical and quantum mechanics; quantum chemistry; molecular spectroscopy; nuclear chemistry and photochemistry. 3 hrs (class). PR. CHEM 112 and concurrent with PHYS 83. (1,2)

**CHEM 120. Inorganic Chemistry (3).** Theoretical aspects of inorganic chemistry; a systematic study of the properties of the elements from the point of view of modern atomic structure. 3 hrs (class). PR. CHEM 111. (1,2)

**CHEM 120.1 Inorganic Chemistry Laboratory (2).** 6 hrs (lab/wk). PR. CHEM 120. (1,2)

**CHEM 131. Technical Analysis I (Foods and Feeds) (4).** Theory and practice of selected quantitative methods in analysis including instrumentation. 8 hrs (2 class, 6 lab). PR. CHEM 40 and CHEM 40.1 (or CHEM 44 and CHEM 44.1) and CHEM 32 and CHEM 32.1 or COI. (1,2)

**CHEM 133. Technical Analysis II (Soils, Fertilizers and Pesticides) (4).** Theory and practice of selected quantitative methods of analysis, including instrumentation. 8 hrs (2 class, 6 lab). PR. CHEM 32 and CHEM 32.1 or COI. (2)

**CHEM 135. Technical Analysis III (Analysis of Industrial Products) (4).** The analysis of industrial products such as fuels, paints, cements, etc. and their evaluation. 8 hrs (2 class, 6 lab). PR. CHEM 40 and CHEM 32. (2)

**CHEM 137. Modern Analytical Chemistry (3).** Theories and principles of modern methods of chemical analysis. 3 hrs (class). PR. CHEM 111. (1,2)

**CHEM 137.1 Modern Analytical Chemistry Laboratory (2).** 6 hrs (lab/wk). PR. CHEM 137. (1,2)

**CHEM 140. Organic Analysis (4).** Identification of organic compounds. 8 hrs (2 class, 6 lab). PR. CHEM 32 and CHEM 32.1 and CHEM 44 and CHEM 44.1. (1,2)

**CHEM 154. Biophysical Chemistry (3).** Physical chemistry of biological systems. 3 hrs (class). PR. CHEM 161 and CHEM 112 or COI. (2)

**CHEM 157. Phytochemistry (3).** Introduction to the chemistry, distribution, and functions of natural products derived from plants. 5 hrs (2 class, 3 lab). PR. CHEM 140. (2)

**CHEM 160. Introductory Biochemistry (3).** Structure and function of biologically active compounds in living systems. 3 hrs (class). PR. CHEM 40 and CHEM 40.1 or CHEM 44 and CHEM 44.1 or COI (intended for graduate students only). (1,2,S)

**CHEM 160.1 Introductory Biochemistry Laboratory (2).** 6 hrs (lab/wk). PR. CHEM 160 (can be concurrent). (1,2,S)

**CHEM 161. General Biochemistry (4).** Structure and function of biomolecules; bioenergetics and metabolism. 4 hrs (class). PR. CHEM 44 and CHEM 44.1 or COI. (1,2)

**CHEM 161.1 General Biochemistry Laboratory (2).** Isolation, identification, characterization, and quantification of biomolecules using techniques such as spectrophotometry, potentiometry, electrophoresis and chromatography. 6 hrs (lab). PR. CHEM 161 and CHEM 32 and CHEM 32.1. (1,2)

**CHEM 162. Plant Biochemistry (3).** Metabolic processes in plant systems. 3 hrs (class). PR. CHEM 160 or CHEM 161. (2)

**CHEM 164. Introduction to Chemical Toxicology (3).** Biochemical mode of action and effects of chemical toxicants on biological systems; toxicological testing; detection and evaluation of hazards of toxicants. 5 hrs (2 class, 3 lab). PR. CHEM 160 or CHEM 161 and BIO 2 or BOT 1 and ZOO 1. (2)

**CHEM 171. Industrial Chemistry (3).** Introduction to the manufacture and production of some important organic and inorganic compounds. 3 hrs (class). PR. CHEM 32 and CHEM 40 or CHEM 44. (2)

**CHEM 173. Polymer Chemistry (3).** Synthetic and natural polymers-classification, molecular structure, physico-chemical properties, synthesis and reactions. 5 hrs (2 class, 3 lab). PR. CHEM 40 or CHEM 44 and CHEM 44.1 and CHEM 112. (2)

**CHEM 174. Principles of Radioisotope Methodology (3).** Principles of radioisotope methodology applied to chemistry and biology. 5 hrs (2 class, 3 lab). PR. CHEM 32 and CHEM 32.1 and PHYS 13 or COI. (2)

**CHEM 177. Biochemical Technology I (3).** Kinetic, energetic, and biochemical engineering aspects of fermentation processes; fermenter types and their operation. 3 hrs (class). PR. MCB 1 and CHEM 112 or CHEM 102. (1)

**CHEM 177.1 Biochemical Technology I Laboratory (2).** 6 hrs (lab). PR. CHEM 177. (2)

**CHEM 178. Biochemical Technology II (3).** Production and characterization of industrially important enzymes, immobilization and applications of enzymes; enzyme reactor types and their operation. 3 hrs (class). PR. CHEM 177.

**CHEM 178.1 Biochemical Technology II Laboratory (2).** 6 hrs (lab). PR. CHEM 178.

**CHEM 180. Environmental Chemistry (3).** Chemical concepts and principles applied to the study of the environment and the preservation of environmental quality. 3 hrs (class). PR. CHEM 40 or CHEM 44. (1,2)

**CHEM 181. Pollution Chemistry (3).** Nature, sources, transformations and effects of pollutive substances in the environment; chemical basis of pollution control and water management; pollution analysis. 3 hrs (class). PR. CHEM 180 or COI. (2)

**CHEM 185. Structure and Reactivity of Agricultural Chemicals (3).** Structures, properties, modes of actions, and environmental effect of agrochemicals. 3 hrs (class). PR. CHEM 160 or 161. (2)

**CHEM 190. Special Problems (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (1, 2)

**CHEM 191. Special Topics (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (1,2,S)

**CHEM 192. Chemical Information, Literature and Communication (3).** History of chemistry; the Chemistry Law; Code of Conduct for Chemists; types of chemical literature and sources of chemical information; the organization of the chemistry library; techniques of manual literature searching; technical writing for chemists. 3 hrs (2 class, 3 lab). PR. CHEM 32 and CHEM 44. (1,2)

**CHEM 198. Practicum (3).** Field training in private or government institutions engaged in chemistry or related activities. PR. Junior standing. (S)

**CHEM 199. Undergraduate Seminar (1).** Review and discussion of current literature in Chemistry. May be taken twice. PR. Senior standing and CHEM 192. (1,2)

**CHEM 200. Undergraduate Thesis (6).** (1,2,S)

## Natural Science

**NASC 1 (MST). The Material Universe (3).** Fundamental concepts, principles, and theories of physics and chemistry. 3 hrs (class). PR. None. (1,2)

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## INSTITUTE OF COMPUTER SCIENCE

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### Computer Science

**CMSC 2. Introduction to the Internet (3).** Tools and services of the Internet. Internet protocols, search engines, file transfer protocol (FTP), email, listservers, and hypertext markup language (HTML) programming. 5 hrs (2 class, 3 lab). PR. None. (1,2)

**CMSC 11. Introduction to Computer Science (3).** Introduction to the major areas of computer science; software systems and methodology; computer theory; computer organization and architecture. 5 hrs (2 class, 3 lab). PR. MATH 11 or MATH 17. (1,2,S)

**CMSC 21. Fundamentals of Programming (3).** Introduction to computer programming using a general-purpose, structured and procedural programming language; program design, testing and debugging. 5 hrs (2 class, 3 lab). PR. CMSC 11. (1,2)

**CMSC 22. Object-Oriented Programming (3).** Objects;



design and implementation of object-oriented programs. 5 hrs (2 class, 3 lab). PR. AMAT 150 or CMSC 11. (1,2)

**CMSC 56. Discrete Mathematical Structures in Computer Science I (3).** Principles of logic, set theory, relations and functions, Boolean algebra, and linear algebra. 5 hrs (2 class, 3 lab). PR. MATH 17. (2,S)

**CMSC 57. Discrete Mathematical Structures in Computer Science II (3).** Principles of combinations, probability, algebraic systems, and graph theory. 5 hrs (2 class, 3 lab). PR. CMSC 56. (1,2)

**CMSC 100. Web Programming (3).** Design and implementation of Web applications. 5 hrs (2 class, 3 lab). PR. CMSC 2 and CMSC 22. (1,2)

**CMSC 123. Data Structures (3).** Abstract data types and implementations of data structures; arrays, stacks, queues, linked lists, mappings, trees, sets and graphs; internal and external searching and sorting; dynamic storage management. 5 hrs (2 class, 3 lab). PR. CMSC 57, and CMSC 21; or COI. (2,S)

**CMSC 124. Design and Implementation of Programming Languages (3).** Language definition structure; data types and structures; control structures and data flow; interpretation of identifiers and run-time consideration. 5 hrs (2 class, 3 lab). PR. CMSC 123 or COI. (1)

**CMSC 125. Operating Systems (3).** Processor management, memory management, file and disk management, resource management, concurrent processes, networks, and distributed systems. 5 hrs (2 class, 3 lab). PR. CMSC 123 or COI. (1,2)

**CMSC 127. File Processing and Database Systems (3).** Hierarchical network and relational database models; principal database systems and query languages; database processing and implementation. 5 hrs (2 class, 3 lab). PR. CMSC 123 or COI. (1,2)

**CMSC 128. Introduction to Software Engineering (3).** Principles and methods for the design, implementation, validation, evaluation, and maintenance of software systems. 5 hrs (2 class, 3 lab). PR. CMSC 123 or COI. (2)

**CMSC 129. Principles of Compiler Design (3).** Fundamental concepts in the design and implementation of compilers: textual analysis, syntax analyses, code generation and optimization. 5 hrs (2 class, 3 lab). PR. CMSC 124. (2)

**CMSC 130. Logic Design and Digital Computer Circuits ( 3 ) .** Logic functions and equations; description, analysis, and design of combinatorial and sequential circuits; digital logic circuits. 5 hrs (2 class, 3 lab). PR. CMSC 57; and CMSC 11; or COI.

**CMSC 131. Introduction to Computer Organization and Machine Level Programming (3).** An introduction to computer organization and interfaces between hardware and software; microcomputer systems, and assembly language programming. 5 hrs (2 class, 3 lab). PR. CMSC 21 or COI. (1)

**CMSC 132. Computer Architecture (3).** Computer systems organization from a designer's point of view; design and testing of simple computer systems and components using a hardware description language; measuring and summarizing the performance of computer systems. 5 hrs (2 class, 3 lab). PR. CMSC 131 or COI. (2)

**CMSC 137. Data Communications and Networking (3).** Basic principles of data communications; design issues and protocols in the layers of data network; networks for various applications. 5 hrs (2 class, 3 lab). PR. CMSC 125. (1)

**CMSC 141. Automata and Language Theory (3).** Abstract machines and languages; finite automata, regular expressions, pushdown automata, context free languages, Turing machines, and recursively enumerable languages. 5 hrs (2 class, 3 lab). PR. CMSC 123 or COI. (1,2)

**CMSC 142. Design and Analysis of Algorithms (3).** Algorithm design and analysis techniques and their applications. 5 hrs (2 class, 3 lab). PR. CMSC 123 or COI. (1,2)

**CMSC 150. Numerical and Symbolic Computations (3).** Computational problem solving; sources of errors in computation; iterative approximation methods and symbolic algebra; mathematical software libraries and symbolic manipulation packages. 5 hrs (2 class, 3 lab). PR. CMSC 21 and MATH 26 or MATH 36. (1)

**CMSC 161. Interactive Computer Graphics (3).** Graphics systems software and hardware, 2D drawing algorithms, geometrical transformations, surface modelling, 3D viewing, visible surface determination algorithms, reflection and illumination models, shading models for polygons, color theory, ray tracing, animation. 5 hrs (2 class, 3 lab). PR. CMSC 123 or COI. (2)

**CMSC 165. Digital Image Processing (3).** Methods for acquiring, creating, manipulating, enhancing, and analyzing digital images. 5 hrs (2 class, 3 lab). PR. CMSC 123 or COI. (1)

**CMSC 170. Introduction to Artificial Intelligence (3).** Basic principles and applications of Artificial Intelligence: knowledge representation, natural language processing, pattern recognition, and expert systems. 5 hrs (2 class, 3 lab). PR. CMSC 123. (2)

**CMSC 172. Robot Modelling (3).** Robotics manipulators and their characteristics; conversion from joint space to real world coordinates; inverse kinematics; workspace analysis; differential motion. 5 hrs (2 class, 3 lab). PR. CMSC 123. (2)

**CMSC 180. Introduction to Parallel Computing (3).** Parallel computational models, machine architectures, performance model, algorithms and programming. 5 hrs (2 class, 3 lab). PR. CMSC 132. (1)

**CMSC 190. Special Problems (3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (1,2)

**CMSC 191. Special Topics (3).** (May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (1,2)

**CMSC 198. Practicum (3).** PR. COI. (S)

**CMSC 199. Undergraduate Seminar (1).** May be taken twice. PR. COI. (1,2)

**CMSC 200. Undergraduate Thesis (6).** PR. COI. (1,2)

### Information Technology

**IT 1 (MST). Information Technology Literacy (3).** Concepts and applications of information technology. 5 hrs (2 class, 3 lab). (1,2)

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## INSTITUTE OF MATHEMATICAL SCIENCES AND PHYSICS

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### Applied Mathematics

**AMAT 19. Finite Mathematics (3).** An introduction to the concepts of logic, probability, mathematical programming, theory of games and graph. 3 hrs (class). (1)

**AMAT 110. Mathematical Modeling (3).** Principles, methods and applications of mathematical modeling. 3 hrs (class). PR. MATH 37 and STAT I. (2)

**AMAT 112. Introduction to Mathematical Optimization (3).** A survey of major techniques in the mathematical modeling of optimization problems. 3 hrs (class). PR. MATH 28 or MATH 38 and AMAT 110. (1)

**AMAT 115. Introduction to Mathematical Decision Theory (3).** Fundamental concepts of quantitative decision-making 3 hrs (class). PR. AMAT 110 and MATH 181 or STAT 145. (2)

**AMAT 150. Computer Programming (3).** Basic computer programming concepts; program constructs and techniques in algorithm development; syntax of programming language. 5 hrs (2 class, 3 lab). PR. COI. (1,2,S)

**AMAT 151. Elementary Numerical Methods (3).** Basic computer programming concepts; program constructs and techniques in algorithm development; syntax programming language. 5 hrs (2 class, 3 lab). PR. COI. (1,2,S)

**AMAT 160. Linear Programming (3).** Formulation, computation, solutions, and applications of linear programming. 3 hrs (class). PR. MATH 120 and AMAT 110 or COI. (1)

**AMAT 161. Nonlinear Programming (3).** Formulation, computation, solutions, and applications of nonlinear programming. 3 hrs (class). PR. MATH 120 and AMAT 110 or COI. (2)

**AMAT 162. Integer and Dynamic Programming (3).** Survey of integer and dynamic programming techniques. 3 hrs (class). PR. AMAT 160. (2)

**AMAT 167. Mathematical Models in Operations Research I (3).** Survey and analysis of mathematical models used in inventories, queues, maintenance of systems, and project management. 3 hrs (class). PR. AMAT 110. (1)

**AMAT 168. Mathematical Models in Operations Research II (3).** Survey and analysis of mathematical models used in transportation planning, facility layout and location, finance and investment, and performance evaluation of systems. 3 hrs (class). PR. AMAT 160. (2)

**AMAT 170. Theory of Interest (3).** Principles, methods, and applications of the theory of interest. 3 hrs (class). PR. MATH 27 or MATH 37. (1)

**AMAT 171. Life Insurance Mathematics I (3).** Mortality, life annuities, life insurance policies and net premiums, methods of valuation, modified and net level reserves, non-forfeiture options, and gross premiums. 3 hrs (class). PR. AMAT 170 and STAT 1. (2)

**AMAT 172. Life Insurance Mathematics II (3).** Mathematical theory of contingencies of single and multiple lives. 3 hrs (class). PR. AMAT 171. (1)

**AMAT 174. Measurement of Mortality (3).** Theory and methods of measuring mortality. 3 hrs (class). PR. AMAT 172. (1)

**AMAT 176. Actuarial Science (3).** Investment of life insurance funds, selection of risks and reinsurance, valuation of liabilities, non-forfeiture values, asset share studies, process of premium formulation. 3 hrs (class). PR. AMAT 172. (1)

**AMAT 177. Introduction to Mathematical Finance (3).** Mathematical theory underlying the pricing and analysis of financial derivatives. 3 hrs (class). PR. AMAT 170 and MATH 181. (2)

**AMAT 178. Stochastic Calculus for Finance (3).** Ito processes, their construction, properties, and application to the pricing of financial derivatives. 3 hrs (class). PR. AMAT 177 and MATH 182. (1)

**AMAT 180. Introduction to Biomathematics (3).** Discrete and continuous mathematical models of biological processes. 3 hrs (class). PR. MATH 28 or MATH 38 and MATH 120 or COI. (2)

**AMAT 190. Special Problems (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (1,2,S)

**AMAT 191a. Special Topics in Operations Research (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (2)

**AMAT 191b. Special Topics in Actuarial Science (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (2)

**AMAT 198. Practicum (3).** PR. COI. (S)

**AMAT 199. Undergraduate Seminar (1).** (May be taken twice.) 1 hr (class). PR. COI. (1,2)

### Applied Physics

**APHY 101. Physics in Scientific Instruments (3).** Physical laws of measurement; operation and use of electronic instruments. 5 hrs (2 class, 3 lab). PR. PHYS 13 or PHYS 72 or PHYS 82. (1)

**APHY 102. Physics of Electronic Devices (3).** Principles of operation and use of electronic devices. 5 hrs (2 class, 3 lab). PR. PHYS 13 or PHYS 72 or PHYS 82. (1)

**APHY 103. Electronic Circuits (3).** Design, implementation, and application of analog electronic circuits in physical instrumentation. 5 hrs (2 class, 3 lab). PR. APHY 102. (2)

**APHY 104. Digital Computer Electronics (3).** Design, implementation, and application of digital electronic circuits in computers and other instruments. 5 hrs (2 class, 3 lab). PR. APHY 102 or COI. (2)

**APHY 105. Microprocessor-based Instrumentation (3).** Basic computer concepts; programming and operation; I/O implementation interfacing techniques; microcomputer systems. 5 hrs (2 class, 3 lab). PR. APHY 101 and APHY 104. (1)

**APHY 106. Biophysical Instrumentation (3).** Properties of measuring instruments; physiological systems of the body from the point of view of instrumentation; animal instrument systems; diagnostic instrumentation; instruments for sensory measurements; bio-telemetry; radioisotope instrumentation and microcomputer in biophysical instrumentation. 5 hrs (2 class, 3 lab). PR. APHY 102. (2)

**APHY 130.1. Logic Design Laboratory (1).** Logic design techniques and applications; construction of digital logic circuits. 3 hrs (lab). PR. APHY 104. (1)

**APHY 131. Microcomputer Architecture (3).** Principles of microcomputer design and organization; microprocessor structure, functional parts and their operations, classification and comparative microprocessor evaluation; interfacing techniques, microprogramming; system development; microprocessor applications. 5 hrs (2 class, 3 lab). PR. APHY 130.1. (2)

**APHY 132. Embedded Systems Programming for Instrumentation (3).** Methods and techniques in programming microprocessors, microcontrollers, and embedded systems for instrumentation. 5 hrs (2 class, 3 lab). PR. APHY 105. (2)

**APHY 140. Modeling and Simulation in Environmental Physics (3).** Physical principles of the environment of biological systems; radiation exchange; transfer of

momentum, heat, and mass applied to micrometeorology. 5 hrs (2 class, 3 lab). PR. PHYS 115. (1,2)

**APHY 150. Introduction to Materials Development (3).** Fundamentals of synthesis, fabrication, processing, and characterization of materials; survey of novel materials. 3 hrs (class). PR. PHYS 83. (2)

**APHY 160. Microscopy and Spectroscopy for Materials Characterization (3).** Fundamental theory and methods of microscopy and spectroscopy. 5 hrs (2 class, 3 lab). PR. PHYS 83 and APHY 101. (2)

**APHY 190. Special Problems (3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units) PR Senior Standing. (1,2,S)

**APHY 191. Special Topics (3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (2)

**APHY 198. Practicum (3).** Apprenticeship in research agencies or manufacturing industries related to the student's area of specialization and report on the apprenticeship - a total of 144 hrs. PR. COI. (S)

**APHY 199. Undergraduate Seminar (1).** May be taken twice. 1 hr (class) PR. Senior standing. (2)

**APHY 200. Undergraduate Thesis (6).** PR. COI. (1,2,S)

### Mathematics

**MATH 1 (MST). Quantitative Reasoning (3).** Logical, quantitative, and postulational thinking. 3 hrs (class). (1,2)

**MATH 2 (MST). Problem Solving (3).** Approaches, techniques and strategies of problem solving using discrete mathematics. 3 hrs (class). (1,2)

**MATH 11. College Algebra (3).** Sets, real number system; radicals and rational exponents; linear equations and inequalities; quadratics; systems of equations; functions. 3 hrs (class). (1,2,S)

**MATH 14. Plane Trigonometry (3).** Functions and relations; logarithms and applications; circular and trigonometric functions and their inverses; solutions of right and oblique triangles. 3 hrs (class). PR. MATH 11. (1,2,S)

**MATH 17. Algebra and Trigonometry (5).** Sets and numbers; the algebra of numbers as a logical system; inequalities; absolute values and coordinate systems, functions and graphs; circular, linear, polynomial and quadratic functions; exponential and logarithmic functions; application of the circular function, angles. 5 hrs (class). (1,2)

**MATH 18. College Geometry (3).** Axioms and propositions of plane, solid, and spherical geometry. 3 hrs (class). PR. MATH 14 or MATH 17. (1,2)

**MATH 20. The Landscape of Mathematics (3).** Fundamental concepts and theorems of mathematics. 3 hrs (class). PR. None. (1)



**MATH 26. Analytic Geometry and Calculus I (3).** Straight lines, functions, and graphs; limits and continuity; concepts of derivatives; derivatives of algebraic functions; differential applications of curve sketching; related rates; maxima and minima problems; equations of the second degree; indefinite integral and its applications; area under the curve; definite integral. 3 hrs (class). PR. MATH 14 or MATH 17. (1,2,S)

**MATH 27. Analytic Geometry and Calculus II (3).** Differentiation and integration of transcendental functions. Indeterminate forms; integration formulas. Integration procedures. Application of integration. Polar coordinate system. 3 hrs (class). PR. MATH 26. (1,2,S)

**MATH 28. Analytic Geometry and Calculus III (3).** Parametric equations, vectors, and solid analytic geometry; partial differentiation; multiple integrals; infinite series. 3 hrs (class). PR. MATH 27. (1,2,S)

**MATH 36. Mathematical Analysis I (5).** The real number system; plane analytic geometry and conic sections, limits and continuity, differentiation and integration of algebraic functions. 5 hrs (class). PR. MATH 14 or MATH 17. (1,2)

**MATH 37. Mathematical Analysis II (5).** Derivatives and integrals of transcendental functions; parametric equations; polar coordinates, techniques of integration and applications; vectors in two and three dimensions; loci in space. 5 hrs (class). PR. MATH 36. (1,2)

**MATH 38. Mathematical Analysis III (3).** Theories, techniques, and applications of partial differentiation and multiple integration, vector differential and integral calculus; elements of infinite series. 3 hrs (class). PR. MATH 37. (1,2)

**MATH 101. Logic and Set Theory (3).** Elements of mathematical logic and the algebra of propositions; arguments, set operations, functions and relations; algebra of sets; cardinal and ordinal numbers; ordered sets; axiom of choice and other topics in set theory. 5 hrs (2 class, 3 comp). PR. AMAT 19 or MATH 20 and MATH 26 or MATH 36. (1,2)

**MATH 103. Elementary Theory of Numbers (3).** Divisibility of integers; primes; congruences; quadratic reciprocity; some functions in number theory and diophantine equations. 3 hrs (class). PR. MATH 101. (2)

**MATH 111. Modern Algebra I (3).** Fundamental concepts of groups, rings, fields and their substructures; permutation representations; isomorphism theorems. 3 hrs (class). PR. MATH 101. (1)

**MATH 112. Modern Algebra II (3).** Advanced topics in groups, rings and fields and their substructures; ring of Laurent series and factorization in commutative rings. 3 hrs (class) PR. MATH 111. (2)

**MATH 120. Linear Algebra (3).** Solution of system of linear equations by matrices; matrix operations and vector spaces; linear operators and linear transformation; determinants and eigenvalues. 3 hrs (class). PR. MATH 37 and MATH 101 or COI. (1,2)

**MATH 130. Metric Geometry (3).** Foundation and structure of metric geometry as a postulational system of reasoning. PR. MATH 101. (2)

**MATH 133. Non-Euclidean Geometries (3).** Origin and development of non-Euclidean geometries. 3 hrs (class). PR. MATH 130. (1)

**MATH 135. Projective Geometry (3).** Synthetic and analytic treatment of projective transformations, duality, conics, polarities, and involution; axiomatic projective geometry; extensions of real projective geometry. 3 hrs (class). PR. MATH 133 or COI. (2)

**MATH 138. (formerly MATH 168) Introductory Topology (3).** Basic topological concepts, theory, and methods. 3 hrs (class). PR. MATH 38 and MATH 101. (2)

**MATH 141. Introductory Combinatorics (3).** Elementary configurations; enumeration of configurations and investigation of unknown configurations. 3 hrs (class). PR. MATH 38 and either MATH 101 or CMSC 56 and CMSC 57. (1)

**MATH 143. Graph Theory (3).** Path problems, directed graphs and colorability and their application. 3 hrs (class). PR. MATH 101 or CMSC 56 and CMSC 57. (1)

**MATH 151. Ordinary Differential Equations (3).** Theory methods and applications of ordinary differential equations. 3 hrs (class). PR. MATH 38 or MATH 28. (1)

**MATH 152. Partial Differential Equations (3).** Theory, methods, and applications of partial differential equations. 3 hrs (class). PR. MATH 151. (2)

**MATH 155. Advanced Calculus I (3).** Geometry of the euclidean n-space; topological concepts; sequences; continuity; limits; convergence. 3 hrs (class). PR. MATH 38 and MATH 101 or COI. (1)

**MATH 156. Advanced Calculus II (3).** Transformation; differentiation of composite functions; inverses of functions and transformations; integration-definite integral, improper integral. 3 hrs (class). PR. MATH 155. (2)

**MATH 160. Vector Analysis (3).** The algebra of vectors; differentiation of vectors; the vector operators del and curl; divergence; Frenet-Serret formulas; involutes, envelopes, first and second fundamental forms; geodesics, integration of vectors. 3 hrs (class). PR. MATH 38 or MATH 28. (2)

**MATH 165. Complex Analysis I (3).** Properties of complex numbers; topological concepts in the complex plane; limits and sequences; analytic and elementary functions; complex differentiation and integration; integral formulas and related theorems. 3 hrs (class). PR. MATH 38 and MATH 101 or COI. (1)

**MATH 166. Complex Analysis II (3).** Generalization of the theories and techniques of power series, integration and transformation to complex variables. 3 hrs (class). PR. MATH 165. (2)

**MATH 170. Finite Differences (3).** Calculus of finite differences; difference equations in general; and linear difference equations with constant coefficients and selected topics. 3 hrs (class). PR. MATH 38. (1)

**MATH 174. Numerical Analysis I (3).** Theory, analysis and implementation of algorithms in polynomial approximation, numerical differentiation, and integration. 5 hrs (2 class, 3 lab). MATH 38 and either AMAT 150 or CMSC 21. (1)

**MATH 175. Numerical Analysis II (3).** Theory, analysis, and implementation of algorithms for solving non-linear equations, linear systems, and ordinary differential equations. 5 hrs (2 class, 3 lab). PR. MATH 174. (2)

**MATH 181. Introduction to Probability Theory (3).** Elements of combinatorial analysis and introductory probability theory. 3 hrs (class). PR. MATH 101 and MATH 38 or MATH 28 (1)

**MATH 182. Introduction to Stochastic Processes (3).** Theory and applications of Bernoulli trials; infinite sequence of trials; random walk and run problems; branching processes and Markov chains. 3 hrs (class). PR. MATH 181 or STAT 143. (2)

**MATH 190. Special Problems (3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR COI (1,2,S)

**MATH 191. Special Topics (3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI. (1)

**MATH 192. Foundations of Mathematics (3).** Axiomatic methods and theories; symbolic logic calculi; school mathematics reform theses; constructivistics, formalistics, and related mathematics; various schools of mathematical thought and operationality of their theses. 3 hrs (class). PR. COI. (2)

**MATH 195. Research Methods in Mathematics (3).** Principles governing mathematical research and documentation. 3 hrs (class). PR. MATH 38 and MATH 101. (1,2)

**MATH 199. Undergraduate Seminar (3).** (May be taken twice.) PR. COI. (2)

**MATH 200. Undergraduate Thesis (6).** PR. COI. (1,2,S)

### Mathematics and Science Teaching

**MST 40/DEVC 40. Fundamentals of Educational Communication and Technology (3).** Theories, principles and concepts of educational communication and technology; practice in planning and designing of media-based learning systems. 3 hrs (lect/recit). PR. DEVC 11 or COI. (1,2)

**MST 101a. Field Study I (1).** Observation of the interaction of student's learning and management of both classroom-based and non-classroom-based learning environment. 48 hrs/sem (lab). PR. None. (1)

**MST 101b. Field Study II (1).** Examination of diverse learners' characteristics including learning styles, interpretation of classroom practices as they relate to designing/planning lessons and assessments. 48 hrs/sem (lab). PR. MST 101a. (2)

**MST 101c. Field Study III (1).** Reflection on and analysis of teaching assessment practices including non-traditional assessments. 48 hrs/sem (lab). PR. MST 101b. (1)

**MST 101d. Field Study IV (1).** Observation and reflection on classroom management and how classroom discipline is implemented. 48 hrs/sem (lab). PR. MST 101c. (2)

**MST 123. The Teaching of Mathematics and Science (5).** Principles, trends and methods of teaching mathematics and science. 7 hrs (4 class, 3 lab). PR. MST 40/DEVC 40 and EDUC 122. (2)

**MST 190. Special Problems (3).** PR. MST 195.1. (1,2)

**MST 195/SOC 195. Research Methodologies in the Social Sciences (2).** Perspectives, design, and process of conducting research in the social sciences. 2 hrs (class). PR. STAT 166. (1,2,S)

**MST 195.1. Research Methodologies in the Social Sciences Laboratory (1).** 3 hrs (lab). PR. SOC/MST 195. (2)

**MST 199. Undergraduate Seminar (1).** PR. COI. (1,2)

**MST 200a. Student Teaching I (on campus) (3).** PR. MST 123 and MST 101d. (1,2)

**MST 200b. Student Teaching II (off campus) (3).** PR. MST 200a. (1,2)

### Natural Science

**NASC 3 (MST). Physics in Everyday Life (3).** Physics, concepts, laws, and principles behind natural phenomena and their applications to technology. 3 hrs (class). (1,2)

### Physics

**PHYS 1. Introductory Physics (3).** An elementary survey of the concepts and laws of physics, covering mechanics, heat, electricity, magnetism, optics, relativity, atomic and nuclear physics, with emphasis on unifying principles. Primarily for students who are not in the natural and engineering sciences. 5 hrs (2 class, 3 lab). (1,2,S)

**PHYS 3. General Physics I (Mechanics and Heat) (3).** Inertia, motion, forces and energy; properties and laws of solids and liquids; temperature measurements and effect on properties of materials, and heat flow. Primarily for students in the natural and engineering sciences. 5 hrs (2 class, 3 lab). PR. MATH 14 or MATH 17. (1,2,S)

**PHYS 13. General Physics II (Electricity and Magnetism) (3).** Sources, effects, measurements and uses of electricity and magnetism; fundamentals of wave motion



applied to the study of sound and light. Primarily for students in the natural and engineering sciences. 5 hrs (2 class, 3 lab). PR. PHYS 3. (1,2,S)

**PHYS 23. Optics and Modern Physics (3).** Laws of refraction and reflection of light; nature of spectra; interference, diffraction and polarization phenomena, introduction to atomic and nuclear physics. 5 hrs (2 class, 3 lab). PR. PHYS 13. (1)

**PHYS 81. Fundamental Physics I (5).** Fundamentals of Newtonian mechanics, gravitational theory, fluid statics and dynamics, special relativity, waves and oscillations, and thermal physics. 7 hrs (4 class, 3 lab). PR. MATH 26 or MATH 36. (1,2)

**PHYS 82. Fundamental Physics II (5).** Fundamentals of electromagnetism and optics. 7 hrs (4 class, 3 lab). PR. MATH 27 or MATH 37 and PHYS 81. (1,2)

**PHYS 83. Fundamental Physics III (5).** Fundamentals of modern physics, wave and quantum mechanics, atomic structure, and statistical physics. 7 hrs (4 class, 3 lab). PR. MATH 28 or MATH 38 and PHYS 82. (1,2)

**PHYS 111. Mathematical Physics I (3).** Linear and matrix algebra, vector analysis, ordinary and partial differential equations. 3 hrs (class). PR. MATH 27 or MATH 37. (2)

**PHYS 112. Mathematical Physics II (3).** Integral transforms, complex analysis, linear vector spaces, special functions. 3 hrs (class). PR. PHYS 111. (1)

**PHYS 115. Computational Physics I (3).** Numerical methods in solving physics problems. 5 hrs (2 class, 3 lab). PR. COI. (2)

**PHYS 116. Computational Physics II (3).** Modeling and simulation of physical systems. 5 hrs (2 class, 3 lab). PR. PHYS 115 or COI. (1)

**PHYS 121. Theoretical Mechanics I (3).** Motion of a particle in one, two, and three dimensions; motion of a system of particles; rotation of rigid bodies about an axis. 3 hrs (class). PR. PHYS 83 and PHYS 111. (2)

**PHYS 131. Electromagnetic Theory I (3).** Vector analysis; electrostatic fields *in vacuo* and in dielectrics; solution to Laplace's and Poisson's equations; magnetic fields of constant and variable currents; magnetic materials. 3 hrs (class). PR. PHYS 83 and PHYS 111. (1)

**PHYS 132. Electromagnetic Theory II (3).** Time-dependent electromagnetic fields. 3 hrs (class). PR. PHYS 112 and PHYS 131. (2)

**PHYS 141. Quantum Physics I (3).** Basic concepts and formalisms of quantum mechanics; one dimensional potentials, the harmonic oscillator, spin and two level systems, and the hydrogen atom. 3 hrs (class). PR. PHYS 83 and PHYS 112. (1)

**PHYS 151. Statistical and Thermo Physics (3).** Laws of thermodynamics; basic concepts, methods, and

applications of statistical mechanics; quantum statistics of ideal gases. 3 hrs (class). PR. PHYS 83 and PHYS 111. (1)

**PHYS 160. Structure of Matter (3).** Basic evidence of the macroscopic and quantum properties of atoms, concepts and phenomena of quantum physics, mechanics of single atoms and aggregates of atoms. 3 hrs (class) PR. PHYS 83 and PHYS 111. (1)

**PHYS 170. Solid State Physics (3).** Crystal structure, periodicity and Bloch's theorem; band theory of solids and its applications; material properties in response to electric and magnetic fields. 3 hrs (class). PR. PHYS 141. (2)

**PHYS 191. Special Topics (1-3).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.) PR. COI (1,2)

**PHYS 192. Experimental Physics I (3).** Selected advanced experiments and projects in physics; technical drawing and machine shop operations. 7 hrs (1 class, 6 lab). PR. PHYS 83. (2)

**PHYS 193. Experimental Physics II (3).** Measurements of the mechanical, thermal, electrical, magnetic and optical properties of materials. 7 hrs (1 class, 6 lab). PR. PHYS 83. (1)

**PHYS 195. Research Methods in Physics (3).** Conduct and presentation of pure and applied physics research, review process and ethics in scientific research and communication. 5 hrs (2 class, 3 lab). PR. PHYS 82 and STAT 1. (1)

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## INSTITUTE OF STATISTICS

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### Statistics

**STAT 1. Elementary Statistics (3).** Basic statistical concepts; frequency tables and distributions; probability and counting methods; sampling methods; tests of significance; regression and correlation; introduction to analysis of variance; analysis of count data. 5 hrs (2 class, 3 lab). PR. MATH 11 or MATH 17. (1,2,S)

**STAT 101. Statistical Methods (3).** Analysis of measurements and discrete data; some non-parametric methods; simple linear regression and correlation analysis; analysis of variance and covariance. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**STAT 135. Logic and Matrix Algebra in Statistics (3).** Basic concepts and methods in math logic and matrix algebra useful in statistics. 3 hrs (2 lect, 1 recit). PR. STAT 101 and MATH 37 or MATH 27. (1)

**STAT 144. Introductory Statistical Theory I (3).** Probability models; operations on probability; random variables and random vectors; mathematical expectations; sampling from a probability distribution; introduction to statistical inference. 3 hrs (2 lect, 1 recit). PR. STAT 1 and MATH 28 or MATH 38. (1,2)

**STAT 145. Introductory Statistical Theory II (3).** Discrete and continuous probability models; generating functions; functions of random variables and random vectors; sampling from a normal population; large-sample theory. 3 hrs (2 lect, 1 recit). PR. STAT 144. (1,2)

**STAT 146. Introductory Statistical Theory III (3).** Estimation; testing of hypothesis and common parametric tests. 3 hrs (2 lect, 1 recit). PR. STAT 145. (1,2)

**STAT 147. Introduction to the Theory of Nonparametric Statistics (3).** Development of point and interval estimates and formulation of test of hypothesis based on distribution-free statistics. 3 hrs (2 class, 1 recit). PR. STAT 145. (1,2)

**STAT 151. Applied Regression and Correlation (3).** Linear regression models; correlation analysis; methods of model selection. 5 hrs (2 class, 3 lab). PR. STAT 101 and STAT 135, or COI. (2)

**STAT 156. Introductory Time Series Analysis (3).** Approaches to time analysis; autocovariance and autocorrelation functions; linear stationary and non-stationary processes; forecasting, modeling and diagnostic checking; seasonal time series. 5 hrs (2 class, 3 lab). PR. STAT 135 or COI. (2)

**STAT 162. Experimental Designs I (3).** Design and analysis of one-way classifications; complete blocks; split-plot and factorial experiments; multiple comparisons; group and trend comparisons; analysis of covariance. 5 hrs (2 class, 3 lab). PR. STAT 1 or COI. (1,2)

**STAT 163. Survey Designs (3).** Introduction to sampling methods; simple random stratified, systematic unequal probability and multi-stage sampling, sample size determination, methods of estimation. 3 hrs (2 lect, 1 recit). PR. STAT 144. (2)

**STAT 164. Statistics for the Biological Sciences (3).** Statistical modelling of biological data; parametric and nonparametric tests for comparing means; probit analysis; linear discriminant analysis; cluster analysis; analysis of categorical data. 5 hrs (2 class, 3 lab). PR. STAT 1. (2)

**STAT 165. Categorical Data Analysis (3).** Inferences on proportions, measures of associations and causal relationships among categorical variables including multinomial responses and repeated measures and categorical responses data. 5 hrs (2 class, 3 lab). PR. STAT 1 or COI. (1)

**STAT 166. Statistics for the Social Sciences (3).** Test of hypothesis; nonparametric tests; analysis of one-way and two-way classification data; measures of association and relationships; introduction to multivariate techniques, factor analysis and time series analysis; sampling. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**STAT 167. Statistical Quality Control (3).** Type of variables, frequency distribution, descriptive measures

of a distribution, probability distribution, control charts, process capability, introduction to designed experiments for process improvement, acceptance sampling. 5 hrs (2 class, 3 lab). PR. STAT 1. (2)

**STAT 172. Experimental Designs II (3).** Analysis of nested experiments; symmetric and fractional factorials; confounding; response surface methodology and mixture designs; incomplete block designs; repeated measures and crossover designs; combined analysis similar experiments. 5 hrs (2 class, 3 lab). PR. STAT 162. (1)

**STAT 173. Survey Operations (3).** Planning, execution and analysis of surveys. 5 hrs (2 class, 3 lab). PR. STAT 163. (1)

**STAT 175. Analysis of Multivariate Data (3).** Multivariate regression; multivariate analysis of variance; discriminant analysis; canonical variate analysis; factor analysis; cluster analysis; causal models and path analysis; log linear analysis. 5 hrs (2 class, 3 lab). PR. STAT 101 or COI. (1)

**STAT 181. Statistical Computing (3).** Computer algorithms for approximating probabilities; random number generation; sampling and randomization; resampling techniques; simulation techniques. 5 hrs (2 class, 3 lab). PR. COI. (1)

**STAT 182. Statistical Packages (3).** Statistical packages in data processing and analysis. 5 hrs (2 class, 3 lab). PR. STAT 101 or COI. (2)

**STAT 190. Special Problem (1-2).** (May be taken twice provided that total number of units to be credited to the student's program will not exceed 3 units.) PR. COI. (1,2)

**STAT 191. Special Topics (1-3).** (May be taken more than once provided that the total number of units to be credited to the student's program will not exceed 3 units.) PR. COI.

**STAT 198. Practicum (3).** PR. COI. (S)

**STAT 199. Undergraduate Seminar (1).** 1 hr. (May be taken twice.) PR. COI. (1,2)

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## DEPARTMENT OF HUMAN KINETICS

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### Physical Education

**PE 1.** Foundations of Physical Fitness (2). (1,2)

**PE 2.** Elective Physical Education Activities for Beginners (2). In the fields of a) sports b) dance c) recreation d) fitness and wellness. (1,2,S)

**PE 3.** Elective Advanced Physical Education Activities for students who have taken PE 2 in the same activity (2). In the fields of a) sports b) dance c) recreation d) fitness and wellness. (1,2)

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**DEPARTMENT OF HUMANITIES**


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**Communication Arts**

**COMA 101. Language and Communication (3).** The nature and functions of language; the study of meaning; the communication process and the role of language in communication. 3 hrs (class). PR. ENG 2(AH). (1)

**COMA 104. Language and Culture (3).** The patterned covariation of language and society, recent developments in socio-linguistic theory; cultural barriers to communication. 3 hrs (class). PR. COMA 101. (2)

**COMA 105. Principles of Public Relations and Advertising (3).** Concepts of public relations and advertising as applied in business, industry, organizations and government. 3 hrs (class). PR. COMA 101 or COI. (1)

**COMA 140. Phonology, Morphology and Syntax (3).** Sounds and structure of words and longer utterances of the human language. 3 hrs (class). PR. COMA 101.

**COMA 141. Methods of Language Teaching (3).** Organization, presentation and methods of teaching Filipino and English as a second language. 3 hrs (class). PR. COMA 101. (1,2)

**COMA 190. Directed Study (3).** (May be repeated a semester for another 3 units.) PR. COI. (1,2)

**COMA 192. Introduction to Research (3).** Introduction to research methods and principles. 3 hrs (class). PR. COMA 101 or COI. (1,2)

**COMA 193. Workshop (3).** PR. COI. (1,2)

**COMA 200. Undergraduate Thesis (6).** (1,2)

**COMA 200a. Practicum (6).** (1,2,S)

**English**

**ENG 0. Tutorial English(0).** American English sounds, basic sentence patterns and vocabulary. 3 hrs (class). (1,2)

**ENG 1. College English (3).** The English language-structure, style and use in various contexts. 3 hrs (class).

**ENG 2. College Writing in English (3).** Critical reading and style in writing expository academic papers. 3 hrs. (class). PR. ENG 1

**ENG 4. Masterpieces of World Literature (3).** The great literary world masterpieces representing the Asian, European and American traditions; the analysis of ideas and forms. 3 hrs (class). PR. ENG 2(AH). (1,2)

**ENG 5. Expository Writing (3).** The development of a lucid and effective expository style through a directed analytical study of prose writing in the informal, literary-formal and scientific styles of great thinkers. 3 hrs (class). PR. ENG 2(AH). (1,2)

**ENG 10. Writing of Scientific Papers (3).** Principles underlying the preparation and writing of scientific papers. 3 hrs (class). PR. ENG 2 (AH) and at least Junior standing. (1,2,S)

**ENG 101. English Prose Styles (3).** Analysis of literary, philosophical, scientific and other styles of prose works written in English. 3 hrs (class). PR. ENG 4 or ENG 5. (1)

**ENG 102. Business and Professional Reports (3).** Principles of and practice in writing reports commonly expected in business and the professions. 3 hrs (class). PR. ENG 101 or COI. (2)

**ENG 103. Critical Writing (3).** Principles of writing applicable to the evaluative paper. 3 hrs (class). PR. ENG 4 or ENG 5. (1,2)

**ENG 104. Argument (3).** Principles of argument; practice in writing various types of argumentative discourse. 3 hrs (class). PR. ENG 2(AH). (2)

**ENG 105. Playwriting (3).** Principles of dramaturgy; writing the one-act play; practice in writing adaptations. 3 hrs (class). PR. ENG 4. (2)

**ENG 106. Creative Writing (3).** Principles of and practice in writing the narrative, the personal essay and other allied forms. 3 hrs (class.). PR. ENG 4. (1)

**ENG 107. Mythology and Folklore (3).** Selected myths and legends from Greek, Roman and Asian sources. 3 hrs (class). PR. ENG 4. (2)

**ENG 155. Creative Nonfiction (3).** Appreciation and practice of creative nonfiction. 3 hrs (class). PR. ENG 101. (2)

**Filipino**

**FIL 11. Sining ng Pakikipagtalastasan (3).** Mga paraan sa pakikipagtalastasan o pagpapahayag; paglalarawan, pagsasalaysay, paglalahad, at pangangatwiran. 3 oras (klase). (1,2)

**FIL 20. Mga Piling Katha ng mga Manunulat na Pilipino (3).** Pagpapalawak ng kaalaman sa pagsasalita at pagbasa sa pamamagitan ng pag-aaral ng mga piling katha ng mga manunulat na Pilipino. 3 oras (klase). (1,2)

**FIL 21. Poklorikong Pilipino (3).** Panimula sa Poklorikong Pilipino. 3 oras (klase). PR. None.

**FIL 150. Ang Pagsulat ng Kuwentong Popular (3).** Ang estetikong pamantayan at mga kalakaran/kumbensiyon sa pagsulat ng kuwentong popular, tulad ng romansa, detektib, sayens piksyon, atbp. 3 oras (klase). PR. Junior standing. (1,2)

**French**

**FRCH 10. Elementary Grammar and Composition (3).** Reading and translation of easy French prose. 3 hrs (class). (1)

**FRCH 11. Elementary Grammar and Composition (3).** Continuation of French 10. 3 hrs (class). (2)

## Japanese

**JAP 10. Elementary Japanese I (3).** Basic Japanese grammar, Japanese expressions in different social locations. (1)

**JAP 11. Elementary Japanese II (3).** Basic Japanese grammar and the reading, writing of Japanese writing system. (2)

## Humanities/Humanidades

**HUM 1(AH). Literature, Man and Society (Panitikan, Tao at Lipunan) (3).** Literary discourse as an imaginative expression of human experience and social values. 3 hrs (class). PR. None. (1,2,S)

**HUM 2(AH). Art, Man and Society (Sining, Tao at Lipunan) (3).** A study of the visual arts and music as products of the creative imagination in dynamic interaction with society. 3 hrs (class). PR. None. (1,2,S)

**HUM 3(AH). Reading Film, TV, and the Internet (3).** Critical reading of film, TV, and the Internet from a literary perspective. 3 hrs (class). PR. None. (1,2)

**HUM 150. Philippine Literature in English (3).** Literature in English produced by Filipino writers since the Commonwealth up to contemporary period. 3 hrs (class). PR. ENG 4. (1)

**HUM 160. Science and Technology in Literature (3).** A study of writers' perception of science and technology in selected literary pieces. 3 hrs (class). PR. ENG 4 or COI. (2)

**HUM 170. Philippine Art and Society (3)** The nature and development of Philippine Art in all major historical periods up to the present as it reflects Filipino culture and identity. 3 hrs (class). PR. Junior standing. (1,2)

## Philosophy

**PHLO A. Ethics for Various Professions (3).** Basic ethical theories and their application to current ethical problems in various professional fields. 3 hrs (class). PR. None (1)

**PHLO 1 (SSP). Philosophical Analysis (3).** Application of the basic concepts, skills, principles and knowledge drawn from philosophy of language, symbolic logic, epistemology, philosophy of science and ethics. 3 hrs (class). (1,2)

**PHLO 9. Logic (3).** Introduction to logical methods and principles. 3 hrs (class). PR. None. (1,2)

**PHLO 100\*. Mathematical Logic I (3).** A formalization of propositional and first-order predicate logic; extensions of first-order predicate logic and proofs of some properties of these systems. 3 hrs (class). (2)

**PHLO 102\*. Mathematical Logic II (3).** First-order recursive arithmetic; arithmetization of syntax and Goedel's incompleteness theorem. 3 hrs (class). (2)

**PHLO 110\*. Ancient Philosophy (3).** Major philosophical ideas from pre-Socratics to the neo-Platonists. 3 hrs (class). PR. COI. (1)

**PHLO 111 \* . Medieval Philosophy (3) .** Major philosophical ideas from Augustine to William of Ockham. 3 hrs (class). PR. COI. (2)

**PHLO 112\*. Modern Philosophy (3).** Major philosophical ideas from the rationalists to the German and British idealists. 3 hrs (class). PR. COI. (1)

**PHLO 113\*. Contemporary Philosophy (3).** Major philosophical ideas from the logical positivists to the present. 3 hrs (class). PR. COI. (2)

**PHLO 120\*. Philosophical Reasoning (3).** Methods and techniques as applied to philosophical problems. 3 hrs (class). (2)

**PHLO 126\*. Chinese Philosophy (3).** Philosophies of China from Confucius to Hu Shih. 3 hrs (class). (2)

**PHLO 150\*. Epistemology (3).** Problems concerning the sources, nature and validation of knowledge. 3 hrs (class). (2)

**PHLO 160\*. Philosophy of Science (3).** Nature of scientific inquiry; problems of demarcation, explanation, prediction, concept formation and validation. 3 hrs (class). PR. COI, Senior standing. (2)

**PHLO 171\*. Ethics (3).** Problems and theories of moral values. 3 hrs (class). (2)

## Speculative Thought

**SPEC. Reading in Speculative Thought (3).** Modern man's heritage in speculative thought and philosophic method. Selected works. 3 hrs (class). (2)

## Speech Communication

**SPCM 1 (AH). Speech Communication (3).** Theories and principles of speaking and listening and their effective and ethical applications in various situations. 3 hrs (class). PR. None.

**SPCM 101. Rhetoric (3).** Rhetorical theories in selected classical and modern works. 3 hrs (class). PR. COMA 101. (1)

**SPCM 102. Voice and Diction (3).** The voice as an aid in effective communication; production, articulation, inflexion and stress. 3 hrs (class). PR. Sophomore standing. (1,2)

**SPCM 103. Oral Interpretation (3).** Principles of oral interpretation and their application to the different types of literature. 3 hrs (class). PR. SPCM 102 or COI. (2)

**SPCM 104. Occasional Speeches (3).** Speeches for special occasions. 3 hrs (class). PR. SPCM 102 or COI. (1,2)



**SPCM 105. Philippine Public Address (3).** Selected speeches on vital issues in their historical milieu. 3 hrs (class). PR. SPCM 104 or COI. (1,2)

**SPCM 106. Group Discussion and Leadership (3).** Principles of group discussion and their application. 3 hrs (class). PR. SPCM 102 or COI. (1)

**SPCM 107. Communication in Public Relations (3).** Principles of communication as they apply to various publics. 3 hrs (class). PR. SOC 130 or SOC 135. (2)

### Theater Arts

**THEA 101. History of the Theater (3).** The origin and development of the theater and drama; a survey of theatrical architecture and stagecraft. 3 hrs (class). PR. ENG 4 or COI. (1)

**THEA 107. Theater Communication (3).** Theater as a composite of all the arts; analysis of the elements of theater and their multifarious components and how they contribute to form a medium of communication; an introduction to theater aesthetics. 3 hrs (class). PR. ENG 4.(1,2)

**THEA 108. Acting (3).** Fundamental mechanics of mime and acting, studies in body movement and voice production for characterization; exercises in imagination, relaxation, concentration and improvisation. 3 hrs (class). PR. THEA 107 or SPCM 103. (1)

**THEA 109. Directing (3).** Principles of directing, qualifications of a director, choosing the play, casting, reading, blocking, rehearsals and staging. 3 hrs (class). PR. THEA 107. (2)

**THEA 114. The Dynamics and Aesthetics of Community Theater (3).** The theory and practice of community-based theater. 5 hrs (2 class, 3 lab). PR. THEA 108 or THEA 109 or COI. (2)

**THEA 115. Drama for Children (3).** Creative drama and the fundamentals of theater production for children. 3 hrs (class). PR. THEA 107 or COI. (2)

## DEPARTMENT OF SOCIAL SCIENCES

### Anthropology

**ANTH 10. Introduction to Social and Cultural Anthropology (3).** Basic concepts in the study of kinship and descent, social differentiation, marriage, production and exchange, politics, law and social control, and religion. 3 hrs (class). PR. SOSC 1(SSP). (1,2)

**ANTH 130 . Ecological Anthropology ( 3 ) .** Anthropological approach to the systematic study of changing human interactions with the environment. 3 hrs (class). PR. ANTH 10 or COI. (2)

### History

**HIST 1 (SSP). Philippine History (3).** The political, economic, social and cultural development of the Philippines. 3 hrs (class). (1,2,S)

**HIST 2 (SSP). Asia and the World (3).** A study of Asian cultural heritage in relation to world civilization. 3 hrs (class). (1,2,S)

**HIST 140. The Revolutionary Tradition in Philippine History (3).** Philippine revolts, popular uprisings and nativistic movements. 3 hrs (class). PR COI.

**HIST 150. Modern Imperialism and Nationalism (3).** Colonial expansion in the 19th and 20th centuries, with special emphasis on the dynamics of modern imperialism and emergent nationalism. 3 hrs (class). PR. COI. (1)

**HIST 151. American Colonialism and Imperialism in the Philippines (3).** Philippine colonial history from the coming of the Americans up to contemporary times, with emphasis on subsequent Philippine-American relations. 3 hrs (class). PR. COI. (1)

### Philippine Institutions

**PI 10(SSP). The Life and Works of Jose Rizal (3).** Significance of the life and writings of Rizal in the life of the Filipino people. 3 hrs (class). PR. None. (1,2,S)

### Political Science

**POSC 1 (SSP). Reimagining Philippine Politics (3).** Actors, patterns, values and dynamics in Philippine politics. 3 hrs (class). PR. None. (1,2)

**POSC 10. Principles of Government and Politics (3).** The principles and concepts of political science especially as they apply to the Philippines; the historical development of political institutions from pre-Spanish times to the present; special emphasis on the new constitution. 3 hrs (class). (1,2)

**POSC 14. Philippine Government and Politics (3).** Development, organization and operation of the Philippine political system, with emphasis on the present. 3 hrs (class). (2)

**POSC 112. Politics of Development (3).** The political implications of development; the process of political growth in developing countries; the relationship between the nature, organization, dynamics of government and development. 3 hrs (class). PR. POSC 10 or COI. (2)

**POSC 141. Contemporary Ideologies (3).** Theoretical foundations of democracy, socialism, communism, political elitism and nationalism relevant to contemporary political problems. 3 hrs (class). PR. SOSC 2(SSP) or COI. (1)

**POSC 161. Political Parties and Interest Groups (3).** The types and structures of political parties and

interest groups; their functions in the political system; their strategy and tactics, particularly in aggregating and articulating interests and controlling governmental power and public policy. 3 hrs (class). PR. POSC 10. (2)

**POSC 165. Contemporary Philippine Politics (3).** Analysis of current issues and problems in Philippine politics. 3 hrs (class). PR. POSC 10 or COI. (1)

**POSC 180. Global Politics (3).** Structures, dynamics and issues in global politics. 3 hrs (class). PR. POSC 10 or COI. (1)

### Psychology

**PSY 1 (SSP). Exploring the Self: Thoughts, Feelings, and Actions (3).** Understanding the self through psychological concepts, theories, principles, and processes relevant to everyday life. 3 hrs (class). PR. None. (1,2)

**PSY 101. Filipino Psychology (3).** Indigenous psychology based on Filipino culture and society; concepts, theories and methodologies. 3 hrs (class). PR. COI. (1)

**PSY 140. Psychology of Learning (3).** A study of elementary principles of behavior derived from experimental studies in the laboratory and fundamental issues and controversies emanating from theoretical positions and consequent empirical findings about human and animal learning process. 3 hrs (class). PR. PSY 1(SSP). (1)

**PSY 148. Cognitive Psychology (3).** Principles and theories of human cognitive processes. 3 hrs (class). PR. PSY 1(SSP). (2)

**PSY 155. Abnormal Psychology (3).** Nature, origin and treatment of abnormal behavior. 3 hrs (class). PR. PSY 1(SSP). (2)

### Social Science

**SOSC 1 (SSP). Foundations of Behavioral Sciences (3).** A survey of the basic concepts, principles, theories and methods of the behavioral sciences (Sociology, Psychology, Anthropology, including Linguistics, Demography and Geography) and the dynamics of social change. 3 hrs (class). (1,2,S)

**SOSC 2 (SSP). Social, Economic and Political Thought (3).** A survey of the social, economic and political thinkers from the classical to contemporary times. 3 hrs (class). (1,2)

**SOSC 3 (SSP). Exploring Gender and Sexuality (3).** A cross-cultural survey of gender and sexuality, applying perspectives from the different social sciences. 3 hr (class). PR. None. (1,2)

**SOSC 4 (SSP). Seeing Society in the Lives of Contemporary Filipinos (3).** Socio-historical relationship between the individual and society through biographies of selected contemporary Filipinos. 3 hrs (class). PR. None. (1,2)

### Sociology

**SOC 10. General Principles of Sociology (3).** Principles and basic concepts of Sociology; social groups and institutions, collective behavior and social classes. 3 hrs (class). (1,2)

**SOC 100. Social Organization (3).** Structure, functions and dynamics of the different forms of social grouping in human society. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 105. Social Stratification (3).** Analysis of various systems of social differentiation; theories of stratification, dimension and dynamics of social classes and social mobility. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 107. Gender Relations (3).** Structure, dynamics and issues on gender relations. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 110. Sociology of the Family (3).** The family as a social institution, patterns by region, race, and social classes; problems and issues in contemporary family life. 3 hrs (class). PR. SOC 10 or COI. (2)

**SOC 112. Sociology of Politics (3).** The analysis of social bases of power and policy formulation. 3 hrs (class). PR. SOC 10 or COI. (2)

**SOC 114. Sociology of Economic Life (3).** Analysis of the relationship between the economy and other bases of the social structure; interdependence between economic institutions and the individual and society. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 115. Social Gerontology (3).** A sociological approach to the study of aging. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 116. Sociology of Religion (3).** Analysis of religion as a base of social structure in itself and in its relations with other basic social institutions. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 119. Industrial Sociology (3).** Formal and informal organization in the industrial setting, analysis of work groups and other relations to the community and the larger society. 3 hrs (class). PR. SOC 10. (2)

**SOC 120. Urban Sociology (3).** The development patterns, social structure, spatial characteristics, institutions, processes, problems and issues associated with urban areas; implications for policy planning. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 129. Race and Ethnic Relations (3).** The nature and problems of ethnic contacts, the study of intersocietal majority-minority relations, group conflicts, prejudice and cooperation. 3 hrs (class). PR. SOC 10. (2)

**SOC 130. Social Psychology (3).** An empirical approach to the study of the individual in small groups; person perception, group structure and processes, attitudes, and communication influences on group behavior. 3 hrs (class). PR. SOC 10 or COI. (1,2)

**SOC 135. Attitudes and Persuasion (3).** Classic and contemporary approaches to attitude change and persuasion. 3 hrs (class). PR. SOC 10 or COI. (2)

**SOC 140. Introduction to Demography (3).** Basic demographic concepts and processes, determinants and consequences of population change; historical and contemporary trends; differentials in regional and world population growth. 3 hrs (class) PR. SOC 10 or COI. (1,2)

**SOC 150. Sociological Theories (3).** Analysis of classical and contemporary sociological thought. 3 hrs (class). PR. SOSC 1 (SSP) or COI. (2)

**SOC 151. Classical Sociological Theories (3).** History of sociological thought and analysis of classical sociological theories. 3 hrs (class). PR. SOC 10. (1)

**SOC 152. Contemporary Sociological Theories (3).** Current developments in sociological theory. 3 hrs (class). PR. SOC 151. (2)

**SOC 160. Social Change (3).** Analysis of the social dynamics leading to change; the impact of change on the affected structural components; and the possible consequences, trends, and patterns of change. 3 hrs (class). PR. SOC 10 or COI. (2)

**SOC 165. Sociology of Development (3).** Sociological elements of modernization; process of technological change; emergence and accommodation of institutions to change. 3 hrs (class). PR. SOC 10 or COI. (2)

**SOC 166. Social Program Evaluation (3).** Nature and process of social program evaluation. 3 hrs (class). PR. SOC 10 or COI. (2)

**SOC 170. Social Problems (3).** Analysis of the problems of modern society, their social consequences; forms and processes of social control. 3 hrs (class). PR. SOC 10 or COI. (2)

**SOC 175. Deviance (3).** Creation, explanation, control and transformation of deviant categories, actors and structures. 3 hrs (class). PR. SOC 10 or COI.

**SOC 180. Collective Behavior (3).** Analysis of spontaneous, transitory and non-institutionalized group action, social context, processes, phases; effects on society. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 191. Special Topics (1-3).** 1-3 hrs (class). PR. COI. (1)

**SOC 192. Introduction to Qualitative Social Research (3).** Perspectives, design, and methods of qualitative social research. 3 hrs (class). PR. SOC 10 or COI. (1)

**SOC 195/MST 195. Research Methodologies in the Social Sciences (2).** Perspectives, design, and process of conducting research in the social sciences. 2 hrs (class). PR. STAT 166. Co-requisite: SOC 195.1. (1,2,S)

**SOC 195.1. Research Methodologies in the Social Sciences Laboratory (1).** 3 hrs (lab). PR. STAT 166. Co-requisite: SOC 195. (1,2)

**SOC 199. Undergraduate Seminar (1).** 1 hr (class). PR. COI. (1,2)

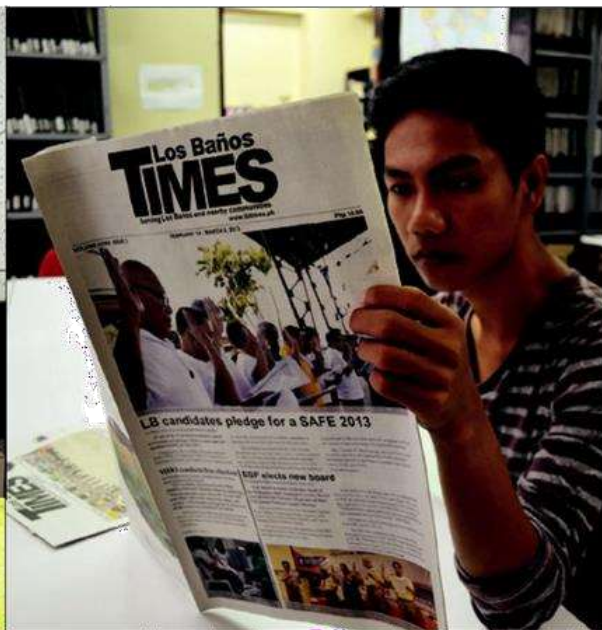
**SOC 200. Undergraduate Thesis (6).** PR. SOC 192, SOC 195 and SOC 195.1. (1,2,S)

**SOC 200a. Practicum (6).** Internship for direct participation in the design and implementation of development projects. PR. SOC 192, SOC 195 and SOC 195.1. (1,2,S)

### Science, Technology and Society

**STS 1 (SSP/MST). Science, Technology and Society (3).** Historical and futuristic analyses of the nature and role of science and technology, socio-cultural and politico-economic factors influencing the development of science and technology, with emphasis on the Philippine setting. 3 hrs (class). PR. None





College of Development Communication

University of the Philippines Los Baños





# COLLEGE OF DEVELOPMENT COMMUNICATION

Ma. Theresa H. Velasco, *Dean*  
Hermilea Marie C. Castillo, *College Secretary*  
Rosa Pilipinas F. Francisco, *Chair, Department of  
Development Journalism*  
Stella C. Tirol, *Chair, Department of Development  
Broadcasting and Telecommunication*  
Edmund G. Centeno, *Chair, Department of  
Educational Communication*  
Garry Jay S. Montemayor, *Chair, Department of  
Science Communication*

## Background

The College of Development Communication (CDC) is recognized as the world's pioneer in the study and practice of development communication. It offers a three-tiered program (BS, MS, and PhD) and is home to a faculty, all of whom have advanced degrees, and a vibrant and diverse student body from various regions within and outside the country. The College has trained faculty members of state universities and colleges in the Philippines and in other countries in the Asia Pacific Region for higher degrees in development communication. CDC was first recognized as a Center of Excellence in Development Communication by the Commission on Higher Education (CHED) in 1999 and again in 2012. The BSDC degree program is considered a model for similar degree programs implemented by other academic institutions in the Philippines.

In 2011, the BSDC curriculum was revised from one with four major fields of specialization (development journalism, community broadcasting, educational communication, and science communication) to the generalist track. Under the generalist curriculum, students are expected to hone their skills in four general areas of competency rather than in a single area of specialization. These areas of competency are: reportage; media-based learning systems; multi-media materials design, production, and management; and management and communication of technical information. The new curriculum thus broadens the base of our students' skills, as is expected of 21<sup>st</sup> century development communication practitioners.

CDC's research and extension agenda continue to respond to the pressing development issues of the times, such as climate change, disaster risk reduction management, social enterprises, food security, and human health and nutrition, among other development concerns. As CHED Center of Excellence, the College continuously undertakes a consolidated program aimed at contributing significantly to the enhancement of instruction, research, and extension/service functions of higher education institutions offering development communication.

## Vision

CDC is committed to nurturing the intellectual foundation of development communication as a scholarly and professional endeavor towards the betterment of the human condition in the Philippines and other developing countries.

## Mission

CDC is a globally relevant academic institution, proactively promoting sustainable development using communication as a catalyst for attaining empowerment, equity, entrepreneurship, and environmentalism (4Es) in the pursuit of distinctive excellence in agriculture, biotechnology, and environment.

## Departments

The College has four departments, namely, Development Broadcasting and Telecommunication, Development Journalism, Educational Communication, and Science Communication.

The Department of Development Broadcasting and Telecommunication aims to maximize the use of radio and television for community organization, mobilization, and action. The Department of Development Journalism focuses on reporting development stories for multi-platforms as well as in-depth interpretative and investigative reporting of current development issues and events. The Department of Educational Communication aims to facilitate learning through indigenous media, as well as multimedia systems for formal and nonformal education. Finally, the Department of Science Communication is concerned with communicating the content, context, and process of science and technology and its impact on development to diverse publics.

## Bachelor of Science in Development Communication

### Learning Goals

This program enables students to apply the insights, concepts, techniques, and processes of communication as an academic discipline to the problems of development. The thrust of the curriculum is participatory communication designed to empower stakeholders to achieve social goals.

Specifically, the four-year BSDC curriculum is designed to enable the student to:

1. Acquire a theoretical base in the sciences and applied arts that underlie the study of development communication;
2. Learn practical skills in mediated and interpersonal communication;
3. Gain a basic grasp of the issues and problems of development in general and of a development area in particular; and
4. Apply the concepts, principles, and skills of communication to help solve the problems of a developing society.

Building on a base of general education courses, the development communication student chooses additional social science electives, and electives in a technical field such as agriculture, forestry, human ecology, human nutrition, natural and physical sciences, and economics and management, among others.



The curriculum aims to develop a corps of devcom professionals in teaching, research, and practice who are equipped with holistic devcom skills. These skills will enable them to undertake capacity building, advisory and action projects applying communication as a process to attain empowerment and equity of people, communities, institutions, and other participants in the development process.

As such, the BSDC graduate is expected to have

competencies in the following areas: critical analysis and articulation of the theories, concepts, and principles of development, communication, and development communication; problem-solving; critical thinking; media materials design and production; information and communication technology utilization; interpersonal communication; planning, coordinating, monitoring and evaluation of development-oriented programs; networking; training and facilitation; processing and communicating information; and communication research.

**BACHELOR OF SCIENCE IN DEVELOPMENT COMMUNICATION\***

| <i>First Semester</i>   | <i>Units</i>                       | <i>Second Semester</i>                           | <i>Units</i> |
|---|------------------------------------|--|--------------|
| <i>FIRST YEAR</i>   |                                    |  |              |
| G.E. (MST)  | 3                                  | CMSC 2 , Introduction to the Internet            | 3            |
| ENG 1 (AH), College English                                       | 3                                  | DEVC 11, Introduction to Mass Media Writing      | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal                     | 3                                  | ECON 11, General Economics                       | 3            |
| POSC1 (SSP), Reimagining Philippine Politics                      | 3                                  | MATH 11, College Algebra                         | 3            |
| DEVC 10, Intro. to Development Communication                      | 3                                  | ENG 2 (AH), College English                      | 3            |
| G.E. (MST)  | 3                                  | SPCM 1 (AH), Speech Communication                | 3            |
| PE 1, Foundations of Physical Fitness                             | (2)                                | PE 2   | (2)          |
|   | <u>18</u>                          |  | <u>18</u>    |
| <i>SECOND YEAR</i>  |                                    |  |              |
| DEVC 20, Fundamentals of Development Journalism                   | 3                                  | G.E. (MST)                                       | 3            |
| DEVC 30, Fundamentals of Community Broadcasting                   | 3                                  | G.E. (SSP)                                       | 3            |
| DEVC 40, Fundamentals of Educational Communication and Technology | 3                                  | Specialized Course                               | 3            |
| DEVC 50, Introduction to Science Communication                    | 3                                  | Specialized Course                               | 3            |
| STS 1 (MST), Science, Technology and Society                      | 3                                  | STAT 1, Elementary Statistics                    | 3            |
| G.E. (SSP)  | 3                                  | Elective (Technical Course)                      | 3            |
| PE 2 or 3, Basic or Advanced Course                               | (2)                                | Elective (Social Science Course)                 | 3            |
| NSTP 1, National Service Training Program I                       | (3)                                | PE 2 or 3, Basic or Advanced Course              | (2)          |
|   | <u>18</u>                          | NSTP 2, National Service Training Program II     | (3)          |
|   |                                    |  | <u>21</u>    |
| <i>THIRD YEAR</i>   |                                    |  |              |
| DEVC 70, Interpersonal Communication in Development               | 3                                  | DEVC 80, Communication and Society               | 3            |
| G.E. (AH)   | 3                                  | DEVC 197, Introduction to Communication Research | 3            |
| DEVC 101, Introduction to Communication Theory                    | 3                                  | G.E. (AH)  | 3            |
| Specialized Course  | 3                                  | Specialized Course                               | 3            |
| Specialized Course  | 3                                  | Specialized Course                               | 3            |
| Specialized Course  | 3                                  | Elective (Technical Course)                      | 3            |
|   | <u>18</u>                          |  | <u>18</u>    |
| <i>SUMMER</i>   |                                    |  |              |
|   | DEVC 190, Communication Internship | 3  |              |
| <i>FOURTH YEAR</i>  |                                    |  |              |
| DEVC 200, Undergraduate Thesis                                    | 3                                  | DEVC 180, Communication Campaigns and Programs   | 3            |
| G.E. (SSP)  | 3                                  | DEVC 199, Undergraduate Seminar                  | 1            |
| Specialized Course  | 3                                  | DEVC 200, Undergraduate Thesis                   | 3            |
| Elective (Technical Course)                                       | 3                                  | G.E. (MST)                                       | 3            |
| Elective (Technical Course)                                       | 3                                  | Elective (Technical Course)                      | 3            |
| Elective (Social Science Course)                                  | <u>3</u>                           | Elective (Technical Course)                      | 3            |
|   | <u>18</u>                          | Elective (Social Science Course)                 | <u>3</u>     |
|   |                                    |  | <u>19</u>    |
| <b>TOTAL NUMBER OF UNITS..... 151</b>                             |                                    |  |              |

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.



## COURSES

### Development Communication

**DEVC 10. Introduction to Development Communication (3).** Communication theory and analytical survey of the communication media for development. 3 hrs (2 class, 1 recit). (1,2)

**DEVC 11. Introduction to Mass Media Writing (3).** Principles and practice of preparing written materials for the print, broadcast, and audio-visual media. 5 hrs (2 class, 3 lab). PR. DEVC 10. (1,2)

**DEVC 20. Fundamentals of Development Journalism (3).** Principles of gathering and writing of developmental news and information, with emphasis on news recognition and accuracy. 3 hrs (2 class, 1 recit). PR. DEVC 11 or COI. (1,2)

**DEVC 30. Fundamentals of Community Broadcasting (3).** Nature of the broadcast media, concept of radio and TV community broadcasting, principles of broadcast writing, program planning and production. 3 hrs (2 class, 1 recit) PR. DEVC 11 or COI. (1,2)

**DEVC 40. Fundamentals of Educational Communication and Technology (3).** Theories, principles, and concepts of educational communication and technology; practice in planning and designing of media-based learning systems. 3 hrs (2 class, 1 recit). PR. DEVC 11 or COI. (1,2)

**DEVC 50. Introduction to Science Communication (3).** Nature, structure and tools of science communication. 3 hrs (2 class, 1 recit). PR. DEVC 11 or COI. (1,2)

**DEVC 70 . Interpersonal Communication in Development (3).** Theories, principles, concepts, and processes of person-to-person communication and their application to development work. 5 hrs (2 class, 3 lab). PR. DEVC 10 and Junior standing. (1,2)

**DEVC 80. Communication and Society (3).** The role of communication in society with special reference to the Asian situation; rights and responsibilities of the communication media. 3 hrs (class). PR. DEVC 10 and Junior standing. (1,2)

**DEVC 101. Introduction to Communication Theory (3).** Communication theories, their foundations and application to development communication studies. 3 hrs (class). PR. DEVC 10. (1,2)

**DEVC 102. Writing For Educational Communication Media (3).** Principles and techniques of scriptwriting for educational communication media with emphasis on sound slides, television and film. 5 hrs (2 class, 3 lab). PR. DEVC 40 or COI. (1,2)

**DEVC 120. Development Writing (3).** Nature and practice of in-depth, investigative, interpretative, trend and process reporting, with emphasis on development news features. 5 hrs (2 class, 3 lab). PR. DEVC 20 or COI. (1,2)

**DEVC 121. Publications Writing and Editing (3).** Preparation and processing of extension and other informational publications, including the mechanics of layout, copyreading, copy fitting and the use of illustrations. 3 hrs (class). PR. DEVC 120 or 102 or 131 or COI. (1)

**DEVC 122. Science Reporting (3).** Interpretation of scientific and specialized topics for a popular audience, with emphasis on reliability and readability. 3 hrs (class). PR. DEVC 120 or 102 or 131 or COI. (1)

**DEVC 123. Management and Production of a Community Newspaper (3).** Principles and practice of managing and producing a community newspaper. 5 hrs (2 class, 3 lab). PR. DEVC 121 and 122 or COI. (2)

**DEVC 124. Advanced Developmental Writing (3).** Study of writing styles and techniques for purposive communication through the printed word. 3 hrs (class). PR. DEVC 121 and 122 or COI. (2)

**DEVC 125. Writing and Reporting for Development (3)\*.** Basic principles, concepts, theories, and practices in news and features writing and reporting for development using various platforms. 5 hrs (2 class, 3 lab). PR. DEVC 20 and DEVC 30. (1,2)

**DEVC 126. Participatory Development Journalism (3)\*.** Data gathering/ collection and storytelling techniques, broadcast performance types, and ethical issues in participatory development journalism. 7 hrs (1 class, 6 lab). PR. DEVC 125. (1)

**DEVC 130. Broadcast Speech and Performance of Community Radio (3).** Announcing, voicing, recording and directing techniques for community radio programs. PR. DEVC 30 or COI. 5 hrs (2 class, 3 lab). (2)

**DEVC 131. Writing and Program Planning for Community Radio (3).** Scriptwriting for community radio; program planning and building; producing news, interview, variety and other radio programs. 5 hrs (2 class, 3 lab). PR. DEVC 30 or COI. (1,2)

**DEVC 132. Radio Drama and Documentary (3).** Planning and presentation of messages through dramatic and special events programs; documentaries; dramatized spots, plugs, serials. 5 hrs (2 class, 3 lab). PR. DEVC 131 or COI. (2)

**DEVC 133 Broadcast-based Distance Learning Systems (3).** Planning, designing, conducting, and evaluating radio schools and other broadcast-based distance learning formats. 5 hrs (2 class, 3 lab). PR. DEVC 40 and DEVC 131 or DEVC 102 or COI. (1)

**DEVC 134. Introduction to Telecommunications (3).** Concepts, history, structure, utilization, and regulation of telecommunication services. 3 hrs (class). PR. DEVC 30. (2)

**DEVC 135. Multi-Media Materials Planning and Design (3)\*.** Principles and practice of planning and design of various multi-media materials within the context of the development process. 5 hrs (2 class, 3 lab). PR. DEVC 20 and DEVC 30 and DEVC 40. (1,2)

**DEVC 136. Multi-Media Materials Production and Management (3)\*.** Principles, techniques, and steps in the production and management of various communication media and materials in the context of development. 7 hrs (1 class, 6 lab). PR: DEVC 135. (2)

**DEVC 140. Basic Photography (3).** The photograph as a communication medium; practice in photographic composition, techniques, and darkroom processing. PR. DEVC 40 or COI. 5 hrs (2 class, 3 lab). (1,2)

**DEVC 141. Visual Design and Techniques (3).** Art principles and techniques in print and visual communication; layout, composition and visualization; the artistic use of color. 7 hrs (1 class, 6 lab). PR. DEVC 140 or COI. (1)

**DEVC 142. Production of Educational Communication Media (3).** Planning, designing, producing, and evaluating educational communication media. 5 hrs (2 class, 3 lab). PR. DEVC 102 and 141 or COI. (2)

**DEVC 143. Fundamentals of Video Production (3).** Principles and techniques of educational video production. 7 hrs (1 class, 6 lab). PR. DEVC 102 and 141 or COI. (2)

**DEVC 144. Media-Based Learning Systems (3)\*.** Production and management of media-based learning systems for development. 5 hrs (2 class, 3 lab). PR. DEVC 135. (1,2)

**DEVC 145. Distance Learning Systems in Development Communication Practice (3)\*.** Planning, design, management, and evaluation of distance learning systems in development communication. 7 hrs (1 class, 6 lab). PR. DEVC 144. (1)

**DEVC 150. Scientific and Technical Information Processing (3).** Principles and techniques of handling scientific and technical information. 5 hrs (2 class, 3 lab). PR. DEVC 50 or COI. (1)

**DEVC 151. Scientific and Technical Publications Editing (3).** Principles and practice of editing scientific and

technical publications. 5 hrs (2 class, 3 lab). PR. DEVC 150 or COI. (2)

**DEVC 152. Principles and Development Applications of Knowledge Management (3).** Principles, processes, and strategies of managing knowledge within the development context. 5 hrs (2 class, 3 lab). PR. DEVC 50 or COI. (2)

**DEVC 153. Managing Information for Development (3).** Processes and tools in managing information for development. 3 hrs (class). PR. DEVC 50. (1)

**DEVC 154. Communicating Science for Development (3)\*.** Concepts, principles, and processes of communicating science at various levels for specific stakeholders. 5 hrs (2 class, 3 lab). PR. DEVC 50 and COI (must have passed 1 technical elective and be taken simultaneously with another technical elective). (2)

**DEVC 180. Communication Campaigns and Programs (3).** Planning and evaluation of educational and promotional campaigns and programs. 3 hrs (class). PR. COI. (1,2)

**DEVC 190. Communication Internship (3).** Supervised work experience in development communication in press, publication, broadcasting, and audio-visual offices. 200 hrs. PR. at least 7 major/specialized courses. (1,2,S)

**DEVC 197. Introduction to Communication Research (3).** Principles and techniques of communication research in relation to social change and development. 3 hrs (class). PR. STAT 1. (1,2)

**DEVC 198. Undergraduate Research in Development Communication (3).** PR. DEVC 197. (1,2,S) (old curriculum)

**DEVC 199. Undergraduate Seminar (1).** PR. DEVC 197. (1,2) Note: to be taken simultaneously with DEVC 198 (old curriculum)/last 3 units of DEVC 200 (new curriculum)

**DEVC 200. Undergraduate Thesis (1-6).** PR. DEVC 197. (1,2,S) (effective SY 2008)

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\* courses under the generalist curriculum





College of Economics and Management

University of the Philippines Los Baños





# COLLEGE OF ECONOMICS AND MANAGEMENT

Isabelita M. Pabuayon, *Dean*  
Karen P. Quilloy, *Associate Dean*  
Amelia L. Bello, *College Secretary*  
Dina Pura T. Depositario, *Chair, Department of  
Agribusiness Management and Entrepreneurship*  
Ma. Eden S. Piadozo, *Chair, Department of Agricultural  
and Applied Economics*  
Rodger Dennis M. Valientes, *Chair, Department of  
Economics*  
Zenaida M. Sumalde, *Director, Institute of Cooperatives  
and Bio-Enterprise Development*

The College of Economics and Management (CEM) was formally created in the 996<sup>th</sup> UP-BOR meeting, February 1987. However, the College traces its roots to the Department of Rural Economics, later known as the Department of Agricultural Economics (DAE), at the UP College of Agriculture in June 1919. The DAE became the nucleus of the Institute of Agricultural Development and Administration (IADA) which was established in 1975, with three departments – Agricultural Economics, Economics, and Agribusiness and Development Management. The institute was elevated to the College of Development Economics and Management in 1978 from the merger of IADA with the Agricultural Credit and Cooperative Institute (ACCI) and the Agrarian Reform Institute (ARI) in 1978. These institutes were transferred to the College of Public Affairs (CPAf) in 1998.

At present, CEM is composed of three departments – the Department of Agricultural Economics, the Department of Economics, and the Department of Agribusiness Management and Entrepreneurship; and one institute, the Institute of Cooperatives and Bio-Enterprise Development (ICOPED). The latter is the former ACCI which was re-named to ICOPED when it was transferred back to CEM from CPAf in 2010.

The College sees itself as a center of excellence in undergraduate and graduate instruction, research and extension in Asia in the fields of economics, applied and agricultural economics, agribusiness management and entrepreneurship, and development cooperatives as viable economic and social enterprises. It envisions to be an institution of higher learning that can serve as catalyst for economic and social transformation. Its two-fold mission is to produce graduates and future leaders with strong training in the above-mentioned fields for meeting the challenges of sustainable and inclusive economic growth and development under a competitive global setting; and to engage in development-oriented research, policy advocacy, and extension services that would promote efficiency, equity, competitiveness, and environmental sustainability of economic activities.

## UNDERGRADUATE PROGRAMS

### **Bachelor of Science in Agribusiness Management**

This program was designed to enhance expertise for increased managerial responsibility in farms, agro-industries, and public agencies of individuals engaged in planning and implementing agribusiness development projects/programs.

As a field of study, agribusiness is management in orientation and is concerned not only with the technical side of agriculture but also with the management of a business. Students specializing in this area can expect to be exposed to business concepts, economic principles, and management tools necessary to solve marketing, financial, production, and personnel concerns of agriculture-based businesses.

The curriculum includes 39 units of general education subjects to develop social orientation and sensitivity in a student; 51 units of core/management subjects to sharpen the student's business perspectives; 18 units of technical-agricultural courses; and 6 units of electives to allow the potential agribusinessman to appreciate the unique characteristics of agricultural processes as they affect businesses.

Initially, the program was a joint undertaking with the College of Business Administration in U. P. Diliman, but it can now be completed in the College of Economics and Management.

### **Bachelor of Science in Agricultural Economics**

This program was designed to meet the substantial demand for professional agricultural economists in the country. The program aims to provide the student with the basic knowledge of various agricultural sciences to enable him to acquire insights into the technological aspects of agriculture. Also, it aims to provide him with the basic tools of economic analysis which he will use in identifying and solving economic problems of production and organization while working towards the goal of agricultural transformation. The curriculum also provides the student with adequate background in the social sciences to enable him to appreciate the socio-economic framework of the economy.

Students can choose from among four areas of specialization in the curriculum: Farm Management and Production Economics, Agricultural Marketing and Prices, Policy and Development, and Agricultural Finance and Cooperatives. For the latter, elective or additional Cooperative Studies (COST) courses are offered by ICOPED.

### **Bachelor of Science in Economics**

The Bachelor of Science in Economics program was instituted in 1986. The program was born out of the necessity of constructing alternative development strategies for overcoming the economic crisis which beset the country during the period. These strategies required the consideration of prevailing economic concerns which included, among others, the heavy debt burden, poverty, unemployment and underemployment, unproductive and inefficient industries, as well as malnutrition. Furthermore, there was a need to better understand natural resource exploitation and its link to the country's development.

The BS Economics program aims to produce graduates who possess: 1) the necessary skills in quantitative and policy analyses for teaching and research





in economics; 2) the ability to analyze, synthesize, and evaluate economic concepts, issues, and data relevant to policy decision-making in the public or private sectors; and 3) a deep appreciation of the economic issues and problems besetting the country, as well as an objective and critical attitude towards the arguments and policies meant to address them.

The BS Economics Program has two fields of specialization: Development Economics and Natural Resource Economics.

### **DIPLOMA PROGRAM**

The College of Economics and Management is offering a diploma program, namely: Diploma in Agribusiness Management. The post-graduate curriculum consists of 34 units of course work to be taken in 36 weeks (10 months) and follow a trimestral program that starts in June and ends in March the following year.

The curriculum could be completed in one summer and two semesters (residential mode) and four semesters and one summer (distance education mode).

#### **Diploma in Agribusiness Management**

The Diploma in Agribusiness Management is a post-graduate course for entrepreneurs, managers, and development planners of institutions engaged in agricultural ventures. The program aims to heighten understanding of the technical and management peculiarities in analyzing, planning, and operating on-going or would-be established agriculture-based projects and organized entities.

#### *Admission Requirements*

1. Bachelor's degree or its equivalent;
2. Certificate of work experience in agriculture or related activities for at least three (3) years from the personnel manager or head of the company;
3. Duly accomplished application forms and bio-data;
4. Official transcript of records; and
5. Letters of recommendation from two former professors or supervisors.

#### *Deadline for Application*

Application should be filed not later than January 31 of each year.

New students are admitted every first semester of each year.

#### *Registration and Fees*

Students admitted to the Diploma program should register at the Office of the University Registrar, at the beginning of the school year for the residential mode or with the UP Open University for the distance education mode.

#### *Graduation Requirements*

A minimum grade of 3.00 in all courses qualifies a student to receive his diploma. A failing grade in any course disqualifies a student from being conferred the degree. Thesis is not required.

**BACHELOR OF SCIENCE IN AGRIBUSINESS MANAGEMENT \***  
(117th UPLB UC 7/11/11; President's Approval 9/13/11)

| <i>First Semester</i>                                  | <i>Units</i> | <i>Second Semester</i>   | <i>Units</i> |
|--|--------------|--|--------------|
| <i>FIRST YEAR</i>                                      |              |  |              |
| BOT 1, Introduction to Plant Science                   | 3            | ANSC 1, Introduction to Animal Science                                 | 3            |
| ENG 1 (AH), College English                            | 3            | CHEM 15, Fundamentals of Chemistry                                     | 3            |
| G.E. (SSP)   | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory                        | 2            |
| ENTR 1 (SSP), Unleashing the Entrepreneurial Spirit    | 3            | ENG 2 (AH), College Writing in English                                 | 3            |
| MATH 11, College Algebra                               | 3            | ECON 11, General Economics   | 3            |
| ZOO 1, General Zoology                                 | 3            | MATH 14, Plane Trigonometry  | 3            |
| PE 1, Foundations of Physical Fitness                  | (2)          | PE 2 or 3, Basic or Advanced Course                                    | (2)          |
|  | <u>18</u>    |  | <u>17</u>    |
| <i>SECOND YEAR</i>                                     |              |  |              |
| ANSC 2, Introduction to Livestock & Poultry Production | 3            | CRSC 2, Fundamentals of Crop Science II                                | 3            |
| CRSC 1, Fundamentals of Crop Science I                 | 3            | G.E. (AH)  | 3            |
| G.E. (AH)  | 3            | G.E. (AH)  | 3            |
| MGT 101, Concepts and Dynamics of Management           | 3            | MGT 111, Principles of Accounting                                      | 3            |
| MATH 26, Analytical Geometry & Calculus I              | 3            | PHYS 3, General Physics I  | 3            |
| SOIL 1, Principles of Soil Science                     | 3            | STAT 1, Elementary Statistics  | 3            |
| PE 2 or 3, Basic or Advanced Course                    | (2)          | PE 2 or 3, Basic or Advanced Course                                    | (2)          |
| NSTP 1, National Service Training Program I            | (3)          | NSTP 2, National Service Training Program II                           | (3)          |
|  | <u>18</u>    |  | <u>18</u>    |
| <i>THIRD YEAR</i>                                      |              |  |              |
| ECON 102, Intermediate Microeconomic Theory            | 3            | ABM 103, Introduction to Agribusiness Management                       | 3            |
| MGT 121, Quantitative Business Analysis                | 3            | ABE 2, Fundamentals of Agricultural and Biosystems Engineering II      | 3            |
| G.E. (SSP)   | 3            | MGT 115, Introduction to Financial Management                          | 3            |
| G.E. (MST)   | 3            | G.E. (SSP)   | 3            |
| MGT 113, Managerial Accounting                         | 3            | MGT 131, Introduction to Human Relations and Behavior in Organizations | 3            |
| MGT 151, Introduction to Marketing Management          | <u>3</u>     | G.E. (MST)   | <u>3</u>     |
|  | 18           |  | 18           |
| <i>SUMMER</i>  |              |  |              |
|  |              | PI 10 (SSP), The Life and Works of Jose Rizal                          | 3            |
|  |              | G.E. (MST)   | <u>3</u>     |
|  |              |  | 6            |
| <i>FOURTH YEAR</i>                                     |              |  |              |
| ABM 180, Agribusiness Research Methodologies           | 3            | ABM 171, Organization of Small Business                                | 3            |
| ECON 101, Intermediate Macroeconomic Theory            | 3            | ABM 190, Special Problems in Agribusiness                              | 3            |
| Elective   | 3            | MGT 181, Business Policy   | 3            |
| MGT 161, Business Law                                  | 3            | Elective   | 3            |
| G.E. (MST)   | 3            | Elective   | <u>3</u>     |
| MGT 141, Production Management                         | <u>3</u>     |  | 15           |
|  | 18           |  |              |
| <b>TOTAL NUMBER OF UNITS ..... 146</b>                 |              |  |              |

\* A 3-unit GE course (in any domain) on Philippine Studies, to be chosen by the student, is required in the curriculum.

**BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS\***  
(117th UPLB UC 7/11/11; President's Approval 9/13/11)

| <i>First Semester</i>  | <i>Units</i> | <i>Second Semester</i>   | <i>Units</i> |
|--|--------------|--|--------------|
| <i>FIRST YEAR</i>  |              |  |              |
| AECO 10, Introduction to Agricultural Economics              | 1            | CHEM 15, Fundamentals of Chemistry                                   | 3            |
| BOT 1, Introduction to Plant Science                         | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory                      | 2            |
| ENG 1 (AH), College English                                  | 3            | CRSC 1, Fundamentals of Crop Science 1                               | 3            |
| G.E. (SSP)   | 3            | ECON 11, General Economics   | 3            |
| G.E. (SSP)   | 3            | ENG 2 (AH), College Writing in English                               | 3            |
| MATH 11, College Algebra                                     | 3            | MATH 14, Plane Trigonometry  | 3            |
| ZOO 1, General Zoology                                       | 3            | PE 2 or 3, Basic or Advanced Course                                  | (2)          |
| PE 1, Foundations of Physical Fitness                        | (2)          |  | <u>17</u>    |
|  | <u>19</u>    |  |              |
| <i>SECOND YEAR</i>   |              |  |              |
| ANSC 1, Introduction to Animal Science                       | 3            | AECO 111, Farm Management  | 3            |
| CRSC 2, Fundamentals of Crop Science II                      | 3            | AECO 120, Agricultural Marketing I                                   | 3            |
| ECON 101, Intermediate Macroeconomic Theory                  | 3            | ANSC 2, Introduction to Livestock and Poultry Production             | 3            |
| MATH 26, Analytical Geometry & Calculus I                    | 3            | ECON 102, Intermediate Microeconomic Theory                          | 3            |
| PHYS 3, General Physics I                                    | 3            | G.E. (AH)  | 3            |
| STAT 1, Elementary Statistics                                | 3            | SOIL 1, Principles of Soil Science                                   | 3            |
| PE 2 or 3, Basic or Advanced Course                          | (2)          | PE 2 or 3, Basic or Advanced Course                                  | (2)          |
| NSTP 1, National Service Training Program I                  | (3)          | NSTP 2, National Service Training Program II                         | (3)          |
|  | <u>18</u>    |  | <u>18</u>    |
| <i>THIRD YEAR</i>  |              |  |              |
| AECO 103, Statistical Analysis of Agricultural Economic Data | 3            | AECO 123, Agricultural and International Trade                       | 3            |
| AECO 141, Introduction to Feasibility Studies in Agriculture | 3            | AECO 150, Economics of Agricultural Development                      | 3            |
| ECON 130, Elements of Mathematical Economics                 | 3            | AECO 160, Introduction to Research Methods in Agricultural Economics | 3            |
| G.E. (MST)   | 3            | AECO 200, Undergraduate Thesis                                       | 2            |
| G.E. (AH)  | 3            | ABE 2, Fundamentals of Agricultural and Biosystems Engineering II    | 3            |
| AECO 110, Agricultural Production Economics                  | 3            | Specialized Course 1   | 3            |
|  | <u>18</u>    | Specialized Course 2   | 3            |
|  |              |  | <u>20</u>    |
| <i>FOURTH YEAR</i>   |              |  |              |
| AECO 151, Agricultural Policy                                | 3            | AECO 199, Undergraduate Seminar                                      | 1            |
| AECO 199, Undergraduate Seminar                              | 1            | AECO 200, Undergraduate Thesis                                       | 2            |
| AECO 200, Undergraduate Thesis                               | 2            | G.E. (SSP)   | 3            |
| G.E. (AH)  | 3            | G.E. (SSP)   | 3            |
| Elective   | 3            | G.E. (MST)   | 3            |
| Specialized Course 3   | 3            | G.E. (MST)   | 3            |
| Specialized Course 4   | 3            | P.I. 10 (SSP), The Life and Works of Jose Rizal                      | 3            |
|  | <u>18</u>    |  | <u>18</u>    |
| <b>TOTAL NUMBER OF UNITS..... 146</b>                        |              |  |              |

\* A 3-unit GE course (in any domain) on Philippine Studies, to be chosen by the student, is required in the curriculum.



**BACHELOR OF SCIENCE IN ECONOMICS\***  
(120th UPLB UC 7/23/12; President's Approval 9/3/12)

| <i>First Semester</i>  | <i>Units</i> | <i>Second Semester</i>   | <i>Units</i> |
|--|--------------|--|--------------|
| <i>FIRST YEAR</i>  |              |  |              |
| ENG 1 (AH), College English  | 3            | ECON 11, General Economics   | 3            |
| G.E. (MST)   | 3            | ENG 2 (AH), College Writing in English   | 3            |
| G.E. (SSP)   | 3            | G.E. (MST)   | 3            |
| G.E. (SSP)   | 3            | G.E. (SSP)   | 3            |
| MATH 17, Algebra and Trigonometry  | 5            | MATH 26, Analytic Geometry and Calculus I  | 3            |
| PE 1, Foundations of Physical Fitness                                      | <u>(2)</u>   | SOC 10, General Principles of Sociology  | 3            |
|  | 17           | PE 2 or 3, Basic or Advanced Course  | <u>(2)</u>   |
|  |              |  | 18           |
| <i>SECOND YEAR</i>   |              |  |              |
| ECON 101, Intermediate Macroeconomic Theory                                | 3            | ECON 104, Introduction to Factor Market Analysis,<br>General Equilibrium and Welfare Economics | 3            |
| ECON 102, Intermediate Microeconomic Theory                                | 3            | G.E. (AH)  | 3            |
| G.E. (AH)  | 3            | G.E. (MST)   | 3            |
| G.E. (AH)  | 3            | G.E. (SSP)   | 3            |
| STAT 1, Elementary Statistics  | 3            | PI 10 (SSP), The Life and Works of Jose Rizal  | 3            |
| Elective (Language Elective)   | 3            | MGT 101, Concepts and Dynamics of Management   | 3            |
| PE 2 or 3, Basic or Advanced Course  | (2)          | PE 2 or 3, Basic or Advanced Course  | (2)          |
| NSTP 1, National Service Training Program I                                | <u>(3)</u>   | NSTP 2, National Service Training Program II   | <u>(3)</u>   |
|  | 18           |  | 18           |
| <i>THIRD YEAR</i>  |              |  |              |
| ECON 103, Introduction to Growth Theory and<br>Open Economy Macroeconomics | 3            | ENG 10, Writing of Scientific Papers   | 3            |
| ECON 130, Elements of Mathematical Economics                               | 3            | ECON 141, International Economics  | 3            |
| ECON 137, Introduction to Econometrics                                     | 3            | ECON 151, Public Economics   | 3            |
| ECON 121, Money and Banking  | 3            | G.E. (MST)   | 3            |
| G.E. (MST)   | 3            | MGT 111, Principles of Accounting  | 3            |
| Specialization Course (1)  | <u>3</u>     | Specialization Course (2)  | <u>3</u>     |
|  | 18           |  | 18           |
| <i>FOURTH YEAR</i>   |              |  |              |
| ECON 199a, Undergraduate Seminar   | 1            | ECON 110, History of Economic Doctrines  | 3            |
| ECON 200, Undergraduate Thesis   | 3            | ECON 185, Development Economics  | 3            |
| ECON 175, Benefit Cost Analysis  | 3            | ECON 199b, Undergraduate Seminar   | 1            |
| FIL 20, Mga Piling Katha ng mga Manunulat<br>na Pilipino or                |              | ECON 200, Undergraduate Thesis   | 3            |
| HUM 170, Philippine Art and Society  | 3            | Elective   | 3            |
| Elective   | 3            | Specialization Course (5)  | <u>3</u>     |
| Specialization Course (3)  | 3            |  | 16           |
| Specialization Course (4)  | <u>3</u>     |  |              |
|  | 19           |  |              |
| <b>TOTAL NUMBER OF UNITS.....142</b>                                       |              |  |              |

\* A 3-unit GE course (in any domain) on Philippine Studies, to be chosen by the student, is required in the curriculum.

## C O U R S E S

### INSTITUTE OF COOPERATIVES AND BIO-ENTERPRISE DEVELOPMENT

#### Cooperative Studies

**COST 110. Fundamentals of Cooperatives (3).** Theory, principles, and practices of cooperation; operation and management; types and levels of organization; and issues and problems on cooperatives. 3 hrs (class). (1,2)

**COST 120. International Cooperative Development (3).** Survey of the international cooperatives within the politico-economic systems; related international institutions supporting cooperatives. 3 hrs (class). PR. COST 110 or COI. (2)

**COST 140. Cooperative Banking and Finance (3).** Legal bases, structure, operation, and performance of cooperative banks, credit cooperatives, and cooperative insurance in the Philippines. 3 hrs (class). PR. ECON 121 or COI. (1)

**COST 141. Cooperatives and Rural Credit (3).** Rural credit policies and programs involving cooperatives. 3 hrs (class). PR. COI. (2)

**COST 150. Cooperative Marketing (3).** Nature, scope, and objectives of cooperative marketing; role and process of pooling resources as well as market bargaining in cooperative marketing. 3 hrs (class). PR. COST 110 or COI. (2)

**COST 160. Education and Training in Cooperatives (3).** Philosophy, theory, practice, methods, techniques, and aims of education and training in cooperatives. 3 hrs (class). PR. COST 110 or COI. (1)

### DEPARTMENT OF AGRIBUSINESS MANAGEMENT AND ENTREPRENEURSHIP

#### Agribusiness Management

**ABM 103. Introduction to Agribusiness Management (3).** Fundamentals of managing agribusiness ventures. 3 hrs (class). PR. MGT 151. (1,2)

**ABM 171. Organization of Small Business (3).** Concepts and strategies in establishing and managing small business enterprises. 3 hrs (class). PR. MGT 115 and ABM 103. (1,2)

**ABM 180. Agribusiness Research Methodologies (3).** Basic research formats and methodologies employed in agribusiness. 3 hrs (class). PR. ABM 103 and senior standing. (1,2)

**ABM 190. Special Problems in Agribusiness (3).** Case studies of agribusiness firms and enterprises. PR. COI. (1,2)

#### Entrepreneurship

**ENTR 1(SSP). Unleashing the Entrepreneurial Spirit (3).** Concepts, values and skills critical to entrepreneurship. 3 hrs (2 lect, 1 recit). PR. None. (1,2)

#### Management

**MGT 1. Introduction to the Enterprise and Entrepreneurship (3).** Basic concepts of the enterprise and entrepreneurship; analysis of important activities, problems and decisions involved in the organization and operation of an enterprise. 5 hrs (2 class, 3 lab). PR. ECON 11 and STAT 1. (1)

**MGT 101. Concepts and Dynamics of Management (3).** Principles and techniques of managing organizations; analysis of actual management problems and situations. 3 hrs (class). PR. COI. (1,2)

**MGT 109. Managerial Economics (3).** Application of economic tools of analysis to the management of business enterprises. 3 hrs (class). PR. ECON 11 and MGT 101. (1,2)

**MGT 111. Principles of Accounting (3).** Introductory course in accounting as a tool and basis for business decisions. 3 hrs (class). PR. COI. (1,2)

**MGT 113. Managerial Accounting (3).** Use and analysis of accounting and financial data for purposes of management's planning; directing and control of the enterprise. Emphasis is on cost analysis and control. 3 hrs (class). PR. MGT 101 and MGT 111. (1,2)

**MGT 115. Introduction to Financial Management (3).** Introduction to the field of business finance, with focus on principles and techniques for financial planning and decision-making. 3 hrs (class). PR. MGT 113 and STAT 1. (1,2)

**MGT 117. Investment Management (3).** Concepts and principles of investments with emphasis on analytical techniques, policies and practices regarding personal and institutional investments. 3 hrs (class). PR. MGT 115. (2)

**MGT 121. Quantitative Business Analysis (3).** Application of mathematical tools and principles in business analysis. 3 hrs (class). PR. MGT 101 or COI and STAT 1. (1,2)

**MGT 131. Introduction to Human Relations and Behavior in Organizations (3).** Introduction to the concepts and principles underlying individual and group behavior in organizations. 3 hrs (class). PR. MGT 101 or COI. (1,2)

**MGT 133. Personnel Management (3).** Principles and processes of selecting, developing and maintaining personnel; methods of dealing with personnel problems. 3 hrs (class). PR. MGT 101 or COI. (2)

**MGT 141. Production Management (3).** Introduction to the production/operations management function with

emphasis on planning and assembling/controlling of resources in a production or service enterprise. 3 hrs (class). PR. MGT 121. (1,2)

**MGT 151. Introduction to Marketing Management (3).** Analysis of marketing opportunities and problems in the various types of business endeavors with application to agribusiness enterprises; market planning and strategy formulation, implementation and control. 3 hrs (class). PR. MGT 101 and MGT 111. (1,2)

**MGT 155. International Marketing (3).** Introduction to patterns, framework, structures, processes and strategic management in international markets. 3 hrs (class). PR. MGT 115 and MGT 151. (1,2)

**MGT 161. Business Law (3).** Basic concepts of governmental promotion and regulation of business through law and how they affect business decisions. 3 hrs (class). PR. MGT 101. (1,2)

**MGT 181. Business Policy (3).** Business strategy formulation and implementation from a general management's point of view, with emphasis on environmental and corporate competence analysis and organizational moves and changes. 3 hrs (class). PR. MGT 115 and ABM 103. (1,2)

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## DEPARTMENT OF AGRICULTURAL AND APPLIED ECONOMICS

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### Agricultural Economics

**AECO 10. Introduction to Agricultural Economics (1).** Overview of the various fields of agricultural economics as a discipline. 1 hr (class). (1,2)

**AECO 103. Statistical Analysis of Agricultural Economic Data (3).** Statistical methods in the analysis of agricultural economic data. 5 hrs (2 class, 3 lab). PR. STAT 1 or COI. (1,2)

**AECO 104. Principles of Farm Business Accounting (3).** Principles of accounting, with emphasis on farm business application. 5 hrs (2 class, 3 lab). PR. ECON 11. (2)

**AECO 110. Agricultural Production Economics (3).** Fundamental concepts in resource allocation and their application to agricultural production. 5 hrs (2 class, 3 lab). PR. ECON 102 or COI. (1)

**AECO 111. Farm Management (3).** Principles and analytical tools in the organization of the farm. 5 hrs (2 class, 3 lab). PR. ECON 11. (1,2)

**AECO 112. Farm Management Practice (3).** Application of principles of farm management on a commercial farm. 7 hrs (1 class, 6 lab). PR. AECO 111 or COI. (2)

**AECO 120. Agricultural Marketing I (3).** Principles of agricultural marketing, types and functions of market

organizations for agricultural inputs and products. 3 hrs (2 class, 1 recit). PR. ECON 11. (1,2)

**AECO 121. Agricultural Marketing II (3).** Market research and development; structure, conduct and performance for specific agricultural commodities. 5 hrs (2 lect, 3 lab). PR. AECO 120 or COI. (2)

**AECO 122. Agricultural Price Analysis (3).** Analysis of the factors affecting the prices of agricultural products. 5 hrs (2 class, 3 lab). PR. ECON 102 and AECO 103. (2)

**AECO 123. Agricultural and International Trade (3).** Patterns of world trade in agricultural products, national and international trade policies related to agricultural development. 3 hrs (2 class, 1 recit). PR. ECON 101 and ECON 102 or COI. (1,2)

**AECO 130. Agricultural Finance (3).** History, development and mechanism of agricultural financing in the Philippines; organization and operation of financing institutions serving agriculture; farm appraisal and evaluation. 3 hrs (class). PR. ECON 11. (2)

**AECO 136. Cooperatives (3).** Structural organization and operation of cooperatives. 3 hrs (2 class, 1 recit). PR. ECON 11. (1)

**AECO 140. Land Economics (3).** Economic principles as applied to the management of land and land-based resources; study of the physical, economic, institutional and other relevant factors that affect condition and control the use of these resources. 3 hrs (class). PR. ECON 11. (1,2)

**AECO 141. Introduction to Feasibility Studies in Agriculture (3).** Preparation of feasibility studies involving agricultural projects. 5 hrs (2 class, 3 lab). PR. ECON 11 or COI. (1,2)

**AECO 150. Economics of Agricultural Development (3).** Analysis of the role of agriculture in economic development. 3 hrs (class). PR. ECON 101 and ECON 102 or COI. (1,2)

**AECO 151. Agricultural Policy (3).** Economic analysis of different aspects of agricultural policies and programs. 3 hrs (class). PR. ECON 101 and ECON 102 or COI. (1,2)

**AECO 160. Introduction to Research Methods in Agricultural Economics (3).** Methods and techniques in conducting agricultural economics research, with emphasis on current agricultural problems. 5 hrs (2 class, 3 lab). PR. AECO 103 or COI. (1,2)

**AECO 199. Undergraduate Seminar (1).** Review and discussion of current developments in economics and agricultural economic fields. 1 hr. May be taken twice for a maximum of 2 units. (1,2)

**AECO 200. Undergraduate Thesis (6).** By arrangement. (1,2,S)

**AECO 200a. Major Farm Practice (6).** By arrangement. (1,2,S)

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**DEPARTMENT OF ECONOMICS**

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**Economics**

**ECON 10(SSP). Economics in Social Issues (3).** Social issues from the market and non-market perspectives. 3 hrs (class). (1,2)

**ECON 11. General Economics (3).** Introduction to economic analysis with special application to the Philippines. 3 hrs (class). (1,2)

**ECON 101. Intermediate Macroeconomic Theory (3).** Analysis of macroeconomic principles relating to aggregate income and employment; products and money markets. 3 hrs (class). PR. ECON 11 or COI. (1,2)

**ECON 102. Intermediate Microeconomic Theory (3).** Analysis of microeconomic principles relating to behavior of the consumer; firm and industry and allocation of resources. 3 hrs (class). PR. MATH 26 or MATH 36 and ECON 11, or COI. (1,2)

**ECON 103. Introduction to Growth Theory and Open Economy Macroeconomics (3).** Theories of growth and accumulation, open economy macroeconomics models, fiscal and monetary policy in the open economy setting. 3 hrs (class). PR. MATH 26 or MATH 36 and ECON 101. (1,2)

**ECON 104. Introduction to Factor Market Analysis, General Equilibrium and Welfare Economics (3).** Factor pricing and employment in perfect and imperfect competitions; general equilibrium and Pareto optimality; welfare comparisons; theory of second best. 3 hrs (class). PR. ECON 102. (1,2)

**ECON 106. Consumption Economics (3).** The economic relationship between consumption and production as it affects the consumption behavior of individuals and households. 3 hrs (class). PR. ECON 102 or COI. (1)

**ECON 110. History of Economic Doctrines (3).** Survey of the development of economic analysis and doctrines. 3 hrs (class). PR. Senior standing. (2)

**ECON 115. Philippine Economic History (3).** Economic change in the Philippines, with emphasis on conditions since 1900. 3 hrs (class). PR. ECON 101 and ECON 102. (1)

**ECON 121. Money and Banking (3).** Theory and problems concerning money, credit and financial institutions. 3 hrs (class). PR. ECON 101 and ECON 102 or COI. (1)

**ECON 130. Elements of Mathematical Economics (3).** Mathematical approaches to elementary economic theory. 3 hrs (class). PR. ECON 101 and ECON 102. (1,2)

**ECON 137. Introduction to Econometrics (3).** Representation of economic phenomena in terms of elementary mathematical and statistical models. 5 hrs (2 class, 3 lab). PR. ECON 101, ECON 102, and STAT 1. (1,2)

**ECON 141. International Economics (3).** Introduction to international trade theory and policy; balance of payments and payments adjustment; factor movement. 3 hrs (class). PR. ECON 103 and ECON 104. (2)

**ECON 151. Public Economics (3).** Government revenue, expenditures and debt. 3 hrs (class). PR. ECON 101 and ECON 104. (2)

**ECON 171. Introduction to Natural Resource Economics (3).** Basic principles in the allocation of natural resources; economic role of natural resources in growth and development. 3 hrs (class). PR. ECON 104. (1)

**ECON 172. Economic Analysis of Pollution Control Policies (3).** Analysis of different policies and control instruments of air, land and water pollution and waste disposal and the link between internal trade and environment. 3 hrs (class). PR. ECON 102 and junior standing. (2)

**ECON 175. Benefit Cost Analysis (3).** Fundamentals of project analysis and their application, with emphasis on natural resources and environmental management projects. 3 hrs (class) PR. ECON 104 or COI. (1)

**ECON 181. Human Resource Economics (3).** Survey and analysis of the theory, methods and problems in labor and population economics; assessment of government labor and population policies. 3 hrs (class). PR. ECON 101 and ECON 104. (2)

**ECON 185. Development Economics (3).** Theories and problems of growth and developmental survey of the experience in low-income and high-income countries. 3 hrs (class). PR. ECON 103 and ECON 104. (2)

**ECON 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ECON 199. Undergraduate Seminar (1).** 1 hr (class). May be taken twice for a maximum of 2 units. PR. COI. (1,2)

**ECON 200. Undergraduate Thesis (1-6).** PR. Senior standing.





College of Engineering and Agro-Technology

University of the Philippines Los Baños



# COLLEGE OF ENGINEERING AND AGRO-INDUSTRIAL TECHNOLOGY

Arnold R. Elepaño, *Dean*  
Myra G. Borines, *Associate Dean*  
Ma. Cristine Concepcion D. Ignacio, *College Secretary*  
Rossana Marie C. Amongo, *Director, Institute of  
Agricultural Engineering*  
Manolito E. Bambase, Jr., *Chair, Department of  
Chemical Engineering*  
Perlie P. Velasco, *Chair, Department of Civil Engineering*  
Annie Liza C. Pintor, *Chair, Department of Electrical  
Engineering*  
Erwin C. Escobar, *Chair, Department of Engineering  
Science*  
Harold Dean Z. Layaoen, *Chair, Department of  
Industrial Engineering*  
Aurelio A. De Los Reyes, Jr., *Director, Agricultural  
Machinery Testing and Evaluation Center*

The College of Engineering and Agro-Industrial Technology (CEAT) traces its roots to the former Department of Agricultural Engineering, which was created in 1912 as one of the departments of the College of Agriculture. On June 24, 1976, the department became the Institute of Agricultural Engineering and Technology. It was elevated to a college on February 24, 1983. The elevation of the institute to a college gave rise to the establishment of the Chemical Engineering Department and creation of the Engineering Science Department. In all these years, CEAT pursues the university goals of providing leadership in agro-industrial engineering for countryside development.

Today, the College offers undergraduate curricular programs leading to the Bachelor of Science degrees in Agricultural and Biosystems Engineering (BSABE), Chemical Engineering (BSChE), Civil Engineering (BSCE), Electrical Engineering (BSEE) and Industrial Engineering (BSIE). The College also offers post-graduate programs in the following fields: Master of Science in Agricultural Engineering and Chemical Engineering and PhD in Agricultural Engineering.

The University of the Philippines Los Baños, with its national and regional mandates for excellence in engineering education; its commitment to rural agro-industrial development and its proven strengths in graduate and undergraduate instruction and research, is in a unique position to complement the crop of graduates of other institutions for the agro-industrial development needs of the country.

The CEAT aims to: 1) produce quality engineering graduates needed for agricultural and industrial development of the country; 2) advance the frontier of knowledge in engineering and generate technologies in support of the agro-industrial thrusts of the country; and 3) promote the utilization of useful technologies by proper clientele.

## UNDERGRADUATE PROGRAMS

### **Bachelor of Science in Agricultural and Biosystems Engineering**

The undergraduate program provides the basic education for developing skills and professional knowledge common to the specialized fields of agricultural and biosystems engineering. The curriculum integrates engineering science and design with applied biological, environmental and agricultural sciences that allows the students to develop professional command of a particular specialized area of discipline such as agricultural power and machinery for bio-production systems, agricultural and bio-process engineering, agrometeorology and farm structures or land and water resources engineering. The BS curriculum provides the basic entry level competencies into engineering designs, biosystems and agro-industrial development, operation processes and services including teaching and research.

Undergraduate students enroll in a five-year curriculum that meets the minimum requirements set by the Commission on Higher Education and for the Professional Regulations Commission board examination for agricultural engineers. Graduates of the program are expected to apply their professional knowledge in tapping emerging technologies that will provide safe food and water to consume, renewable energy, a stable environment and products and processes that will improve quality of life and contribute to the agro-industrial development needs of the country.

### **Bachelor of Science in Chemical Engineering**

The graduates of this curriculum are expected to meet the technical manpower requirements of the newly emerging agri-based industries and traditional chemical process industries, specifically in the area of bio-process engineering and chemical process engineering. Chemical engineers with some understanding of bio-processes are needed to scale up production from laboratory to bench levels into the industrial level. In the long run, local processing of raw materials into consumer and industrial products should help raise rural income, generate foreign exchange and protect the Philippine economy from adverse external trade conditions.

Students in this program may take the general curriculum or the major in Sugar Technology or Pulp and Paper Technology options which require 39 units of Revitalized General Education courses, and 3 units of a legislated course. The general curriculum includes at least 56 units of chemical engineering courses and 6 units of cognate courses which may be chosen from the following fields: sugar engineering, food engineering, pulp and paper technology, management economics, scientific and technical communication, experimental design, wood science and technology, environmental chemistry, biotechnology and food microbiology. Six units are devoted to thesis to provide the student experience





in integrating and applying his technical knowledge in solving industrial processing problems and generating new technologies relevant to agri-based industries.

The inclusion of microbiology, biochemistry and biotechnology courses in the curriculum will strengthen the student's background in agri-based industries.

#### **Bachelor of Science in Chemical Engineering, *major in Sugar Technology***

The graduates of this curriculum are expected to meet the technical manpower requirements of the sugar industry and allied industries. With solid background in both chemical engineering and sugar technology, it is envisioned that this program will develop graduates who possess competency and proper perspective to meet the changing needs of the sugar industry and related agro-based industries.

Students in this program may take the thesis or practicum option. Both options require 22 units of Sugar Technology courses, 42 units of Chemical Engineering courses and 6 units of thesis/ practicum.

#### **Bachelor of Science in Chemical Engineering, *major in Pulp and Paper Technology***

The graduates of this curriculum who are sufficiently trained in the science and technology of pulp and paper making are expected to meet the professional manpower requirements of the pulp and paper industry. With strong backgrounds in both chemical engineering and in pulp and paper science and technology, it is expected that this program will produce globally competitive professionals equipped with the knowledge of the process involved in converting wood and fibers, and recycling the same, into paper.

Students of this program may take the thesis or practicum option. Both options require 27 units of Pulp and Paper courses, 39 units of Chemical Engineering and 6 units of thesis/practicum.

#### **Bachelor of Science in Civil Engineering**

One of the most important aspects of rural development in the Philippines is the continuing need for infrastructures for transportation, communication, commerce, education, human settlements, energy development and agriculture. In the age of modern technology and interdependence of people and institutions, civil engineers constitute a specialized group of trained manpower whose expertise is indispensable for the design and construction of infrastructures for public and private use.

The Southern Tagalog Region, in particular, is an emerging agro-industrial center with a high-projected need for irrigation and drainage, roads, bridges, manufacturing plants, agro-processing facilities, warehouses and port development. There are parallel

high growth needs in residential homes, business offices, water supply systems and waste-disposal facilities. In the total picture, competent civil engineering graduates with other professionals are needed to effect the development of structural systems that are safe, economical and efficient. The UPLB seeks to help upgrade in the long run, the quality of civil engineering education in the country, particularly in the Southern Tagalog Region.

#### **Bachelor of Science in Electrical Engineering**

This curricular program offers an excellent opportunity for the students to acquire solid academic preparations in electrical and electronic circuit theory and analysis. Graduates of the program are expected to be fully equipped and able to enhance the level of their competencies as they chart their professional careers in the development mainstreams, particularly in power, electronic and computer engineering including equipment/instrument design.

This curricular program was conceived in response to the dire need for well-trained electrical and electronic engineers in all sectors of development, both the local and global scales. In the Philippines, graduates of electrical engineering are key players as the country modernizes in agriculture systems and accelerates in rural-urban and industrial base for the 21st century.

Each student can specialize in one or more of the following fields: (a) power engineering, (b) electronic engineering and (c) computer engineering. Moreover, the student may choose a thesis research or practicum as a specialization course.

#### **Bachelor of Science in Industrial Engineering**

This curricular program aims to enable its students to have the competence to plan, design, install and evaluate integrated systems of personnel, materials, equipment, energy and information in ways that reduce costs and increase system efficiency and effectiveness. Through the program, the students are provided technical competencies for industrial systems analysis, design, and management.

The BSIE program meets the minimum standards and other requirements set by the Commission on Higher Education. Graduates of the program are expected to apply their knowledge and skills for the industrial development needs of the Philippines.

The academic program is distinct from other curricula in industrial engineering in that it requires the students to conduct and document a thesis research or practicum study before they graduate.

The UPLB BSIE program is highly recommended for high school graduates who are good in mathematics, physics and chemistry and have keen interests in industrial systems processes, organization and management.



**BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING\***  
117th UPLB UC 7/11/11; President's Approval 9/13/11

| <i>First Semester</i>   | <i>Units</i> | <i>Second Semester</i>  | <i>Units</i> |
|---|--------------|---|--------------|
| <i>FIRST YEAR</i>   |              |   |              |
| ABE 30, Introduction to Agricultural and Biosystems Engineering | 1            | ANSC 1, Introduction to Animal Science                                      | 3            |
| BIO 1, General Biology I  | 3            | BIO 2, General Biology II   | 3            |
| ECON 10 (SSP), Economics in Social Issues                       | 3            | CHEM 15, Fundamentals of Chemistry  | 3            |
| HIST 1 (SSP), Philippine History                                | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory                             | 2            |
| ENG 1 (AH), College English                                     | 3            | ENSC 10a, Engineering Graphics I  | 2            |
| MATH 17, Algebra and Trigonometry                               | 5            | ENG 2 (AH), College Writing in English                                      | 3            |
| PE 1, Foundations of Physical Fitness                           | <u>(2)</u>   | MATH 26, Analytic Geometry and Calculus I                                   | 3            |
|   | 18           | PE 2 or 3, Basic or Advanced Course   | <u>(2)</u>   |
|   |              |   | 19           |
| <i>SECOND YEAR</i>  |              |   |              |
| ENSC 10b, Engineering Graphics II                               | 3            | ABE 70, Fundamentals of Surveying   | 3            |
| G.E. (AH)   | 3            | ENSC 11, Statics of Rigid Bodies  | 3            |
| G.E. (MST)  | 3            | SPCM 1 (AH), Speech Communication   | 3            |
| MATH 27, Analytic Geometry and Calculus II                      | 3            | G.E. (MST)  | 3            |
| PHYS 3, General Physics I                                       | 3            | G.E. (SSP)  | 3            |
| SOIL 1, Principles of Soil Science                              | 3            | MATH 28, Analytic Geometry and Calculus III                                 | 3            |
| STAT 1, Elementary Statistics                                   | 3            | PHYS 13, General Physics II   | 3            |
| PE 2 or 3, Basic or Advanced Course                             | <u>(2)</u>   | PE 2or 3, Basic or Advanced Course  | <u>(2)</u>   |
| NSTP 1, National Service Training Program I                     | <u>(3)</u>   | NSTP 2, National Service Training Program II                                | <u>(3)</u>   |
|   | 20           |   | 21           |
| <i>THIRD YEAR</i>   |              |   |              |
| ABE 31, Engineering Shop  | 2            | G.E. (SSP)  | 3            |
| CRSC 1, Fundamentals of Crop Science I                          | 3            | CRSC 2, Fundamentals of Crop Science II                                     | 3            |
| ENSC 12, Dynamics of Rigid Bodies                               | 3            | ENSC 15, Heat Transfer  | 3            |
| ENSC 13, Strength of Materials                                  | 3            | ENSC 16, Fluid Mechanics  | 3            |
| ENSC 14, Thermodynamics   | 3            | Elective  | 3            |
| ENSC 21, Mathematical Methods in Engineering                    | 3            | ENSC 18, Materials of Engineering   | 3            |
| ENSC 26, Computer Applications in Engineering I                 | <u>3</u>     | G.E. (MST)  | <u>3</u>     |
|   | 20           |   | 21           |
| <i>FOURTH YEAR</i>  |              |   |              |
| ABE 50, Refrigeration and Cold Storage                          | 3            | ABE 51, Crop Processing I   | 3            |
| ABE 71, Field Hydrology   | 3            | ABE 72, Irrigation and Drainage Engineering                                 | 3            |
| ABE 11, Agricultural Structures I                               | 3            | ABE 12, Environmental Control Engineering                                   | 3            |
| ABE 40, Machine Design for Bio-Production Systems I             | 4            | ABE 42, Machinery for Bio-Production Systems                                | 3            |
| EE 1, Basic Electrical Engineering                              | 3            | ABE 47, Electrical System Design for Agricultural and Biosystems Structures | 3            |
| ABE 41, Agricultural and Biosystems Power Engineering           | <u>4</u>     | IE 150, Systems Evaluation  | <u>3</u>     |
|   | 20           |   | 18           |
| <i>FIFTH YEAR</i>   |              |   |              |
| ABE 73, Soil and Water Conservation Engineering                 | 3            | ABE 199, Undergraduate Seminar  | 1            |
| ABE 49, Agricultural Engineering Law, Specs., and Contracts     | 1            | ABE 200, Undergraduate Thesis or  |              |
| ABE 200, Undergraduate Thesis or                                |              | ABE 200a, Practicum   | 3            |
| ABE 200a, Practicum   | 3            | IE 141, Operations Research I   | 3            |
| ABE 81, Aquaculture Engineering I                               | 3            | PI 10 (SSP), The Life and Works of Jose Rizal                               | 3            |
| G.E. (AH)   | 3            | Elective  | 3            |
| ENG 10, Writing of Scientific Paper                             | 3            | Specialization Course   | 3            |
| Specialization Course   | <u>3</u>     | Specialization Course   | <u>3</u>     |
|   | 19           |   | 19           |
| <b>TOTAL NUMBER OF UNITS. ....195</b>                           |              |   |              |

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

**BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING\***  
**(General Curriculum)**

117th UPLB UC 7/11/11; President's Approval 9/13/11

| <i>First Semester</i>  | <i>Units</i> | <i>Second Semester</i>  | <i>Units</i> |
|--|--------------|---|--------------|
| <i>FIRST YEAR</i>  |              |   |              |
| G.E. (SSP)   | 3            | CHEM 17, General Chemistry II                                   | 3            |
| CHEM 16, General Chemistry I   | 3            | CHEM 17.1, General Chemistry II Laboratory                      | 2            |
| CHEM 16.1, General Chemistry Laboratory                                  | 2            | ENG 2 (AH), College Writing in English                          | 3            |
| ENG 1 (AH), College English  | 3            | MATH 36, Mathematical Analysis I                                | 5            |
| MATH 17, Algebra and Trigonometry  | 5            | PHYS 3, General Physics I                                       | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal                            | 3            | MCB 1, General Microbiology                                     | 3            |
| PE 1, Foundations of Physical Fitness                                    | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                             | <u>(2)</u>   |
|  | 19           |   | 19           |
| <i>SECOND YEAR</i>   |              |   |              |
| CHEM 32, Quantitative Inorganic Analysis                                 | 3            | ChE 31, Introduction to Chemical Engineering                    | 3            |
| CHEM 32.1, Quantitative Inorganic Analysis Laboratory                    | 2            | CHEM 111, Physical Chemistry I                                  | 3            |
| CHEM 40, Basic Organic Chemistry   | 3            | ENSC 10a, Engineering Graphics I                                | 2            |
| CHEM 40.1, Basic Organic Chemistry Laboratory                            | 1            | G.E. (SSP), Course on Philippine Studies                        | 3            |
| MATH 37, Mathematical Analysis II  | 5            | ENSC 11, Statics of Rigid Bodies                                | 3            |
| PHYS 13, General Physics II  | 3            | MATH 38, Mathematical Analysis III                              | 3            |
| SPCM 1 (SSP), Speech Communication                                       | 3            | NASC 5 (MST), Environmental Biology                             | 3            |
| PE 2or 3, Basic or Advanced Course                                       | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                             | <u>(2)</u>   |
| NSTP 1, National Service Training Program I                              | <u>(3)</u>   | NSTP 2, National Service Training Program II <u>(3)</u>         |              |
|  | 21           |   | 19           |
| <i>THIRD YEAR</i>  |              |   |              |
| ChE 32, Industrial Stoichiometry   | 3            | ENSC 26, Computer Application in Engineering                    | 2            |
| CHEM 111.1, Physical Chemistry I Laboratory                              | 2            | ChE 142, Chemical Engineering Thermodynamics I                  | 3            |
| CHEM 112, Physical Chemistry II  | 3            | ChE 147, Applications of Fluid Dynamics in Chemical Engineering | 3            |
| EE 1, Basic Electrical Engineering                                       | 3            | ChE 149, Transport Phenomena                                    | 3            |
| ENSC 12, Dynamics of Rigid Bodies  | 3            | ChE 152, Separation Processes                                   | 3            |
| ENSC 21, Mathematical Methods in Engineering                             | 3            | G.E. (AH)   | 3            |
| CHEM 160, Introductory Biochemistry                                      | 3            | STAT 1, Elementary Statistics                                   | 3            |
|  | 20           |   | 20           |
| <i>FOURTH YEAR</i>   |              |   |              |
| ChE 143, Chemical Engineering Thermodynamics II                          | 3            | ChE 41, Chemical Process Industries                             | 3            |
| ChE 145, Chemical Reaction Engineering                                   | 3            | ChE 156, Unit Operations Laboratory II                          | 2            |
| ChE 153, Transfer Operations I   | 3            | ChE 192, Chemical Process Equipment Design                      | 3            |
| ChE 154, Transfer Operations II  | 3            | ChE 172, Introduction to Biochemical Engineering                | 3            |
| ChE 155, Unit Operations Laboratory I                                    | 2            | ENG 10, Writing of Scientific Papers                            | 3            |
| ENSC 10b, Engineering Graphics II  | 2            | G.E. (SSP)  | 3            |
| ENSC 13, Strength of Materials   | 3            | Cognate Course  | 3            |
|  | 19           |   | 20           |
| <i>FIFTH YEAR</i>  |              |   |              |
| ChE 193, Plant Design  | 3            | ChE 191**, Special Topics                                       | 3            |
| ChE 180, Agro-Industrial Waste Management                                | 3            | ChE 199, Plant Inspection and Seminar                           | 1            |
| ChE 200**, Undergraduate Thesis  | 3            | ChE 200***, Undergraduate Thesis                                | 3            |
| ChE 185, Chemical Engineering Laws, Ethics, Specifications and Contracts | 2            | G.E. (SSP)  | 3            |
| G.E. (AH)  | 3            | ChE 170, Instrumentation and Process Dynamics and Control       | 3            |
| G.E. (MST)   | 3            | G.E. (MST)  | 3            |
| Cognate Course   | 3            |   | 16           |
|  | 20           |   |              |

**TOTAL NUMBER OF UNITS..... 194**

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

\*\* May be taken two or three times

\*\*\* May be taken as early as the summer before the fifth year

**BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING\***  
**(Major in Sugar Technology)**

117th UPLB UC 7/11/11; President's Approval 9/13/11

| <i>First Semester</i>   | <i>Units</i>                        | <i>Second Semester</i>   | <i>Units</i> |
|---|-------------------------------------|--|--------------|
| <i>FIRST YEAR</i>   |                                     |  |              |
| G.E. (SSP)  | 3                                   | SUTC 185, Sugar Laws and Economics                                       | 2            |
| CHEM 16, General Chemistry I  | 3                                   | CHEM 17, General Chemistry II  | 3            |
| CHEM 16.1, General Chemistry I Laboratory                                     | 2                                   | CHEM 17.1, General Chemistry II Laboratory                               | 2            |
| ENG 1 (AH), College English   | 3                                   | ENG 2 (AH), College Writing in English                                   | 3            |
| MATH 17, Algebra and Trigonometry   | 5                                   | MATH 36, Mathematical Analysis I   | 5            |
| PI 10 (SSP), The Life and Works of Jose Rizal                                 | 3                                   | MCB 1, General Microbiology  | 3            |
| PE 1, Foundations of Physical Fitness   | <u>(2)</u>                          | PHYS 3, General Physics I  | 3            |
|   | 19                                  | PE 2 or 3, Basic or Advanced Course                                      | <u>(2)</u>   |
|   |                                     |  | 21           |
| <i>SECOND YEAR</i>  |                                     |  |              |
| CHEM 32, Quantitative Inorganic Analysis                                      | 3                                   | ChE 31, Introduction to Chemical Engineering                             | 3            |
| CHEM 32.1, Quantitative Inorganic Analysis Laboratory                         | 2                                   | CHEM 111, Physical Chemistry I   | 3            |
| CHEM 40, Basic Organic Chemistry  | 3                                   | ENSC 10a, Engineering Graphics I   | 2            |
| CHEM 40.1, Basic Organic Chemistry Laboratory                                 | 1                                   | ENSC 11, Statics of Rigid Bodies   | 3            |
| MATH 37, Mathematical Analysis II   | 5                                   | NASC 5 (MST), Environmental Biology                                      | 3            |
| PHYS 13, General Physics II   | 3                                   | MATH 38, Mathematical Analysis III                                       | 3            |
| SPCM 1 (AH), Speech Communication   | 3                                   | G.E. (SSP)   | 3            |
| PE 2 or 3, Basic or Advanced Course   | <u>(2)</u>                          | PE 2 or 3, Basic or Advanced Course                                      | <u>(2)</u>   |
| NSTP 1, National Service Training Program I                                   | <u>(3)</u>                          | NSTP 2, National Service Training Program II                             | <u>(3)</u>   |
|   | 20                                  |  | 20           |
| <i>THIRD YEAR</i>   |                                     |  |              |
| ChE 32, Industrial Stoichiometry  | 3                                   | ChE 41, Chemical Process Industry  | 3            |
| CHEM 111.1, Physical Chemistry I Laboratory                                   | 2                                   | ChE 142, Chemical Engineering Thermodynamics I                           | 3            |
| CHEM 112, Physical Chemistry II   | 3                                   | ChE 147, Applications of Fluid Dynamics in Chemical Engineering          | 3            |
| CHEM 160, Introductory Biochemistry   | 3                                   | ChE 149, Transport Phenomena   | 3            |
| EE 1, Basic Electrical Engineering  | 3                                   | ChE 152, Separation Processes  | 3            |
| ENSC 12, Dynamics of Rigid Bodies   | 3                                   | ENSC 13, Strength of Materials   | 3            |
| ENSC 21, Mathematical Methods in Engineering                                  | <u>3</u>                            | ENSC 26, Computer Application in Engineering                             | <u>3</u>     |
|   | 20                                  |  | 21           |
| <i>FOURTH YEAR</i>  |                                     |  |              |
| ChE 143, Chemical Engineering Thermodynamics II                               | 3                                   | ChE 192, Chemical Process Equipment Design                               | 3            |
| ChE 145, Chemical Reaction Engineering  | 3                                   | G.E. (AH)  | 3            |
| ChE 153, Transfer Operations I  | 3                                   | STAT 1, Elementary Statistics  | 3            |
| ChE 154, Transfer Operations II   | 3                                   | G.E. (MST)   | 3            |
| SUTC 148, Sugar Analysis and Factory Operations Control                       | 3                                   | SUTC 154, Field and Factory Operations and Processess                    | 5            |
| G.E. (AH)   | 3                                   | SUTC 181, Waste Management in the Sugar Industries                       | 3            |
| G.E. (SSP)  | <u>3</u>                            |  | 20           |
|   | 21                                  |  |              |
| <i>SUMMER</i>   |                                     |  |              |
|   | SUTC 200**, Undergraduate Thesis or | 3  |              |
|   | SUTC 200a, Practicum                | <u>3</u>   |              |
|   |                                     | 3  |              |
| <i>FIFTH YEAR</i>   |                                     |  |              |
| ENG 10, Writing of Scientific Papers  | 3                                   | ChE 156, Unit Operations Laboratory II                                   | 2            |
| ChE 155, Unit Operations Laboratory I   | 2                                   | ChE 185, Chemical Engineering Laws, Ethics, Specifications and Contracts | 2            |
| G.E. (SSP)  | 3                                   | ENSC 10b, Engineering Graphics II  | 2            |
| G.E. (MST)  | 3                                   | SUTC 193, Sugar Process Engineering and Plant Design                     | 3            |
| SUTC 170, Instrumentation and Process Control Application to Sugar Industries | 3                                   |  | 9            |
| SUTC 171, Sugarcane By-Products Utilization and Sucochemistry                 | 3                                   |  |              |
| SUTC 200 **, Undergraduate Thesis or  | 3                                   |  |              |
| SUTC 200a, Practicum  | <u>3</u>                            |  |              |
|   | 20                                  |  |              |
| <b>TOTAL NUMBER OF UNITS..... 194</b>   |                                     |  |              |

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

\*\* For student with thesis option; may be taken as early as the summer before the fifth year

**BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING\***  
**(Major in Pulp and Paper Technology)**

117th UPLB UC 7/11/11; President's Approval 9/13/11

| <i>First Semester</i>   | <i>Units</i> | <i>Second Semester</i>  | <i>Units</i> |
|---|--------------|---|--------------|
| <i>FIRST YEAR</i>   |              |   |              |
| CHEM 16, General Chemistry I  | 3            | CHEM 17, General Chemistry II                                       | 3            |
| CHEM 16.1, General Chemistry I Laboratory                                     | 2            | CHEM 17.1, General Chemistry II Laboratory                          | 2            |
| PI 10(SSP), The Life and Works of Jose Rizal                                  | 3            | ENG 2 (AH), College Writing in English                              | 3            |
| ENG 1 (AH), College English   | 3            | PHYS 3, General Physics I   | 3            |
| G.E. (SSP)  | 3            | MATH 36, Mathematical Analysis I                                    | 5            |
| MATH 17, Algebra and Trigonometry   | 5            | MCB 1, General Microbiology   | 3            |
| PE 1, Foundations of Physical Fitness   | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                                 | <u>(2)</u>   |
|   | 19           |   | 19           |
| <i>SECOND YEAR</i>  |              |   |              |
| BOT 1, Introduction to Plant Science  | 3            | ChE 31, Introduction to Chemical Engineering                        | 3            |
| CHEM 32, Quantitative Inorganic Analysis                                      | 3            | CHEM 111, Physical Chemistry I                                      | 3            |
| CHEM 32.1, Quantitative Inorganic Analysis Laboratory                         | 2            | ENSC 10a, Engineering Graphics I                                    | 2            |
| SPCM 1 (AH), Speech Communication   | 3            | ENSC 11, Statics of Rigid Bodies                                    | 3            |
| MATH 37, Mathematical Analysis II   | 5            | G.E. (SSP), Course of Philippine Studies                            | 3            |
| PHYS 13, General Physics II   | 3            | MATH 38, Mathematical Analysis III                                  | 3            |
| PE 2 or 3, Basic or Advanced Course   | (2)          | NASC 5 (MST), Environmental Biology                                 | 3            |
| NSTP 1, National Service Training Program I                                   | <u>(3)</u>   | PE 2 or 3, Basic or Advanced Course                                 | (2)          |
|   | 19           | NSTP 2, National Service Training Program II <u>(3)</u>             | 20           |
| <i>THIRD YEAR</i>   |              |   |              |
| CHEM 40, Basic Organic Chemistry  | 3            | ChE 41, Chemical Process Industry                                   | 3            |
| CHEM 40.1, Basic Organic Chemistry Laboratory                                 | 1            | ChE 142, Chemical Engineering Thermodynamics I                      | 3            |
| CHEM 111.1, Physical Chemistry I Laboratory                                   | 2            | ChE 147, Applications of Fluid Mechanics in<br>Chemical Engineering | 3            |
| CHEM 112, Physical Chemistry II   | 3            | ChE 149, Transport Phenomena  | 3            |
| ENSC 12, Dynamics of Rigid Bodies   | 3            | ChE 152, Separation Processes                                       | 3            |
| ENSC 21, Mathematical Methods in Engineering                                  | 3            | CHEM 160, Introductory Biochemistry                                 | 3            |
| ENSC 26, Computer Application in Engineering                                  | 3            | G.E. (AH)   | 3            |
| FPPS 111, Wood and Fiber Anatomy  | <u>3</u>     |   | 21           |
|   | 21           |   |              |
| <i>SUMMER</i>   |              |   |              |
|   |              | G.E. (MST)  | 3            |
|   |              | G.E. (SSP)  | <u>3</u>     |
|   |              |   | 6            |
| <i>FOURTH YEAR</i>  |              |   |              |
| ChE 143, Chemical Engineering Thermodynamics II                               | 3            | ChE 156, Unit Operations laboratory II                              | 2            |
| ChE 145, Chemical Reaction Engineering  | 3            | ENSC 13, Strength of Materials                                      | 3            |
| ChE 153, Transfer Operations I  | 3            | FPPS 132, Pulp and Paper Technology                                 | 3            |
| ChE 154, Transfer Operations II   | 3            | FPPS 132.1, Pulp and Paper Technology Laboratory                    | 2            |
| ChE 155, Unit Operations Laboratory I   | 2            | G.E. (AH)   | 3            |
| EE 2, Basic Electrical Engineering  | 3            | G.E. (SSP)  | 3            |
| FPPS 131, Wood Chemistry I  | <u>3</u>     | STAT 1, Elementary Statistics                                       | <u>3</u>     |
|   | 20           |   | 19           |
| <i>FIFTH YEAR</i>   |              |   |              |
| ChE 32, Industrial Stoichiometry  | 3            | PPT 193, Pulp and Paper Plant Design                                | 3            |
| ChE 185, Chemical Engineering Laws, Ethics,<br>Specifications and Contracts   | 2            | PPT 199, Undergraduate Seminar                                      | 1            |
| ENG 10, Writing of Scientific Papers  | 3            | ENSC 10b, Engineering Graphics II                                   | 2            |
| G.E. (MST)  | 3            | PPT 200,** Undergraduate Thesis or<br>PPT 200a, Practicum           | <u>6</u>     |
| PPT 170, Instrumentation & Process Control<br>for the Pulp and Paper Industry | 3            |   | 12           |
| ChE 192, Chemical Process Equipment Design                                    | 3            |   |              |
| PPT 188, Environmental Technology for Pulp<br>and Paper Industry              | <u>3</u>     |   |              |
|   | 20           |   |              |

**TOTAL NUMBER OF UNITS. .... 196**

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

\*\* Maybe taken three times for 2 units each and as early as the summer before the fifth year



**BACHELOR OF SCIENCE IN CIVIL ENGINEERING \***  
**117th UPLB UC 7/11/11; President's Approval 9/13/11**

| <i>First Semester</i>                                | <i>Units</i> | <i>Second Semester</i>                               | <i>Units</i> |
|--|--------------|--|--------------|
| <i>FIRST YEAR</i>                                    |              |  |              |
| ENSC 1, Introduction to Engineering                  | 1            | G.E. (SSP)   | 3            |
| ENG 1 (AH), College English                          | 3            | G.E. (AH)  | 3            |
| G.E. (SSP)   | 3            | ENG 2 (AH), College Writing in English               | 3            |
| G.E. (MST)   | 3            | G.E. (MST)   | 3            |
| G.E. (SSP)   | 3            | MATH 36, Mathematical Analysis I                     | 5            |
| MATH 17, Algebra and Trigonometry                    | 5            | STAT 1, Elementary Statistics                        | 3            |
| PE 1, Foundations of Physical Fitness                | (2)          | PE 2 or 3, Basic or Advanced Course                  | (2)          |
|  | <u>18</u>    |  | <u>20</u>    |
| <i>SECOND YEAR</i>                                   |              |  |              |
| ENSC 10a, Engineering Graphics I                     | 2            | SPCM 1 (AH), Speech Communication                    | 3            |
| CHEM 15, Fundamentals of Chemistry                   | 3            | G.E. (AH)  | 3            |
| CHEM 15.1, Fundamentals of Chemistry Laboratory      | 2            | ENSC 11, Statics of Rigid Bodies                     | 3            |
| MATH 37, Mathematical Analysis II                    | 5            | PI 10 (SSP), The Life and Works of Jose Rizal        | 3            |
| PHYS 81, Fundamental Physics I                       | 5            | MATH 38, Mathematical Analysis III                   | 3            |
| PE 2 or 3, Basic or Advanced Course                  | (2)          | PHYS 82, Fundamental Physics II                      | 5            |
| NSTP 1, National Service Training Program I          | (3)          | PE 2 or 3, Basic or Advanced Course                  | (2)          |
|  | <u>17</u>    | NSTP 2, National Service Training Program II         | (3)          |
|  |              |  | <u>20</u>    |
| <i>THIRD YEAR</i>                                    |              |  |              |
| ABE 70, Fundamentals of Surveying                    | 3            | CE 12, Higher Surveying                              | 3            |
| EE 1, Basic Electrical Engineering                   | 3            | CE 131, Structural Engineering I                     | 3            |
| ENSC 13, Strength of Materials                       | 3            | ENSC 16, Fluid Mechanics                             | 3            |
| ENSC 12, Dynamics of Rigid Bodies                    | 3            | ENSC 18, Materials of Engineering                    | 3            |
| ENSC 10b, Engineering Graphics II                    | 2            | ENSC 21, Mathematical Methods in Engineering         | 3            |
| G.E. (SSP)   | 3            | FPPS 183, Engineering Economic Analysis              | 3            |
|  | <u>17</u>    |  | <u>18</u>    |
| <i>FOURTH YEAR</i>                                   |              |  |              |
| ABE 71, Field Hydrology                              | 3            | CE 122, Transportation Engineering II                | 3            |
| ABE 180, Soil Engineering                            | 3            | CE 134, Structural Engineering IV                    | 3            |
| CE 121, Transportation Engineering I                 | 3            | CE 152, Sanitary Engineering II                      | 3            |
| CE 132, Structural Engineering II                    | 3            | CE 161, Construction Materials and Testing           | 3            |
| CE 133, Structural Engineering III                   | 3            | CE 162, Construction Project Planning and Management | 3            |
| CE 151, Sanitary Engineering I                       | 3            | CE 137, Earthquake Engineering                       | 3            |
| ENSC 14, Basic Thermodynamics                        | <u>3</u>     | ENSC 16b, Fluid Mechanics Laboratory                 | 2            |
|  | 21           |  | <u>20</u>    |
| <i>FIFTH YEAR</i>                                    |              |  |              |
| CE 135, Structural Engineering V                     | 3            | ABE 72, Irrigation and Drainage Engineering I        | 3            |
| CE 141, Hydraulic Engineering                        | 3            | CE 136, Pre-stressed Concrete                        | 3            |
| CE 163, Civil Engineering Laws, Contracts and Ethics | 2            | CE 199, Seminar                                      | 1            |
| CE 171, Foundation Engineering                       | 3            | CE 200, Undergraduate Thesis or                      |              |
| CE 200, Undergraduate Thesis or                      |              | CE 200a, Practicum                                   | 3            |
| CE 200a, Practicum                                   | 3            | ChE 180, Agro-industrial Waste Management            | 3            |
| ENG 10, Writing of Scientific Papers                 | 3            | G.E. (MST)   | 3            |
| ENSC 26, Computer Applications in Engineering        | <u>3</u>     | Cognate/Major CE Course **                           | <u>3</u>     |
|  | 20           |  | 19           |

**TOTAL NUMBER OF UNITS ..... 190**

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

\*\* To be taken/chosen with Department's approval

**BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING\***  
**117th UPLB UC 7/11/11; President's Approval 9/13/11**

| <i>First Semester</i>                                  | <i>Units</i> | <i>Second Semester</i>                                  | <i>Units</i> |
|--|--------------|---|--------------|
| <i>FIRST YEAR</i>                                      |              |   |              |
| EE 10, Introduction to Electrical Engineering          | 1            | CMSC 11, Introduction to Computer Science               | 3            |
| ENG 1 (AH), College English                            | 3            | ENSC 10a, Engineering Graphics I                        | 2            |
| G.E. (SSP)   | 3            | ENG 2 (AH), College Writing in English                  | 3            |
| G.E. (MST)   | 3            | G.E. (SSP)  | 3            |
| G.E. (SSP)   | 3            | G.E. (MST)  | 3            |
| MATH 17, Algebra and Trigonometry                      | 5            | MATH 36, Mathematical Analysis I                        | 5            |
| PE 1, Foundations of Physical Fitness                  | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                     | <u>(2)</u>   |
|  | 18           |   | 19           |
| <i>SECOND YEAR</i>                                     |              |   |              |
| CHEM 15, Fundamentals of Chemistry                     | 3            | ENSC 10b, Engineering Graphics II                       | 2            |
| CHEM 15.1, Fundamentals of Chemistry Laboratory        | 2            | ENSC 11, Statics of Rigid Bodies                        | 3            |
| SPCM 1 (AH), Speech Communication                      | 3            | PI 10 (SSP), The Life and Works of Jose Rizal           | 3            |
| MATH 37, Mathematical Analysis II                      | 5            | MATH 38, Mathematical Analysis III                      | 3            |
| PHYS 81, Fundamental Physics I                         | 5            | PHYS 82, Fundamental Physics II                         | 5            |
| PE 2 or 3, Basic or Advanced Course                    | (2)          | ECON 10(SSP), Economics in Social Issues                | 3            |
| NSTP 1, National Service Training Program I            | <u>(3)</u>   | PE 2 or 3, Basic or Advanced Course                     | (2)          |
|  | 18           | NSTP 2, National Service Training Program II            | <u>(3)</u>   |
|  |              |   | 19           |
| <i>THIRD YEAR</i>                                      |              |   |              |
| EE 11, Fundamentals of Electrical Engineering I        | 4            | G.E. (AH)   | 3            |
| ENSC 12, Dynamics of Rigid Bodies                      | 3            | EE 12, Fundamentals of Electrical Engineering II        | 4            |
| ENSC 14a, Engineering Thermodynamics and Heat Transfer | 5            | EE 18, Introduction to Electromagnetic Fields           | 3            |
| ENSC 21, Mathematical Methods in Engineering           | 3            | ENSC 26, Computer Applications in Engineering           | 3            |
| PHYS 83, Fundamental Physics III                       | <u>5</u>     | G.E. (AH)   | 3            |
|  | 20           | STAT 1, Elementary Statistics                           | <u>3</u>     |
|  |              |   | 19           |
| <i>FOURTH YEAR</i>                                     |              |   |              |
| EE 15, Linear Systems Analysis                         | 3            | EE 120, Digital Electronics                             | 4            |
| EE 21, Fundamentals of Electronics                     | 4            | EE 131, Control Systems Analysis                        | 3            |
| EE 41, Electromechanical Energy Conversion             | 4            | EE 151, Fundamentals of Electrical Power Systems        | 3            |
| EE 170, Signals & Noise in Comm. Systems               | 3            | ENG 10, Writing of Scientific Papers                    | 3            |
| FPPS 183, Engineering Economic Analysis                | 3            | G.E. (MST)  | 3            |
| Elective   | <u>3</u>     | Specialization Course                                   | <u>3</u>     |
|  | 20           |   | 19           |
| <i>FIFTH YEAR</i>                                      |              |   |              |
| EE 126, Industrial Electronics                         | 3            | EE 90, Electrical Engineering Law, Contracts and Ethics | 1            |
| EE 130, Fundamentals of Instrumentation                | 3            | EE 180, Estimation of Electrical Materials and Devices  | 3            |
| EE 158, Electrical System Design                       | 3            | EE 181, Maintainability Engineering                     | 3            |
| EE 199, Undergraduate Seminar                          | 1            | EE 141, Electrical Machines                             | 3            |
| EE 171, Fundamentals of Communication Systems          | 3            | Elective  | 3            |
| Specialization Course                                  | 3            | Specialization Course                                   | 3            |
| EE 200/EE 200a   | <u>3</u>     | EE 200/EE 200a  | 3            |
|  | 19           |   | 19           |

**TOTAL NUMBER OF UNITS.....190**

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

**BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING\***  
117th UPLB UC 7/11/11; President's Approval 9/13/11

| <i>First Semester</i>                           | <i>Units</i> | <i>Second Semester</i>                            | <i>Units</i> |
|---|--------------|---|--------------|
| <i>FIRST YEAR</i>                               |              |   |              |
| ECON 11, General Economics                      | 3            | CHEM 15, Fundamentals of Chemistry                | 3            |
| ENG 1 (AH), College Writing                     | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory   | 2            |
| G.E. (SSP)                                      | 3            | IE 3, Introduction to Industrial Engineering      | 3            |
| G.E. (SSP)                                      | 3            | ENG 2 (AH), College Writing in English            | 3            |
| G.E. (AH)                                       | 3            | MATH 36, Mathematical Analysis I                  | 5            |
| MATH 17, Algebra and Trigonometry               | 5            | STAT 1, Elementary Statistics                     | 3            |
| PE 1, Foundations of Physical Fitness           | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course               | <u>(2)</u>   |
|   | 20           |   | 19           |
| <i>SECOND YEAR</i>                              |              |   |              |
| ENSC 10a, Engineering Graphics I                | 2            | ENSC 10b, Engineering Graphics II                 | 2            |
| SPCM 1 (AH), Speech Communication               | 3            | CMSC 11, Introduction to Computer Science         | 3            |
| MATH 37, Mathematical Analysis II               | 5            | G.E. (MST)  | 3            |
| PHYS 81, Fundamental Physics I                  | 5            | MATH 38, Mathematical Analysis III                | 3            |
| STAT 101, Statistical Methods                   | 3            | MGT 111, Principles of Accounting                 | 3            |
| IE 31, Industrial Organization and Management   | 3            | PHYS 82, Fundamental Physics II                   | 5            |
| PE 2or 3, Basic or Advanced Course              | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course               | <u>(2)</u>   |
| NSTP 1, National Service Training Program I     | <u>(3)</u>   | NSTP 2, National Service Training Program II      | <u>(3)</u>   |
|   | 21           |   | 19           |
| <i>THIRD YEAR</i>                               |              |   |              |
| ENSC 11, Statics of Rigid Bodies                | 3            | ENSC 12, Dynamics of Rigid Bodies                 | 3            |
| ENSC 14a, Thermodynamics & Heat Transfer        | 5            | IE 150, Systems Evaluation                        | 3            |
| ENSC 21, Mathematical Methods in Engineering    | 3            | IE 132, Methods Engineering                       | 5            |
| ENSC 26, Computer Applications in Engineering   | 3            | IE 125, Industrial Quality Control                | 5            |
| IE 21, Industrial Processes                     | 3            | IE 141, Operations Research I                     | 3            |
| ABE 31, Engineering Shop                        | <u>2</u>     |   | <u>19</u>    |
|   | 19           |   |              |
| <i>FOURTH YEAR</i>                              |              |   |              |
| G.E. (SSP)                                      | 3            | EE 1, Basic Electrical Engineering                | 3            |
| IE 134, Ergonomics                              | 3            | ENSC 16, Fundamentals of Fluid Mechanics          | 3            |
| IE 151, Production Systems                      | 3            | IE 184, Project Development and Management        | 3            |
| IE 142, Operations Research II                  | 3            | IE 152, Manufacturing Planning and Design         | 3            |
| IE 143, Stochastic Processes in Engineering     | 3            | IE 144, Systems Simulation                        | 3            |
| IE 164, Information Systems I                   | 3            | IE 136, Industrial Safety and Health              | 3            |
| ENSC 13, Strength of Materials                  | <u>3</u>     | G.E. (AH)   | 3            |
|   | 21           |   | <u>21</u>    |
| <i>FIFTH YEAR</i>                               |              |   |              |
| IE 185, Industrial Systems Design               | 3            | ENSC 90, Engineering Ethics                       | 1            |
| ENG 10, Writing of Scientific Papers            | 3            | STS 1(MST), Science, Technology and Society       | 3            |
| IE 199, Undergraduate Seminar                   | 1            | G.E. (SSP)  | 3            |
| IE 198/200, Internship/Thesis                   | 3            | G..E. (MST)                                       | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal 3 | 3            | IE 190/200, Special Problems/Undergraduate Thesis | 3            |
| Technical Cognate                               | <u>3</u>     | Technical Cognate                                 | <u>3</u>     |
|   | 16           |   | 16           |
| <b>TOTAL NUMBER OF UNITS..... 191</b>           |              |   |              |

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

## C O U R S E S

### INSTITUTE OF AGRICULTURAL AND BIO-SYSTEMS ENGINEERING

#### AGRICULTURAL AND BIO-PROCESS DIVISION

**ABE 2. (formerly AENG 2) Fundamentals of Agricultural and Biosystems Engineering II (3).** Structures and machinery for crop/animal production and processing. 5 hrs (2 class, 3 lab). PR. PHYS 3. (1,2)

**ABE 50. (formerly AENG 30) Refrigeration and Cold Storage (3).** Refrigeration processes and cycles; psychrometrics; cooling load calculations; cold storage systems. 5 hrs (2 class, 3 lab). PR. ENSC 14a or ENSC 15. (1,2)

**ABE 51. (formerly AENG 31) Crop Processing I (3).** Principles of drying, storage, and milling for food and feed; operation and maintenance of crop processing systems. 5 hrs (2 class, 3 lab). PR. ABE 50. (1,2)

**ABE 150. (formerly AENG 130) Materials Handling (3).** Principles and design of materials handling equipment in agricultural processing; handling of farm products for transport. 5 hrs (2 class, 3 lab). PR. ABE 40 or ABE 51. (1)

**ABE 151. (formerly AENG 131) Crop Processing II (3).** Principles and practices in size reduction and consolidation; mechanical separation; mixing and expelling; and evaporation and dehydration. 5 hrs (2 class, 3 lab). PR. ABE 51. (1,2)

**ABE 152. (formerly AENG 132) Crop Processing Plant Design and Management (3).** Principles and practices in plant design; process and economic analysis; plant operation and management. 5 hrs (2 class, 3 lab). PR. ABE 151 and IE 150. (2)

**ABE 153. (formerly AENG 133) Rheology of Biological Materials (3).** Mechanical properties, flow characteristics and mechanical damage of plant and animal products. 5 hrs (2 class, 3 lab). PR. ENSC 18. (1)

**ABE 154. (formerly AENG 134) Fuels and Combustion for Applications in Agriculture and Biosystems (3).** Properties of solid, liquid and gaseous fuels; theory of combustion; principles and practices of burners and furnaces; design of heating systems. 5 hrs (2 class, 3 lab). PR. ENSC 14a or ENSC 15 or ChE 142. (1)

**ABE 155. (formerly AENG 135) Intermediate Thermodynamics in Agriculture and Biosystems (3).** Reversible and irreversible processes and cycles; Availability; Real gases; Thermodynamic relations; Binary mixtures. 3 hrs (class). PR. ENSC 14a or ENSC 15. (2)

**ABE 156. (formerly AENG 136) Intermediate Refrigeration in Agriculture and Biosystems (3).**

Air conditioning processes and systems, absorption refrigeration, thermoelectric cooling, direct contact cooling, thermal storage systems. 3 hrs (class). PR. ABE 50. (1)

**ABE 157. (formerly AENG 157) Postharvest Engineering of Perishable Crops (3).** Role and importance of handling systems for perishables; internal and external factors affecting food quality, safety, and shelf life; engineering aspects of postharvest handling systems and packing house operations for perishable crops. 5 hrs (2 class, 3 lab). PR. HORT 109 and ABE 50. (2)

**ABE 190. (formerly AENG 190) Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (2)

**ABE 191. (formerly AENG 191) Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (2)

**ABE 199. (formerly AENG 199) Undergraduate Seminar (1).** May be taken twice. PR. Senior standing.

**ABE 200. (formerly AENG 200) Undergraduate Thesis (6).** PR. COI.

**ABE 200a. (formerly AENG 200a) Practicum (6).** PR. COI. (1,2,S)

#### AGRICULTURAL MACHINERY DIVISION

**ABE 2. (formerly AENG 2) Fundamentals of Agricultural and Biosystems Engineering II (3).** Structures and machinery for crop/animal production and processing. 5 hrs (2 class, 3 lab). PR. PHYS 3. (1,2)

**ABE 30. (formerly AENG 10) Introduction to Agricultural and Biosystems Engineering (1).** Nature and scope of agricultural and biosystems engineering; professional opportunities in the Philippines. 1 hr (class). PR. None. (1,2)

**ABE 31. (formerly AENG 11) Engineering Shop (2).** Machine tools; welding and foundry. 4 hrs (1 class, 3 lab). PR. Junior standing or COI. (1,2)

**ABE 40. (formerly AENG 60) Machine Design for Bio-Production Systems I (4).** Fundamentals of machine design as applied to bio-production systems. 8 hrs (2 class, 6 lab). PR. ENSC 12 and ENSC 18. (1,2)

**ABE 41. (formerly AENG 61) Agricultural and Biosystems Power Engineering (4).** Conventional and non-conventional sources of power and their measurements for agricultural and biosystems applications. 6 hrs (3 class, 3 lab). PR. ENSC 14a or ENSC 15. (1,2)

**ABE 42. (formerly AENG 62) Machinery for Bio-Production Systems (3).** Construction, operation, testing, selection and economics of bio-production



machinery. 5 hrs (2 class, 3 lab). PR. ABE 41 and ABE 40. (2)

**ABE 47. (formerly AENG 70) Electrical System Design for Agricultural and Biosystems Structures (3).** Generation, transmission, distribution and utilization of electric power; design of electrical systems and controls for biosystems. 5 hrs (2 class, 3 lab). PR. EE 1 and ABE 11. (2)

**ABE 49. (formerly AENG 90) Agricultural Engineering Law, Specifications, Contracts and Ethics (1).** Agricultural engineering law; preparation of agricultural engineering contracts and specifications; engineering ethics; intellectual property rights. 1 hr (class). PR. COI. (1)

**ABE 132. Manufacturing Processes (3).** Equipment and procedures in foundry, heat treatment, forging, welding, metal cutting and presswork. 3 hrs (class). PR. ENSC 18. (1)

**ABE 136. (formerly AENG 166) Design of Biomass Energy Systems (3).** Biomass energy resource calculations; design of biomass energy conversion systems. 5 hrs (2 class, 3 lab). PR. ENSC 14a or ENSC 15. (1)

**ABE 137. (formerly AENG 167) Design of Solar Energy Systems (3).** Principles of solar energy collection; design of solar collectors and systems. 5 hrs (2 class, 3 lab). PR. ENSC 14a or ENSC 15. (1)

**ABE 138. (formerly AENG 168) Design of Wind and Micro-Hydro Systems (3).** Wind and micro-hydro energy resource calculations; design of energy conversion systems. 5 hrs (2 class, 3 lab). PR. ENSC 14. (2)

**ABE 140. (formerly AENG 160) Machine Design for Bio-Production Systems II (3).** Design of machine elements and systems; limit dimensioning; materials and processes; dynamic loading; creative design. 7 hrs (1 class, 6 comp). PR. ABE 40. (2)

**ABE 142. (formerly AENG 162) Agricultural Mechanization (3).** Principles and practices in agricultural mechanization; mechanization management. 5 hrs (2 class, 3 comp). PR. ABE 42 and IE 150. (1)

**ABE 145. (formerly AENG 165) Soil-Machine Mechanics (3).** Classical and critical state soil mechanics concept as applied to tillage and traction. 5 hrs (2 class, 3 lab). PR. SOIL 1 and ENSC 13. (2)

**ABE 147. Mechatronics for Agriculture and Biosystems (3).** Fundamentals of instrumentation and control engineering applied in agriculture and biosystems: Digital and analog electronics, sensors and actuators in feedback control systems, data acquisition systems, microcontroller and programmable logic controller, integration of mechanical and electronic designs, case studies. 8 hrs (2 class, 6 lab). PR. EE1 or APHY 101. (2)

**ABE 190. (formerly AENG 190) Special Problems**

(1-3). May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (2)

**ABE 191. (formerly AENG 191) Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (2)

**ABE 199. (formerly AENG 199) Undergraduate Seminar (1).** Review and discussion of current literature in agricultural engineering. Reports are required. Meets once a week. May be taken twice. Open to Senior and graduate students.

**ABE 200. (formerly AENG 200) Undergraduate Thesis (6).** PR. COI.

**ABE 200a. (formerly AENG 200a) Practicum (6).** PR. COI. (2,S)

## **AGROMETEOROLOGY AND FARM STRUCTURES DIVISION**

**ABE 1. (formerly AENG 1) Fundamentals of Agricultural and Biosystems Engineering I (3).** Weather elements, crop and livestock environment, soil and water management in agricultural production systems; agricultural waste management. 5 hrs (2 class, 3 lab). PR. PHYS 3 and SOIL 1. (1,2,S)

**ABE 11. (formerly AENG 51) Agricultural Structures I (3).** Properties and use of forest products as construction materials; principles of farm structure design; design of farm structures with emphasis on farm buildings. 5 hrs (2 class, 3 comp). PR. ENSC 10a and ENSC 18. (1,2)

**ABE 12. (formerly AENG 52) Environmental Control Engineering (3).** Analysis and design of environmental control in agricultural structures with emphasis on tropical conditions; principles of controlled environment agriculture. 5 hrs (2 class, 3 comp). PR. ABE 11. (1,2)

**ABE 110. (formerly AENG 150) Plant Climate (3).** Heat exchange near the ground; relation to topography and plant cover to the micro-climate; modification of micro-climate by agricultural operation. 3 hrs (class). PR. PHYS 3 and COI. (1)

**ABE 111. (formerly AENG 151) Agricultural Structure II (3).** Design methods and codes for timber, steel and reinforced concrete structures; design and construction of farm structures; agricultural infrastructure development; works engineering and contracts. 5 hrs (2 class, 3 comp). PR. ABE 12. (1)

**ABE 112. (formerly AENG 152) Agricultural Waste Management (3).** Principles of agricultural waste management; collection, storage, transport, treatment and utilization of agricultural wastes. 5 hrs (2 class, 3 comp). PR. ABE 12. (2)

**ABE 113. (formerly AENG 153) Farmstead Planning (3).** Basic concepts and fundamentals of farmstead planning; layout and organization of farmstead systems. 3 hrs (class). PR. ABE 12. (2)

**ABE 114. (formerly AENG 154) Spatial Analysis in Hydrometeorology (3).** Spatial distribution of climatic elements and soil moisture; digital terrain analysis; spatial interpolation. 5 hrs (2 class, 3 lab). PR. ABE 71. (1)

**ABE 115. (formerly AENG 155) Agricultural Structures III (3).** Design of agricultural structures; preparation of agricultural drawings; estimation of construction cost. 7 hrs (1 class, 6 lab). PR. ABE 111. (2)

**ABE 190. (formerly AENG 190) Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ABE 191. (formerly AENG 191) Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ABE 199. (formerly AENG 199) Undergraduate Seminar (1).** May be taken twice. PR. Senior standing.

**ABE 200. (formerly AENG 200) Undergraduate Thesis (6).** PR. COI. (1,2,S)

**ABE 200a. (formerly AENG 200a) Practicum (6).** PR. COI. (1,2,S)

### **Agrometeorology**

**AGME 110. (formerly AGME 150) Geometeorology (3).** Atmospheric environment; chemical quality circulation and variability of meteorological factors; surface energy budget; earth materials and processes. 3 hrs (class). PR. COI. (2)

### **LAND AND WATER RESOURCES DIVISION**

**ABE 1. (formerly AENG 1) Fundamentals of Agricultural and Biosystems Engineering I (3).** Weather elements, crop and livestock environment, soil and water management in agricultural production systems; institutional and legal aspects of water resource utilization. 5 hrs (2 class, 3 lab). PR. PHYS 3 and SOIL 1. (1,2,S)

**ABE 70. (formerly AENG 40) Fundamentals of Surveying (3).** Surveying principles and applications; measurement of distances, elevations, directions and errors; profile and topographic surveying; earthwork calculations; land grading; elementary aerial photogrammetry. 7 hrs (1 class, 6 lab). PR. ENSC 10a. (1,2,S)

**ABE 71. (formerly AENG 140) Field Hydrology (3).** Hydrologic processes; streamflow hydrographs; mathematical models; hydrology and water quality. 5 hrs (2 class, 3 lab). PR. ENSC 16 and STAT 1. (1,2)

**ABE 72. (formerly AENG 41) Irrigation and Drainage Engineering I (3).** Basic soil-plant-water relationships; flow measurements; selection and efficiency of pumps; planning and design of irrigation and drainage systems. 5 hrs (2 class, 3 lab). PR. ABE 70 and ABE 71. (1,2)

**ABE 73. (formerly AENG 42) Soil and Water Conservation Engineering (3).** Design, construction and maintenance of water conservation works, drainage and erosion control facilities. 5 hrs (2 class, 3 comp). PR. ABE 72. (1,2)

**ABE 81. (formerly AENG 181) Aquaculture Engineering I (3).** Principles of planning aquaculture systems; layout of farm facilities. 5 hrs (2 class, 3 lab). PR. ABE 71.(1)

**ABE 172. (formerly AENG 172) Irrigation and Drainage Engineering II (3).** Planning, design, layout, construction, operation and maintenance of irrigation and drainage systems. 5 hrs (2 class, 3 lab). PR. ABE 72. (1)

**ABE 174. (formerly AENG 144) Open Channel Hydraulics (3).** Flows in open channels; design of channels for uniform flow. 5 hrs (2 class, 3 lab). PR. ENSC 16. (1)

**ABE 175. (formerly AENG 145) Water Control Structures (3).** Hydraulics of water control and measurement structures; criteria for selection and design of hydraulics structures; design of structures; construction methods. 5 hrs (2 class, 3 lab). PR. ABE 174. (2)

**ABE 177. (formerly AENG 147) Principles of Tropical Water Quality Management (3).** Water quality problems and parameters; monitoring, control and management systems. 5 hrs (2 class, 3 lab). PR. ABE 71 or COI. (2)

**ABE 179. (formerly AENG 149) Water Resources Planning (3).** Water and land resources requirements for planning of water and land development, alternative basin plans; economic and financial analysis. 3 hrs (class). PR. FPPS 183 or IE 150 and ABE 73. (1)

**ABE 180. (formerly AENG 180) Soil Engineering (3).** Basic engineering properties of soils; analyses of compressive and shear stresses; lateral pressures, retaining structures, slope stability, bearing capacity and foundations; subsurface exploration methods. 3 hrs (class). PR. ENSC 13 and ENSC 16. (1)

**ABE 181. (formerly AENG 182) Aquaculture Engineering II (3).** Design, construction, operation and maintenance of aquaculture facilities. 5 hrs (2 class, 3 lab). PR. ABE 81 and ABE 174 or COI. (2)

**ABE 190. (formerly AENG 190) Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (2)

**ABE 191. (formerly AENG 191) Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (2)

**ABE 199. (formerly AENG 199) Undergraduate Seminar (1).** May be taken twice. PR. Senior standing.

**ABE 200. (formerly AENG 200) Undergraduate Thesis (6).** PR. COI.

**ABE 200a. (formerly AENG 200a) Practicum (6).** PR. COI. (2,S)

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## DEPARTMENT OF CHEMICAL ENGINEERING

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### Chemical Engineering

**ChE 31. Introduction to Chemical Engineering (3).** Principles of equilibrium as applied to unit operations and thermodynamics; elementary material and energy balances. 3 hrs (class). PR. CHEM 32 and MATH 27 or MATH 37. (1,2)

**ChE 32. Industrial Stoichiometry (3).** Application of physico-chemical principles in the analysis and solution of industrial processes involving chemical reactions. 5 hrs (2 class, 3 lab). PR. ChE 31. (1)

**ChE 41. Chemical Process Industries (3).** Study of the chemical manufacturing industries in terms of unit processes and unit operations; chemical process flow sheets and energy balances; process equipment; chemical control; economic evaluation of unit operations. 3 hrs (class). PR. CHEM 40 and ChE 31. (2)

**ChE 142. Chemical Engineering Thermodynamics I (3).** The first law of thermodynamics, ideal gas concepts, pressure-volume-temperature relationships of fluids, heat effects; second law of thermodynamics, other thermodynamic properties of fluids. 3 hrs (class). PR. CHEM 111 and ChE 31. (2)

**ChE 143. Chemical Engineering Thermodynamics II (3).** Thermodynamic flow processes, power cycles, refrigeration, phase equilibria, chemical reaction equilibria. 3 hrs (class). PR. ChE 142. (1)

**ChE 145. Chemical Reaction Engineering (3).** Fundamental principles of reaction engineering and their applications. 3 hrs (class). PR. ChE 31, ENSC 21 and CHEM 112. (1)

**ChE 147. Application of Fluid Dynamics in Chemical Engineering (3).** Concepts and principles of fluid dynamics and their applications. PR. ChE 31 and ENSC 12 or ENSC 11a. (2)

**ChE 149. Transport Phenomena (3).** Physical rate processes with particular emphasis on the formulation and solution of typical boundary value problems associated with heat, mass and momentum transport; equations of change, molecular and turbulent transport. 3 hrs (class). PR. ChE 31 and ENSC 21. (2)

**ChE 152. Separation Processes (3).** Unified treatment of separation processes with primary emphasis on the concept of equilibrium stage, formulation, numerical and graphical solution technique; application of principles to separation processes - distillation, liquid extraction and leaching. 3 hrs (class). PR. ChE 31. (2)

**ChE 153. Transfer Operations I (3).** Applications of the principles of rate processes, unified treatment of mass, heat and simultaneous heat and mass transfer operations. 3 hrs (class). PR. ChE 149. (1)

**ChE 154. Transfer Operations II (3).** Applications of the principles of transfer and separation processes in cooling tower and packed column design, unified treatment of size reduction, screening and solids handling. PR. ChE 149, ChE 152 and concurrent with ChE 153. (1)

**ChE 155. Unit Operations Laboratory I (2).** Experimental study of fluid flow, sedimentation, filtration, flotation, extraction and adsorption. 6 hrs (lab). PR. ChE 152 and ChE 147. (1,2)

**ChE 156. Unit Operations Laboratory II (2).** Experimental study of heat transfer and applications, solids handling, mass transfer and fermentation. 6 hrs (lab). PR. ChE 153, ChE 154 and ChE 155. (1,2)

**ChE 170. Instrumentation and Process Dynamics and Control (3).** Fundamentals of automatic control, instrumentation, analyses of process dynamics and control system. 3 hrs (class). PR. ENSC 21 and ChE 41. (2)

**ChE 172. Introduction to Biochemical Engineering (3).** Chemical engineering principles as applied to enzyme and whole cell mediated bioprocesses. PR. MCB 1, ChE 149, ChE 152 and CHEM 160. (2)

**ChE 180. Agro-industrial Waste Management (3).** Changing practice in agro-industrial production; environmental impact analysis; waste characteristics; waste treatment and disposal fundamentals; waste recycling management. 3 hrs (class). PR. COI. (1,2)

**ChE 185. Chemical Engineering Laws, Ethics, Specifications and Contracts (2).** Laws and code of ethics for chemical engineers; specifications and contracts; occupational health and safety. 2 hrs (class). PR. COI. (1,2)

**ChE 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI (2)

**ChE 192. Chemical Process Equipment Design (3).** Mechanical design of chemical process equipment. 3 hrs (class). PR. ChE 145, ChE 153, ChE 154 and ENSC 13. (1,2)

**ChE 193. Plant Design (3).** Calculations of material balance, energy balance and specifications of major process equipment; balancing of equipment. 5 hrs (2 class, 3 comp). PR. ChE 32, ChE 41 and ChE 192. (1,2)

**ChE 199. Plant Inspection and Seminar (1).** PR. COI. (2)

**ChE 200. Undergraduate Thesis (6).** May be taken twice. PR. COI. (1,2,S)

### **Pulp and Paper Technology**

**PPT 170. Instrumentation and Process Control for the Pulp and Paper Industry (3).** Principles and methods of control system analysis and design as applied to the pulp and paper industry. 3 hrs (class). PR. EE 1, ENSC 21 and FPPS 132. (1)

**PPT 188. Environmental Technology for the Pulp and Paper Industry (3).** Causes and control of pollution associated with the pulp and paper industry and methods for effluent treatment. 3 hrs (class). PR. FPPS 132 or COI. (1)

**PPT 193. Pulp and Paper Plant Design (3).** Computations of material balances, energy balances, power requirement, equipment balancing, cost and profitability estimation. 5 hrs (2 class, 3 lab). PR. ChE 32, ChE 41 and ChE 192. (2)

**PPT 199. Undergraduate Seminar (1).** PR. Senior standing. (2)

**PPT 200. Undergraduate Thesis (6).** (1,2,S)

**PPT 200a. Practicum (6).** (1,2,S)

### **Sugar Technology**

**SUTC 148. Sugar Analysis and Factory Operations Control (3).** Technical analysis of sugar house products; chemical and industrial stoichiometry with specific application to operations control and sugar accounting and distribution. 5 hrs (2 class, 3 lab). PR. CHEM 32. (1)

**SUTC 154. Field and Factory Operations and Processes (5).** Operations and processes in sugarcane production, raw sugar manufacture and refining. 7 hrs (4 class, 3 lab). PR. CHEM 32 and ChE 149. (1,2)

**SUTC 170. Instrumentation and Process Control Application to Sugar Industries (3).** Principles and methods of instrumentation and control system analysis as applied to sugar industries. 3 hrs (class). PR. EE 1, ENSC 21 and SUTC 154. (1,2)

**SUTC 171. Sugarcane-By-Products Utilization and Suchochemistry (3).** Characterization, processing and utilization of sugarcane-by-products; properties, synthesis and reactions of sucrose. 5 hrs (2 class, 3 lab). PR. CHEM 40 or CHEM 44 and MCB 1. (1)

**SUTC 181. Waste Management in the Sugar Industry (3).** Types, sources, quantities of waste in sugar industry; effects of waste in receiving environment; waste handling practices; cleaner products/pollution prevention, emission control. 3 hrs (class). PR. COI. (2)

**SUTC 185. Sugar Laws and Economics (2).** Laws affecting the sugar industry and the profession of sugar technology; production costs; consumption trends; international outlook. 2 hrs (class). PR. None. (2)

**SUTC 193. Sugar Process Engineering and Plant Design (3).** Material, steam and equipment balancing; design and specifications. 5 hrs (2 class, 3 lab). PR. SUTC 154. (2)

**SUTC 200 . Undergraduate Thesis ( 6 ) .** PR. COI. (1,2)

**SUTC 200a. Practicum (6).** Actual practice in a commercial sugar factory, refinery and distillery. One whole semester. PR. COI. (1,2,S)

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## **DEPARTMENT OF CIVIL ENGINEERING**

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### **Civil Engineering**

**CE 12. Higher Surveying (3).** Topographic surveys; triangulation; solar and stellar observations; gravity, trigonometric and barometric leveling; hydrographic surveys; route surveys for highways and railways. 7 hrs (1 class, 6 lab). PR. ABE 70. (2)

**CE 121. Transportation Engineering I (3).** Highway organization, planning and geometric design, traffic flow and control. 5 hrs (2 class, 3 comp). PR. CE 12. (1)

**CE 122. Transportation Engineering II (3).** Fundamentals of design, construction and maintenance of highway and airport pavements. 3 hrs (class). PR. CE 121. (2)

**CE 131. Structural Engineering I (3).** Survey of structural systems; analyses of loads and influence lines in trusses; design of roof and bridge trusses. 5 hrs (2 class, 3 lab). PR. ENSC 13. (1,2)

**CE 132. Structural Engineering II (3).** Deflection of trusses; analyses of statically determinate and indeterminate beams and frames for different materials. 5 hrs (2 class, 3 comp). PR. CE 131. (1,2)

**CE 133. Structural Engineering III (3).** Design of timber structures; joints, splices, roof and floor frames; bridge trusses. 5 hrs (2 class, 3 comp). PR. CE 131. (1)

**CE 134. Structural Engineering IV (3).** Theory and design of reinforced concrete slabs, beams and columns. 5 hrs (2 class, 3 comp). PR. CE 132. (1,2)

**CE 135. Structural Engineering V (3).** Design of structural elements in steel for buildings, bridges, towers and other infrastructure. 5 hrs (2 class, 3 comp). PR. CE 132. (1)

**CE 136. Pre-stressed Concrete (3).** Analysis and design of pre-stressed beams, girders, slabs, shells and arches. 3 hrs (class). PR. CE 134. (2)

**CE 137. Structural Dynamics and Earthquake Engineering (3).** Analysis of engineering structures with respect to earthquake forces. 3 hrs (class). PR. CE 132 and ENSC 21. (1,2)



**CE 141. Hydraulic Engineering (3).** Principles and application of hydraulic engineering. 5 hrs (2 class, 3 comp). PR. ENSC 16b. (1)

**CE 151. Sanitary Engineering I (3).** Sewerage and water supply system: Principles, design and maintenance. 3 hrs (class). PR. CHEM 15 and ENSC 16. (1)

**CE 152. Sanitary Engineering II (3).** Principles of wastewater treatment processes; design of treatment facilities. 3 hrs (class). PR. CE 151. (2)

**CE 161. Construction Materials (3).** Engineering properties and testing of construction materials. 5 hrs (2 class, 3 lab). PR. ENSC 18. (2)

**CE 162. Construction Project Planning and Management (3).** Construction planning, job scheduling, selection of construction equipment, and cost estimation. 3 hrs (class). PR. COI. (2)

**CE 163. CE Laws, Contracts and Ethics (2).** Elements of contracts, bid proposals and specifications for civil engineering projects; civil engineers' code of ethics. 2 hrs (class). PR. COI. (1)

**CE 171. Foundation Engineering (3).** Mechanics of soils and rocks; phase relationships; consolidation behavior; site investigation and soil classification; foundation analysis and design; slope stability and soil improvement. 3 hrs (class). PR. CE 134 and AENG 180. (1)

**CE 199. Undergraduate Seminar (1).** May be taken twice. PR. Senior standing. (1,2)

**CE 200. Undergraduate Thesis (6).** PR. COI. (1,2)

**CE 200a. Practicum (6).** PR. COI. (1,2)

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## DEPARTMENT OF ELECTRICAL ENGINEERING

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### Electrical Engineering

**EE 1. Basic Electrical Engineering (3).** Network laws and theorems; resistive and alternating current circuits; basic electronics; power transformers; introduction to logic circuits and motors. 5 hrs (2 class, 3 lab). PR. MATH 27 or MATH 37 and PHYS 13 or PHYS 82. (1,2)

**EE 10. Introduction to Electrical Engineering (1).** Nature and scope of electrical engineering. 1 hr (class). PR. None. (1)

**EE 11. Fundamentals of Electrical Engineering I (4).** Circuit concepts and laws; resistive and magnetic circuits; passive and active devices. 6 hrs (3 class, 3 lab). PR. PHYS 82. (1,2)

**EE 12. Fundamentals of Electrical Engineering II (4).** Transient response; sinusoidal steady state; resonance; transformer theory; polyphase systems. 6 hrs (3 class, 3 lab). PR. EE 11. (1,2)

**EE 15. Linear Systems Analysis (3).** Two-port networks; Fourier series; Fourier transforms; Laplace transforms; frequency response; filters; difference equations; z-transforms. 3 hrs (class). PR. EE 12 and ENSC 21. (1,2)

**EE 18. Introduction to Electromagnetic Fields (3).** Vector analysis; steady electric and magnetic fields; dielectric and magnetic materials; time-varying fields; Maxwell's equations; applications to electrical engineering. 3 hrs (class). PR. MATH 38 and EE 11. (1,2)

**EE 21. Fundamentals of Electronics (4).** Semiconductor theory; operation, characteristics, models and basic circuits of electronic devices; large and small signal modeling and analysis; biasing circuits; transistor amplifiers and switches; frequency response; feedback; operational amplifiers. 6 hrs (3 class, 3 lab). PR. EE 12 and EE 18. (1,2)

**EE 41. Electromechanical Energy Conversion (4).** Basic principles of electromechanical energy conversion; generalized machine model; performance characteristics of direct-current; synchronous and induction machines. 6 hrs (3 class, 3 lab). PR. EE 12 and EE 18. (1,2)

**EE 90. Electrical Engineering Law, Ethics and Contracts (1).** Laws, ethics, and contracts governing the electrical engineering profession. 1 hr (class). PR. COI. (2)

**EE 120. Digital Electronics (4).** Digital numbering systems and codes; logic concepts and gates; Boolean algebra; combinational and sequential logic circuits; binary arithmetic operations; integrated circuit families; analog-to-digital and digital-to-analog conversion; digital measurements. 6 hrs (3 class, 3 lab). PR. EE 21 or COI. (1,2)

**EE 126. Industrial Electronics (3).** Electronic devices and control circuits for industrial processes; applications to direct-current and induction machines. 5 hrs (2 class, 3 lab). PR. EE 41 and EE 120. (1,2)

**EE 130. Fundamentals of Instrumentation (3).** Analysis of the measurement system; primary sensing elements; signal conditioning and coupling; data output and controlling. 5 hrs (2 class, 3 lab). PR. EE 1 or EE 11. (1,2)

**EE 131. Control Systems Analysis (3).** Principles and methods of analyzing control systems. 3 hrs (class). PR. EE 15. (2)

**EE 141. Electrical Machines (3).** Engineering aspects, performance characteristics and applications of transformers, induction motors, synchronous and direct-current generators and motors. 5 hrs (2 class, 3 lab). PR. EE 41. (2)

**EE 145. Electrical Equipment and Devices (3).** Selected electrical equipment and devices; principles, performance characteristics and roles in an electrical system. 3 hrs (class). PR. EE 41. (2)

**EE 148. Electrical Machine Design (3).** Design

practices for transformers, rotating machines and selected electrical equipment and devices. 3 hrs (class). PR. EE 41. (1)

**EE 151. Fundamentals of Electrical Power Systems (3).** Electric power industry; components and system modeling; load-flow concept; symmetrical components; fault calculations; economic operation; stability studies. 3 hrs (class). PR. EE 41. (1,2)

**EE 158. Electrical System Design (3).** Choice of systems; selection, arrangement and protection of components for power, light and auxiliary systems of commercial, industrial, residential and institutional buildings; illumination design. 5 hrs (2 class, 3 lab). PR. EE 151. (1,2)

**EE 159. Industrial Power Systems (3).** Selection and arrangement of electrical equipment for distribution, control, protection and metering in industrial plants, substations and modern power plants. 5 hrs (2 class, 3 lab). PR. EE 158. (2)

**EE 160. Digital Hardware Design (3).** Theory, formalism and methods of digital design; computer interfacing; microprogrammed design; microcomputers in digital design. 5 hrs (2 class, 3 lab). PR. EE 120. (1,2)

**EE 165. Microprocessor- Based Design (4).** Microprocessor organizations and programming; microcomputer development systems and interfacing techniques. 6 hrs (3 class, 3 lab). PR. EE 160. (2)

**EE 170. Signals and Noise in Communication Systems (3).** Description and analysis of signals and noise for signal processing in communication systems. 3 hrs (class). PR. MATH 38 and STAT 1. (1,2)

**EE 171. Fundamentals of Communication Systems (3).** Theories, concepts and techniques in information transmission and reception. 3 hrs (class). PR. EE 15, EE 120, and EE 170. (1,2)

**EE 179. Antenna Engineering (3).** Propagation and reception of electromagnetic radiation; principles and concepts in the analysis, design and applications of antennas. 5 hrs (2 class, 3 lab). PR. EE 171. (2)

**EE 180. Estimation for Electrical Engineering Projects (3).** Estimation of materials and scheduling of activities of an electrical engineering project. 3 hrs (class). PR. EE 158. (1,2)

**EE 181. Maintainability Engineering (3).** Maintainability as a system characteristic; maintenance strategy analysis; applications in industrial and scientific instruments and systems. 5 hrs (2 class, 3 lab). PR. EE 126 and EE 130. (1,2)

**EE 185. Engineering Production Systems (3).** Planning, analysis, and electrical/electronic control of production systems in engineering. 3 hrs (class). PR. Senior standing. (2)

**EE 191. Special Topics (1-3).** PR. None. (1,2)

**EE 199. Undergraduate Seminar (1).** May be taken twice. PR. Senior standing. (1,2)

**EE 200. Undergraduate Thesis (6).** PR. COI. (1,2,S)

**EE 200a. Practicum (6).** PR. COI. (1,2,S)

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## DEPARTMENT OF ENGINEERING SCIENCE

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### Engineering Science

**ENSC 1. Introduction to Engineering (1).** Nature and scope of the engineering sciences. 1 hr (class). PR. None. (1)

**ENSC 10a. Engineering Graphics I (2).** Basic drafting operations and tools; techniques of pictorial representations; geometric constructions; technical drafting practice. 6 hrs (lab). PR. MATH 14 or MATH 17. (1,2,S)

**ENSC 10b. Engineering Graphics II (2).** Perspective drawing; machine pipes, electrical and topographic drawings; computer-aided designs. 6 hrs (lab). PR. ENSC 10a. (1,2,S)

**ENSC 11. Statics of Rigid Bodies (3).** Fundamental principles of equilibrium of rigid bodies; analysis of structures; first and second moments of mass, volume, area and length; shear and bending diagrams. 3 hrs (class). PR. MATH 27 or MATH 37 and PHYS 3 or PHYS 81. (1,2,S)

**ENSC 12. Dynamics of Rigid Bodies (3).** Kinematics and kinetics of rigid bodies in rectilinear, curvilinear and plane motion; force, mass and acceleration relationships; concepts of work, energy, impulse and momentum; mechanical vibrations. 3 hrs (class). PR. ENSC 11. (1,2,S)

**ENSC 13. Strength of Materials (3).** Elementary stress and strain analysis; analysis and design of structural elements based on equilibrium and material properties. 3 hrs (class). PR. ENSC 11. (1,2,S)

**ENSC 14. Basic Thermodynamics (3).** Fundamental concepts and laws of thermodynamics; thermodynamic properties of substances; thermodynamic processes and cycles; 3 hrs (class). PR. MATH 28 or MATH 38 and PHYS 13 or PHYS 82. (1,2)

**ENSC 14a. Engineering Thermodynamics and Heat Transfer (5).** Fundamental concepts and laws of thermodynamics; thermodynamic properties of substances; thermodynamic processes and cycles; principles of heat transfer. 7 hrs (4 class, 3 comp). PR. MATH 28 or MATH 38 and PHYS 13 or PHYS 82. (1,2)

**ENSC 15. Fundamentals of Heat Transfer (3).** Principles of conduction, convection and radiation of heat. 3 hrs (class). PR. ENSC 14. (1,2)

**ENSC 16. Fluid Mechanics (3).** Properties of fluids; fluid statics, kinematics and dynamics; flow in pressure conduits and open channels; fluid measurements and turbomachinery. 3 hrs (class). PR. ENSC 12. (1,2,S)

**ENSC 16b. Fluid Mechanics Laboratory (2).** Principles of experimental analysis and design in fluid mechanics. 6 hrs (lab). PR. ENSC 16. (2)

**ENSC 18. Materials of Engineering (3).** Properties, structure and composition of materials; behavior of materials under service conditions; testing, inspection, specification and selection of materials. 5 hrs (2 class, 3 lab). PR. ENSC 13 and CHEM 15 or CHEM 17. (1,2)

**ENSC 21. Mathematical Methods in Engineering (3).** Mathematical treatment of problems in engineering sciences; introduction to ordinary differential equations; Fourier series; Laplace transformation and vector analysis. 3 hrs (class). PR. MATH 28 or MATH 38. (1,2)

**ENSC 26. Computer Applications in Engineering (3).** Concepts and methods of programming; applications to engineering problems. 5 hrs (2 class, 3 lab). PR. CMSC 11 or COI and MATH 28 or MATH 38. (1,2)

**ENSC 90. Engineering Ethics (1).** Engineering code of ethics; specifications and contracts. 1 hr (class). PR. Junior standing. (1,2)

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## DEPARTMENT OF INDUSTRIAL ENGINEERING

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### Industrial Engineering

**IE 3\*. Introduction to Industrial Engineering (3).** Systems concepts, the industrial organization and its functions; overview of industrial engineering tools. 3 hrs (class). PR. None. (2)

**IE 21\*. Industrial Processes (3).** Industrial processes and their effects on production system decisions; metal, plastic, ceramic, elastomer, fiber, wood and pulp processes, etc. 3 hrs (class). PR. CHEM 15 and PHYS 82. (1)

**IE 31\*. Industrial Organization and Management (3).** Basic features governing the industrial organization; administration and financing of industries; relations between management and labor. 3 hrs (class). PR. IE 3. (1)

**IE 125\*. (formerly IE 135) Industrial Quality Control (5).** Statistical process control charts; specifications and tolerances; acceptance sampling; reliability and life testing. 7 hrs (4 class, 3 lab). PR. STAT 101 and IE 21. (2)

**IE 132\*. (formerly IE 32) Methods of Engineering**

**(5).** Design and measurement of work; specification of methods and performance times; productivity concepts and techniques; systems and procedures; human factors engineering; value engineering. 7 hrs (4 class, 3 lab). PR. IE 21 and IE 31. (2)

**IE 134\*. Ergonomics (3).** Anthropometry; biomechanics; human task analysis; displays and control; work environments; ergonomic work design and evaluation. 5 hrs (2 class, 3 lab). PR. IE 132. (1)

**IE 136\*. Industrial Safety and Health (3).** Accident prevention and reduction of health hazards in the work environment; control of noise, vibration, and heat stress. 3 hrs (class). PR. IE 134. (2)

**IE 141\*. Operations Research I (3).** Operations research methodology; recurrent processes and problems in industrial systems; optimization models for linear systems; linear programming, graph theory, and network analysis. 3 hrs (class). PR. ENSC 21. (1,2)

**IE 142\*. Operations Research II (3).** Optimization techniques and applications; integer programming, dynamic programming, simulation heuristics; competitive waiting line, inventory and large scale systems. 3 hrs (class). PR. IE 141. (1)

**IE 143\*. (formerly IE 183) Stochastic Processes in Industrial Engineering (3).** Independent Bernoulli trials and Poisson processes; renewal theory and Markovian chains. 3 hrs (class). PR. STAT 101. (1,2)

**IE 144\*. (formerly IE 181) Systems Simulation (3).** Representation and simulation of systems; random number generation; record processing and generation of statistics. 5 hrs (2 class, 3 lab). PR. IE 143 and IE 151. (2)

**IE 150\*. Systems Evaluation (3).** Criteria for evaluation of systems; technological economic, and human factors. 3 hrs (class). PR. MATH 28 or MATH 38. (1,2)

**IE 151\*. Production Systems (3).** Capacity planning; forecasting; production planning, scheduling and inventory control, maintenance; production control; production information system. 5 hrs (2 class, 3 lab). PR. IE 125, IE 141 and IE 150. (1)

**IE 152\*. Manufacturing Planning and Design (3).** Location and layout of facilities; materials handling, storage and distribution. 3 hrs (class). PR. IE 151. (2)

**IE 164\*. (formerly IE 154) Informations Systems I (3).** Concepts and frameworks of information systems; analysis and design of information systems. 3 hrs (class). PR. CMSC 11. (1)

**IE 165\*. (formerly IE 156) Information Systems II (3).** Implementation considerations in information systems design; relational database systems. 3 hrs (class). PR. IE 164. (1,2)

**IE 184\*. (formerly IE 153) Project Development and Management (3).** Phases of project feasibility studies; project development, evaluation and management. 5 hrs (2 class, 3 lab). PR. IE 151. (2)

**IE 185\*. (formerly IE 155) Industrial Systems Design (3).** Total systems design; integration of subsystems with concentration on optimal total systems implementation. 5 hrs (2 class, 3 lab). PR. IE 184. (1)

**IE 190. Special Problems (3).** 3 hrs (class). PR. 5th year standing. (1,2)

**IE 191. Special Topics (3).** 3 hrs (class). PR. 5th year standing. (1,2)

**IE 198, Internship (3).** 3 hrs (class). PR. COI. (1,2,S)

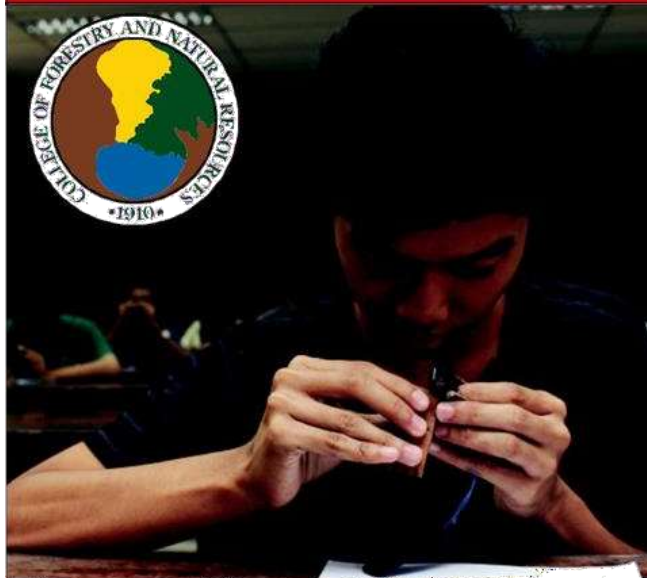
**IE 199. Undergraduate Seminar (1).** 1 hr (class). PR. 5th year. (1)





College of Forestry and Natural Resources

University of the Philippines Los Baños





# COLLEGE OF FORESTRY AND NATURAL RESOURCES

Willie P. Abasolo, *Dean*  
Ronniel D. Manalo, *Associate Dean*  
Mutya Ma. Q. Manalo, *College Secretary*  
Juancho B. Balatibat, *Chair, Department of Forest Biological Sciences*  
Vivian C. Daracan, *Chair, Department of Forest Product and Paper Science*  
Eleno O. Peralta, *Chair, Department of Social Forestry and Forest Governance*  
Diomedes A. Racelis, *Director, Institute of Renewable Natural Resources*  
Reynaldo A. Comia, *Director, Institute of Agroforestry*  
Roberto P. Cereno, *Director, Training Center for Tropical Resources and Ecosystems Sustainability*  
Nathaniel C. Bantayan, *Director, Makiling Center for Mountain Ecosystem*  
Priscila C. Dolom, *OIC, Forestry Development Center*

## HISTORY

The College of Forestry and Natural Resources (CFNR) is one of the 11 degree-granting units of the University of the Philippines Los Baños (UPLB). Established in 1910, CFNR is the Philippines' oldest and finest academic institution of higher learning in forestry. It was conferred as a Center of Excellence in Forestry Education by the Philippine Commission on Higher Education.

The teaching, research, and extension programs of CFNR are at the forefront of various fields such as watershed management, climate change, silviculture, ecology, biodiversity, biotechnology, physiology, agroforestry, pulp and paper technology, natural resources management, policy formulation, governance, economics, and social forestry.

## DEGREE PROGRAMS

The UPLB College of Forestry and Natural Resources offers a sub-professional course, a course in the baccalaureate level, three master's degree programs and a doctor of philosophy program.

1. **Certificate in Forestry** - A two-year non-degree course focused on basic social and technical skills required to assist professional foresters.
2. **Bachelor of Science in Forestry** - A four-year program composed of a general curriculum with specialized courses in three forestry fields: 1) Environmental Forestry, 2) Production and Industrial Forestry, and 3) Social Forestry and Agroforestry.

## VISION

A world-class leader in the education, science and responsible management of tropical forests, natural resources and the environment.

## MISSION

- a. Developing globally competitive and locally adaptive human resources imbued with technical, social and moral competencies for forestry, natural resources and environmental management.

- b. Pioneering knowledge generation and innovative enterprise management and technologies through research and development programs and policy initiatives that increase natural productivity, strengthen cultural values, enhance ecosystem services, and respond to national issues and imperatives.
- c. Empowering people, institutions and communities for sustainable forests, natural resources and environmental development and governance towards a better quality of life.
- d. Strengthening institutional capability and enhancing public appreciation of the role of forestry in environmental protection and national development.

## OBJECTIVES

In general, the CFNR aims to develop and implement programs to promote sustainable development in the forestry and natural environment sectors primarily through instruction, research, and extension. Specifically, it will:

1. Produce professionals and scientists in forestry, agroforestry, natural resource management, pulp and paper technology and allied fields.
2. Train forestry and natural resource technicians.
3. Develop and transfer appropriate technologies in forestry and the natural development.
4. Promote community empowerment and participation in sustainable resource management.
5. Play an active role in shaping and reshaping policies in forestry and the natural environment in response to the present and future demands of sustainable development.
6. Promote continuing education in forestry and natural resources.
7. Develop and maintain Mt. Makiling as a model in the sustainable management of mountain ecosystem and as a center for biodiversity conservation.

## FIVE-POINT STRATEGIC PROGRAMS

1. Advancing distinctive excellence in forests and natural resources education.
2. Developing world-class research and development capacity.
3. Instituting responsive extension services for community and national development.
4. Promoting enabling environment through good governance and effective support system.
5. Generating resources for productivity.



**CERTIFICATE IN FORESTRY**

| <i>First Semester</i>                                     | <i>Units</i> | <i>Second Semester</i>   | <i>Units</i> |
|---|--------------|--|--------------|
| <i>FIRST YEAR</i>   |              |  |              |
| FBS 1, Forest Botany                                      | 4            | FBS 21, Taxonomy of Forest Plants                                    | 4            |
| FBS 9, Forest Zoology                                     | 3            | FRM 16, Fundamentals of Small-scale<br>Forest-based Entrepreneurship | 3            |
| FRM 62, Forest Mensuration                                | 4            | FRM 93, Elementary Forest Surveying and Mapping                      | 4            |
| FRM 90, Elementary Forestry Cartography                   | 1            | SFFG 80, Forest Community Development                                | 2            |
| FRM 100, Introduction to Forest Resources Management      | 3            | SFI 30, Forest Nurseries   | 3            |
| SFFG 20, Communication Skills for Forestry<br>Technicians | 3            | PE 2, Swimming   | <u>(2)</u>   |
| PE 1, Foundations of Physical Fitness                     | <u>(2)</u>   |  | 16           |
|   | 18           |  |              |
| <i>SUMMER</i>   |              |  |              |
|   |              | FRM 165, Forest Surveys  | 3            |
|   |              | SFFG 80.1, Forest Community Development Laboratory                   | <u>3</u>     |
|   |              |  | 6            |
| <i>SECOND YEAR</i>  |              |  |              |
| FPPS 11, Wood Structure and Identification                | 3            | FOR 31, Elementary Forest Protection                                 | 3            |
| FRM 94, Forest Products Harvesting                        | 3            | FOR 110, Introduction to Protected Area<br>Management                | 3            |
| SFFG 123, Forest Policy and Institutions                  | 3            | FPPS 42, Forest Products Utilization 1                               | 3            |
| SFI 31, Elementary Silviculture                           | 4            | FPPS 43, Forest Products Utilization 2                               | 3            |
| SFI 10, Elementary Forest Soil Conservation               | 3            | SFI 123, Fundamentals of Agroforestry                                | 3            |
| PE 2 or 3, Basic or Advanced Course                       | (2)          | PE 2 or 3, Basic or Advanced Course                                  | (2)          |
| NSTP 1, National Service Training Program I               | <u>(3)</u>   | NSTP 2, National Service Training Program II                         | <u>(3)</u>   |
|   | 16           |  | 15           |
| <b>TOTAL NUMBERS OF UNITS ..... 71</b>                    |              |  |              |



**BACHELOR OF SCIENCE IN FORESTRY\***  
**(General)**

| <i>First Semester</i>   | <i>Units</i> | <i>Second Semester</i>   | <i>Units</i> |
|---|--------------|--|--------------|
| <i>FIRST YEAR</i>   |              |  |              |
| BOT 1, Introduction to Plant Science                                      | 3            | CHEM 15, Fundamentals of Chemistry                             | 3            |
| ENG 1 (AH), College English   | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory                | 2            |
| FOR 1, General Forestry   | 3            | ENG 2 (AH), College Writing in English                         | 3            |
| MATH 11, College Algebra  | 3            | FBS 21, Taxonomy of Forest Plants                              | 4            |
| SOSC 1 (SSP), Foundations of Behavioral Sciences                          | 3            | MATH 14, Plane Trigonometry                                    | 3            |
| ZOO 1, General Zoology  | 3            | SFFG 101, Principles and Concepts of Social Forestry           | 3            |
| PE 1, Foundations of Physical Fitness                                     | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                            | <u>(2)</u>   |
|   | 18           |  | 18           |
| <i>SECOND YEAR</i>  |              |  |              |
| ECON 11, General Economics  | 3            | FBS 36, Fundamentals of Forest Ecology                         | 3            |
| FBS 31, Plant Physiology  | 3            | FRM 92, Forest Engineering                                     | 3            |
| FPPS 11, Wood Structure and Identification                                | 3            | FRM 117, Forestry Economics                                    | 3            |
| G.E. (AH)   | 3            | G.E. (MST)   | 3            |
| G.E. (MST)  | 3            | G.E. (SSP)   | 3            |
| G.E. (SSP)  | 3            | STAT 1, Elementary Statistics                                  | 3            |
| SFI 100, Geology and Forest Soils   | 3            | PE 2 or 3, Basic or Advanced Course                            | (2)          |
| PE 2 or 3, Basic or Advanced Course                                       | (2)          | NSTP 2, National Service Training Program II                   | <u>(3)</u>   |
| NSTP 1, National Service Training Program I                               | <u>(3)</u>   |  | 18           |
|   | 21           |  |              |
| <i>THIRD YEAR</i>   |              |  |              |
| G.E. (AH)   | 3            | FBS 45, Forest Insect Pests and Diseases                       | 4            |
| G.E. (AH)   | 3            | FBS 101, Forest Biodiversity                                   | 3            |
| G.E. (SSP)  | 3            | FOR 195, Research Methods in Forestry and<br>Natural Resources | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal                             | 3            | FRM 153, Watershed Management                                  | 3            |
| FRM 61, Forest Biometry   | 3            | SFI 121, Silviculture 2  | 3            |
| FRM 104, Introduction to Geographic Information Systems                   | 3            | Specialized Course   | <u>3</u>     |
| SFFG 123, Forest Policies and Institutions                                | 3            |  | 19           |
| SFI 120, Silviculture 1   | <u>3</u>     |  |              |
|   | 21           |  |              |
| <i>SUMMER</i>   |              |  |              |
|   |              | Thesis(FOR 200)/Practicum(FOR 200a)                            | 6            |
| <i>FOURTH YEAR</i>  |              |  |              |
| G.E. (SSP)  | 3            | G.E. (MST)   | 3            |
| FPPS 127, Properties & Utilization of Forest Products                     | 3            | FPPS 128, Non-Timber Forest Products                           | 3            |
| FRM 171, Forestry Business Management                                     | 3            | FRM 184, Integrated Forest Resources Management                | 3            |
| SFFG 113, Forestry Extension  | 3            | SFFG 152, Sociology of Natural Resources                       | 3            |
| SFFG 125, Political Economy and Administration<br>of Forestry Development | 3            | Specialized Course   | 3            |
| Specialized Course  | <u>3</u>     | Specialized Course   | <u>3</u>     |
|   | 18           |  | 18           |

**TOTAL NUMBER OF UNITS .....157**

\* A 3-unit GE course (in any domain) on Philippine studies, to be chosen by the student, is required in the curriculum.

## COURSES

### INSTITUTE OF RENEWABLE NATURAL RESOURCES

#### Forest Resources Management

**FRM 16. Fundamentals of Small-scale Forest-based Enterprises (3).** Economic and business concepts as applied to the establishment of small-scale forest-based enterprises. 3 hrs (class). (2)

**FRM 61. Forest Biometry (3).** Measurements of standing and felled timber, tree growth, and of non-timber forest products; tree inventory methods. 5 hrs (2 class, 3 lab). PR. FBS 21 and STAT 1. (1,2)

**FRM 62. Forest Mensuration (4).** Elements of forest mensuration; tree measurements; forest products measurements and volume determination; and basic computer applications. 8 hrs (2 class, 6 lab). (1,2)

**FRM 90. Elementary Forestry Cartography (1).** Lettering, orthographic and auxiliary projection; sectioning and dimensioning methods; detailed working drawing; isometric and oblique representation; technical sketching. 3 hrs (lab). (1,2)

**FRM 92. Forest Engineering (3).** Forest surveying and topographic mapping; direct and indirect leveling; elementary road engineering. 7 hrs (1 class, 6 lab). PR. MATH 14. (1,2)

**FRM 93. Elementary Forest Surveying and Mapping (4).** Basic surveying; methods of measurements and instrumentation; techniques and procedures in map-making. 8 hrs (2 class, 6 field). PR. FRM 62 and FRM 90. (2)

**FRM 94. Forest Products Harvesting (3).** Techniques and management of forest products harvesting. 5 hrs (2 class, 3 lab). PR. FRM 93. (1)

**FRM 100. Introduction to Forest Resources Management (3).** General forest management; its relation to the forest products industries. 3 hrs (class). (1,2)

**FRM 103. Introduction to Remote Sensing (3).** Principles, concepts and types of remote sensing. 5 hrs (2 class, 3 lab). PR. MATH 14 or MATH 17. (1)

**FRM 104. Introduction to Geographic Information Systems (3).** Principles and concepts of geographic information systems; GIS operation. 5 hrs (2 class, 3 lab). PR. MATH 14 or MATH 17. (1,2)

**FRM 110. Fundamentals of Environmental Forest Management(3).** Structure and dynamics of forest ecosystems, principles, decision-making tools and strategies in environmental forest management. 3 hrs (class). PR. FOR 1 and FBS 36 or COI. (2)

**FRM 116. Accounting (3).** Theory and practice of accounting. 5 hrs (2 class, 3 lab). (1)

**FRM 117. Forestry Economics (3).** Economics of production, distribution, and consumption of forest products and services. 3 hrs (class). PR. ECON 11. (1,2)

**FRM 118. Forest Finance (3).** Comparative valuation of alternative forest operations. 3 hrs (class). PR. FRM 117. (1)

**FRM 119 (or FPPS 119). Marketing of Forest Products (3).** Forest products marketing, the structure of forest products' market, output and pricing policies and strategic trends. 5 hrs (2 class, 3 lab). PR. ECON 11. (1,2)

**FRM 130. Forest Range Management (3).** Principles of range management, range condition, classification and analysis, range ecology, improvement and management planning; identification of range pasture and forage plants. 5 hrs (2 class, 3 lab). PR. FRM 61. (1)

**FRM 140. Parks and Outdoor Recreation Management (3).** The technical, economic and social aspects of the management of parks and outdoor recreation areas. 3 hrs (class). PR. FRM 117 or COI. (2)

**FRM 153. Watershed Management (3).** Regulation, use, conservation practices and treatment of the aggregate resources of a drainage basin for the production of water and the control of erosion, stream flow, and floods. 5 hrs (2 class, 3 lab). PR. SFI 100 or COI. (1,2)

**FRM 161. Aerial Photo Interpretation (3).** Principles and techniques of forest photo interpretation; use of photographs in mapping forest stands; introduction to volume estimation of trees and stands from aerial photographs. 5 hrs (2 class, 3 lab). PR. FRM 61. (1,2)

**FRM 164. Sampling Methods in Forestry (3).** Sampling problems with special reference to timber inventory of forest area. 5 hrs (2 class, 3 lab). PR. FRM 61. (1)

**FRM 165. Forest Surveys (3).** Techniques, instruments, procedures in planning and implementing forest surveys; analysis and presentation of data. 7 hrs (1 class, 6 field). PR. FBS 21 and FRM 93. (S)

**FRM 167. Experimental Designs in Forestry Research (3).** Principles of experimental designs; basic and other experimental designs and analysis applied in forestry research; treatment comparisons; regression and correlation. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**FRM 171. Forestry Business Management (3).** Business management principles and their application to forestry. 5 hrs (2 class, 3 lab). PR. COI. (1,2)

**FRM 183. Timber Production Management (3).** Theories and techniques in timber management and harvesting in natural and plantation forests. 5 hrs (2 class, 3 lab). PR. FRM 61 and FRM 117. (1)

**FRM 184. Integrated Forest Resource Management (3).** The biophysical and socio-economic aspects of FRM;

forest land use management; forest management planning and plans. 5 hrs (2 class, 3 lab). PR. FRM 61, FRM 117 and SFI 121. (1,2)

**FRM 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**FRM 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**FRM 194. Production Planning and Control in Logging Operations (3).** Preparation of production and cost standards; job analysis; production planning and control techniques; machine selection and replacement. 5 hrs (2 class, 3 lab). PR. FRM 192 and MATH 26. (1)

### Natural Science

**NASC 10 (MST). Forests as Source of Life (3).** The roles and importance of forests in sustaining life, environment, and society. 3 hrs (class). (1,2,S)

### Silviculture and Forest Influences

**SFI 10. Elementary Forest Soil Conservation (3).** Introduction to properties of soils and techniques in forest soil conservation. 5 hrs (2 class, 3 lab). (1)

**SFI 30. Forest Nurseries (3).** Establishment and management of forest nurseries. 7 hrs (1 class, 6 field). PR. FBS 1. (1,2)

**SFI 31. Elementary Silviculture (4).** Regeneration and treatment of Philippine forests. 8 hrs (2 class, 6 field). PR. FBS 1. (1,2)

**SFI 100. Geology and Forest Soils (3).** Physical geology; formation and development of land forms; physical, chemical, and biological characteristics of forest soils. 5 hrs (2 class, 3 lab). PR. CHEM 15 and CHEM 15.1 or CHEM 16 and CHEM 16.1. (1,2)

**SFI 101. Forest Soils (3).** Soil classification, organic matter, organisms, physical and chemical properties, and relation to forest management. 5 hrs (2 class, 3 lab). PR. SFI 100 or COI. (1,2)

**SFI 102. Forest Soil and Water Conservation (3).** Principles, theories and research methodologies in forest soil and water conservation. 5 hrs (2 class, 3 lab). PR. SFI 100 and FRM 184 or COI. (2)

**SFI 120. Silviculture 1 (3).** Silvicultural methods and their applications in tropical forests, with emphasis on the forests of the Philippines. 5 hrs (2 class, 3 lab). PR. FBS 36 and SFI 100. (1,2)

**SFI 121. Silviculture 2 (3).** Continuation of SFI 120. 5 hrs (2 class, 3 lab). PR. SFI 120. (1,2)

**SFI 122. Arboriculture and Landscape Gardening (3).** Propagation and culture of important fruit and ornamental perennial plants; landscape gardening and ground

improvement. 5 hrs (2 class, 3 lab). PR. COI. (1,2)

**SFI 123. Fundamentals of Agroforestry (3).** Principles and practices of agroforestry; managing agroforestry projects. 5 hrs (2 class, 3 lab). PR. COI. (1,2)

**SFI 124. Silviculture of Non-Timber Producing Plant Species (3).** Classification, propagation and cultivation of economically important non-timber producing plant species. 5 hrs (2 class, 3 lab). PR. FBS 1 or BOT 1. (1,2)

**SFI 126. Fundamentals of Urban Forestry (3).** Structure, composition, distribution and classification, planning, management of urban forests. 5 hrs (2 class, 3 lab). PR. SFI 122 or COI. (1)

**SFI 131. Silvicultural Approaches to Forest Protection (3).** Causes and silvicultural control of forest destructive agents. 3 hrs (class). PR. SFI 121 or COI. (1)

**SFI 133. Agroforestry Systems of the Philippines (3).** Description and analysis of agroforestry system in the Philippines. 5 hrs (2 class, 3 lab). PR. SFI 123 or COI. (1,2)

**SFI 141. Forest Tree Improvement (3).** Application of genetics to forestry; selection, hybridization, progeny testing and seed orchard establishment. 5 hrs (2 class, 3 lab). PR. FBS 172. (1)

**SFI 143. Agroforestry System Design and Development (3).** Concepts and application of diagnosing and designing appropriate agroforestry system and technologies. 5 hrs (2 class, 3 lab). PR. SFI 123 or COI. (1,2)

**SFI 152. Forest Tree Seeds (3).** Production, anatomy, and composition of tree seeds, and their collection, extraction, testing, treatment, storage, germination, and certification. 5 hrs (2 class, 3 lab). PR. BOT 1 or COI. (2)

**SFI 161. Introduction to Forest Influences (3).** Introductory analysis of the modifying effects of forests on the microclimate, soil and the biological aspects of the environment and the basic principles underlying their measurement. 5 hrs (2 class, 3 lab). PR. BOT 1 and SFI 100. (1)

**SFI 168. Environmental Impact Assessment of Natural Resource Management Projects (3).** Concepts of environmental impact assessment (EIA). Application of EIA in natural resource management projects with emphasis in forestry and upland development projects. 5 hrs (2 class, 3 lab). PR SFI 121 and FRM 184 or COI. (2)

**SFI 171. Silvics (3).** Ecological foundation of silviculture; analysis of the interrelationships of trees, stand, and forests and environment. 5 hrs (2 class, 3 lab). PR. FBS 36. (1)

**SFI 172. Forest Fire Management (3).** Basic principles and practices in forest fire management; fire behavior, fire danger rating and forest fire prevention and control. 5 hrs (2 class, 3 lab). PR. FBS 36 or COI. (2)

**SFI 182. Forestation Techniques for Marginal and Degraded Areas (3).** Concepts, principles and

applications of forestation strategies or techniques for marginal and degraded upland areas. 5 hrs (2 class, 3 lab). PR. SFI 100 or COI. (1,2)

### Forestry

**FOR 1. General Forestry (3).** Forests, forestry and socio-biophysical system; forest management concepts and principles; role of forestry in sustainable development and conservation of renewable natural resources. 3 hrs (class). (1,2)

**FOR 31. Elementary Forest Protection (3).** Harmful effects of fire, insects and diseases on forests; preventive and remedial control measures. 5 hrs (2 class, 3 lab). PR. FBS 1 and FBS 9. (1,2)

**FOR 110. Introduction to Protected Area Management (3).** Principles and practices in the management of protected areas. 5 hrs (2 class, 3 lab). PR. FRM 100 and FBS 21. (2)

**FOR 195. Research Methods in Forestry and Natural Resources (3).** Methods and approaches in conducting researches in forestry and natural resources including proposal preparation and communicating results. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**FOR 200. Undergraduate Thesis. (1,2,S)**

**FOR 200a. Practicum (6). (1,2,S)**

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## DEPARTMENT OF FOREST BIOLOGICAL SCIENCES

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### Forest Biological Sciences

**FBS 1. Forest Botany (4).** Survey of the plant kingdom, with emphasis on the morphology, anatomy, taxonomy, and physiology of forest species. 6 hrs (3 class, 3 lab). (1,2)

**FBS 9. Forest Zoology (3).** Survey on the animal kingdom, with emphasis on forest fauna. 5 hrs (2 class, 3 lab). (1,2)

**FBS 21. Taxonomy of Forest Plants (4).** Identification, classification, nomenclature, phenology, geographical distribution and economic importance of woody and non-woody plants found in the Philippine forest. 8 hrs (2 class, 6 lab/field). PR. BOT 1. (1,2)

**FBS 26. Introduction to Forest Entomology (3).** General entomology; life history, habits and control of insects affecting forest trees and forest products. 5 hrs (2 class, 3 lab). PR. ZOO 1. (1)

**FBS 31. Plant Physiology (3).** Nutrition, metabolism, growth and reproduction of plants. 5 hrs (2 class, 3 lab). PR. CHEM 15 or 16 and BOT 1. (1,2)

**FBS 36. Fundamentals of Forest Ecology (3).** Biological interactions of forest components, energy flow and trophic levels, principles of limiting factors and succession, forest

dynamics and vegetational development, with emphasis on tropical rainforest; the ecological impact of man. 5 hrs (2 class, 3 lab). PR. FBS 21 and FBS 31. (1,2)

**FBS 41. Forest Pathology (3).** The common and important diseases of forest plants and forest products, recognition of symptoms, causes, and control methods. 5 hrs (2 class, 3 lab). PR. BOT 1 and ZOO 1. (2)

**FBS 42. Forest Products Pathology (3).** Types of wood defects caused by fungus and their control. Special emphasis on wood durability, fungicides, lumber discoloration, heart-rots and decay in forest products. 5 hrs (2 class, 3 lab). PR. BOT 1. (1)

**FBS 45. Forest Insect Pests and Diseases (4).** Nature, development, and control of insect pests and diseases of trees and agroforestry crops. 6 hrs (3 class, 3 lab). PR. FBS 36. (1,2)

**FBS 101. Forest Biodiversity (3).** Survey of genetic resources and types of ecosystems in the tropical forest, with emphasis on Philippine forests. 5 hrs (2 class, 3 lab). PR. BOT 1 and ZOO 1, or BIO 1. (1,2)

**FBS 126. Forest Entomology (3).** Biology and ecology of insects associated with forest trees and forest products; laboratory rearing methods and field work. 7 hrs (1 class, 6 lab). PR. ZOO 1. (2)

**FBS 127. Insect Ecology (3).** Concepts on insect abundance, distribution, dispersal, natural control and related problems. 5 hrs (2 class, 3 lab). PR. FBS 26 or equivalent and ZOO 150. (1)

**FBS 130. Forest Tree Physiology (3).** The physiological processes of trees and the relation of these processes to the environment. 5 hrs (2 class, 3 lab). PR. FBS 31. (2)

**FBS 136. Forest Ecology (3).** Interrelationships of forest plants and environmental factors; structure and dynamics of vegetational types; plants succession; indicator plants and ecological methods. 5 hrs (2 class, 3 lab). PR. FBS 36. (1)

**FBS 140. Forest Mycology (3).** A comprehensive survey of fungi affecting forest trees, including the morphology, taxonomy and physiology of fungi. 5 hrs (2 class, 3 lab). PR. BOT 1. (1)

**FBS 146. Forest Microbiology (3).** Morphology, physiology, ecology, classification, and important activities of microorganisms affecting forest and forest products. 5 hrs (2 class, 3 lab). PR. BOT 1 and ZOO 1 or BIO 2. (2)

**FBS 151. Microtechnique of Woody Plants (3).** Preparation of tissue of woody plants for microscopic studies. 7 hrs (1 class, 6 lab). PR. FPPS 11 and CHEM 15 or CHEM 16. (1)

**FBS 161. Plant Anatomy (3).** Organization and development of the primary and secondary plant body of higher plants. 5 hrs (2 class, 3 lab). PR. BOT 1. (1)

**FBS 167. Plant Taxonomy (3).** Fundamentals of classification and nomenclature. 5 hrs (2 class, 3 lab). PR. FBS 21. (1)



**FBS 172. Forest Genetics (3).** Theories and practical applications of genetics to forestry, including tree selection, hybridization, progeny testing and seed orchard establishment. 5 hrs (2 class, 3 lab). PR. BOT 1 or BIO 1. (2)

**FBS 181. Research Techniques in Forest Biology (3).** Laboratory and field techniques in reproductive biology, propagation, microbial fertilizers and biological control; data collection, processing and analysis. 7 hrs (1 class, 6 lab). PR. COI. (2)

**FBS 185. (or NRC 185) Nature Interpretation (3).** Interpretive techniques for natural resources conservation. 5 hrs (2 class, 3 lab). (1)

**FBS 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**FBS 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2,S)

**FBS 199. Undergraduate Seminar (1).** May be taken twice. (1,2)

#### Forestry

**FOR 1. General Forestry (3).** Forests, forestry and the socio-biophysical system; forest management concepts and principles; role of forestry in sustainable development and conservation of renewable natural resources. 3 hrs (class). (1,2)

**FOR 31. Elementary Forest Protection (3).** Harmful effects of fire, insects and diseases on forests; preventive and remedial control measures. 5 hrs (2 class, 3 lab). PR. FBS 1 and FBS 9. (1,2)

**FOR 110. Introduction to Protected Area Management (3).** Principles and practices in the management of protected areas. 5 hrs (2 class, 3 lab). PR. FBS 21 and FRM 100. (2)

**FOR 195. Research Methods in Forestry and Natural Resources (3).** Methods and approaches in conducting researches in forestry and natural resources including proposal preparation and communicating results. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**FOR 200. Undergraduate Thesis (6).** (1,2,S)

**FOR 200a. Practicum (6).** (1,2,S)

#### Natural Resources Conservation

**NRC 185 (or FBS 185). Nature Interpretation (3).** Interpretive techniques for natural resources conservation. 5 hrs (2 class, 3 lab). (1)

#### Wildlife

**WLDL 105. Principles of Wildlife Management (3).** Interrelationships of wildlife biology, habitat ecology, and

population dynamics as they affect management problems. 3 hrs (class). PR. WLDL 101 or COI. (1)

**WLDL 195. Techniques of Wildlife Management (3).** Field and laboratory method used in wildlife management and research; including identification of signs, population census, food habits, trapping, transplanted, collection and preservation of specimens. 7 hrs (1 class, 6 lab). PR. WLDL 105. (2)

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## DEPARTMENT OF FOREST PRODUCTS AND PAPER SCIENCE

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#### Forest Products and Paper Science

**FPPS 11. Wood Structure and Identification (3).** Gross and microscopic structure of wood; wood identification, natural defects and variations in structure. 7 hrs (1 class, 6 lab). PR. BOT 1. (1,2)

**FPPS 42. Forest Products Utilization 1 (3).** Log and lumber grading; lumber manufacture; utilization of non-timber forest products; seasoning and preservation of wood and non-timber products. 5 hrs (2 class, 3 lab). PR. FPPS 11. (1,2)

**FPPS 43. Forest Products Utilization 2 (3).** Veneer and plywood; pulp and paper; wood composition boards; and wood derivatives and other chemicals from wood and forest plants. 5 hrs (2 class, 3 lab). PR. FPPS 11. (1,2)

**FPPS 111. Wood and Fiber Anatomy (3).** Microscopic identification, variability and anatomical characteristics of wood and paper-making fibers. Wood and non-wood structure in relation to defects, properties and uses. 7 hrs (1 class, 6 lab). PR. BOT 1 or BIO 1. (1)

**FPPS 112. Bark Structure and Properties (3).** Structure and development, properties and uses of the barks of woody plants. 5 hrs (2 class, 3 lab). PR. COI. (1)

**FPPS 119 (or FRM 119). Marketing of Forest Products (3).** Forest products marketing, the structure of forest products market, output and pricing policies and strategic trends. 5 hrs (2 class, 3 lab). PR. ECON 11.

**FPPS 121. Wood Physics 1 (3).** Physical structure and properties of wood in relation to moisture heat, sound, and electricity. 5 hrs (2 class, 3 lab). PR. PHYS 3. (1)

**FPPS 124. Timber Mechanics (3).** Elements of strength of materials; mechanical properties of wood. 5 hrs (2 class, 3 lab). PR. MATH 28 and ENSC 11a. (2)

**FPPS 125. Wooden Structures (3).** Analysis and design of trusses, bridges and frames; bending, compression and tension members with emphasis on wood materials; timber fastenings. 5 hrs (2 class, 3 lab). PR. FPPS 124. (1)

**FPPS 127. Properties and Utilization of Forest Products (3).** Physical, mechanical and chemical properties of wood products; manufacturing processes and sustainable

utilization technologies for wood products. 5 hrs (2 class, 3 lab). PR. CHEM 15 and FPPS 11. (1,2)

**FPPS 128. Non-Timber Forest Products (3).** Properties, processing and utilization of non-timber forest products. 5 hrs (2 class, 3 lab). PR. FBS 21 and FPPS 127. (1,2)

**FPPS 131. Wood Chemistry 1 (3).** Chemistry of wood; pulping and paper-making principles; cellulose-derived products. 5 hrs (2 class, 3 lab). PR. CHEM 40. (1)

**FPPS 132. Pulp and Paper Technology (3).** Chemical and technological aspects of the manufacture of mechanical and chemical pulps, paper and paper products. 3 hrs (class). PR. COI. (2)

**FPPS 132.1 Pulp and Paper Laboratory (2).** Laboratory experiments on the pulping wood; fiber technology, physical and chemical characteristics of pulp and paper. 6 hrs (lab) PR. FPPS 132 or COI. (2)

**FPPS 134. Wood Finishing (3).** Modern industrial methods and techniques in finishing wood products. 5 hrs (2 class, 3 lab). PR. COI. (1)

**FPPS 136. Chemical Properties and Processing of Forest Products (3).** Chemical and technological aspect of the manufacture of pulp, paper, paperboard and fiber products and other cellulose-derived products; chemical processing of extractives and other forest products. 5 hrs (2 class, 3 lab). PR. CHEM 40. (1,2)

**FPPS 139. Fundamentals of Wet-End Chemistry in Paper Making (3).** The paper making fiber and its behavior during paper making; theories and principles of paper chemistry; additives used in paper making. 5 hrs (2 class, 3 lab). PR. FPPS 132. (1)

**FPPS 140. Environmental Pollution in Forest Industries (3).** Causes and control of pollution associated with the primary wood processing industries. 3 hrs (class). PR. COI. (2)

**FPPS 141. Lumber Manufacture and Grading (3).** Sawmills, sawmilling practices and techniques; log and lumber grading. 5 hrs (2 class, 3 lab). PR. FPPS 11. (1,2,S)

**FPPS 144. Machining of Forest Products (3).** Analysis of wood-cutting processes, operation adjustment, and maintenance of machineries for wood working processing of bamboos, rattan and other related materials. 5 hrs (2 class, 3 lab). PR. COI. (2)

**FPPS 151. Seasoning of Wood and Related Products (3).** Theory and practice of kiln drying and other methods of seasoning wood and related products. 5 hrs (2 class, 3 lab). PR. PHYS 1 or PHYS 3. (2)

**FPPS 152 (or SFFG 151). Forest-Based Rural Industries (3).** Nature, type, characteristics of forest resource-based rural industries; role in promoting social forestry; strategies to promote their development. 3 hrs (class) PR. FRM 117 or COI. (2)

**FPPS 161. Preservation of Wood and Related Products (3).** Common factors causing the destruction and decay

of wood and related products; methods of preservation and control; fire proofing, and the economic aspects of preservation of wood and related products. 5 hrs (2 class, 3 lab). PR. COI. (2)

**FPPS 171. Adhesives and Gluing (3).** Theory of adhesion and cohesion. Glues and synthetic resin adhesives. Principles in cold pressing, hot pressing, radio frequency heating, lamination and modified woods. Gluing defects and their causes. 5 hrs (2 class, 3 lab). PR. CHEM 40. (1)

**FPPS 172. Glued Wood Products Technology (3).** Manufacture of veneer, plywood, laminated wood and related products, principles of glued wood construction, properties, characteristics, and uses of glued products. 5 hrs (2 class, 3 lab). PR. COI. (2)

**FPPS 181. Quality Control (3).** Principles of statistical quality control and organization of quality control programs in the manufacture of wood products. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**FPPS 182. Production Planning and Control (3).** Planning of production requirements, routing, scheduling, dispatching and inspection coordination; control of materials, methods, machines, tooling and operation times. 5 hrs (2 class, 3 lab). PR. COI. (2)

**FPPS 183. Engineering Economic Analysis (3).** Economics of engineering decisions. Depreciation and cost estimating, analysis of existing and proposed plans, including materials, products design, and machine selection and replacement. 5 hrs (2 class, 3 comp). PR. COI. (1,2)

**FPPS 190. Special Problems (1-3).** Open only to students who are candidates for graduation. 1 semester; 6 hrs (lab). May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**FPPS 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**FPPS 199. Undergraduate Seminar (1).** May be taken twice. (1,2)

## Forestry

**FOR 1. General Forestry (3).** Forests, forestry and the socio-biophysical system; forest management concepts and principles; role of forestry in sustainable development and conservation of renewable natural resources. 3 hrs (class). (1,2)

**FOR 195. Research Methods in Forestry and Natural Resources (3).** Methods and approaches in conducting researches in forestry and natural resources including proposal preparation and communicating results. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**FOR 200. Undergraduate Thesis (6).** (1,2,S)

**FOR 200a. Practicum (6).** (1,2,S)

### Pulp and Paper Technology

**PPT 170. Instrumentation and Process Control for the Pulp and Paper Industry (3).** Principles and methods of control system analysis and design as applied to the pulp and paper industry. 3 hrs (class). PR. EE 1, ENSC 21 and FPPS 132. (1)

**PPT 188. Environmental Technology for the Pulp and Paper Industry (3).** Causes and control of pollution associated with the pulp and paper industry and methods for effluent treatment. 3 hrs (class). PR. FPPS 132 or COI. (1)

**PPT 193. Pulp and Paper Plant Design (3).** Computations of material balances, energy balances, power requirement, equipment balancing, cost and profitability estimation. 5 hrs (2 class, 3 comp). PR. ChE 32, ChE 41 and ChE 165. (2)

**PPT 199. Undergraduate Seminar (1).** 1 hr (class). PR. Senior standing. (1,2)

**PPT 200. Undergraduate Thesis (6).** (1,2,S)

**PPT 200a. Practicum (6).** (1,2,S)

## DEPARTMENT OF SOCIAL FORESTRY AND FOREST GOVERNANCE

### Forestry

**FOR 1. General Forestry (3).** Forests, forestry and the socio-biophysical system; forest management concepts and principles; role of forestry in sustainable development and conservation of renewable natural resources. 3 hrs (class). (1,2)

**FOR 110. Introduction to Protected Area Management (3).** Principles and practices in the management of protected areas. 5 hrs (2 class, 3 lab). PR. FRM 100 and FBS 21. (2)

**FOR 195. Research Methods in Forestry and Natural Resources (3).** Methods and approaches in conducting researches in forestry and natural resources including proposal preparation and communicating results. 5 hrs (2 class, 3 lab). PR. STAT 1. (1,2)

**FOR 200. Undergraduate Thesis (6).** (1,2,S)

**FOR 200a. Practicum (6).** (1,2,S)

### Social Forestry and Forest Governance

**SFFG 20. Communication Skills for Forestry Technicians (3).** Introduction to the basic skills and tools in communication to promote participatory forestry development. 3 hrs (class). (1)

**SFFG 80. Forest Community Development (2).** Theories, concepts, strategies and tools for the development of forest communities. 2 hrs (class). PR. SFFG 20. (2)

**SFFG 80.1. Forest Community Development Laboratory (3).** Application of theories, concepts, strategies and tools for the development of forest communities. 9 hrs (field). PR. SFFG 80. (S)

**SFFG 101. Principles and Concepts of Social Forestry (3).** Rationale for and approaches in Social Forestry and its application for local community development. 3 hrs (class). PR. FOR 1 or COI. (1,2)

**SFFG 111. Forest Conservation (3).** Approaches to forest conservation; socio-cultural economic factors affecting it. 3 hrs (class). (1,2)

**SFFG 112. Program Planning (3).** Formulation of programs of public forestry education for the use of extension agents and adult education workers. 3 hrs (class). PR. COI. (1,S)

**SFFG 113. Forestry Extension (3).** Theories and practices in extension education as applied to forestry; analysis of forestry extension programs in the Philippines. 3 hrs (class). PR. COI. (1,2)

**SFFG 120. Environmental and Natural Resource Worldviews (3).** Introduction to the philosophical dimensions of human-habitat relationships; Western, Oriental, and indigenous Filipino worldviews about the environment and forests; and political-economic dimensions of environmentalism within the realities of Philippine society. 3 hrs (class). PR. SFFG 101 or COI. (1,2)

**SFFG 123. Forest Policy and Institutions (3).** Study of policies and institutions involved in forest management and development in the Philippines. 3 hrs (class). PR. COI. (1,2)

**SFFG 125. Political Economy and Administration of Forestry Development (3).** Philosophy, concepts, theories, processes, and ethics; policies and institutions involved in the interactions between the state and forestry development. 3 hrs (2 class, 3 lab). PR. ECON 11 and SFFG 101 or COI. (1,2)

**SFFG 133. Socio-Economics of Agroforestry (3).** Socio-economic principles underlying the management of agro-forestry establishments. 5 hrs (2 class, 3 lab). PR. SFFG 101 and ECON 11 or COI. (1)

**SFFG 141. Formal Organizations in Social Forestry (3).** Formal forestry organizations implementing social forestry programs in the Philippines and in other tropical countries; approaches to organizational design and change, its application to social forestry. 3 hrs (class). PR. COI. (1)

**SFFG 149. Gender Analysis and Planning (3).** Gender analysis and planning methods; implications for national development with emphasis on agriculture, forestry and natural resources. 3 hrs (class). PR. SFFG 101 or COI. (1,2)

**SFFG 150. Production and Conservation Technologies in Social Forestry (3).** Concept; identification, characterization, applicability, analysis and practical evaluation of appropriate production and conservation technologies in social forestry. 3 hrs (class). PR. SFFG 101 or COI. (1,2)

**SFFG 151 (or FPPS 152). Forest-Based Rural Industries (3).** Nature, type, characteristics of forestry resource-based rural industries; role in promoting social forestry; strategies to promote their development. 3 hrs (class). PR. FRM 117 or COI. (2)

**SFFG 152. Sociology of Natural Resources (3).** Relationship between social structure and natural resources; application of sociological theories and findings to problems of natural resource development. 3 hrs (class). PR. COI. (1,2)

**SFFG 155. Social Equity Issues in Social Forestry (3).** Social equity issues in forestry with emphasis on social structure, land tenure, and gender. 3 hrs (class). PR. SFFG 152 or COI. (2)

**SFFG 163. Anthropological Concepts for Social Forestry (3).** Application of anthropological concepts to an understanding of ethnic groups in relation to forestry. 3 hrs (class). PR. SFFG 101 or COI. (1,S)

**SFFG 182. Rural Institutions for Forestry and Natural Resource Development (3).** Concepts and processes of institution building in forest communities with emphasis on the dynamic role of institutions in participatory forest and natural resources management. 3 hrs (class). PR. SFFG 101 or COI. (1,2)

**SFFG 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. 3 hrs (class). PR. ENG 10 or COI. (1,2,S)

**SFFG 191. Special Topics (2-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**SFFG 197. Anthropological Research Methods in Forestry and other Natural Resources Development (3).** Anthropological research methods and techniques relevant to the concerns of forestry and other natural resources development, with special emphasis on the study of culture-environment interactions. 5 hrs (2 class, 3 lab). PR. SFFG 163 or COI. (2)

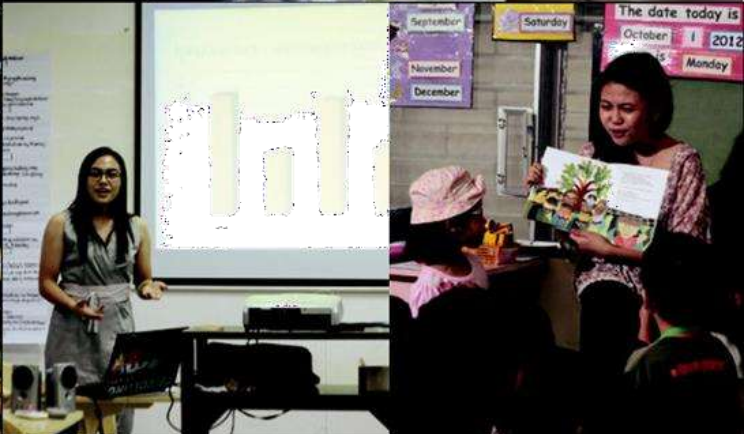
**SFFG 199. Undergraduate Seminar (1).** May be taken twice. PR. COI. (1,2)





College of Human Ecology

University of the Philippines  
Los Baños



# COLLEGE OF HUMAN ECOLOGY

Raden G. Piadozo, *Dean*  
Ma. Emilinda T. Mendoza, *Associate Dean*  
Wilma A. Hurtada, *College Secretary*  
Efraim D. Roxas, *Chair, Department of Community and Environmental Resource Planning*  
Ria D. Sanchez, *Chair, Department of Human and Family Development Studies*  
Carla Edith G. Jimena, *Chair, Department of Social Development Services*  
Normahitta P. Gordoncillo, *Director, Institute of Human Nutrition and Food*

## OBJECTIVES

The College aims to:

1. provide an ecologically oriented unit in UPLB which focuses on identification of enabling mechanisms for the fulfillment of basic human needs, resource planning utilization and management, and delivery of social services at the family and community levels; and
2. develop programs for research, training, and community service towards a desirable quality of life.

## UNDERGRADUATE PROGRAMS

### Bachelor of Science in Human Ecology

The program aims to produce professionals who can contribute to the improvement of human welfare. Specifically, the student is trained to understand human development in relation to the biophysical and social environments; to have the necessary skills and

competencies to participate in development programs as well as teaching and research on human-environment interaction; and to internalize and apply the ecological perspective to society's problems.

The program has three major options:

- (a) Family Development - focuses on the development of the individuals and families as they transact, relate and adapt to the environment over the lifespan.
- (b) Human Settlements Planning - focuses on design and implementation of plans which will ensure the long-term sustainability of community and environmental resources while providing optimum development benefits to rural and urban communities.
- (c) Social Technology - focuses on the various social development services and is concerned with the tools and techniques of effecting self-propelling communities and sustainable development.

### Bachelor of Science in Nutrition

This program aims to produce professionals competent in providing nutritional services to people. Specifically, the student will be trained to: (a) manage community nutrition programs; (b) assist in planning and evaluation of food and nutrition programs at macrolevels; (c) operate food service in institutions and communities; (d) plan and prepare therapeutic diets; (e) train nutrition workers, and (f) conduct research in nutrition and related fields.





**BACHELOR OF SCIENCE IN HUMAN ECOLOGY\***

| <i>First Semester</i>                                 | <i>Units</i> | <i>Second Semester</i>                              | <i>Units</i> |
|---|--------------|---|--------------|
| <i>FIRST YEAR</i>                                     |              |   |              |
| BIO 1, General Biology                                | 3            | BIO 2, General Biology II                           | 3            |
| ENG 1 (AH), College English                           | 3            | CHEM 15, Fundamentals of Chemistry                  | 3            |
| HUME 1, Introduction to Human Ecology                 | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory     | 2            |
| HFDS 21, Family and Society                           | 3            | ENG 2 (AH), College Writing in English              | 3            |
| MATH 11, College Algebra                              | 3            | SDS 10, Introduction to Social Development          | 3            |
| HIST 1 (SSP), Philippine History                      | 3            | HUME 2, Humans and Their Environment                | 3            |
| PE 1, Foundations of Physical Fitness                 | <u>(2)</u>   | CERP 31, Fundamentals of Human Settlements          | 3            |
|   | 18           | PE 2 or 3, Basic or Advanced Course                 | <u>(2)</u>   |
|   |              |   | 20           |
| <i>SECOND YEAR</i>                                    |              |   |              |
| BIO 150, Principles of Ecology                        | 3            | CERP 11, Material & Energy Flows                    | 3            |
| MATH 14, Plane Trigonometry                           | 3            | ECON 11, General Economics                          | 3            |
| SPCM 1 (AH), Speech Communication                     | 3            | SOC 140, Introduction to Demography                 | 3            |
| G.E. (MST)  | 3            | STAT 1, Elementary Statistics                       | 3            |
| HFDS 11, Principles of Human Development              | 3            | G.E.(SSP)   | 3            |
| HUME 101, Human Ecological Perspective in Development | 3            | HNF 151, Food and Nutrition Systems                 | 3            |
| PHYS 1, Introductory Physics                          | 3            | HUME 102, Ecology and Value Systems                 | 3            |
| PE 2 or 3, Basic or Advanced Course                   | <u>(2)</u>   | PE 2 or 3, Basic or Advanced Course                 | <u>(2)</u>   |
| NSTP 1, National Service Training Program I           | <u>(3)</u>   | NSTP 2, National Service Training Program II        | <u>(3)</u>   |
|   | 21           |   | 21           |
| <i>THIRD YEAR</i>                                     |              |   |              |
| G.E. (AH)   | 3            | ENTR 1 (SSP), Unleashing the Entrepreneurial Spirit | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal         | 3            | G.E. (AH)   | 3            |
| G.E. (MST)  | 3            | CERP 21, Environmental Health                       | 3            |
| HUME 196, Research Methods in Human Ecology           | 3            | SDS 11, Community Study in Human Welfare            | 3            |
| HUME 103, Social Policies                             | 3            | Major   | 3            |
| Major   | 3            | Major   | 3            |
| Major   | <u>3</u>     | Major   | <u>3</u>     |
|   | 21           |   | 21           |
| <i>FOURTH YEAR</i>                                    |              |   |              |
| G.E. (SSP)  | 3            | Major   | 3            |
| G.E. (MST)  | 3            | Major   | 3            |
| Major   | 3            | Major   | 6            |
| Major   | 3            | Major   | <u>1</u>     |
| Major   | 3            |   | 13           |
| Major   | 1            |   |              |
| Elective  | <u>3</u>     |   |              |
|   | 19           |   |              |
| <b>TOTAL NUMBER OF UNITS ..... 154</b>                |              |   |              |

\* Depending on the major: Family Development(HS/PS Teaching, Non-teaching), Social Technology, Human Settlements Planning



**BACHELOR OF SCIENCE IN NUTRITION\***

| <b>First Semester</b>                               | <b>Units</b> | <b>Second Semester</b>                          | <b>Units</b> |
|---|--------------|---|--------------|
| <b>FIRST YEAR</b>                                   |              |   |              |
| BIO 1, General Biology I                            | 3            | BIO 2, General Biology II                       | 3            |
| PI 10 (SSP), The Life and Works of Jose Rizal       | 3            | CHEM 15, Fundamentals of Chemistry              | 3            |
| ENG 1 (AH), College English                         | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory | 2            |
| HIST 1 (SSP), Philippine History                    | 3            | ECON 11, General Economics                      | 3            |
| HUME 1, Introduction to Human Ecology               | 3            | ENG 2 (AH), College Writing in English          | 3            |
| MATH 11, College Algebra                            | 3            | IT 1 (MST), Information Technology Literacy     | 3            |
| PE 1, Foundations of Physical Fitness               | <u>(2)</u>   | MATH 14, Plane Trigonometry                     | 3            |
|   | 18           | PE 2 or 3, Basic or Advanced Course             | <u>(2)</u>   |
|   |              |   | 20           |
| <b>SECOND YEAR</b>                                  |              |   |              |
| CHEM 40, Basic Organic Chemistry                    | 3            | CHEM 160, General Biochemistry                  | 3            |
| CHEM 40.1, Basic Organic Chemistry Laboratory       | 1            | HNF 61, Fundamentals of Health Care             | 3            |
| SPCM 1 (AH), Speech Communication                   | 3            | MCB 1, General Microbiology                     | 3            |
| AGRI 11, Fundamentals of Agriculture                | 1            | G.E. (AH)                                       | 3            |
| HFDS 12, Human Physiology                           | 3            | HNF 11, Food Selection and Preparation          | 4            |
| ENTR 1 (SSP), Unleashing the Entrepreneurial Spirit | 3            | MGT 101, Concepts and Dynamics of Management    | 3            |
| PHYS 1, Introductory Physics                        | 3            | PE 2 or 3, Basic or Advanced Course             | (2)          |
| G.E. (MST)  | 3            | NSTP 2, National Service Training Program I     | <u>(3)</u>   |
| PE 2 or 3, Basic or Advanced Course                 | (2)          |   | 19           |
| NSTP 1, National Service Training Program I         | <u>(3)</u>   |   |              |
|   | 20           |   |              |
| <b>THIRD YEAR</b>                                   |              |   |              |
| G.E. (AH)   | 3            | ENG 10, Writing of Scientific Papers            | 3            |
| HNF 12, Food Preservation                           | 3            | HNF 123, Nutritional Assessment                 | 3            |
| MGT 111, Principles of Accounting                   | 3            | HNF 22, Nutrition in Human Development          | 3            |
| HNF 21, Food and Nutrition                          | 4            | HNF 41, Medical Nutrition Therapy I             | 4            |
| HNF 111, Food Management                            | 4            | HNF 131, Food Service System I                  | 3            |
| STAT 1, Elementary Statistics                       | 3            | G.E. (SSP)                                      | <u>3</u>     |
| G.E. (MST)  | <u>3</u>     |   | 19           |
|   | 23           |   |              |
| <b>FOURTH YEAR</b>                                  |              |   |              |
| HNF 124, Nutrition Education                        | 3            | HNF 198, Field Practice                         | 12           |
| HNF 42, Medical Nutrition Therapy II                | 4            |   |              |
| HNF 125, Public Health Nutrition                    | 3            |   |              |
| HNF 132, Food Service System II                     | 3            |   |              |
| HNF 152, Food and Nutrition Research                | 3            |   |              |
| G.E. (SSP)  | <u>3</u>     |   |              |
|   | 19           |   |              |

**TOTAL NUMBER OF UNITS ..... 150**

\* A three (3) unit GE course on Philippine studies will be chosen by the student from qualified GE courses in any of the three domains.

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## C O U R S E S

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### INSTITUTE OF HUMAN NUTRITION AND FOOD

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#### Human Nutrition and Food

##### **HNF 11. Food Selection and Preparation (4).**

Principles, underlying selection, storage and preparation of food with emphasis on local food materials. 8 hrs (2 class, 6 lab). PR. AGRI 11 and CHEM 15 and CHEM 15.1. (2)

**HNF 12. Food Preservation (3).** Principles and methods of processing food at home and community levels, and the relationships to physio-chemical properties of food. 5 hrs (2 class, 3 lab). PR. MCB 1 and HNF 11. (2)

**HNF 21. Food and Nutrition (4).** The course deals with the fundamentals of nutrition science as they relate to human life and growth. It includes the study of nutrients - their nature, functions, interrelationships, utilization and metabolism in the body, the food sources, requirements, deficiencies and toxicities. It also introduces the concepts on nutritional assessment and tools in nutrition. 6 hrs (3 class, 3 lab). PR. CHEM 160, HNF 61 and HNF 11. (1,2)

**HNF 22. Nutrition in Human Development (3).** Nutritional needs during growth, reproduction and old age; emphasis on maternal and child nutrition. 5 hrs (2 class, 3 lab). PR. HNF 21 or COI. (1)

**HNF 41 . Medical Nutrition Therapy I ( 4 ) .** Principles underlying medical nutrition therapy and their applications to various nutritional states. 6 hrs (3 class, 3 lab). PR. HNF 21. (2)

**HNF 42. Medical Nutrition Therapy II (4).** Principles underlying medical nutrition therapy and their applications to various disease conditions such as degenerative and metabolic disorders. 6 hrs (3 class, 3 lab). PR. HNF 41. (1)

**HNF 61. Fundamentals of Health Care (3).** Principles in managing health care of individuals and families as well as concepts in health care system and health economics. 3 hrs (class). PR. HFDS 12. (1,2)

**HNF 111. Food Management (4).** Nutritional, economic, social, cultural and aesthetic aspects of food management. 8 hrs (2 class, 6 lab). PR. HNF 11. (1)

**HNF 121. Advanced Human Nutrition (3).** Physiological and chemical bases of human nutritional needs. 3 hrs (class). PR. COI. (1)

**HNF 123. Nutritional Assessment (3).** Principles involved in the evaluation of nutritional status of population groups. 5 hrs (2 class, 3 lab). PR. HNF 21. (1,2)

**HNF 124. Nutrition Education (3).** Principles, approaches and methods in teaching nutrition; designing, testing and evaluating nutrition education materials and programs. 5 hrs (2 class, 3 lab). PR. HNF 123 and HNF 22. (1)

**HNF 125. Public Health Nutrition (3).** Principles and theories of public health nutrition as applied to the management of community nutrition and health programs. 5 hrs (2 class, 3 lab). PR. HNF 123. (1)

**HNF 131. Food Service System I (3).** Principles and techniques in the management of food service operations in various settings. 5 hrs (2 class, 3 lab). PR. HNF 111 or COI. (1)

**HNF 132. Food Service System II (3).** Analysis of the food service operations through feasibility studies and practicum. 7 hrs (1 class, 6 lab). PR. HNF 131, MGT 101 and MGT 111. (2)

**HNF 152. Food and Nutrition Research (3).** Food and nutrition research methodologies and their applications. 5 hrs (2 class, 3 lab). PR. ENG 10 and STAT 1. (1,2)

**HNF 198. Field Practice (12).** PR. COI. (1,2)

**HNF 199. Undergraduate Seminar (1).** The seminar will deal with the principles of ethics, professionalism and leadership as applied to the practice of the Nutrition and Dietetics. 1 hr (class). PR. COI. (1,2)

#### Natural Science

**NASC 6 (MST). Food and Nutrition for a Healthy Life (3).** The interrelationship of food, nutrition and health. 3 hrs (class). (1,2)

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### DEPARTMENT OF HUMAN AND FAMILY DEVELOPMENT STUDIES

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#### Human and Family Development Studies

**HFDS 11. Principles of Human Development (3).** Processes and factors affecting human development; functional synthesis of principles of development. 3 hrs (class). PR. BIO 2 or BIO 3. (1,2)

**HFDS 12. Human Physiology (3).** Fundamentals of physiology of man. 3 hrs (class). PR. BIO 2 or BIO 3. (1,2)

**HFDS 13. Child Psychology (3).** Behavior patterns and personality of the child in relation to the processes of development. 3 hrs (class). PR. HFDS 11. (2)

**HFDS 14. Child Development Programs (3).** Application of principles of development to children from 2 to 12 years; observation and participation in programs for children. 7 hrs (1 class, 6 lab). PR. HFDS 11. (1)

**HFDS 21. Family and Society (3).** The family in relation to individual members, society and institutions; include structural patterns, relations and formation. 3 hrs (class). (1,2)

**HFDS 22. Family Relationships (3).** Dimensions and processes of interaction at the inter-personal and family levels. 3 hrs (class). PR. HFDS 21. (1)

**HFDS 31. Family and Community Resource Management I (3).** Theories of decision-making and management of resources of the family and the community. 3 hrs (class). PR. ECON 11. (1)

**HFDS 41. Fundamentals of Design (3).** Elements and principles of design; interplay of people, materials and processes in the evaluation, selection and creation of the immediate man-made environment. 5 hrs (2 class, 3 lab). (2)

**HFDS 43. Craft Design (3).** Analysis of materials, methods, and articles as basis for craft designing, with emphasis on the use of local materials. 7 hrs (1 class, 6 lab). PR. HFDS 41. (1)

**HFDS 44. Housing (3).** Perspectives in housing, geographic, socio-cultural and structural factors considered; emphasis on contemporary housing needs of families and groups. 3 hrs (class). PR. CERP 31. (2)

**HFDS 51. Clothing Resource (3).** Clothing and textile resource in various parts of the world and their uses for man in various settings. 5 hrs (2 class, 3 lab). PR. HFDS 41 or COI. (1)

**HFDS 52. Basic Clothing Design (3).** Aesthetic, functional and economic factors related to design and construction of clothing. 7 hrs (1 class, 6 lab). PR. HFDS 41. (1)

**HFDS 111. Personality Theory (3).** Theories and approaches in understanding personality development; major methods in personality research. 3 hrs (class). PR. COI. (1)

**HFDS 112. Behavior Change (3).** Analysis of human behavior; understanding basic psychological processes and techniques in behavior change and modification. 3 hrs (class). PR. COI (1)

**HFDS 113. The Adolescent (3).** Developmental characteristics of adolescents, with emphasis on typical behavior patterns. 3 hrs (class). PR. HFDS 11. (2)

**HFDS 114. Adulthood and Aging (3).** Developmental characteristics of adulthood and aging related to biological, psychological, socio-cultural and economic factors; current issues on aging and their implications to program and policy formulation. 3 hrs (class). PR. HFDS 11 or COI. (2)

**HFDS 121. Human Sexuality (3).** Nature of human sexuality; physiological, social and historical perspectives of contraception. 3 hrs (class). PR. COI. (2)

**HFDS 122. Migration (3).** Theories of migration, determinants, problems and adjustments; implications for development. 3 hrs (class). PR. SOC 140. (2)

**HFDS 152. Advanced Clothing Design (3).** Problems of design involving interrelationships of fabric behavior, construction, techniques and the human figure. 7 hrs (1 class, 6 lab). PR. COI. (2)

**HFDS 156. Textile Evaluation (3).** Physical and chemical analysis of fabrics and finishes. 5 hrs (2 class, 3 lab). PR. COI. (2)

**HFDS 162. The Preschool Curriculum (3).** Strategies in curriculum development for preschoolers applicable to formal and nonformal settings. 3 hrs (class). PR. HFDS 13. (2)

**HFDS 200. Undergraduate Thesis (6).** (1,2,S)

## Human Ecology

**HUME 1. Introduction to Human Ecology (3).** Nature, scope and development of human ecology. 3 hrs (class). (1,2)

**HUME 10(SSP). Sexuality in Adolescence (3).** The dynamics of sexuality in adolescent development. 3 hrs (class). PR. None. (1,2)

**HUME 102. Ecology and Value Systems (3).** Analysis of value orientations of man and societal groups; their role in dealing with the environment, resources, other human groups, and institutions. 3 hrs (class). PR. HUME 2 and BIO 150. (1,2)

**HUME 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**HUME 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**HUME 198. Supervised Field Experience (6).** Participation in on-going development programs; case study. 300 hrs field work. PR. COI. (1,2,S)

**HUME 199a and 199b. Seminar in Human Ecology (1).** Review and discussion of current issues in human ecology and related fields. 1 hr (class). PR. COI. (1,2)

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## DEPARTMENT OF COMMUNITY AND ENVIRONMENTAL RESOURCE PLANNING

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### Community and Environmental Resource Planning

**CERP 11. Material and Energy Flows (3).** Matter and energy forms and transformation; thermodynamic principles; material cycle; and energy flows; man's role in material and energy production; recycling. 3 hrs (class). PR. CHEM 15 and PHYS 1 or COI. (1,2)

**CERP 21. Environmental Health (3).** Nature of environmental hazards including pollution and human wastes; effects on human functioning and means of minimizing such effects. 3 hrs (class). PR. HUME 2 or COI. (1,2)

**CERP 31. Fundamentals of Human Settlements (3).** Types, elements and functions of human settlements; dimensions for planning. 3 hrs (class). PR. HUME 1 or COI. (1,2)

**CERP 122. Conservation of Natural Resources (3).** Principles and practices in the use and conservation of natural resources. 3 hrs (class). PR. BIO 150 or COI. (2)

**CERP 131. Planning Theory and Practice (3).** Planning theories, process and dimensions and their contextual applications. 3 hrs (class). PR. HUME 101 or COI. (2)

**CERP 132. Land Use Planning for Human Settlements (3).** Concepts and techniques of spatial analysis and site planning for human settlements. 3 hrs (class). PR. CERP 131. (1)

**CERP 133. Human Settlements Planning I (3).** Techniques in the planning of human settlements. 5 hrs (2 class, 3 lab). PR. CERP 131 and HUME 196. (1,2)

**CERP 134. Human Settlements Planning II (3).** Casework-based planning of human settlements. 7 hrs (1 class, 6 lab). PR. CERP 133. (1,2)

**CERP 140. Fundamentals of Environmental Economics (3).** Economic concepts and techniques applied to environmental studies. 3 hrs (class). PR. ECON 11 and HUME 101 or COI. (1)

**CERP 152. Environmental Project Planning and Administration (3).** Elements and approaches in formulating and administering environmental projects. 3 hrs (class). PR. HUME 103 and CERP 140 or COI. (2)

**CERP 200. Undergraduate Thesis (6).** (1,2,S)

### Human Ecology

**HUME 1. Introduction to Human Ecology (3).** Nature, scope and development of human ecology. 3 hrs (class). (1)

**HUME 2. Humans and Their Environment (3).** Interrelationship of man with the earth, climate, land forms and water; contemporary ecological problems encompassing physical, biological, social and ethical dimensions; implication to man's well-being and behavior. 3 hrs (class). PR. HUME 1. (1,2)

**HUME 101. Human Ecological Perspectives in Development (3).** Concepts, philosophy and resources of development in human ecosystems; generation of alternative models of development based on human ecological problems and perspective. 3 hrs (class). PR. HUME 2 or COI. (1)

**HUME 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**HUME 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**HUME 196. Research Methods in Human Ecology (3).** Concepts and dynamics of interdisciplinary studies; formulation of research designs in human ecology. 3 hrs (class). PR. STAT 1. (1)

**HUME 198. Supervised Field Experience (6).** Participation in on-going development programs; case study. 300 hrs field work. PR. COI. (1,2,S)

**HUME 199a and 199b. Seminar in Human Ecology (1).** Review and discussion of current issues in human ecology and related fields. 1 hr (class). PR. COI. (1,2)

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## DEPARTMENT OF SOCIAL DEVELOPMENT SERVICES

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### Social Development Services

**SDS 10. Introduction to Social Development (3).** History, perspectives, trends, approaches, and contemporary issues and problems of social development. 3 hrs (class). PR. HUME 1. (2)



**SDS 11. Community Study in Human Welfare (3).** Analysis of communities as to social and physical structures, functions, resources, technology, and levels of living; implications on community and human welfare. 5 hrs (2 class, 3 lab). PR. SDS 10 and STAT 1. (2)

**SDS 30. Design and Management of Training Programs (3).** Concepts and principles, formulation, implementation and evaluation of training programs. 5 hrs (2 class, 3 lab). PR. SDS 10. (1)

**SDS 31. Community Services and Programs (3).** Services and programs designed to assist the development of the community; analysis of approaches and techniques for bringing about development. 5 hrs (2 class, 3 lab). PR. SDS 11. (1)

**SDS 32. Consumer Education (3).** Problems on safety, labelling, and advertising of goods as these relate to the consumer in the market; the effects of social and economic policies on consumer behavior and human welfare. 3 hrs (class). PR. ECON 11. (1)

**SDS 113. Filipino Values and Social Development (3).** Nature and concepts of values; approaches to values development; application of Filipino values in the management of social development programs. 3 hrs (class). PR. SDS 10 or COI. (2)

**SDS 120. Techniques in Community Organizing (3).** Techniques and practices in organizing human-centered development groups. 7 hrs (1 class, 6 lab). PR. SDS 10 or AERS 154. (1)

**SDS 131. Adult Programs in Social Development (3).** Organization and management of adult programs towards social development with emphasis on extension work, teaching methods and experiences for successful

adult learning and in working with adults. 3 hrs (class). PR. SDS 10. (2)

**SDS 168. Social Impact Assessment (3).** Principles and methods in the assessment of the social impacts of planned interventions on human ecological systems. 3 hrs (class). PR. SDS 10 or SOC 10. (1)

**SDS 200. Undergraduate Thesis (6).** (1,2,S)

## Human Ecology

**HUME 1. Introduction to Human Ecology (3).** Nature, scope and development of human ecology. 3 hrs (class). (1,2)

**HUME 103. Social Policies (3).** Social and resource policies based on analysis of problems and approaches; introduction to cost-benefits in human, social and economic terms. 3 hrs (class). PR. COI. (1)

**HUME 190. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**HUME 191. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**HUME 198. Supervised Field Experience (6).** Participation in on-going development programs; case study. 300 hrs field work. PR. COI. (1,2,S)

**HUME 199a and 199b. Seminar in Human Ecology (1).** Review and discussion of current issues in human ecology and related fields. 1 hr (class). PR. COI. (1,2)





College of Public Affairs

University of the Philippines  
Los Baños





# COLLEGE OF PUBLIC AFFAIRS AND DEVELOPMENT

Virginia R. Cardenas, *Dean*  
Vella A. Atienza, *Assistant to the Dean*  
Jaine C. Reyes, *Head, Knowledge Management Office*  
Rowena DT. Baconguis, *Director, Institute for Governance and Rural Development*  
Blanquita R. Pantoja, *Director, Community Innovations Studies Center*  
Merlyne M. Paunlagui, *Director, Center for Strategic Planning and Policy Studies*

## Brief History

From its creation in 1998, the then College of Public Affairs (CPAf) has made its mark in development and governance studies. Through the years, CPAf has produced a significant number of graduates and a body of knowledge along institutional, policy, and governance issues in the rural sector, in general, and in the agriculture and natural resources sectors, in particular.

Under a new name and a strong, dynamic “one-college-one-faculty” structure that helps strengthen and sustain its established innovations, the College of Public Affairs and Development now aims to offer more relevant academic programs on development and governance studies.

## Vision and Mission

Vision: “To be an academic institution with distinctive excellence in development studies and governance in support of national development goals in the agriculture and rural sector and communities in transition”

Mission: “By means of transdisciplinary approaches, CPAf shall develop human and institutional capacities in the areas of local development policy, governance, and community development consistent with our values and traditions while taking into account the demands of globalization.”

## Academic and Research Units

CPAf is composed of an academic institute and two research centers. The Institute for Governance and Rural Development offers the curricular programs of CPAf, including undergraduate service courses in agrarian studies and education. The Community Innovations Studies Center and Center for Strategic Planning and Policy Studies conduct research and extension programs and policy studies.

## Academic Programs

### Master in Public Affairs

The Master in Public Affairs program intends to train practitioners serving government and non-government institutions as well as scholars dedicated to the analysis of public issues, particularly as they relate to the improvement of public welfare.

It is a non-thesis program but students are required

to complete a minimum total of 31 units of graduate level courses: 13-unit core courses, minimum of 12-unit specialization courses, 2-unit special topics, 1-unit seminar, and 3-unit field study.

CPAf offers three areas of specialization under this program: 1) Agrarian and Rural Development Studies; 2) Education Management; and 3) Strategic Planning and Public Policy.

### Master of Science in Development Management and Governance

The Master in Development Management and Governance (DMG) and Master of Science in DMG programs seek to develop competencies and proficiencies required for new governance and development managers and leaders.

The MDMG program requires a minimum of 31 units: minimum of 15-unit prescribed courses, minimum of 9-unit major courses, minimum of 3-unit elective courses, 1-unit seminar, and 3-unit field study. Meanwhile, the MS DMG program requires a minimum of 38 units: minimum of 19-unit prescribed courses, minimum of 9-unit major courses, minimum of 3-unit elective courses, 1-unit seminar, and 6-unit thesis.

Four areas of specialization are offered under these programs: 1) Organizational and Institutional Development; 2) Program Management; 3) Local Governance and Development; and 4) Governance of Microfinance and Microinsurance Institutions.

### Master of Science and Doctor of Philosophy

The MS program has four components with a minimum total of 37 units: minimum of 12-unit core courses, minimum of 10-unit research specialization courses, minimum of 9-unit cognate courses, and 6-unit thesis.

Similarly, the PhD program has four components but requires a minimum total of 45 units: minimum of 14-unit core courses, minimum of 10-unit research specialization courses, minimum of 9-unit cognate courses (for single cognate and 12 units for double cognates with a minimum of 6 units taken from each cognate field), and 12-unit dissertation.

**Agricultural Education.** The MS and PhD in Agricultural Education programs emphasize the historical and critical analysis of managerial, curriculum, and instructional strategies and techniques of formal educational systems. These programs prepare teachers and education development practitioners to be leaders in the scientific investigation of educational phenomena that will evolve effective ways of managing, teaching, and learning agriculture and its allied fields in order to improve the productivity of its practitioners and the institutions they represent.

**Community Development.** The MS and PhD in

Community Development programs prepare students to take on the challenge of empowering local communities to develop effective strategies for identifying community goals and maximizing their assets to achieve these goals. Blending theory and practice, the programs enable students to better understand complex linkages between local actions and policy-making processes at various levels. Students learn to critically examine the complex roles and effectiveness of local institutions in community development. Students also learn to employ and critique traditional and emerging strategies and tools of community development.

**Extension Education.** The MS and PhD in Extension Education programs provide analytical skills to critically examine development concepts from various perspectives, enabling people and organizations to learn and work together as they negotiate problematic situations relating to their livelihood, food security, and natural resource management. Extension education programs focus on strengthening formal and non-formal education programs for academic and development practitioners interested in capacitating individuals and groups to enable them to respond to complex situations. These programs also provide grounding in extension science, leadership,

adult education strategies, psychology, development perspectives, and participatory tools and techniques required in ensuring stakeholder participation and engagement.

### **Doctoral of Philosophy in Development Studies**

The PhD in Development Studies is a campus-wide multidisciplinary program of the Graduate School hosted by CPAf. The College offers the four core courses, namely, DVST 301 (Development Theories and Frameworks), DVST 302 (Development Practice), DVST 303 (Mixed Methods Research for Development Studies), and SPPS 272 (Science, Technology, and Development).

The program combines the analytical rigor required of social science and technical fields to be able to address development issues. At the end of the program, graduates will be able to identify and analyze key policy, governance and economic issues as well as socio-political processes that are shaping the opportunities and constraints for public and collective action in development sectors such as agriculture, natural resources, and science and technology at the local, regional, and international levels.



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## INSTITUTE FOR GOVERNANCE AND RURAL DEVELOPMENT

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### Agrarian Studies

**AGRS 1. Fundamentals of Agrarian Reform (3).** Basic concepts of agrarian reform; problems and issues in agrarian reform and rural development with emphasis on the Philippine situation. 3 hrs (class). PR. None. (1,2)

**AGRS 115. Political Economy of Agrarian Reform (3).** Political economy and agrarian change, agrarian models; dynamics of agrarian reform program formulation and implementation. 3 hrs (class). PR. ECON 11 or COI. (1,2)

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## INSTITUTE OF COMMUNITY EDUCATION

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### Education

**EDUC 102 (formerly AERS 102). Theories and Principles of Education (3).** Significant theories and

principles of education; educational philosophies and their implications to agricultural education in the Philippines. 3 hrs (class). (1,2)

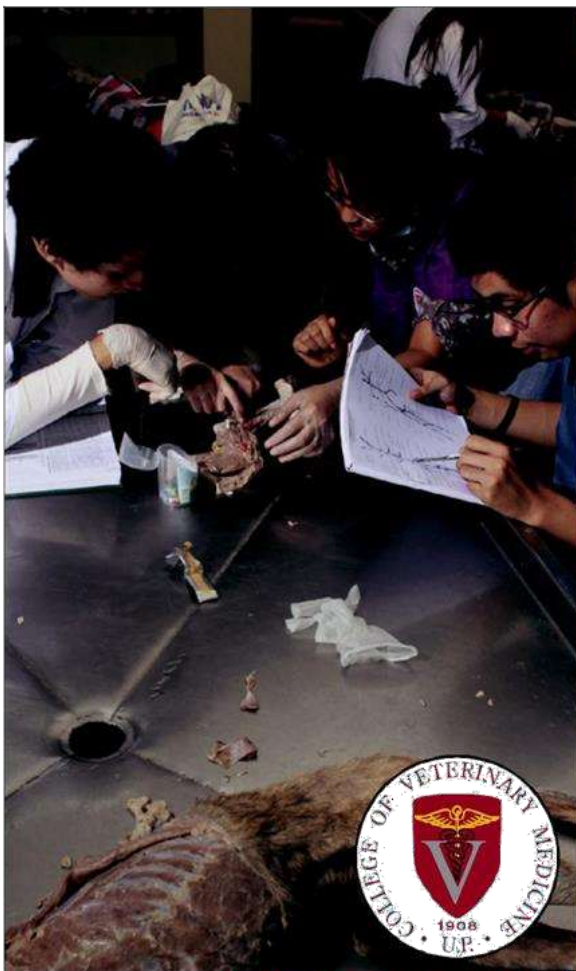
**EDUC 111 (formerly AERS 11). Educational Psychology (3).** Psychological principles and theories in education and the teaching-learning process. 3 hrs (class). PR. COI. (1,2)

**EDUC 122 (formerly AERS 122). Principles and Strategies of Teaching (3).** Principles and concepts of teaching, selection and organization of course content. PR. COI. (1,2)

**EDUC 144 (formerly AERS 44). Evaluation of Learning (3).** Methods of evaluating learning; selection, construction, and administration of assessment instruments; analysis and interpretation of results. 3 hrs (class). (1,2)

**EDUC 200a. Major Practice (6).** (1,2,S)

*(For other courses offered, please see entries listed under Graduate School)*



College of Veterinary  
Medicine

University of the Philippines  
Los Baños





# COLLEGE OF VETERINARY MEDICINE

Eduardo B. Torres, *Dean*  
Rio John T. Ducusin, *Assistant to the Dean*  
Maria Catalina T. de Luna, *College Secretary*  
Joseph F. Dela Cruz, *Chair, Department of Basic  
Veterinary Sciences*  
Benjamin Reuel E. Marte, *Chair, Department of  
Veterinary Paraclinical Sciences*  
Veronica A. Matawaran, *Chair, Department of Veterinary  
Clinical Sciences*  
Marianne Leila S. Flores, *Director, Veterinary Teaching  
Hospital*

The College of Veterinary Medicine (CVM), formerly named College of Veterinary Science, is the first veterinary school in the Philippines. It was established on June 18, 1908 through Act No. 1870, primarily to produce veterinarians who will be involved in the eradication of animal diseases, particularly rinderpest, in the country.

The College started its first classes on June 4, 1910 with four students at the Animal Quarantine Station, Pandacan, Manila. It was transferred five times to different locations: San Lazaro, Manila (1912-1919), Los Baños, Laguna (1919-1933), back to Pandacan, Manila (1933-1949), Diliman, Quezon City (1949-1983), and back again to Los Baños, Laguna (1983-present).

In 1976, the U.P. Board of Regents approved a bi-campus scheme for the CVM as one of the conditions imposed by the World Bank in granting the fourth educational loan to the Philippines. As a result, the Companion Animal Clinic of the Veterinary Teaching Hospital was strategically maintained in UP Diliman while the College administration and academic and research facilities were transferred to UPLB. For 50 years (1910-1960), the U. P. CVM was the sole source of the country's veterinary manpower needs, providing quality graduates. By 2014, it has produced 3,201 graduates.

On January 11, 2000, the Commission on Higher Education (CHED), upon the recommendation of the Office of Programs and Standards (OPS) and the Technical Panel for Agriculture Education (TPAE) designated the U. P. College of Veterinary Medicine as the lone Center of Excellence for Veterinary Education for three years (2000-2002) through Resolution No. 42-2000. This is in recognition of its leading role in the education of veterinary students through its academic, research and extension activities.

## **Vision**

A world-class veterinary institution recognized for producing highly competent and service-oriented professionals.

## **Mission**

To set the standards in veterinary education, research, development, extension and leadership in support of animal and public health, and animal production and welfare.

## **Goals**

To realize its vision, the CVM has the following goals:

1. To offer undergraduate and graduate programs relevant to Philippine and Asian concerns;
2. To provide the highest quality of instruction in veterinary medical science;
3. To undertake research in various fields of veterinary medicine, including animal production and veterinary public health;
4. To participate in multidisciplinary activities for promotion and enhancement of biomedical and agricultural sectors; and
5. To provide client-oriented veterinary services in urban and rural areas.

## **Objectives**

To realize its vision, the CVM plans to:

1. Produce highly competent general practitioners, through the DVM program;
2. Produce specialists in various fields of veterinary medicine, through the MS program;
3. Conduct studies that will lead to generation of new information and/or discovery of new technologies in veterinary medicine and allied fields;
4. Establish linkages with local, national and foreign government, non-government and private organizations/institutions for teaching, research and extension collaborations;
5. Cooperate with government and private entities in the delivery of veterinary services to the various sectors of society especially the marginalized and rural populations.

## **UNDERGRADUATE PROGRAM**

The College offers a six-year Doctor of Veterinary Medicine (DVM) program that includes a two-year pre-veterinary medicine curriculum, with a total of 76-78 units, taken in the College of Arts and Sciences, and a four-year professional medicine curriculum with 160 units.

Students are required to complete 42 units of general education courses to acquire proficiency in communication skills and become familiar with art and literature, history and social and political theories.

The first two years of the professional medicine curriculum are concerned with basic and paraclinical veterinary courses while the third and fourth years concentrate on clinical subjects. The students acquire both theoretical knowledge and practical experience in animal production and in the diagnosis, prevention, treatment and control of diseases in companion, exotic and farm animals.

## **DVM LEARNING OUTCOMES**

### **Clinical Skills**

1. Identify animal health problems in a geophysical environment;

2. Diagnose and treat animal diseases/ abnormalities; and
3. Formulate plans and implement cost-effective programs for diagnosis, treatment, prevention and control of animal diseases.

#### Environmental/Public Health

1. Safeguard and protect the environment for a sustainable ecosystem;
2. Promote, develop, and implement veterinary public health programs;
3. Demonstrate knowledge and understanding of the role of veterinarians in promoting food safety; and
4. Demonstrate knowledge and understanding of important zoonotic diseases and of approaches to control disease transmission.

#### Jurisprudence/Ethics

1. Demonstrate knowledge of regulatory laws pertaining to the veterinary profession;
2. Contribute to national development;
3. Demonstrate knowledge and understanding of the societal responsibilities of veterinarians locally, nationally, and globally;
4. Promote animal welfare; and
5. Demonstrate humane and responsible treatment of animals.

#### Professionalism

1. Develop proper work attitude; and
2. Cultivate interpersonal relations with peers, clients, and the general public.

#### Communication Skills

1. Communicate effectively and efficiently through written and oral means with people.



**PRE-VETERINARY MEDICINE\***

| <i>First Semester</i>                         | <i>Units</i> | <i>Second Semester</i>                          | <i>Units</i> |
|---|--------------|---|--------------|
| <i>FIRST YEAR</i>                             |              |   |              |
| G.E. (AH)                                     | 3            | CHEM 15, Fundamentals of Chemistry              | 3            |
| ENG 1 (AH), College English                   | 3            | CHEM 15.1, Fundamentals of Chemistry Laboratory | 2            |
| NASC 3 (MST), Physics in Everyday Life        | 3            | ENG 2 (AH), College Writing in English          | 3            |
| PHLO 1 (SSP), Philosophical Analysis          | 3            | G.E. (AH)                                       | 3            |
| G.E. (SSP)                                    | 3            | G.E. (SSP)                                      | 3            |
| MATH 11, College Algebra <i>or</i>            | 3            | PI 10 (SSP), The Life and Works of Jose Rizal   | 3            |
| MATH 17, Algebra and Trigonometry             | 5            | STAT 1, Elementary Statistics                   | 3            |
| NSTP 1, National Service Training Program I   | (3)          | NSTP 2, National Service Training Program II    | (3)          |
| PE 1, Foundations of Physical Fitness         | (2)          | PE 2, Basic or Advanced Course                  | (2)          |
|   | 18-20        |   | 20           |
| <i>SECOND YEAR</i>                            |              |   |              |
| BOT 11, Veterinary Botany                     | 3            | CHEM 160, General Biochemistry                  | 3            |
| CHEM 40, Basic Organic Chemistry              | 3            | CHEM 160.1, General Biochemistry Laboratory     | 2            |
| CHEM 40.1, Basic Organic Chemistry Laboratory | 1            | G.E. (SSP)                                      | 3            |
| G.E. (AH)                                     | 3            | G.E. (MST)                                      | 3            |
| IT 1 (MST), Information Technology Literacy   | 3            | ZOO 11, Fundamentals of Zoology                 | 5            |
| G.E. (MST)                                    | 3            | Elective**                                      | 3            |
| STAT 162, Experimental Designs I              | 3            | PE 2 or 3, Basic Skills or Advanced Course      | (2)          |
| PE 2 or 3, Basic Skills or Advanced Course    | (2)          |   | 19           |
|   | 19           |   |              |

**TOTAL NUMBER OF UNITS..... 76 -78**

GE unit requirements by domain:

|   |                 |
|---|-----------------|
| Arts & Humanities (AH)                  | 15 units        |
| Social Sciences & Philosophy (SSP)      | 15 units        |
| Mathematics, Science & Technology (MST) | <u>15 units</u> |
| Total                                   | 42 units        |

\* All students are required to undergo the National Service Training Program (NSTP, 6 units) for one year as a requirement for graduation.

\*\*Choice of either 3 units of one language (e.g., Filipino, Japanese, Spanish, French) or 3 units of any of the following: ECO 11, MGT 101, MGT 111, ZOO 150, BIO 101, BIO 150, ENG 10 or STAT 164.

**PHILIPPINE STUDIES.** Any 3-unit course (in any domain) on Philippine Studies, to be chosen by the student, is required: HUM 3 (AH), HIST 1/KAS 1 (SSP), POSC 1 (SSP), SOSC 4 (SSP), NASC 5 (MST), or NASC 10 (MST).

**NATIONAL VETERINARY ADMISSION TEST (NVAT).** The NVAT is a required prerequisite for admission in the DVM professional program given to all incoming students to the four-year DVM professional or proper program in accredited veterinary colleges. The NVAT was applied to incoming PREVET students beginning AY 2006-2007.

**FOUR-YEAR PROFESSIONAL VETERINARY MEDICINE \***

| <i>First Semester</i>                               | <i>Units</i> | <i>Second Semester</i>                         | <i>Units</i> |
|---|--------------|--|--------------|
| <i>FIRST YEAR</i>                                   |              |  |              |
| VETA 101, Macroscopic Anatomy I                     | 5            | VETA 102, Macroscopic Anatomy II               | 4            |
| VETA 103, Developmental Anatomy                     | 3            | VETA 104, Microscopic Anatomy                  | 4            |
| VPHY 141, General Physiology                        | 4            | VPHY 142, Systemic Physiology                  | 4            |
| ZOTC 111, General Principles of Animal Production   | 3            | ZOTC 113, Principles of Animal Nutrition       | 3            |
| ZOTC 112, Principles of Animal Breeding             | <u>3</u>     | ZOTC 114, Swine Production                     | 3            |
|   | 18           | ZOTC 116, Poultry Production                   | <u>3</u>     |
|   |              |  | 21           |
| <i>SECOND YEAR</i>                                  |              |  |              |
| VMCB 121, General Microbiology                      | 4            | VMCB 122, Veterinary Bacteriology and Mycology | 3            |
| VMCB 124, Fundamentals of Immunology                | 2            | VMCB 123, Veterinary Virology                  | 2            |
| VPAR 131, Veterinary Entomology and Protozoology    | 4            | VPAR 132, Veterinary Helminthology             | 4            |
| VPHM 141, Pharmacology and Therapeutics I           | 4            | VPHM 142, Pharmacology and Therapeutics II     | 4            |
| VPTH 121, General Pathology                         | 4            | VPTH 122, Systemic Pathology                   | 3            |
| ZOTC 115, Ruminant Production                       | <u>3</u>     | VSUR 151, Principles of Surgery                | 3            |
|   | 21           | ZOTC 117, Equine Production                    | <u>2</u>     |
|   |              |  | 21           |
| <i>THIRD YEAR</i>                                   |              |  |              |
| VETC 171, Clinical Orientation I (Clerkship)        | 2            | VETC 172, Clinical Orientation II (Clerkship)  | 2            |
| VMED 151, General Principles of Veterinary Medicine | 2            | VMED 152, Canine and Feline Medicine           | 4            |
| VMED 195, Research Methods in Veterinary Medicine   | 3            | VMED 153, Ruminant and Equine Medicine         | 4            |
| VPH Y121, Epidemiology                              | 3            | VMED 154, Poultry and Swine Medicine           | 3            |
| VPHY 143, Endocrinology and Reproductive Physiology | 4            | VMED 200, Undergraduate Thesis                 | 2            |
| VPTH 123, Clinical Pathology                        | 3            | VPH 122, Zoonoses                              | 2            |
| VSUR 152, Small Animal Surgery                      | <u>4</u>     | VSUR 153, Large Animal Surgery                 | 3            |
|   | 21           | VSUR 154, Diagnostic Imaging                   | 1            |
|   |              |  | <u>2</u>     |
|   |              |  | 21           |
| <i>FOURTH YEAR</i>                                  |              |  |              |
| VETC 173, Clinico-Pathological Conference I         | 1            | VETC 174, Clinico-Pathological Conference II   | 1            |
| VETC 175, Clinics I (Internship)                    | 6            | VETC 176, Clinics II (Internship)              | 14           |
| VMED 155, Theriogenology                            | 3            | VMED 200, Undergraduate Thesis                 | <u>2</u>     |
| VMED 156, Jurisprudence, Ethics and Economics       | 2            |  | 17           |
| VMED 200, Undergraduate Thesis                      | 2            |  |              |
| VPH 123, Food Hygiene                               | 4            |  |              |
| Elective* *   | <u>2</u>     |  |              |
|   | 20           |  |              |

**TOTAL NUMBER OF UNITS.....160**\* **ELECTIVE.** Only one elective is required.

VPTH 124, Special Pathology- 2 units (PR. VMCB 122 &amp; VPTH 122)

VMED 157, Wildlife, Fish &amp; Laboratory Animal Medicine – 2 units (PR. VMED 151)

VSUR 155, Lameness in Horses and Racetrack Practice – 2 units (PR. VSUR 151)

VPAR 134, Parasites of Wild Birds and Mammals and Lab. Animals – 3 units (PR. VPAR 132 or COI)

VPAR 135, Parasites of Fishes and Other Aquatic Animals – 2 units (PR. VPAR 132 or COI)

VPH 120, Perspectives in Veterinary Public Health – 2 units (PR. COI)

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## COURSES

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### DEPARTMENT OF BASIC VETERINARY SCIENCES

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#### Veterinary Anatomy

**VETA 101. Macroscopic Anatomy I (5).** Dissection of the dog. 9 hrs (3 class, 6 lab). PR. ZOO 11 or COI. (1)

**VETA 102. Macroscopic Anatomy II (4).** Dissection of the horse, ruminant, pig and fowl. 8 hrs (2 class, 6 lab). PR. VETA 101 or COI. (2)

**VETA 103. Developmental Anatomy (3).** Embryonic and fetal development of domestic animals and the various processes related to reproduction. 5 hrs (2 class, 3 lab). PR. ZOO 11 or COI. (1)

**VETA 104. Microscopic Anatomy (4).** Cell structure, tissue morphology and architecture of the various organs of the domestic animals. 8 hrs (2 class, 6 lab). PR. VETA 103 or COI. (2)

#### Veterinary Medicine

**VMED 195. Research Methods in Veterinary Medicine (3).** Research strategies and approaches in veterinary medicine. 3 hrs (class). PR. STAT 162 or COI. (1,2)

#### Veterinary Pharmacology

**VPHM 141. Pharmacology and Therapeutics I (4).** General principles of pharmacy, pharmacology and therapeutics of drugs acting on the nervous system. 6 hrs (3 class, 3 lab). PR. VPHY 142. (1)

**VPHM 142. Pharmacology and Therapeutics II (4).** Chemotherapy, the antiparasitic and anti-infective drugs, drugs used in fluid therapy and those acting on other body systems. 6 hrs (3 class, 3 lab). PR. VPHM 141. (2)

#### Veterinary Physiology

**VPHY 141. General Physiology (4).** Physiological processes in the cell; membrane phenomena; excitability and contractility; nervous, blood and cardiovascular systems. 6 hrs (3 class, 3 lab). PR. CHEM 160, CHEM 160.1 and ZOO 11. (1)

**VPHY 142. Systemic Physiology (4).** Physiology of the respiratory, digestive, metabolic, urinary and body fluid systems. 6 hrs (3 class, 3 lab). PR. VPHY 141. (2)

**VPHY 143. Endocrinology and Reproductive Physiology (4).** The endocrine organs, their secretions, action and control; physiology of reproduction with emphasis on food animals. 6 hrs (3 class, 3 lab). PR. VPHY 142. (1)

#### Zootechnics

**ZOTC 111. General Principles of Animal Production (3).** Fundamentals of animal husbandry in its different phases. 3 hrs (class). (1)

**ZOTC 112. Principles of Animal Breeding (3).** Selection, breeding and improvement of farm animals. 3 hrs (class). PR. ZOTC 111. (1)

**ZOTC 113. Principles of Animal Nutrition (3).** Fundamentals of nutrition, feed formulation and feeding. 5 hrs (2 class, 3 lab). PR. ZOTC 111. (2)

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### DEPARTMENT OF VETERINARY PARACLINICAL SCIENCES

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#### Veterinary Microbiology

**VMCB 121. General Microbiology (4).** Classification and general characteristics of bacteria, viruses, fungi and rickettsiae and fundamental microbiological techniques. 6 hrs (3 class, 3 lab). PR. BOT 11 or COI. (1)

**VMCB 122. Veterinary Bacteriology and Mycology (3).** Bacteria and fungi of veterinary importance with emphasis on their pathogenicity, epidemiology and laboratory diagnosis. 5 hrs (2 class, 3 lab). PR. VMCB 121. (2)

**VMCB 123. Veterinary Virology (2).** Viruses and rickettsiae of veterinary importance with emphasis on their pathogenicity, epidemiology and laboratory diagnosis. 2 hrs (class). PR. VMCB 121. (2)

**VMCB 124. Fundamentals of Immunology (2).** Principles of immunology and basic laboratory techniques. 2 hrs (class). PR. COI. (1)

#### Veterinary Parasitology

**VPAR 131. Veterinary Entomology and Protozoology (4).** Important arthropod and protozoan parasites of domestic animals; their morphology, biology, pathogenicity, transmission and control. 8 hrs (2 class, 6 lab). PR. ZOO 11 or COI. (1)

**VPAR 132. Veterinary Helminthology (4).** Morphology, biology, pathogenicity, epidemiology and control of helminths of domestic animals. 8 hrs (2 class, 6 lab). PR. VPAR 131. (2)

**VPAR 134. Parasites of Wild Birds and Mammals and Laboratory Animals (3).** Biomorphology and control of common disease-causing parasites of wild birds and mammals, and laboratory animals. 5 hrs (2 class, 3 lab). PR. VPAR 132 or COI. (2)

**VPAR 135. Parasites of Fishes and Other Aquatic Animals (2).** Biomorphology and control of parasites of fishes and other aquatic animals. 4 hrs (1 class, 3 lab). PR. VPAR 132 or COI. (1)

**Veterinary Pathology**

**VPTH 121. General Pathology (4).** Principles of pathology and fundamentals of veterinary necropsy and histopathology. 6 hrs (3 class, 3 lab). PR. VETA 104. (1)

**VPTH 122. Systemic Pathology (3).** Functional and morphological pathology of the body systems, necropsy and histopathological diagnosis. 5 hrs (2 class, 3 lab). PR. VPTH 121 and VPHY 141. (2)

**VPTH 123. Clinical Pathology (3).** Collection and examination of body fluids, secretions and excretions, with emphasis on interpretation of laboratory findings. 5 hrs (2 class, 3 lab). PR. VPTH 122 and VPHY 142. (1)

**VPTH 124. Special Pathology (2).** Pathology, prevention and control of notifiable and selected diseases of livestock and poultry. 4 hrs (1 class, 3 lab). PR. VMCB 122 and VPTH 122. (1)

**Veterinary Public Health**

**VPH 120. Perspectives in Veterinary Public Health (2).** Veterinary contributions to public health; national and international aspects of veterinary medicine and its relation to human health, nutrition and welfare; recent developments in veterinary public health. 2 hrs (class). PR. COI. (1)

**VPH 121. Epidemiology (3).** Principles and methods of epidemiology. 5 hrs (2 class, 3 lab). PR. VMCB 121. (1)

**VPH 122. Zoonoses (2).** Study of animal diseases transmissible to man with special emphasis on their epidemiology, prevention and control. 2 hrs (class). PR. VPH 121. (2)

**VPH 123. Food Hygiene (4).** Basic principles of food hygiene mainly involving meat, fish and milk; pertinent Philippine laws involved; field trips to farms, abattoirs, dairy plants and other food establishments. PR. VPH 122. (1)

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## DEPARTMENT OF VETERINARY CLINICAL SCIENCES

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**Veterinary Clinics**

**VETC 171. Clinical Orientation I (Clerkship) (2).** Demonstration of methods in clinical examination, diagnosis and treatment. Selected cases will be presented and discussed by the clinical staff together with senior students. 6 hrs (lab). PR. Completion of 1<sup>st</sup> and 2<sup>nd</sup> year veterinary proper courses. (1)

**VETC 172. Clinical Orientation II (Clerkship) (2).** Continuation of VETC 171. 6 hrs (lab). PR. VETC 171. (2)

**VETC 173. Clinico-Pathological Conference I (1).** Presentation of interesting clinical cases submitted by senior clinicians to be attended by members of the clinical staff, faculty and clinicians. 1 hr (class). PR. Completion of 1<sup>st</sup> to 3<sup>rd</sup> year veterinary proper courses. (1)

**VETC 174. Clinico-Pathological Conference II (1).** Continuation of VETC 173. 1 hr (class). PR. VETC 173. (2)

**VETC 175. Clinics I (Internship) (6).** 18 hrs (lab). PR. Completion of 1<sup>st</sup> to 3<sup>rd</sup> year veterinary proper courses. (1)

**VETC 176. Clinics II (Internship) (14).** 42 hrs (lab). Continuation of VETC 175. PR. VETC 175. (2)

**Veterinary Medicine**

**VMED 151. General Principles of Veterinary Medicine (2).** Principles of diagnosis and treatment of diseases and disorders of animals. 2 hrs (class). PR. VPHM 142 and VPAR 132. (1)

**VMED 152. Canine and Feline Medicine (4).** Diagnosis and treatment of diseases and disorders of dogs and cats. 4 hrs (class). PR. VMED 151. (2)

**VMED 153. Ruminant and Equine Medicine (4).** Diagnosis and treatment of diseases and disorders of ruminants and horses. 4 hrs (class). PR. VMED 151. (2)

**VMED 154. Poultry and Swine Medicine (3).** Diagnosis and treatment of diseases and disorders of poultry and pigs. 3 hrs (class). PR. VMED 151. (2)

**VMED 155. Theriogenology (3).** Pregnancy diagnosis, reproductive diseases and obstetrical operations. 5 hrs (2 class, 3 lab). PR. VPHY 143 and VSUR 154. (1)

**VMED 156. Jurisprudence, Ethics and Economics (2).** Laws, ethics, business methods and economics of veterinary medicine. 2 hrs (class). PR. COI. (1)

**VMED 157. Wildlife, Fish and Laboratory Animal Medicine (2).** Management, diagnosis and treatment of diseases of fishes, laboratory and wild animals. 2 hrs (class). PR. COI. (1)

**VMED 200. Undergraduate Thesis (6).** (1,2)

**Veterinary Surgery**

**VSUR 151. Principles of Surgery (3).** Basic animal restraints, surgical techniques and procedures in domestic animals. 5 hrs (2 class, 3 lab). PR. VETA 101; Concurrent registration with VPHM 142. (2)

**VSUR 152. Small Animal Surgery (4).** Surgical restraint, anesthesia techniques and procedures in small animals. 8 hrs (2 class, 6 lab). PR. VSUR 151. (1)

**VSUR 153. Large Animal Surgery (3).** Surgical restraint, anesthesia, techniques and procedures in large animals. 7 hrs (1 class, 6 lab). PR. VSUR 151. (2)

**VSUR 154. Diagnostic Imaging (1).** Principles, operation and interpretation of radiography, ultrasonography and other diagnostic imaging procedures in animals. 3 hrs (lab). PR. VMED 151. (2)



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**VSUR 155. Lameness in Horses and Racetrack Practice (2).** Diagnosis and treatment of lameness in horses and veterinary procedures in race horses. 4 hrs (1 class, 3 lab). PR. VSUR 151.

### **Zootechnics**

**ZOTC 114. Swine Production (3).** Basic management of pigs. 5 hrs (2 class, 3 lab). PR. ZOTC 111. (2)

**ZOTC 115 . Ruminant Production ( 3 ) .** Basic management of ruminants. 5 hrs (2 class, 3 lab). PR. ZOTC 111. (1)

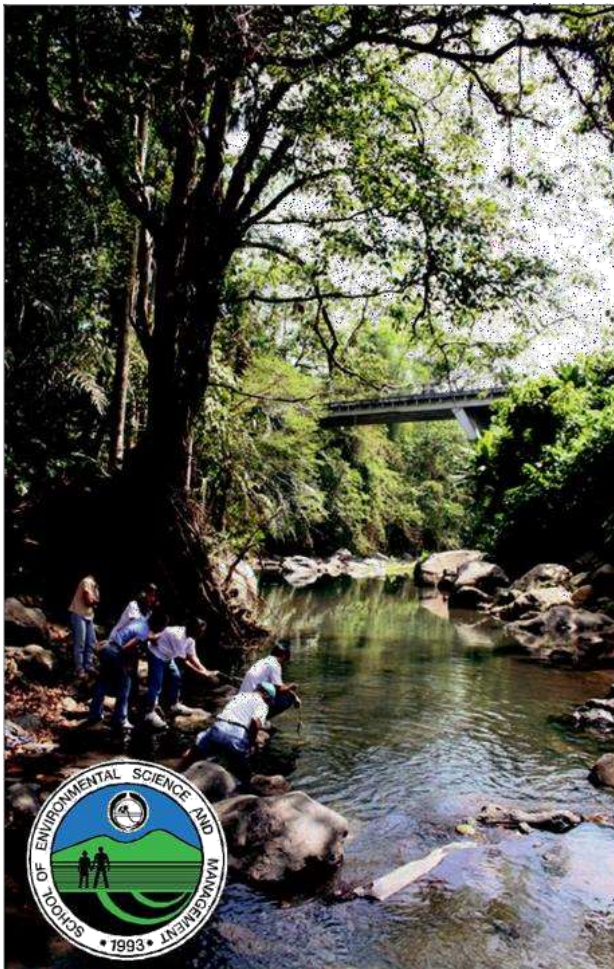
**ZOTC 116. Poultry Production (3).** Basic management of chicken, duck, turkey and quail. 5 hrs (2 class, 3 lab). PR. ZOTC 111. (2)

**ZOTC 117. Equine Production (2).** Basic management of horses. 2 hrs (class). PR. ZOTC 111. (2)

### **Natural Science**

**NASC 7 (MST). Animals in Human Society (3).** The role of animals in society and their relationship with man. 3 hrs (class). (1,2)





School of Environmental Science and Management

University of the Philippines Los Baños





# SCHOOL OF ENVIRONMENTAL SCIENCE AND MANAGEMENT

Decibel F. Eslava, *Dean*  
Carmelita M. Rebanco, *Head, Instruction Division*  
*, Head, Research and Extension*  
*Division*  
Rico Ancog, *Head, Publication and Information*  
*Services*

The School has a rich history that started in the 1970s when a group of scientists in UPLB felt the need for an institutionalized, holistic, and systematic approach in dealing with the emerging environmental issues at that time.

Over the last three decades, from the 1970s to 2000s, SESAM's name has evolved to reflect the development it has undergone as an institution. In its inception and establishment in November 1977, it began as a Program on Environmental Science and Management. Ten years after, it was elevated to an Institute to enhance its capability to cater to the growing demands for its services in instruction, research and extension. And still after another decade, it was made into a full-fledged School by the University administrators. In retrospect, the years 1977, 1987, and 1997 witnessed major turning points in SESAM's history.

The **Program on Environmental Science and Management (PESAM)**, a multi-disciplinary research program which evolved from the Upland Hydroecology Program (UHP), was organized in 1977 amidst heightened environmental consciousness. It was supported by the Ford Foundation and UPLB. PESAM's main objective was to influence and help build resource management systems that are productive, ecologically stable and socially acceptable.

In February 1987, the U.P. Board of Regents approved the establishment of the **Institute of Environmental Science and Management (IESAM)**. The projects of PESAM became the research and extension components of IESAM and the MS Environmental Studies program became its primary academic offering which was later revised into MS Environmental Science in 1996. IESAM was attached to the College of Arts and Sciences but was in essence an inter-college and multidisciplinary unit deriving its faculty from the different colleges of UPLB.

In December 1997, the Board of Regents approved the establishment of the **School of Environmental Science and Management** in the University of the Philippines Los Baños, from out of the staff, facilities and programs of IESAM. SESAM maintains programs in instruction, research and extension and continuing education and training. SESAM operates with the following vision:

1. Offer our people world-class opportunity for higher education in fields of environmental science and management consistent with the Filipino aspirations;

2. Sharpen the human resource base of the country to meet the expanding needs of the Filipino people in a manner that fully respects the limits of nature;
3. Command respect as a center of knowledge on the environment; and
4. Lead in the unfolding of new areas of scientific inquiry and scholarship on the environment.

## INSTRUCTION PROGRAM

Central to SESAM's activities is its instruction program that offers the following:

- a) **MS Environmental Science.** The **Master of Science in Environmental Science (MSES)** is a holistic and integrative program. It incorporates contemporary thinking on the relationship between nature and human society and on how the relationship is influenced by such factors as local, national and global policies and structures. This is an inter-College program designed to produce environmental researchers, teachers, and managers. The areas of specialization are: (1) Community-Based Resource Management; (2) Environmental Biology; (3) Environmental Chemistry and Toxicology; (4) Environmental Planning and Management; (5) Environmental Restoration; and (6) Protected Area Management.
- b) **Ph.D. in Environmental Science.** The Doctor of Philosophy in Environmental Science is a university-wide, interdisciplinary program focusing on theoretical and methodological issues on environmental science and management. Students of this program are expected to deal competently with contemporary concerns in environmental analysis, planning, and management. The areas of specialization are: (1) Environmental Security and Management; (2) Protected Areas Planning, Development and Management; and (3) Social Theory and Environment.

## RESEARCH

SESAM adopts the Landscape Science approach in the analysis of environmental problems. Its research program is anchored on the following thematic areas of concern: (a) Climate Change Research and Human Aggravated Natural Disasters - this research focuses on climate change and climate variability topics, adaptation and mitigation approaches to disaster risks reduction and management strategies; (b) Ecosystem Fragmentation and Biodiversity Research Program - this is a science-based initiative applied to solving natural resources and biodiversity problems; (c) Aquatic and Water Resources Systems Protection Research

Program - The School recognizes that future problems are water-related. The importance of water to eradicate poverty was articulated in the Millennium Development Goals. Hence, research initiatives and priorities of the School include water-related issues and concerns; (d) Agro-Industrial Ecology - a new interdisciplinary field of study that provides framework for understanding the agro-industrial system in the context of the natural systems that surround it. This is envisioned to improve the eco-efficiency of agricultural production systems and their products and services throughout their entire life cycles; (e) Land Degradation and Rehabilitation using Landscape Sciences - this approach requires an interdisciplinary perspective and reflects a convergence of geography, soil science, hydrology, and geo-sciences. This will be the "wave of the future" for environmental assessment, protection and preservation in this century; (f) Cross-cutting Issues on Environmental Conservation, Protection and Rehabilitation - an initiative to look into the multidimensional themes that cover the research programs such as environmental risk assessments, environmental education, information, education and communication programs, environmental ethics and advocacy, policy, and economic concerns. Researches of students, faculty, and research staff may be aligned in any of the above themes.

#### EXTENSION

SESAM reaches the various sectors of society through workshops, seminars, training, publications, exhibits, library services and whenever necessary, the organization of task forces.

**Training Programs.** The School conducts training programs on such topics as Environmental Impact Assessment (EIA), Rapid Rural Appraisal (RRA), Environmental Planning and Management (EPM), and Community-Based Resource Management (CBRM).

**Library.** SESAM maintains an extensive and up-to-date collection of books, vertical files, maps, databases and other materials on environment and related topics.

**Analytical Laboratory.** This is SESAM's teaching laboratory that supports the School's environmental research, instruction and monitoring programs.

**Simulation Laboratory.** This is another teaching computer laboratory that supports primarily the School's research and instruction programs.

**Journal of Environmental Science and Management.** is an international scientific journal produced semi-annually. SESAM is indexed and covered by ISI-Thomson-Reuters, Elsevier, Sciverse-Scopus and CHED-JAS.

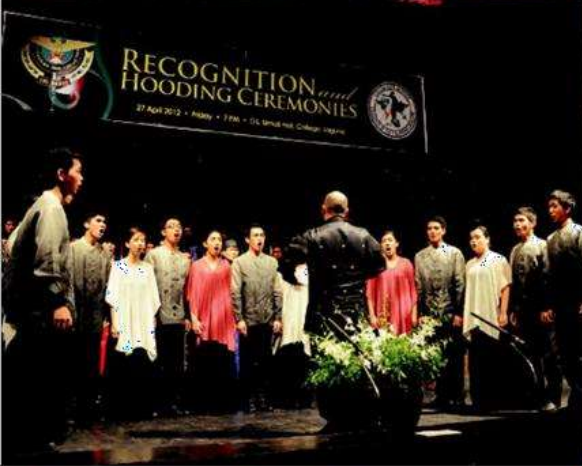
**Audio-Visual Facilities.** SESAM maintains audio-visual equipment for instruction, research and training activities. It has also an extensive collection of environmental tapes and photoslides on environmental management.

#### LINKAGES

SESAM initiated the formation of the Environmental Education Network of the Philippines (EENP), now Philippine Network of Educators on Environment (PNEE) serving as its permanent secretariat. It has also started the formation of Environmental Outreach Network (EON). It co-founded the Southeast Asian Universities Agroecosystem Network (SUAN), an informal association of university-based research groups in Indonesia, Philippines and Thailand. It maintains institutional linkages with international organizations and local institutions.

*(For courses offered, please see entries listed under Graduate School)*





University of the Philippines  
Los Baños

Graduate School





# GRADUATE SCHOOL

Jose V. Camacho, Jr., *Dean*  
Mark Dondi M. Arboleda, *College Secretary*

## INTRODUCTION

### Brief History

Graduate programs at the University of the Philippines Los Baños (UPLB) started as early as 1913 under the College of Agriculture. One graduate student of the College was awarded the degree of Master of Science in agricultural chemistry during that year. Graduate studies in the University of the Philippines were then supervised by the University Graduate Committee which administered the graduate programs of all the units of the University.

Realizing the need for more adequate instruction at the graduate level, the Board of Regents established the University Graduate School headed by a dean on 26 October 1950. Under this set-up, the U.P. Graduate School administered the graduate program at Los Baños through a subcommittee. The dean of the College of Agriculture was the ex-officio chairman of this subcommittee. Within the next few years, curricular offerings at Los Baños continued to expand and enrollment increased. The first PhD graduate obtained his doctoral degree in soil science in 1962-63. To cope with the expansion, the Office of the Director of Graduate Studies was created in January 1970.

The field of higher education took a historic step on 20 November 1972 when Presidential Decree No. 58 was issued. This decree authorized the U.P. Board of Regents to establish a University of the Philippines System, including an autonomous University of the Philippines at Los Baños. Consequently, a full-fledged and distinct UPLB Graduate School was established on 21 December 1972.

### Purpose

The Graduate School administers all graduate programs of UPLB. Graduate studies at UPLB aim to develop the ability of students for critical inquiry and independent research towards the advancement of knowledge as well as to develop professional leadership. Besides paving the way to specialization in selected fields, graduate work is designed to encourage independent work and to promote research. Graduate students, therefore, are admitted to candidacy for a degree only after demonstrating distinct ability in graduate work.

### Organization

Graduate studies are supervised by more than 500 graduate faculty members from the nine different colleges and one school of UPLB. It is headed by the dean who, with the assistance of the college secretary, implements the policies, rules, and regulations of the Graduate School. The dean is advised by the Graduate Academic Advisory

Council composed of the deans of the different colleges and the chairs of the standing committees of the Graduate School. Graduate students constitute about 10% of the UPLB student population.

### Degree Programs Offered

The Graduate School offers twelve (12) degree programs:

- Doctor of Philosophy (PhD)
  - a) Regular PhD
  - b) Straight PhD
  - c) PhD by Research
- Master of Agriculture (MAgr)
- Master of Arts (MA)
- Master in Communication Arts (MCA)
- Master of Development Management and Governance (MDMG)
- Master of Forestry (MF)
- Master of Information Technology (MIT)
- Master of Management (MM)
- Master in Public Affairs (MPAf)
- Master of Science (MS)
- Master of Professional Studies (MPS)
- Master in Veterinary Epidemiology (MVE)

## ADMISSION

### Requirements

Applicants for admission to graduate work for the master's degree must be holders of bachelor's degree or its equivalent from any recognized institution. For the regular Doctor of Philosophy degree, applicants must have a master's degree or its equivalent from any recognized institution. Admission requirements to the Straight PhD program and PhD by Research program are listed on pages 160 and 161, respectively.

A duly accomplished application form must be submitted to the Graduate School together with the following documents:

- a) One official/original and a photocopy of transcript of record, in English language, for each college previously attended. Transcript of record should not have remarks such as "for employment/for evaluation/for reference only or not valid for transfer". Remarks should be graduated with a degree or granted honorable dismissal by the school;
- b) Two letters of recommendation from former professors. If with a master's degree, a third letter

of recommendation from the major professor is required.

- c) Proof of English proficiency is required for international applicants from countries where English is not the medium of instruction and/ or not the native language;
- d) A nonrefundable application fee of P500 for Filipino citizens or US\$40 for foreign nationals in bank draft or money order remitted to the Graduate School.

The Graduate School and the individual programs reserve the right to require additional information or documents from an applicant when deemed necessary. All application materials become part of the permanent records of UPLB and will not be returned to the applicant.

### **International Applicants**

If English is not the medium of instruction or the TOEFL score is below 500 (250 Computer-Based) or IELTS is below 5.5, an applicant is required to take the English Proficiency Examination (EPE) in UPLB. This is to determine her/his level of proficiency.

The fee for EPE is P250. If the applicant's level of proficiency is Level A, she/he is required to take the Level A English Intensive Course offered by the Language Instruction Towards Excellence (LITE) Program.

### **Application Deadlines**

All documents must be received by the Graduate School not later than 30 May for First Semester (August) admission, and 30 October for Second Semester (January) admission.

### **Incomplete Applications**

Applications lacking the required documents will not be processed until after all the papers are received by the Graduate School. Processing will then commence at the earliest succeeding evaluation period.

### **Evaluation of Applications**

The complete set of application documents of an applicant is forwarded to the Graduate Admissions Committee of the appropriate program for evaluation. The committee, upon careful review of the academic credentials of the applicant, submits its recommendations, with endorsement of the department chair or institute director to the dean of the Graduate School for approval. The Graduate School then informs the applicant of the action taken.

### **Admission Categories**

An applicant to a degree program may be admitted on either regular or probationary status. Regular admission

is offered to an applicant whose academic records and supporting documents indicate that she/he is qualified to undertake graduate study in her/his chosen field. Probationary admission is offered to an applicant whose academic records and supporting documents indicate deficiencies but show promise of success in graduate study. An applicant must meet the specific requirements of her/his admission before her/his probationary status can be changed to regular. An applicant who fails to meet the terms of probationary admission is disqualified from the intended program of study.

### **Deferment of Admission**

An applicant who cannot enroll in the semester for which admission was offered may send a written request to the dean of the Graduate School to have her/his admission deferred for a period not exceeding one year. If the request is approved, the student cannot register for graduate course work as a non degree or special student in UPLB while her/his deferment is in effect.

### **Non-regular Admission**

An applicant for non degree or special programs may be offered admission to the Graduate School but not to any graduate degree program upon recommendation of the Graduate Admissions Committee of the department for which the applicant intends to enroll courses. The recommendation must be endorsed by the department chair and approved by the dean of the Graduate School. An applicant admitted on non degree status may take a maximum of 12 units of course work for credit but shall not be allowed to enroll for more than one semester, except by special permission of the dean of the Graduate School and the Registrar. An applicant admitted on special status shall not be allowed to enroll for more than 9 units a semester or to register for more than 2 years, except by special permission of the dean of the Graduate School; subjects taken shall not be credited.

### **Readmission**

An applicant offered readmission to a degree program shall undergo the same procedure as that of a newly admitted graduate student. Applications for readmission to a graduate program can be made only once.

### **Applicants not admitted**

Applicants who are denied admission due to lack of preparatory or fundamental courses in the intended graduate program of study may have their applications reconsidered only after submission of additional documents not submitted at the time of original evaluation. Applicants denied admission due to poor academic credentials are discouraged from reapplying for admission.

**Non-registration**

A student who does not register in the current semester without an approved leave of absence or does not return from an approved leave of absence is considered to have withdrawn without official leave from the Graduate School. As such the student's degree status shall be discontinued.

**Reinstatement**

A graduate student whose degree status was discontinued may petition the dean of the Graduate School to be reinstated for the semester in which the decision to discontinue her/his status was taken. Such a petition requires a reinstatement fee.

**Fees and Financial Assistance**

|   |                 |
|---|-----------------|
| Application Fee/Deferment Fee                         |                 |
| (Filipino):   | 500/200 PhP     |
| (International):                                      | 40/15 USD       |
| Leave of Absence:                                     | 300 PhP         |
| Reinstatement Fee:                                    | 500 PhP         |
| Certification:  | 50 PhP per copy |
| Graduation Fee and English Translation<br>of Diploma: | 600 PhP         |
| True Copy of Grades /Certificate<br>of Completion:    | 50 PhP          |
| For International Students only                       |                 |
| Graduate Education Development Fee (GEDF):            |                 |
| Summer:   | 200 USD         |
| Semester:   | 500 USD         |
| For Residency Only:                                   | 100 USD         |

**Refunds**

A student who has paid her/his matriculation fees and who withdraws her/his registration or is granted honorable dismissal or leave of absence shall be entitled to a refund of her/his matriculation fees, except entrance and registration fees, in accordance with the following schedule:

- Before the opening of classes: 100%
- Within 1 week from the opening of classes: 80%
- Within 2-4 weeks from the opening of classes: 50%
- After the fourth week: No refund

Laboratory fees will not be refunded after 1 week from the opening of classes where voluntary change is made from one course to another. Refund of tuition for a subject may be allowed only in the case of forced dropping of the subject.

**FINANCIAL ASSISTANCE**

**Study Privileges for U. P. Personnel and Dependents**

1. All full-time university personnel shall be entitled to 100% waiver of tuition and miscellaneous fees (except student fund fees) in any U.P. college or unit. This applies to full-time personnel-permanent or temporary, regular incumbents or substitutes, casual or contractual, including project personnel, regardless of the source of funds for their salaries as long as the funds either belong to the regular budget of the University or are institutional grants to the University, provided only that their appointments issued by the University are at least coextensive with the semester or term.

2. All regular part-time faculty (with at least 1 year of continuous service) shall be entitled to 100% waiver of tuition and miscellaneous fees (except student fund fees) in any U.P. college or unit provided the field of study is one of the academic thrusts of the faculty member's home department or college. This applies to all part-time faculty-permanent or temporary, regular incumbents, or substitutes.

**National and International Sources of Scholarships/ Grants**

Graduate students who do not avail of reduced fee privileges carry their own source of financial support or grant.

**National**

1. Agricultural Support Services Projects (ASSP)
2. Abra State Institute of Science and Technology Faculty Development Program (ASIST)
3. Bureau of Forest Development (BFD)
4. Bicol University (BU)
5. Benguet State College (BSC)
6. Bukidnon State University (BSU)
7. Central Luzon State University (CLSU)
8. Central Mindanao University (CMU)
9. Catanduanes State College (CSC)
10. Cagayan State University (CSU)
11. UPLB Foundation Incorporated (FI)
12. Dingle Agricultural and Technical College (DATEC)
13. Don Severino Agricultural College (DSAC)
14. Dansalan College Staff Development Program (DCSDP)
15. Department of Environment and Natural Resources (DENR)
16. Dr. Emilio B. Espinosa Sr. Memorial Agricultural College (DEBESMAC)
17. Department of Science and Technology (DOST)
18. Ecosystems Research and Development Bureau (ERDB)
19. Forest Products Research and Development Institute (FPRDI)



20. Farming System Development Project (FSDP)
21. Farming Systems and Soil Resources Institute (FSSRI)
22. Grants-in-Aid, UPLB (GIA, UPLB)
23. Institute of Plant Breeding (IPB)
24. Iloilo National College of Agriculture (INCA)
25. Ifugao State College of Agriculture and Forestry (ISCAF)
26. Mariano Marcos State University (MMSU)
27. Mindanao State University (MSU)
28. National Food and Agriculture Council (NFAC)
29. Negros Occidental Agricultural College (NOAC)
30. Nueva Viscaya State Institute of Technology (NVSIT)
31. Pampanga Agricultural College (PAC)
32. Panay State Polytechnic College (PSPC)
33. Palawan National Agricultural College (PNAC)
34. Philippine Association of State Universities and Colleges (PASUC)
35. Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD)
36. Philippine Rice Research Institute (PHILRICE)
37. Philippine Sugar Institute (PHILSUGIN)
38. Pangasinan State University Faculty Development (PSUF)
39. Philippine Training Center for Rural Development (PTCRD)
40. National Tobacco Administration (NTA)
41. Philippine Veterans Administration Office (PVAO)
42. Tarlac College Joint Projects (TAC)
43. Tarc Special Joint Projects (TARC)
44. University of Eastern Philippines (UEP)
45. University of Southern Mindanao (USM)
46. University of Southern Philippines (USP)
47. University of the Philippines Alumni Association Fonacier (UPCAAF)
48. University of the Philippines Visayas (UPV)
49. Visayas State College of Agriculture (ViSCA)
16. Netherlands University Foundation for International Cooperation (NUFFIC)
17. Sacred Divine Mission Council (SDVM)
18. SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA)
19. United Nations Development Programme (UNDP)
20. United States Agency for International Development (USAID)
21. WINROCK International
22. World Bank
23. United Mission to Nepal (UMN)
4. World Health Organization (WHO)

### **ACADEMIC REGULATIONS AND DEGREE REQUIREMENTS**

It is the student's responsibility to become familiar with the academic regulations and degree requirements of the Graduate School as well as the special requirements of her/his academic program. A manual on the policies, rules, and regulations is available online or for a minimal fee at the Graduate School. Other information may be obtained from the Graduate School Catalog or the UPLB Catalog.

#### **Academic Freedom**

The University has the right and the responsibility to exercise academic freedom. Academic freedom is both institutional and individual. Institutional academic freedom is freedom of the university from intervention and control in the conduct of its affairs as a university. Individual academic freedom is the right of the academic staff and students to conduct academic and scholarly inquiry and to discuss and publicize the results of such inquiry unhampered by prior restraint or subsequent punishment.

#### **Student's Pledge**

Every student shall, upon admission, sign the following pledge: "In consideration of my admission to the University of the Philippines Los Baños and of the privileges of a student in this institution, I hereby promise and pledge to abide by and comply with all the rules and regulations laid down by competent authority in the University and in the college or school in which I am enrolled." Refusal to take this pledge or violation of its terms shall be sufficient cause for summary dismissal or denial of admission.

#### **Graduate Courses**

Graduate credits may be earned in courses numbered 201 to 399; those numbered 301 to 399 are for PhD students only. Courses numbered 300 are for master's thesis while those numbered 400 are for PhD dissertation. Advanced undergraduate courses numbered 100 to 199 may be taken for graduate credit only upon recommendation of the student's guidance or advisory committee, endorsed by the department chair or institute director, and approved by the dean of the Graduate School.

#### **International**

1. Asian Development Bank (ADB)
2. Agricultural Development Council (ADC)
3. Association of Southeast Asian Nations (ASEAN)
4. Bangladesh Agricultural Research Institute (BARI)
5. Canadian International Development Assistance (CIDA)
6. Centro Internacional Mejoramiento de Mais Y Trigo (CIMMYT)
7. Food and Agriculture Organization (FAO)
8. German Foundation for International Development (DSE)
9. International Development Research Centre (IDRC)
10. International Potato Center (CIP)
11. International Rice Research Institute (IRRI)
12. Indonesian Government
13. Mandala Development Corporation (MADECOR)
14. Mary Blythe Petersen Marsman Scholarship (MARSMAN)
15. Midwestern University Consortium for International Assistance

### Academic Standards

A regular graduate student must maintain a weighted average grade of 2.00 or better in all courses prescribed in her/his approved plan of course work. Failure to do so disqualifies the student from earning the degree to which she/he was admitted.

A graduate student on provisional admission status must obtain an average of 2.00 or better in at least 9 units of graduate courses in her/his area of specialization during her/his first semester of admission to have her/his status changed to regular. Failure to meet this criterion disqualifies the student from admission to the intended degree program.

If the student fails to obtain grades which carry graduate credit as required by the Graduate School, the university rules on scholastic delinquency shall be applied.

### Transfer of Credit

A duly matriculated graduate student may apply for advanced credits or transfer credits for work done in another institution upon:

- a) presentation of credentials showing that she/he has passed, in another institution, courses fully equivalent to those given in the UPLB Graduate School for which credit is sought; and
- b) passing the validating test given, if necessary, by the department concerned.

Not more than 9 units of advanced credit or transfer credit may be granted a student for course work done towards the graduate degree, unless course work is done in another institution of higher learning with prior approval of a duly constituted guidance or advisory committee. Application for advanced credit should be filed with the Graduate School during the first semester of residence.

No transfer credit shall be given for work that has been credited to any other degree.

### Southeast Asian University Consortium for Graduate Education in Agriculture and Natural Resources

#### Background

The Southeast Asian University Consortium for Graduate Education in Agriculture and Natural Resources was launched on 19 September 1989. Five leading agricultural universities in Southeast Asia committed to share their academic facilities and strengths in the implementation and enrichment of top-quality graduate degree programs in agriculture and natural resources. The free exchange of information, facilities, and expertise among the universities is expected to improve teaching, research, and extension work in agriculture and related sciences, thereby benefiting the whole region.

### Objective of the Consortium

To share scarce resources and expertise existing at agricultural universities in Southeast Asia to enhance graduate education and research in the region.

Founding Members  
Institut Pertanian Bogor (IPB)  
Bogor, Indonesia

Universitas Gadjah Mada (UGM)  
Yogyakarta, Indonesia

Universiti Pertanian Malaysia (UPM)  
Serdang, Malaysia

University of the Philippines Los Baños (UPLB)  
Los Baños, Philippines  
Kasetsart University (KU)  
Bangkok, Thailand  
Associate Members

University of Queensland (UQ)  
Brisbane, Australia

University of British Columbia (UBC)  
Vancouver, Canada

### Program Components

Student Exchange is one of the five program components.

SEAMEO SEARCA scholars and other graduate students in agriculture and related fields of any Consortium member university are considered consortium students. To enrich the quality of their graduate degree programs, consortium students are given the opportunity to cross-enroll in another Consortium member university whose academic strength lies in the student's field of specialization. The student is thus exposed to the graduate educational system in neighboring countries. Her/His outlook and professional competence are improved through the solid educational support from the host university. To facilitate student exchange, the Consortium universities have identified their programs of strength and potential. The universities are committed to offer courses in English in these programs, whenever the needs of Consortium students warrant it.

Students who go on exchange will pay tuition and other fees to their home institution.

Catalogs on Consortium courses and research expertise, library resources, and faculty are available at all Graduate Schools of each Consortium university. Students interested to go on exchange may inquire from their respective University Consortium coordinators. Other components of the University Consortium are thesis grants, faculty visits, professorial chairs, and research fellowship.

## MASTER'S DEGREE

### General Rules and Requirements

#### Guidance Committee

A student on regular status, in consultation with the chair of the department in which she/he wishes to do her/his major work, selects her/his major professor who shall serve as chair of the guidance committee. Not later than two months after registration, the student, in consultation with the major professor, selects two or three other members of her/his committee. One member shall represent her/his minor or supportive field, and the chair and other members shall come from the major field. Membership in the guidance committee shall be limited to graduate faculty members and shall be with the mutual consent of the individuals selected to serve.

#### Changes in Committee Composition

A student may request a revision in composition of her/his guidance committee upon endorsement of the department chair or institute director and in consultation with the professor concerned for approval by the dean of the Graduate School.

#### Residence Requirement

A minimum of two semesters of residence are required for the master's degree. A student is in residence when she/he is registered for course work on campus, or work in absentia with due approval in advance by her/his guidance committee.

#### Course Work Requirements

The Graduate School offers two types of master's degree programs: without thesis or with thesis.

##### a) Master's Degree Without Thesis

*Master of Communication Arts* - a minimum of 36 units of course work and 1 unit of seminar are required; 6 units are for core courses; at least 18 units must be in the major field; and at least 12 units must be in the minor field.

*Master of Agriculture* - a minimum of 36 units of course work and 1 unit of seminar are required; at least 27 units must be for courses above the 200 level; at least 24 units must be in the major field; and at least 12 units must be in the minor field.

*Master of Development Management and Governance* - a minimum of 31 units are required which include 15 units prescribed courses; 9 units chosen from the courses under each stream of specialization; 3 units for an elective; 3 units for field study; and 1 unit seminar.

*Master of Forestry* - a minimum of 30 units of course work and 1 unit of seminar are required; at least 24 units must be for courses above the 200 level; 18 to 21 units must be in the major field; and 9 to 12 units must be in the minor field.

*Master of Information Technology* - a minimum of 37 units of course work, 28 units of which are core courses and 9 units are elective courses.

*Master of Management* - a minimum of 36 units of course work and 1 unit of seminar are required; at least 27 units must be for courses above the 200 level; 9 units are common to all students; and a 3-unit field study is required.

*Master of Professional Studies* - a minimum of 36 units of course work and 1 unit of seminar are required; at least 18 units must be for courses above the 200 level.

*Master of Public Affairs* - a minimum of 31 units of course work; 13 units of which are common for all areas of specializations; 12 units for required courses; and 6 units for elective courses.

*Master in Veterinary Epidemiology* - a minimum of 30 units of course work, at least 18 units of major courses, 3 units of special topics, 6 units of field project and 3 units elective.

##### b) Master's Degree With Thesis

*Master of Arts* - a minimum of 24 units of course work, 1 unit of seminar, and 6 units of thesis are required; at least 18 units must be for courses above the 200 level; at least 15 units must be in the major field; and at least 9 units must be in the minor field.

*Master of Science* - a minimum of 24 units of course work, 1 unit of seminar, and 6 units of thesis are required; at least 18 units must be for courses above the 200 level; at least 15 units must be in the major field; and at least 9 units must be in the minor field.

The cumulative units to be credited for courses numbered 290/291 and 299 should not exceed 6 and 2 units, respectively.

#### English Language Requirement

International students whose English proficiency is Level A as determined from the English Proficiency Examination are required to present a certificate of English proficiency issued by the Language Instruction Towards Excellence (LITE) Program of the College of Arts and Sciences. The Graduate School monitors the fulfillment of the English language requirement and this must be satisfied prior to taking the general (for thesis programs) or final examination (for non-thesis programs).

### Official Plan of Study

Within the first semester of residence, a regular student must confer with her/his guidance committee to draw up her/his proposed plan of study which includes a detailed listing of the courses, and transfer of courses, if any, that she/he is proposing for the fulfillment of the degree requirements. A form is available in the Graduate School office. The proposed plan of study must be recommended by her/his guidance committee and endorsed by the department chair or institute director to the dean of the Graduate School for approval. Once approved, this becomes the official program of study and must be fulfilled in every detail to meet graduation requirements.

### Change in the Approved Plan of Study

A student who needs to revise her/his official plan of study may file a petition, upon recommendation of her/his guidance committee and endorsement of the department chair or institute director, to the dean of the Graduate School for approval. Any change in the official program should first be approved before courses to be deleted, added, or replaced are registered.

### Grade Requirement

A student must obtain a weighted average of "2.00" or better for all courses prescribed by her/his guidance committee under the major and minor fields to qualify for the final or general examination, whichever is applicable. She/He must also obtain "passing grades" in all other courses in which she/he enrolled.

### Course Examination

The course examination for master's degree without thesis is called final examination while that for the master's degree with thesis is called general examination.

Specific programs may have additional departmental course examination requirements.

After completing all the academic course requirements with an average grade of "2.00" or better, the student should submit her/his application for course examination, duly recommended by her/his guidance committee and noted by the chair of the major department or institute director, to the dean of the Graduate School for approval at least one month before the date of the examination. This examination, which is to be given by the guidance committee, shall test the student's competence in integrating knowledge in her/his major and minor fields and shall be based on all courses prescribed for the student. It shall be oral in form to be supplemented, if desired by the committee, with a written examination.

To pass the examination, a unanimous vote of the committee, all present and voting, is required. A student who fails this examination may be given one re-examination upon unanimous approval of the committee, at least one month but not later than 1 year after the first examination.

Failure to pass the second examination disqualifies the student permanently from earning the degree.

The chair of the committee shall submit a report of the result in a prescribed form to the dean of the Graduate School within one week after the examination.

### Master's Thesis

*For MA and MS degrees only.* After earning at least 12 units of courses with graduate credit, a student may be authorized to work on her/his thesis. A thesis outline must be approved by the guidance committee before actual research may be done. The student shall submit to the Graduate School the approved title and outline of the thesis.

The master's thesis shall have an equivalent of 6 units of graduate credit and shall have a numerical grade upon completion. The six (6) units of thesis shall be registered in three terms for two units each term (2-2-2) or two terms for three units each term (3-3).

A student who has already registered a total of six (6) units for thesis but still unable to finish the work should register one unit per term until she/he is able to submit the copies of approved manuscript, but only up to a maximum of six (6) terms (4 semesters, 2 summers). If at the end of this time limit, the student is still unable to submit copies of the approved manuscript, she/he shall be given a grade of "U" and should re-enroll all the six units of thesis. The same policies on how to enroll the number of thesis shall apply. However, a student who is a candidate for graduation during the semester and only has thesis to enroll may be allowed to register the whole six units total credit.

Copies of the completed and editorially acceptable thesis draft shall be submitted to the student's guidance committee for critique, evaluation, and suggestions for improvement. It shall be the responsibility of the adviser to ensure that final copies conform to the format prescribed by the Graduate School.

The thesis shall be subjected to external review. The dean of the Graduate School appoints an external reviewer from three nominees recommended by the guidance committee.

The external reviewer shall have expertise along the student's field of study and shall come from outside the student's major department. The external reviewer is required to submit an independent report to the dean that indicates a recommendation for either acceptance or rejection of the thesis with explanation based on the critical review and evaluation that she/he has made.

The guidance committee certifies to the publishable quality of the thesis--that the thesis is suitable for publication in a journal that practices a thorough and credible review process.



The student is required to submit to the dean one article based on the thesis and written in a format that is ready for publication in a refereed journal.

Three copies of the thesis manuscript and an e-copy in PDF and in Word format must be submitted to the dean of the Graduate School not later than the deadline set for submission of all requirements for graduation.

Three copies of the thesis shall be distributed as follows: one copy each for the major department, major adviser, and the UPLB Graduate School.

### **Work in Absentia**

The thesis of a candidate may be done *in absentia* with the approval of the guidance committee if her/his research can be better done outside UPLB. In such cases, the candidate working *in absentia* shall make periodic reports of her/his progress to her/his thesis adviser.

### **Final Examination**

*For MA and MS degree programs only.* The student shall be given an oral examination on her/his thesis by her/his guidance committee. The thesis adviser shall be the chair of the examining committee.

The candidate may apply for the examination when her/his thesis is complete and in a form acceptable to her/his guidance committee as indicated by their recommendation for approval of the application for final examination.

The application for final examination, duly recommended by her/his guidance committee and noted by the chair of the major department or institute director, and a copy of the final draft of the thesis shall be submitted to the dean of the Graduate School at least two weeks before the examination. The candidate must also submit a copy of the final draft of her/his thesis to each member of her/his committee.

To pass the examination, the student must receive not more than one negative vote from the committee. A student who fails the examination may be given a re-examination upon unanimous approval of the committee. Failure to pass this second examination shall disqualify the student permanently from earning the degree.

The chair of the examining committee shall submit a report on the result of the examination to the dean of the Graduate School on a prescribed form not later than the working day following the examination.

### **Time Limit for Earning the Master's Degree**

The maximum time allowed for the completion of the master's degree is five years. The 5-year period begins with the earliest course work listed in the official plan of study, including validated and/or transfer courses.

### **Extension of Residency**

A student who was not able to complete the requirements for the degree within the time limit of her/his residence may apply for an extension of residency provided the student has satisfied all the following conditions:

- a) has completed all coursework requirements based on the approved plan of course work with a GWA of 2.00 or better;
- b) has already passed the general examination and has a recommending approval of her/his Guidance Committee

Students must apply for extension at least one month before reaching maximum residency. Upon approval, a formal notice of extension will be sent to the student and her/his Guidance Committee. Prescription of additional courses is optional and is dependent on the collective decision of the student's Guidance Committee.

A second and last year of extension may be granted to a student if she/he has already successfully defended the thesis, and is in the process of finalizing the manuscript.

In cases of *force majeure*, such as typhoons and major calamities, which the Graduate School, upon the recommendation of the Guidance Committee, will determine, the student may be allowed an additional, or third extension, to complete her/his program.

## **DOCTOR OF PHILOSOPHY DEGREE**

### **General Rules and Requirements**

#### **Advisory Committee**

Membership in the advisory committee shall be limited to graduate faculty members who are professors and/or PhD degree holders and shall be with the mutual consent of individuals selected to serve. Other graduate faculty members may act as member or chair of the committee only by exceptional merit to be approved by the dean upon recommendation of the department chair or institute director.

The student, in consultation with the chair of the department or institute director in which she/he desires to do her/his major work, selects her/his major professor who shall serve as chair of the advisory committee.

Not later than two months after registration, the

student, in consultation with the major professor, selects one or two cognate fields and the other members of her/his advisory committee. This committee shall be composed of four or five members with the major field and cognate field(s) represented.

The chair of the major department or institute director recommends to the dean of the Graduate School the composition of the advisory committee.

### **Changes in Committee Composition**

A student may request a revision of the composition of her/his advisory committee upon endorsement of the department chair or institute director and in consultation with the professor concerned for approval by the dean of the Graduate School.

### **Qualifying Examination**

The student must take the qualifying examination to be conducted by the advisory committee before the registration of the second semester of residence. The result of the examination will be the basis for evaluating the student's ability to pursue doctoral study and for determining a suitable program of course work.

The student should submit her/his application for the qualifying examination, duly recommended by her/his advisory committee and noted by the chair of the major department, or institute director, to the dean of the Graduate School not later than one month before the date of examination. Details of the qualifying examination shall be left to the discretion of the advisory committee.

To pass the examination, the student must receive not more than one negative vote of the committee.

If the student fails the qualifying examination, no re-examination shall be allowed except with the unanimous approval of her/his advisory committee. If the student fails the re-examination, she/he shall be permanently disqualified from earning the degree.

The chair of the advisory committee shall submit to the dean of the Graduate School a report on the result of the examination within one week after the examination.

### **Residence Requirement**

A minimum of four semesters of residence is required for the doctoral degree. A student is in residence when she/he is registered for course work on campus, or work *in absentia* with due approval in advance by her/his advisory committee.

### **Course Work Requirement**

After passing the qualifying examination, the student shall confer with her/his advisory committee to plan

her/his course work. The plan of course work shall be recommended by the advisory committee and endorsed by the department chair or institute director to the dean of the Graduate School for approval. The UPLB Registrar shall be furnished the approved copy of the plan of course work.

A minimum of 24 units of course work beyond the master's degree is required with at least 18 units of the course work in the above-200 level.

At least 12 units of courses shall be in the major field and 6 units in each cognate field. In case the student selects to have only one cognate, the minimum number of units for the major and cognate fields shall be 15 and 9 units, respectively.

The cumulative units to be credited for courses numbered 290/291 and 299 should not exceed 6 and 2 units, respectively.

### **English Language Requirement**

Foreign students whose English proficiency is Level A as determined from the English Proficiency Examination are required to present a certificate of English proficiency issued by the Language Instruction Towards Excellence (LITE) Program of the College of Arts and Sciences. The Graduate School monitors the fulfillment of the English language requirement and this must be satisfied prior to taking the written comprehensive examination.

### **Official Plan of Study**

Within the first semester of residence, a regular student must confer with her/his advisory committee to draw up her/his proposed plan of study which includes a detailed listing of the courses, and transfer of courses, if any, that she/he is proposing for the fulfillment of the degree requirements. A form is available in the Graduate School office. The proposed plan of study must be recommended by her/his advisory committee and endorsed by the department chair or institute director to the dean of the Graduate School for approval. Once approved, this becomes the official program of study and must be fulfilled in every detail to meet graduation requirements.

### **Changes in the Approved Plan of Study**

A student may request a revision in her/his approved plan of study upon recommendation of her/his advisory committee and endorsement of the department chair or institute director to the dean of the Graduate School for approval. Any change in the official program should first be approved before courses to be deleted, added, or replaced are registered.

### **Grade Requirement**

A student must obtain a weighted average of "2.00" or better in all courses prescribed by her/his advisory committee under the major and minor fields to qualify

for the comprehensive examination. She/He must also obtain "passing grades" in all other courses in which she/he enrolled.

### **Comprehensive Examination**

The student may apply for a comprehensive examination after completing satisfactorily all courses prescribed by her/his committee and the foreign language requirement, if any, and upon recommendation of her/his advisory committee.

Application for comprehensive examination duly recommended by the advisory committee and noted by the chair of the major department, or institute director, shall be submitted to the dean of the Graduate School at least one month before the date of examination.

The comprehensive examination shall test the student in her/his major and cognate fields. A written examination shall be given for each area indicated in her/his plan of course work. An integrative oral examination shall be given after passing the written examination. The details of the examination shall be left to the discretion of the advisory committee.

To pass the examination, a unanimous vote of the committee is required.

A student who fails the comprehensive examination may apply for re-examination not earlier than one month but not later than one year after the first examination. If the student fails the re-examination, she/he shall be permanently disqualified from earning the degree.

The chair of the advisory committee shall submit to the dean of the Graduate School a report on the result of the examination within one week after the examination.

### **Doctoral Candidacy**

Candidacy is established when a student has passed the oral comprehensive examination.

### **Doctoral Dissertation**

After earning at least 12 units of course work, a doctoral student may start working on her/his dissertation. The title and outline of the dissertation as recommended by the adviser must be approved by all members of the advisory committee and submitted to the dean of the Graduate School for approval.

The doctoral dissertation shall have an equivalent of 12 units of graduate credit and shall have a numerical grade upon completion. The 12 units of dissertation can be enrolled in three terms for four units each term (4-4-4) or four terms for three units each term (3-3-3-3).

A student who has already registered a total of 12 units for dissertation but still unable to finish the work should register one unit per term until she/he is able to submit the copies of approved manuscript, but only up to a maximum of six terms (4 semesters, 2 summers). If at the end of this time limit, the student is still unable to submit copies of the approved manuscript, he/she shall be given a grade of "U" and should re-enroll all the 12 units of thesis. The same policies on how to enroll the number of units for dissertation shall apply. However, a student who is a candidate for graduation during the semester and only has dissertation to enroll may be allowed to register the whole 12 units total credit.

The candidate must present a copy of her/his dissertation that is satisfactory to all members of the advisory committee. The dissertation which should be in the prescribed form must show that (1) the candidate possesses mastery of the field in which she/he presents himself; (2) she/he is capable of doing independent scholarly work; and (3) she/he is able to draw or infer such conclusions as may, in some respect, modify or enlarge upon what has been previously known. It shall be the responsibility of the adviser to ensure that final copies conform to the format prescribed by the Graduate School.

The dissertation shall be subjected to external review. The Dean of the Graduate School appoints an external reviewer from three nominees recommended by the advisory committee. The external reviewer shall have expertise along the student's field of study and shall come from outside the student's major department. The external reviewer is required to submit an independent report to the Dean that indicated her/his recommendation for either acceptance or rejection of the dissertation with explanation based on the critical review and evaluation that she/he has made.

The advisory committee certifies to the publishable quality of the dissertation that the dissertation is suitable for publication in a journal that practices a thorough and credible review process. The student is required to submit to the Dean of the Graduate School two articles based on the dissertation and written in a format that is ready for publication in a refereed journal or journals.

Three printed copies of the dissertation manuscript and an e-copy in PDF and in Word format must be submitted to the dean of the Graduate School not later than the deadline set for submission of all requirements for graduation.

The three copies of the dissertation shall be distributed as follows: one copy each for the major department, major adviser, and the UPLB Graduate School.

### **Work in Absentia**

The dissertation of a candidate may be done *in absentia* with the approval of the advisory committee, if her/

his research project requires work outside the University or will be facilitated by the resources of other institutions.

A candidate working *in absentia* shall make periodic reports of her/his progress to her/his adviser. The candidate must be registered if her/his work is to be recognized.

### Final Examination

The final oral examination has two purposes: to test the candidate's ability to defend her/his dissertation and to provide the advisory committee the opportunity to suggest modifications in the dissertation proper.

The candidate may apply for the examination when her/his dissertation is complete and in a form acceptable to her/his major professor who indicates her/his favorable judgment by recommending the approval of the application for final examination.

The application for final examination duly recommended by the candidate's advisory committee and noted by the chair of the major department or institute director and the final draft of the dissertation shall be submitted to the dean of the Graduate School not later than two weeks before the examination. The candidate must also submit a copy of the final draft of her/his dissertation to each member of her/his advisory committee who shall conduct the examination.

To pass the examination, the candidate must receive not more than one negative vote of the committee.

A candidate who fails in her/his final examination may apply for a re-examination, which should take place not earlier than one month but not later than one year after the final examination only upon the unanimous approval of the advisory committee. If the student fails the reexamination, she/he shall be permanently disqualified from earning the degree.

The chair of the advisory committee shall report the result of the examination to the dean of the Graduate School not later than three days after the examination.

Interested members of the Graduate Faculty may attend and participate without any voting power in the final examination.

### Time Limit for Earning the Doctoral Degree

The maximum time allowed for the completion of the doctoral degree is seven years. The 7-year period begins with the earliest course work listed in the official plan of study, including validated and/or transfer courses.

### Extension of Residency

A student who was not able to complete the

requirements for the degree within the time limit of their residency may apply for extension of residency provided the student has satisfied the following conditions:

- a) has completed all coursework requirements based on the approved plan of course work with a GWA of 2.00 or better;
- b) has already passed the written and oral comprehensive examinations; and
- c) has the recommending approval of her/his Advisory Committee.

Students must apply for extension at least one month before reaching maximum residency. Upon approval, a formal notice of extension will be sent to the student and her/his Advisory Committee. Prescription of additional courses is optional and is dependent on the collective decision of the student's Advisory Committee.

A second and last year of extension may be granted to a student if she/he has already successfully defended the thesis, and is in the process of finalizing the manuscript.

In cases of *force majeure*, such as typhoons and major calamities, which the Graduate School, upon the recommendation of the Advisory Committee, will determine, the student may be allowed an additional, or third extension, to complete her/his program.

## STRAIGHT DOCTOR OF PHILOSOPHY

### Admission Requirements

A master of science student in UPLB who has completed 18 units of 200-level graduate courses in two consecutive semesters during her/his first year in the graduate program, with a grade point average of 1.25, may shift to the straight PhD program.

The applicant shall undergo the following procedures prior to her/his admission to the straight PhD program:

- 1) Obtain a certification of her/his grade point average and record of her/his grades for each course she/he has taken at the 200-level from the Office of the UPLB Registrar. These documents must be attached to her/his application for a qualifying examination.

- 2) After securing the foregoing documents, apply for a qualifying examination to the department chair upon the recommendation of her/his guidance committee.

- 3) Take the qualifying examination before the opening of classes following her/his completion of the first 18 units of 200-level graduate courses. The qualifying examination shall determine whether the following criteria are met.

- a) Substantial scholarship and high attainment in a particular field of knowledge;



- b) Marked ability and scholarship in some relatively broad field of knowledge;
- c) High critical ability and powers of imagination and synthesis; and
- d) Knowledge in the use of research techniques.
- c) Have at least three (3) years of relevant experience in research certified by her/his agency;
- d) Have at least one refereed publication, senior or sole author, in a reputable journal;
- e) Must undergo and pass the assessment process conducted by the evaluation committee of the relevant academic unit.

### **Examination Committee**

The department chair shall organize the Examination Committee after she/he has approved the application of the student for a qualifying examination. The Examination Committee shall perform the following tasks:

- 1) Assess the scholastic standing of the candidate;
- 2) Examine the subject areas taken by the student which will receive emphasis in the doctoral program;
- 3) Interview the candidate;
- 4) Prepare and administer the written qualifying examination;
- 5) Evaluate the result of the written qualifying examination and measure them against the criteria set forth in the foregoing; and
- 6) Submit to the department chair the results of the evaluation of the candidate's performance in the written qualifying examination.

A student who passes the written qualifying examination shall be recommended by the department chair to the dean of the Graduate School who will issue the official letter of admission. An applicant who fails to meet the admission requirements retains her/his status in the master's program.

### **Shifting Process**

Upon admission to the Straight PhD degree program, the applicant must nominate her/his advisory committee following the general rules and requirements of the doctoral degree program given on pages 157.

## **DOCTOR OF PHILOSOPHY BY RESEARCH**

### **Admission Requirements**

An applicant for admission to graduate work for the degree of Doctor of Philosophy (PhD) by research must:

- a) Be a holder of a Master of Science (MS) degree in the same area as the PhD degree being applied for from a recognized institution;
- b) Have a grade point average of 1.75 or better in the MS degree program;

A duly accomplished application form must be submitted to the Graduate School together with the following documents:

- a) Original and a photocopy of the official transcript of academic records, in English language, with no remarks and with an explanation of the grading system used, from all tertiary and graduate institutions attended;
- b) Photocopy of BS and MS diplomas;
- c) Certification from the immediate head of the agency that the applicant has at least three (3) years of satisfactory research experience;
- d) Reprints or copies of the applicant's research outputs;
- e) A research proposal which shall include the title, rationale, objectives, methodology, and references;
- f) For international students, certification from the Office of the University Registrar of previous university attended that the medium of instruction is English (if applicable), or results of Test of English as a Foreign Language (TOEFL) or results of the International English Language Testing System (IELTS), or its equivalent;
- g) Application fee (maybe paid by bank transfer or postal money order); and
- h) Sealed letters of references from two former professors, superiors or colleagues, and a letter of reference from the applicant's former master's degree adviser.

All documents must be in the Graduate School at least one month before the start of classes every semester. For international students, documents must be submitted earlier to have ample time to process travel papers. Submitted documents pertinent to the application become part of the university files and cannot be returned to the applicant.

All applicants from countries where English is not the medium of instruction and with TOEFL score below 500 or IELTS score below 5.5 should take the English proficiency examination. Those who do not meet the required level of proficiency for graduate studies in UPLB may be admitted in probationary status with the condition that they should take the Intensive English Course for International Students administered by the Language Instruction Towards Excellence (LITE) program of the

College of Arts and Sciences prior to or during their first semester of residency in the program.

### **Admission Evaluation**

The Evaluation Committee composed of a chair and at least three (3) but not more than five (5) graduate faculty members shall assess the potential of an applicant as a PhD by research student.

The Evaluation Committee shall conduct the interview, assessment examination, and defense of the research proposal of the applicant. The assessment examination may be written or oral, or both, as unanimously approved by the Evaluation Committee.

Acceptance (or non-acceptance) to the program shall be based on the overall performance of the applicant in the interview, assessment examination, and in the defense of the applicant's research proposal.

To be accepted in the program, the applicant must receive not more than one negative vote from the Evaluation Committee.

### **Registration**

The student shall confer with the UPLB Registrar regarding her/his initial registration requirements only upon presentation of the letter of admission from the dean of the Graduate School.

### **Deferment of Registration**

Deferment of registration for a period not exceeding one year may be granted upon written request. A student unable to register within one year of admission needs to reapply for admission to the Graduate School.

### **Residency and Time Limit**

A student is in residence when she/he is registered for dissertation work on campus or work *in absentia* with due approval in advance by her/his Advisory Committee.

A minimum period of two (2) but not more than five (5) years is required for residency.

### **Advisory Committee**

The candidate, in consultation with the chair/director of the major department/institute, shall select her/his prospective major adviser who shall also be the chair of the student's advisory committee. The student, together with her/his major adviser, shall form the committee which shall be composed of at least five (5) members, including the adviser, with the major and related areas represented.

The chair of the advisory committee shall convene the committee not later than 1 month after the approval of its composition by the dean of the Graduate School. The candidate shall discuss with her/his advisory committee the details of the dissertation proposal including the place of work and its mechanics of monitoring, facilities needed, time required to accomplish the work, and the budget. During her/his first semester, the student shall also discuss the required seminar presentations in relation to the dissertation research with the advisory committee.

The candidate shall discuss with her/his advisory committee the approval of portions of the dissertation which are ready for presentation in a seminar, and to be written and submitted for publication.

### **Work in Absentia**

The provisions on pages 159 and 160 shall apply to the PhD by Research program.

### **Final Examination Panel**

The final examination panel shall be composed of the student's advisory committee and one external reviewer to be appointed by the dean of the Graduate School from among three nominees of the department or institute. In addition, the doctoral dissertation outline as well as the manuscript will be externally reviewed to ensure quality.

### **Final Examination**

The candidate shall be given, by her/his Final Examination Panel, an oral examination which will be open to the public. The Graduate School shall publicize the schedule and place of the oral examination.

To pass the examination, the candidate must not receive more than one negative vote from the Final Examination Panel.

A candidate who fails the examination may be given a re-examination not earlier than one month but not later than one year after the first examination only upon unanimous approval of her/his Advisory Committee. Failure to pass the re-examination shall disqualify the candidate from earning the degree.

A student who passes the final examination shall be given a numerical grade by her/his adviser in consultation with the members of the advisory committee. This grade reflects the whole work done during the program to include the publications emanating from the research work and the results of the final examination.

## Requirements for Graduation

The candidate must register three (3) units of seminar (1 unit per semester) and present a seminar as a requirement for each enrollment. At least two of the seminar topics to be presented must include results of the dissertation. The student shall not be allowed to continue the program if she/he will not be able to give a satisfactory performance in her/his first seminar presentation.

Before the candidate can be awarded the degree, at least three articles from her/his dissertation work should have been published or at least accepted for publication in a refereed scientific journal. The first pages or title pages of the published articles shall be appended to the manuscript. If the articles are not yet published, the letter of acceptance can be appended instead.

Three printed copies of the dissertation and an e-copy in PDF and in Word format duly approved by the Advisory Committee members must be submitted to the Graduate School.

## READMISSION

A student who was not able to complete the requirements for the degree within the time limit, that is, five calendar years for the master's degree and seven calendar years for the regular doctoral degree may apply for readmission to the Graduate School. To be eligible for readmission, the student must have a general weighted average of "2.00" or better in all advanced undergraduate and graduate courses taken in the program that she/he was pursuing.

## Residence Requirement and Time Limit

The student is in residence when she/he is registered for course work, thesis, or dissertation work on the campus or work *in absentia*, with due approval in advance by her/his guidance/advisory committee.

Not more than five (5) calendar years from the start of initial registration as a readmitted student shall be allowed for the completion of all requirements for the master's degree and not more than seven (7) calendar years for the doctoral degree. The time limit allowed to complete a graduate degree excludes the period when the student is on leave of absence. The 5- or 7-year period begins with the earliest work listed in the official plan of study, including validated and/or transfer courses.

## GRADUATION

Requirements for graduation include the completion of all academic as well as non-academic requirements.

A student in the master's (with thesis) degree program is required to complete at least 30 units of course work and thesis, pass the general and final examinations, and submit three copies of the thesis and an e-copy.

A student in the master's (without thesis) degree program is required to complete from 30 to 42 units of course work and pass the final examination.

Candidates for the PhD degree are required to complete a minimum of 36 units of course work and dissertation, pass a qualifying examination, a written and an oral comprehensive examination, and a final examination based on the dissertation. Submission of three copies of the dissertation and an e-copy is also required.

*Deadlines for the submission of all requirements for graduation are:*

- a) For Mid-Year Term Graduation - the day before the first day of regular registration for the succeeding first semester.
- b) For First Semester Graduation - the day before the first day of regular registration for the succeeding second semester.
- c) For Second Semester Graduation - the day before the Graduate Academic Advisory Council meets.

If some graduation requirements are completed beyond the deadline, the student must register in the succeeding semester to be considered a candidate for graduation as of the end of the last semester of registration.

All candidates for graduation must have their deficiencies made up and their records cleared not later than 5 weeks before the end of their last semester with the exception of those in academic subjects in which the student is currently enrolled in.

A student who fails to pay the required graduation fee cannot be conferred any title or degree. She/he may, however, upon her/his request and payment of necessary fees, be issued a certified copy of her/his credentials without specifying her/his completion of the requirements toward any title or degree.

**Clearance for Graduation**

Clearance may be obtained by accomplishing U.P. Form 13a. Students who have completed all academic and other requirements including submission of required clearance forms and fees qualify for graduation. Students who have completed all the academic requirements for their respective degrees may be recommended for graduation even if they have not processed their clearance. However, granting of honorable dismissal and the issuance of the transcript or checklist and diploma shall be withheld pending submission of clearance by the student.

**Commencement Exercises**

Candidates for graduation are required to attend the commencement exercises. Those who are unable to do so because of illness or other valid reasons must submit a request for graduation *in absentia* to the dean of the Graduate School.

**Transcripts**

Application for transcripts of records should be filed at the Office of the University Registrar upon presentation of the clearance slip. Graduates are encouraged to file their requests for transcripts as early as possible to avoid unnecessary delay.



## GRADUATE PROGRAMS AND COURSES

### AGRARIAN AND RURBAN DEVELOPMENT STUDIES (ARDS)

*Institute of Governance and Rural Development, College of Public Affairs and Development*

**Degree offered:** Master in Public Affairs

The MPAf ARDS program consist of 31 units, these are 13 units of core courses, 12 units of specialization courses and 6 units of electives. The core courses are PAF 201, PAF 203, PAF 204 and DM 224. The specialization courses are ARDS 201, AGRS 211, AGRS/CED 291, AGRS 298 and AGRS 299. The 3 unit elective course can be selected from the following, AGRS 221, AECO 251 or DM 220.

#### Agrarian Studies

**AGRS 211. Economics of Agrarian Reform (3).** The role of agrarian reform in economic development; cost and financing of agrarian reform programs; economics of institution-building. 3 hrs (class). PR AECO 250 or COI. (1).

**AGRS 221. Legislation and Administration of Agrarian Reform Programs (3).** Statutes, executive orders, code, decrees on agrarian reforms; case studies and problems of adjudication; and comparison of agrarian reform organizations, management, policies, planning and programming. 3 hrs (class). PR. COI (2).

**AGRS 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the students program will not exceed 4 units. (1,2).

**AGRS 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2).

**AGRS 298. Field Studies (3).** Field work in agrarian reform situations, designing feasibility studies, training program evaluation, and related activities. PR. COI. (1,2,S).

**AGRS 299a. Graduate Seminar on Agrarian Reform (1).** May be taken twice. PR. COI. (1).

**AGRS 299b. Graduate Seminar on Agrarian Reform (1).** May be taken twice. PR. COI. (2).

#### Agrarian and Rurban Development Studies

**ARDS 201. Social Dynamics of Agrarian and Rurban Institutions. (3).** The interfluence between the agrarian and rurban sectors and the factors that affect the interrelationships among the institutions within those sectors. PR. ECO 11 or COI. (2).

*Please refer to Public Affairs for other courses.*

## AGRIBUSINESS MANAGEMENT AND ENTREPRENEURSHIP (ABME)

*Department of Agribusiness Management, College of Economics and Management*

**Degree offered:** Master of Management

Prior to regular admission to the program, prospective students will be required to attend a summer workshop on the problems and prospects of agribusiness today, fundamentals of accounting and financial statement analysis, quantitative management, and microcomputer applications. The 5-week workshop will serve both as post-screening procedure and refresher course to prospective students.

The MM ABME is a non-thesis program, it requires a total of 39 units, these are: 9 units of core courses, and 30 units of major courses. The core courses are MGT 201, MGT 213 and MGT 231. The 30 units of major courses are ABME 203, ABME 207, ABME 240, ABME 298, ENTR 201, ENTR 271, MGT 215, MGT 221, MGT 251, and MGT 281.

#### Agribusiness Management and Entrepreneurship

**ABME 203. Advanced Agribusiness (3).** Analysis of agribusiness industries with emphasis on major agricultural commodity systems. 3 hrs (class). PR. MGT 201. (1)

**ABME 207. Innovative and Integrative Arrangements in Managing Agribusiness Enterprises (3).** Managing innovative opportunities and integrative arrangements relevant to the overall agribusiness enterprise decision-making. 3 hrs (class). PR. ABME 203 (2)

**ABME 240. Agribusiness Operations Management (3).** Operations management in agribusiness enterprises, application of analytical tools and techniques in agribusiness enterprise decision-making. 3 hrs (class). PR. MGT 221. (2)

**ABME 298. Field Studies (3).** PR. COI. (2)

#### Entrepreneurship

**ENTR 201. Theory and Practice of Entrepreneurship (3).** Theories, principles, perspectives, practices, and trends in entrepreneurship. 3 hrs (class). PR. None. (1, 2)

**ENTR 271. Technology Commercialization and Technopreneurship (3).** Technology commercialization; technology-based enterprise identification and business plan development. 3 hrs (class). PR. ENTR 201 or COI. (1,2)

*Please refer to Business Management for the other courses.*

**AGRICULTURAL CHEMISTRY (ACHM)**

*Institute of Chemistry, College of Arts and Sciences*

**Degrees offered:** Master of Science and Doctor of Philosophy

The MS ACHM program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. The major courses are composed of 9 units of core courses (CHEM 205, CHEM 220, CHEM 230, CHEM 242, CHEM 260) and 6 units of major courses of any CHEM or ACHM courses.

The PHD ACHM program has a total of 37 units, these are 15 units of major courses which should include at least three of the core courses of the MS ACHM program if not taken during master's; CHEM or ACHM courses that are aligned with the cognate must be taken to satisfy the number of units; 9 units of cognate; 12 units of dissertation units and 1 unit of seminar.

Minor/cognate must be from any field of specialization in Agriculture or Forestry, and the thesis/dissertation topic must be application of chemistry to these fields.

**Agricultural Chemistry**

**ACHM 203. Advanced Agricultural Chemistry (2).** Chemistry and technology of compounds in relation to their application to agriculture. 2 hrs (class). PR. CHEM 160 or CHEM 161 or COI. (1)

**ACHM 231. Advances in Carbohydrate Chemistry (2).** 2 hrs (class). PR. CHEM 160 or CHEM 161 or COI. (1)

**ACHM 235. Research in Sugar By-Products (3).** 7 hrs (1 class, 6 lab). PR. CHEM 40 or its equivalent. (2)

**ACHM 238. Cereal Chemistry (3).** Chemistry of cereal with emphasis on rice and corn. 5 hrs. (2 class, 3 lab). PR. CHEM 160 or CHEM 161 or COI. (1)

**ACHM 250. Chemistry of the Coconut (3).** Composition of coconut parts and their uses; biochemical properties of the coconut. 3 hrs (class). PR. CHEM 160 or CHEM 161 or COI. (1)

**ACHM 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**ACHM 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units.

**ACHM 299. Graduate Seminar in Agricultural Chemistry (1).** May be taken twice. PR. COI. (1,2)

**ACHM 300. Master's Thesis (6).** (1,2,S)

**ACHM 400. Doctoral Dissertation (12).** (1,2,S)

*Please refer to Chemistry for more courses.*

**AGRICULTURAL ECONOMICS (AECO)**

*Department of Agricultural Economics, College of Economics and Management*

**Degrees offered:** Master of Science and Doctor of Philosophy

**Areas of specialization:** Agricultural Development, Agricultural Marketing, Agricultural Policy, Agricultural Prices, Farm Management, Production Economics, and Resource Economics.

The MS AECO program requires a minimum of 32 units, these are 15 units of major courses, 9 units of minor courses, 2 units of seminar and 6 units of thesis. The major courses are composed of core courses ECON 201, ECON 202, ECON 237 and other major courses to satisfy the minimum number of units.

The PhD AECO program requires a minimum of 38 units, these are 15 units of major courses, 9 units of cognate courses (or 12 units for double cognate), 2 units of seminar and 12 units of dissertation. The major courses are composed of core courses ECON 203, ECON 204, ECON 237 and other major courses to satisfy the minimum number of units.

Other requirements: Graduate students are required to pass a departmental written comprehensive examination given once in a semester and an oral examination.

**Agricultural Economics**

**AECO 210. Advanced Agricultural Production Economics (3).** Selected economic theories and their application to problems in agricultural production and their distribution. 3 hrs (class). PR. COI. (1)

**AECO 211. Advanced Farm Management (3).** Production problems of small and large farms; farm business analysis; production decision criteria; and labor management. 3 hrs (class). PR. AECO 111 and ECON 102 or COI. (2)

**AECO 220. Economics of Agricultural Marketing (3).** Economic theory applied to marketing; analysis of marketing functions, cost and prices of agricultural inputs and products; industry structure, marketing policies. 3 hrs (class). PR. AECO 120 or COI. (1)

**AECO 222. Agricultural Prices (3).** Price determination in product and factor markets; supply and demand; price variation and instability; dynamic analysis; price policy. 3 hrs (class). PR. ECON 102 or COI. (2)

**AECO 230. Advanced Agricultural Finance (3).** Conceptual bases of agricultural finance; risks and uncertainties in farm-related financial intermediaries; issues in financing agricultural development. 3 hrs (class). PR. COI. (2)

**AECO 240. Natural Resource Economics (3).** Application of economic theory to developmental and intertemporal issues in the optimal management of agricultural land and other resource-evaluation of economic institutions affecting use of such resources. 3 hrs (class). PR. ECON 101 or COI. (1)

**AECO 241. Economic Analysis and Planning of Agricultural Projects (3).** Economic analysis of agricultural projects from national and individual viewpoints; identification of projects; preparation and evaluation of project plans. 3 hrs (class). PR. ECON 101 and ECON 102 or COI. (2)

**AECO 248. Economic Analysis and Design of Natural Resource and Environmental Policies (3).** Economic principles, methods and tools in the analyses and design of natural resource and environmental policies. 3 hrs (class). PR. AECO 240 or COI. (1,2)

**AECO 250. Agriculture and Economic Development (3).** Factors that accelerate or inhibit the growth of agriculture; survey of existing growth theories and establishment of their relevance to Philippine experience. 3 hrs (class). PR. ECON 101 and ECON 102 or COI. (2)

**AECO 251. Agricultural Programs for Economic Development (3).** Past and present action programs of government agencies and farmer's organizations; coordination of programs of viable private operating units and public agencies. 3 hrs (class). PR. ECON 101 and ECON 102 or COI. (1)

**AECO 253. Applied Regional Economics (3).** Application of economic theories and analytical tools to regional planning, development, and program implementation. 3 hrs (class). PR. ECON 101 and STAT 1 or COI. (2)

**AECO 260. Research in Agricultural Economics (3).** Methods and techniques of economic research, emphasis on current agricultural economic problems. 3 hrs (class). PR. ECON 101 and ECON 102 or COI. (1)

**AECO 261. Food and Nutrition Economics (3).** World food problems and the economic consequences of malnutrition; review of food and nutrition policies and programs. 3 hrs (class). (1)

**AECO 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**AECO 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**AECO 299. Graduate Seminar in Agricultural Economics (1).** May be repeated once for a maximum of 2 units. PR. COI. (1,2)

**AECO 300. Master's Thesis (6).** (1,2,S)

**AECO 320. Organization and Performance of Agricultural Markets (3).** Agricultural markets: structure, conduct and performance; policy and welfare analysis; research and development. 3 hrs (class). PR. AECO 220 and ECON 202 or COI. (2)

**AECO 400. Doctoral Dissertation (12).** (1,2,S)

## AGRICULTURAL EDUCATION (AgED)

*Institute of Governance and Rural Development, College of Public Affairs and Development*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

The MS AgED program requires a minimum of 37-38 units, these are 21-22 units of major courses, 9 units of minor courses, 1 unit of graduate seminar and 6 units of thesis. The major courses are composed of core courses (CED 232, CED 220, AERS 282, STAT 166 or CED 291); 6 units of specialization courses (CED 201, CED 211); and 3 units of electives (CED 210, CED 213, AGRI 121").

The PhD AgED program requires a minimum of 45-48 units, these are 23 units of major courses, 9 or 12 units of cognate courses, 1 unit of graduate seminar and 12 units of dissertation. The major courses are composed of core courses (CED 227, CED 301, CED 365, AERS 281, AERS 282, CED 291"); 6 units of specialization courses (CED 201, CED 211, CED 217, CED 224); and 3 units of elective (CED 215, CED 226, CED 242, AGR 221").

\*Required if not taken in the MS program

\*\*If CED 291 has been taken, additional social science statistics or qualitative research methods may be required.

\*\*\*To be prescribed if student lacks background in agriculture

*Please refer to Community Development for the list of courses.*

## AGRICULTURAL ENGINEERING (AENG)

*Institute of Agricultural Engineering, College of Engineering and Agro-Industrial Technology*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

**Areas of specialization:** For MS: Farm Power and Machinery, Crop Processing, and Soil and Water Engineering. For PhD: Land and Water Resources Engineering, Agricultural Power and Machinery and Agricultural Process Engineering

The MS AENG includes a minimum of 31 units, these are: 15 units of major courses; 9 units of minor, 1 unit of graduate seminar, and 6 units of thesis work.

The PhD AENG includes a minimum of 37 units, these are: 12 units of major courses; 6 units in each cognate field; 1 unit of seminar and 12 units of dissertation.

If only one cognate field is chosen, the minimum major and cognate courses must be 15 and 9 units, respectively

AENG 201, AENG 299 is required for Agricultural Power and Machinery and Agricultural Process Engineering.

### Agricultural Engineering

**AENG 201. Advanced Engineering Mathematics (3).** Formulation and solution of differential and systems equations in engineering. 3 hrs (class). PR. MATH 28 or its equivalent. (1)

**AENG 202. Engineering Similitude (3).** Theory of similitude and its application to engineering models. 5 hrs (2 class, 3 lab). PR. COI. (2)

**AENG 203. Heat, Mass and Momentum Transport (3).** Principles of transport phenomena and their application to agricultural, biological, and food systems. 3 hrs (class). PR. COI. (2)

**AENG 204 . Advanced Thermodynamics ( 3 ) .** Thermodynamic theory of irreversible processes. Selected applications in physiological unit operations and separation processes. 3 hrs (class). PR. ENSC 14 or CHEM 102; MATH 151. (1)

**AENG 205. Numerical Methods in Thermo-Fluid Engineering (3).** Finite differences, finite elements analysis and application in agricultural process engineering. 3 hrs (class). PR. AENG 201 or COI. (2)

**AENG 225. Advanced Heat Transfer (3).** Analysis and application of steady state and transient heat conduction; radiant heat transfer; radiation networks; spectral properties, natural and forced convective transfer of heat and mass in boundary layers and in fluids with phase change. 3 hrs (class). PR. ENSC 14a. (2)

**AENG 226. Convective Heat Transfer (3).** Equations of convective heat transfer, solutions to laminar and turbulent forced convection; free and mixed convective transfer; property variation; condensation and heat transfer in porous media. 3 hrs (class). PR. AENG 225 or COI. (1)

**AENG 232. Drying, Storage, and Preservation of Cereal and Forage Crops (3).** Systems for drying, storage and preservation of cereal and forage crops; theory of heat and mass transfer in drying and its relation to quality control. 5 hrs (2 class, 3 lab). PR. COI. (1)

**AENG 233. Agricultural Process Engineering (3).** Design and operations of systems for drying and storage, material handling and refrigeration; other unit operations in the processing of agricultural products. 5 hrs (2 class, 3 lab). PR. COI. (2)

**AENG 235. Agricultural Process Systems Analysis and Design (3).** Modeling agricultural process equipment; systems simulation; economic analysis of process systems. 3 hrs (class). PR. AENG 233. (1)

**AENG 236. Physical Properties of Agricultural Materials (3).** Measurement and application of mechanical, rheological, thermal and electrical properties of agricultural materials. 5 hrs (2 class, 3 lab). PR. AENG 233 or COI. (2)

**AENG 237. Process Control in Agricultural Process Engineering (3).** Control systems analysis and design; simulation for process control. 3 hrs (class). PR. AENG 270 or COI. (2)

**AENG 238. Drying and Dehydration of Agricultural Crops (3).** Principles of drying and dehydration, drying methods; design and operation of drying systems. 3 hrs (class). PR. AENG 232 or COI. (1)

**AENG 240. Advanced Water Resources Planning (3).** Factors and issues in water resource planning; application of systems methodologies. 3 hrs (class). PR. COI. (1)

**AENG 241. Research Methods in Land and Water Resources Engineering (3).** Quantitative and qualitative research methods; validity and reliability considerations in research design; analytical tools and techniques; computer-oriented approaches; application to land and water resources engineering problems. 3 hrs (class). PR. COI. (1)

**AENG 242. Water Management (3).** Irrigation practices as affected by soil properties and topography; interrelations of irrigation with tillage, fertility and fertilizer applications; moisture control during germination and harvest; irrigation for water conservation; influences of salinity and drainage on water management. 3 hrs (class). PR. COI. (1)

**AENG 243. Soil and Water Conservation (3).** Agricultural hydrology; flood control and structures; diversion and waterways; relationship between water management and soil-water conservation; land clearing, development, and formation. 3 hrs (class). PR. COI. (2)

**AENG 244. Groundwater Hydrology (3).** Groundwater as a source of water supply, occurrence and distribution, flow hydraulics, aquifer and well characteristics, well drilling, discharge, development, maintenance, and recharge. Pumps and pumping test analysis. 3 hrs (class). PR. ABE 71 and MATH 26 or 36. (2)

**AENG 245. Drainage Engineering (3).** Dynamics of soil water; rainfall-runoff relations; seepage analysis; soil permeability measurements; generalized flow equations; design criteria; quantitative determination of drainage spacing and depth; subsurface and open ditch drainage design. 3 hrs (class). PR. ABE 73 and MATH 151. (1)



**AENG 247. Water Quality Control Engineering (3).** Water and waste water characteristics; design and operation of water and waste water treatment systems; water reclamation and reuse. 3 hrs (class). PR. ABE 177 or ChE 180 or COI. (2)

**AENG 248. Erosion and Sediment Transport (3).** Theories and models of erosion and sediment transport; control measures; soil and water conservation planning. 3 hrs (class). PR. COI. (1)

**AENG 249. Statistical Hydrology (3).** Frequency analysis of hydrologic events; hydrologic models; single and multisite generation of synthetic sequences; data augmentation; flood estimation; application studies. 3 hrs (class). PR. ABE 71 or COI. (2)

**AENG 260. Experimental Stress Analysis (3).** Elasticity, brittle-coating methods, photoelastic methods, strain measurement methods and related instrumentation; principles of testing and inspection of engineering materials. 5 hrs (2 class, 3 lab). PR. ENSC 13 or its equivalent. (1)

**AENG 261. Agricultural Machinery Design (4).** Design and testing of agricultural machinery to meet their functional and economic requirements. 8 hrs (2 class, 6 lab). PR. COI. (2)

**AENG 262. Advanced Soil Mechanics of Tillage and Traction (3).** Soil failure theories, traction, compaction and flotation on agricultural soils; tillage tool design. 5 hrs (2 class, 3 lab). PR. ABE 145 or ABE 180 or COI. (1)

**AENG 263. Crop Establishment Engineering (3).** Dynamics of seeding and transplanting; soils seed and seedling-machine interactions. 5 hrs (2 class, 3 lab). PR. ABE 145 or ABE 180 or SOIL 1. (1,2)

**AENG 264. Pesticide Application Equipment (3).** Design, operation and the efficient and safe use of pesticide application equipment for crops. 5 hrs (2 class, 3 lab). PR. ABE 42. (1)

**AENG 265. Design of Harvesting and Threshing Machinery (3).** Theory of operation of and design of harvesters and threshers 3 hrs (class). PR. ABE 42 or COI. (2)

**AENG 266. Advanced Agricultural Energy and Power Engineering (3).** Conventional and non-conventional energy sources; engine test on dynamometers; design of alternative power sources. 5 hrs (2 class, 3 lab). PR. ABE 41 or COI. (2)

**AENG 270. Instrumentation for Engineering Research (4).** Instruments and principles of measurement and control of temperature, humidity, strain, moisture content, and pressure and fluid flow in engineering process; principles of digital measurements. 6 hrs (3 class, 3 lab). PR. EE 1 or its equivalent. (2)

**AENG 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**AENG 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (2)

**AENG 296. Special Problems in Agricultural Engineering (2).** May be taken twice for additional credits not to exceed a total of 6 units. PR. COI

**AENG 299. Graduate Seminar in Agricultural Engineering (1).** May be taken twice.

**AENG 300. Master's Thesis (6).** (1,2,S)

**AENG 400. Doctoral Dissertation (12).**

### AGROMETEOROLOGY (AGMET)

*Agrometeorology and Farm Structures Division, Institute of Agricultural Engineering, College of Engineering and Agro-Industrial Technology*

**Degree offered:** *Master of Science*

**Foundation courses:** ABE 110, AGME 110

To qualify for the MS AGMET degree, a student must complete 18 units of core and major courses (ABE 114, AGME 250, AGME 260, AGME 290, AGME 291, AENG 270, STAT 241); 9 units of minor courses; 6 units of thesis and 1 units of Graduate Seminar.

For students with agrometeorology as minor/cognate field AGME 250 and AGME 260 is required.

#### Agrometeorology

**AGME 250. Micrometeorology (3).** Radiation, energy and water balances over land surfaces, radiation, temperature, humidity and wind profiles in the atmospheric boundary; microclimate modifications; and instrumentation. 3 hrs (class). PR. PHYS 13 or its equivalent. (1)

**AGME 260. Tropical Agrometeorology (3).** Climatic controls; agrometeorological observation network and practices; crop and animal weather-relations; research methods in agrometeorology; agrometeorological forecasts and advisories. 5 hrs (2 class, 3 lab). PR. AGME 250. (2)

**AGME 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**AGME 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**AGME 300. Master's Thesis (6).** (1,2,S).

## AGRONOMY (AGR)

*Crop Science Cluster, College of Agriculture*

**Degrees offered:** *Master of Agriculture, Master of Science and Doctor of Philosophy*

**Areas of specialization:** MAgr: Crop Production and Management / MS: Crop Physiology, Crop Production and Management, Seed Science and Technology, Weed Science / PhD: Crop Production and Management, Crop Physiology, Weed Science

**Foundation courses:** For MAgr and MS students - HORT 132/BOT 132, CHEM 40 and SOIL 150 / For PhD students - BOT 132/HORT 132, CHEM 40, SOIL 150, and CHEM 160

Students who have not taken the foundation or core courses should include them in the plans of course work in addition to the requirements for the degree. A foundation or core course need not be included in the program of the student if the course has been taken by the student. If an equivalent course was taken outside UPLB, the student must pass a validating examination. Determination of equivalence shall be the prerogative of the academic department offering the course.

The minimum number of units required for graduation in the MAgr AGR program is 36 units. At least 24 units of course work shall be in the major field, and at least 12 units in the minor field.

The MS AGR program requires a minimum of 32 units, these are 15 units of major courses, 9 units of minor courses, 2 units of seminar and 6 units of thesis. The major courses are composed of core courses AGR 112, AGR 241, CHEM 160 and other major courses to satisfy the minimum number of units.

The PhD AGR program requires a minimum of 38 units, these are 15 units of major courses, 9 units of cognate courses, 2 units of seminar and 12 units of dissertation. The major courses are composed of core courses AGR 112, AGR 240, AGR 241 and other major courses to satisfy the minimum number of units.

For MS and PhD students with Agronomy as minor/cognate field at least 9 units of course work in Agronomy is required. AGR 241 or AGR 240 or both may be taken plus 6 or 3 units of other Agronomy courses depending on area of specialization. Students with weed science as a minor/cognate may opt not to include AGR 241/240.

PhD students are required to pass a departmental written comprehensive examination in their area of specialization to be administered by a department committee. This examination is given once in a semester.

## Agronomy

**AGR 235. Physiology of Herbicides (3).** Absorption translocation, mechanism of action, and selectivity of herbicides. 3 hrs (class). PR. BOT 20 and CHEM 40 (2)

**AGR 235.1. Laboratory on Mode of Action of Herbicides (2).** Laboratory phase of Agronomy 235, 6 hrs (lab). (2)

**AGR 236. Herbicide-Soil Interactions (3).** Herbicide adsorption, leaching, volatilization, degradation, and persistence in soils. 3 hrs (class). PR. SOIL 1 or COI. (1)

**AGR 240. Environmental Physiology (3).** Characterization of climatic environment and elucidation of varied response of plants to its environment with emphasis on economically important crops. 3 hrs (class). PR. BOT 20 or COI. (1,2)

**AGR 241. Advanced Field Crop Physiology and Ecology (3).** Management and evaluation of the effects of climatic and edaphic factors on crop growth. 3 hrs (class). PR. BOT 20 or COI. (1,2)

**AGR 250. Advanced Plant Breeding I (3).** Types, uses, and induction of genetic variation; systems of pollen control; selection concepts and general breeding procedures for crops in each mode of pollination; approaches in breeding for specific characters. 3 hrs (class). PR. AGR 150 (2)

**AGR 251. Advanced Plant Breeding II (3).** Advanced concepts and methods in population breeding and cultivar development. 3 hrs (class). PR. BIO 130b and AGR 250. (1)

**AGR 254. Crop Evolution (3).** Origin and evolution of crop plants and dynamics of plant domestication. 3 hrs (class). PR. AGR 50 or COI. (1)

**AGR 255/BIO 255. Population Genetics (3).** Genetics of population undergoing random mating and inbreeding; effects of selection, mutation, migration and other forces on the genetic composition of natural and artificial biological population. 3 hrs (class). PR. BIO 130b and MATH 26. (1)

**AGR 256. Quantitative Genetics (3).** Genetics of quantitative characters in random and nonrandom mating population. Application of quantitative genetic theories in breeding work. 3 hrs (class). PR. AGR 255. (2)

**AGR 258. Molecular Plant Breeding (3).** Molecular markers, recombinant DNA technology, and cell and tissue culture technology in crop improvement. 3 hrs (class). PR. AGR 150 and BIO 101 or COI. (1)

**AGR 270. Seed Science, Technology and Program Development (3).** Advanced concepts in the science and technology of seed production, postproduction, genetic conservation, testing and quality control; policies and management of seed and related programs. 3 hrs (class). PR. AGR 170 or COI. (1)

**AGR 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**AGR 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**AGR 299. Graduate Seminar in Agronomy (1).** May be taken twice for a maximum of 2 units. 1 hr (class). PR. Graduate standing. (1,2)

**AGR 300. Master's Thesis (6).** (1,2,S)

**AGR 400. Doctoral Dissertation (12).** (1,2,S)

### Agriculture

**AGRI 211. Design and Assessment of Farming Systems (3).** Critical analysis, designing and evaluating farming systems. 3 hrs (class). PR. AGRI III or COI. (2)

**AGRI 221. Advanced Ecological Agriculture (3).** Dynamics of agroecosystem in relation to ecological agriculture practices, issues and concerns. 3 hrs (class). PR. AGRI 121 or COI. (2)

### Crop Science

**CRSC 245. Stress Physiology of Plants (3).** Response of plants to various environmental stresses; morphophysiological, biochemical and genotypic variation as bases for adaptation to stress. 3 hrs (class). PR. BOT 20. (1,2)

## ANIMAL SCIENCE (ANSC)

*Animal and Dairy Science Cluster, College of Agriculture*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

**Areas of specialization:** MS: Animal Breeding, Animal Nutrition, Animal Physiology, Animal Production, Meats / PhD: Animal Breeding, Animal Nutrition, Animal Physiology, Animal Production

**Foundation courses:** CHEM 160 and STAT 162 for both MS and PhD students:

The MS ANSC program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis.

The PhD ANSC program requires a minimum of 37 units,

these are 15 units of major courses, 9 units of cognate courses, 1 unit of seminar and 12 units of dissertation.

### Animal Science

**ANSC 210. Advances in Swine Production (3).** Modern concepts and practices in swine production. 3 hrs (class). PR. ANSC 111 or COI. (1,2)

**ANSC 220. Advanced Course in Cattle and Carabao Production (3).** Cattle, carabao, and draft animal production with emphasis on smallholder systems; integration with crops and farm activities. 5 hrs (2 class, 3 lab). PR. ANSC 121 or COI. (1)

**ANSC 225. Conservation of Grass and Forage Crops (3).** Principles and methods of preserving grasses, legumes, and farm by-products; their nutritive value, utilization and cost of production. 5 hrs (2 class, 3 lab). PR. AGR 118 or COI. (2)

**ANSC 240. Advanced Poultry Production (3).** Modern practices and new concepts in commercial poultry production. 3 hrs (class). PR. ANSC 116 or COI. (2)

**ANSC 250. Advanced Course in Meats (3).** Physical and chemical characterization of meats and determination of meat quality. 5 hrs (2 class, 3 lab). PR. ANSC 131 or COI. (1)

**ANSC 260. Artificial Breeding of Farm Animals (3).** Techniques in the artificial breeding of farm animals. 7 hrs (1 class, 6 lab). PR. COI. (1)

**ANSC 261/ZOO 261. Livestock Endocrinology (3).** Anatomy and functional interrelationships of the endocrine gland in vertebrates. 3 hrs (class). PR. ANSC 101 or COI. (2)

**ANSC 262. Physiology of Reproduction (3).** Comparative physiology of reproduction in higher animals; factors involved in fertility; genetic and environmental variations in fertility mechanisms. 5 hrs (2 class, 3 lab). PR. ANSC 171 or COI. (2)

**ANSC 263. Mammalian Anatomy (3).** Anatomical dissection of mammals with emphasis on the horse, ox, and pig. 7 hrs (1 class, 6 lab). PR. COI. (1)

**ANSC 264. Mammalian Physiology (3).** General mammalian physiology with emphasis on circulation, respiration, digestion, metabolism, renal function, endocrinology, and nervous system. 3 hrs (class). PR. ANSC 101 or COI. (1)

**ANSC 265. Advanced Animal Breeding (3).** Population genetics; estimation and interpretation of genetic parameters in experimental population; selection index theory and application; breeding plans for maximum rate of improvement. 3 hrs (class). PR. ANSC 161 or COI. (1)

**ANSC 266. Poultry Breeding (3).** Breeding for the improvement of the economically important traits of poultry. 3 hrs (class). PR. ANSC 161 or COI. (2)

**ANSC 267/MBB 267. Animal Productive Biotechnology (3).** Biotechnological concepts and techniques in animal reproduction. 3 hrs (class). PR. ANSC 260 or COI. (2)

**ANSC 270. Research Techniques in Animal Nutrition (3).** Feeding experiments; metabolism and laboratory studies. 7 hrs (1 class, 6 lab). PR. COI. (2)

**ANSC 271. Feed Formulation and Quality Control (3).** Microscopic, chemical, and other tests for identification of feedstuffs additives and adulterants, advances in feed formulation for different classes of farm animals and for different nutritive purposes. 7 hrs (1 class, 6 lab). PR. COI. (1)

**ANSC 272. Advanced Animal Nutrition (3).** Advances in animal nutrition research and in industry practices. 3 hrs (class). PR. COI. (2)

**ANSC 285. Environmental Physiology of Domestic Animals (3).** Physiological mechanisms of animal adaptation, body temperature regulation, and related nutritional, metabolic and hormonal functions affecting animal production. 5 hrs (2 class, 3 lab). PR. ANSC 172 or COI. (2)

**ANSC 290. Special Problems in Animal Science (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ANSC 291. Special Topics in Animal Science (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ANSC 299. Graduate Seminar in Animal Science (1).** May be repeated once for a maximum of 2 units. PR. Graduate standing. (1,2)

**ANSC 300. Master's Thesis (6).** (1,2,S)

**ANSC 400. Doctoral Dissertation (12).** (1,2,S)

#### Dairy Science

**DSC 230. Advances in Dairy Production (3).** Recent advances in feeding, breeding, type, classification and other management practices in dairy production. 3 hrs (class). PR. ANSC 122 or COI. (2)

**DSC 235. Dairy Products Processing I (3).** Handling and processing of liquid milk cream and butter. 5 hrs (2 class, 3 lab). PR. ANSC 135 or COI. (1)

**DSC 236. Dairy Products Processing II (3).** Handling and processing of concentrated, dried, and fermented milk and frozen dairy products. 5 hrs (2 class, 3 lab). PR. ANSC 135 or COI. (2)

**DSC 240. Quality Control of Milk Products (3).** The physical, chemical and microbiological quality control testing of milk and milk products, dairy water supplies, detergents, and sanitizers. 7 hrs (1 class, 6 lab.) PR. CHEM 32 and ANSC 135 or COI. (2)

**DSC 268. Physiology of Lactation (3).** Anatomy and physiology of the mammary gland; theories of milk secretion affecting lactation. 5 hrs (2 class, 3 lab). PR. ANSC 101 and CHEM 160 or COI. (1,2)

**DSC 290. Special Problems (1-3).** May be taken twice provided that total numbers of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

#### APPLIED NUTRITION (ApN)

*Institute of Human Nutrition and Food, College of Human Ecology*

**Degree offered:** *Master of Science*

**Foundation courses:** STAT 1, CHEM 160, HNF 11, HNF 121, HFDS 12

The MS ApN program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. The major courses are composed of core courses HNF 223, HNF 251, HNF 222, HUME 290 or HUME 291 and other major courses to satisfy the minimum number of units.

\*Major courses could be chosen from any of the following: HNF 221, HNF 224, HNF 225, HNF 252, HNF 253, HNF 254, HNF 298

Graduate students may choose to minor in any of the following areas/disciplines: Agricultural Education, Community Development, Extension Education, Rural Sociology, Development Communication, Food Science, Agronomy, Animal Science, Horticulture, Agricultural Economics, Development Management, Agricultural Chemistry, Chemistry, and Statistics.

*Please refer to Human Nutrition for the list of courses.*

#### BIOCHEMISTRY (BCHM)

*Institute of Chemistry, College of Arts and Sciences*

**Degrees offered:** *Master of Science and Doctor of Philosophy*



The MS BCHM program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses\*, 1 unit of seminar and 6 units of thesis. The major courses are composed of 9 units of core courses (CHEM 260, CHEM 261, CHEM 263) and 6 units of biochemistry courses.

The PhD BCHM program has a total of 38 units, these are 15 units of major courses, 9 units of cognate\*; 12 units of dissertation units and 2 units of seminar. The major courses are composed of 12 units of core courses units of core courses CHEM 262, CHEM 263", CHEM 266, CHEM 268, CHEM 269 and 3 units of other biochemistry courses.

\*Minor/cognate fields are Agricultural biotechnology, agricultural chemistry, agronomy, animal science, applied nutrition, botany, chemistry, computational science, entomology, food science, forestry, genetics, horticulture, microbiology, molecular biology, plant pathology, veterinary medicine

\*\*CHEM 263 is required in place of one of the indicated core courses if it has not been taken yet in the masters degree program.

Thesis/Dissertation should involve the application of biochemical principles and techniques.

*Please refer to Chemistry for the list of courses.*

## BOTANY (BOT)

*Institute of Biological Sciences, College of Arts and Sciences*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

**Areas of specialization:** MS: Economic Botany, Mycology, Palynology, Phycology, Plant Anatomy and Morphology, Plant Ecology, Plant Physiology (Plant Growth, Plant Nutrition, Salt Tolerance, Water Relations), Plant Systematics. / PhD: Mycology, Palynology, Phycology, Plant Physiology (Plant Growth, Plant Nutrition, Salt Tolerance, Water Relations).

**Foundation courses:** BOT 20; BOT 110; BOT 140; other related basic courses as may be deemed necessary by the Graduate Program Coordinating Committee.

The MS BOT program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis.

The PhD BOT program requires a minimum of 37 units, these are 15 units of major courses, 9 units of cognate courses, 1 unit of seminar and 12 units of dissertation.

## Botany

**BOT 201. Cell Ultrastructure (3).** Ultrastructure, molecular organization, origin and function of cellular organelles. 5 hrs (2 class, 3 lab). PR. COI. (1)

**BOT 202. Advances in Phycology (3).** Selected topics on the biology of algae with emphasis on recent ecological, physiological, and ultrastructural studies. 5 hrs (2 class, 3 lab). PR. COI. (1)

**BOT 210. Developmental Plant Anatomy (3).** Analytical study and interpretation of the initiation, differentiation, and organization of tissues and organs with emphasis on vascular plants. A term report on the development of specific tissues or organs is required. 5 hrs (2 class, 3 lab). PR. COI. (2)

**BOT 220. Plant Photophysiology (3).** Photosynthesis, photo respiration, photo morphogenesis, and other related processes in photophysiology of the plants. 3 hrs (class). PR. BOT 20 and CHEM 160 or CHEM 161. (1)

**BOT 221. Water Economy and Related Process in Plants (3).** Water relations, energy exchange, ion uptake, and ionic relations in plants. 3 hrs (class). PR. COI. (2)

**BOT 225/MBB 225. Biotechnology of Plant Secondary Metabolites (3).** Physiological bases of secondary plant metabolites production in vitro. 5 hrs (2 class, 3 lab). PR. BOT 20 and CHEM 160 or COI. (2)

**BOT 232/HORT 232. Physiology and Biochemistry of Endogenous Growth Regulators (3).** Physiology, biochemistry, transport, mode of action, assay and application of endogenous growth regulators. 5 hrs (2 class, 3 lab). PR. COI. (2)

**BOT 240. Problems and Methods in Plant Systematics (3).** A consideration of recent developments in plant taxonomy. 5 hrs (2 class, 3 lab). PR. BOT 140 or its equivalent. (1,2)

**BOT 245. Weed Systematics (3).** Identification and ecology of major tropical weeds. 5 hrs (2 class, 3 lab). PR. BOT 140 or its equivalent. (2)

**BOT 250. Advanced Plant Ecology. (3).** Physical, chemical, and biological processes which underlie ecosystem structure and function including plant competition, plant succession, material, and energy cycling. 3 hrs (class). PR. BOT 150 or its equivalent. (1)

**BOT 261. Pollination Biology (3).** Pollination processes, relationships of plants and pollinating agents, population dynamics of pollinators, and techniques in pollination biology. 5 hrs (2 class, 3 lab). PR. BIO 150 or COI. (1)

**BOT 290. Special Problems (1-3).** May be taken twice

provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**BOT 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units.

**BOT 299. Graduate Seminar in Botany (1).** May be repeated once for a maximum of 2 units. PR. COI. (1, 2, S)

**BOT 300. Master's Thesis (6).** (1, 2, S)

**BOT 400. Doctoral Dissertation (12).** (1, 2, S).

### **BUSINESS MANAGEMENT (BM)**

*Department of Agribusiness Management, College of Economics and Management*

**Degree offered:** *Master of Management*

The Master of Management in Business Management is a non-thesis program. Prior to regular admission to the program, prospective students will be required to attend a summer workshop on the problems and prospects of agribusiness today, fundamentals of accounting and financial statement analysis, quantitative management, and microcomputer applications. The 5-week workshop will serve both as post-screening procedure and refresher course to prospective students.

The BM curriculum has 39 academic units, these are, 9 units of core courses (MGT 201, MGT 213 and MGT 231); 27 units of major courses (MGT 203, MGT 209, MGT 215, MGT 221, MGT 251, MGT 281, BM 240, BM 255, BM 280), and 3 units of electives (MGT 117, MGT 207, MGT 273, BM 261, STAT 250 or any graduate course approved by the student's guidance committee.)

#### **Business Management**

**BM 240. Production and Operations Management (3).** Production, principles, procedures and techniques for efficient utilizations of production resources. 3 hrs (class). PR. MGT 221. (2)

**BM 255. International Marketing (3).** Export-import trade with emphasis on analyzing the commercial feasibility of export products. 3 hrs (class). PR. MGT 251. (1)

**BM 261. Law in Business Transaction (3).** Laws affecting the various aspects of business operations, particularly those affecting the production, financing, marketing and distribution of goods and services. 3 hrs (class). PR. MGT 201 (1)

**BM 280. Research Methods in Business Management (3).** Statistical description, estimation and inference; statistical decision theory; survey of research methods

and analytical procedures in the social sciences and their application in business management. 3 hrs (class). PR. COI. (1, 2)

#### **Management**

**MGT 201. Organization and Management (3).** Organization and management theories, concepts and processes; organization changes and managerial systems. 3 hrs (class). (1,2)

**MGT 203. Environment of Management (3).** Survey of socio-cultural, economic, politico-legal, technological and natural forces in local and international environment, their interactions/interrelationships, and their influence and effects on management of public and private organizations. 3 hrs (class). PR. COI. (2,S)

**MGT 207. Managerial Problem Solving and Decision-Making (3).** Quantitative and non-quantitative concepts, tools, and dynamics in problem solving and decision-making processes at the national, firm, and individual levels. 3 hrs (class). PR. COI. (1,2)

**MGT 209. Economic Analysis (3).** Economic theory and policy with reference to the Philippine development program. 3 hrs (class). (2)

**MGT 213. Management Accounting and Control I (3).** Financial accounting policy in private and public organizations within the framework of accounting conventions. 3 hrs (class). (1)

**MGT 215. Financial Management (3).** Short and long-range financial planning. Management of working capital and long-term financial position of a business organization. 3 hrs (class). (2)

**MGT 221. Quantitative Methods in Administration (3).** Various techniques of determining optimization involving univariate and multivariate functions. Includes differential and integral calculus, linear systems, and matrices and an introduction to linear programming. 3 hrs (class). PR. COI. (1)

**MGT 231. Human Behavior in Organization (3).** Individual and group behavior as these are influenced by cultural and technological factors: organizational change. 3 hrs (class). (1,2)

**MGT 251. Marketing Management (3).** The nature and dynamics of demand, the major marketing problems confronting the management in adapting to demand conditions; the development of pricing strategies for new and existing products. The types of distribution patterns and promotional programs employed to obtain sales and profits under a variety of operating conditions; the management of existing product lines, the development, testing, and introduction of new products; and the dynamics of export markets. 3 hrs (class). (2)

**MGT 273. Management of Small Business (3).** Characteristics, opportunities and hazards of small business; entrepreneurship and the formation of small business; problems of survival; problems created by growth and ways to deal with them. 3 hrs (class). (1)

**MGT 281. Strategic Management (3).** Strategy formulation, implementation, evaluation and control; integration of the functional areas of business for a better strategy-environmental alignment. 3 hrs (class). PR. MGT 215, MGT 251 and BM 240 or ABME 240. (1, 2)

### CHEMICAL ENGINEERING (ChE)

*Department of Chemical Engineering, College of Engineering and Agro-Industrial Technology*

**Degree offered:** *Master of Science*

**Area of Specialization:** Pollution Engineering

The MS ChE program requires a minimum of 34 units, these are 18 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. The major courses are composed of 12 units of core courses ChE 204, ChE 242, ChE 243, ChE 245 and 6 units of major courses from ChE 240, ChE 272, ChE 290, ChE 291.

The MS ChE with Pollution Engineering as specialization requires 37 units, these are: 12 units of core courses (ChE 204, ChE 242, ChE 243, ChE 245), 18 units of specialization courses (ChE 282, ChE 283, ChE 284, ChE 286, ChE 288, ChE 291), 1 unit of seminar; and 6 units of thesis.

\*Partial list of cognate/minor courses for MS ChE Program  
Animal Science (Dairy Science): DSC 230, DSC 235, DSC 236

Food Science (Food Science and Engineering): FST 219, FST 235, FST 236, FST 240, FST 241, AENG 232, AENG 233

Chemistry: ACHM 235, CHEM 214, CHEM 205, CHEM 216, CHEM 230, CHEM 265, CHEM 267, CHEM 275

Computer Science: CMSC 215, CMSC 250, CMSC 280  
Environmental Science: ChE 291, AENG 247, ENS 275, ENS 201, ENS 203, ENS 242, ENS 296, CHEM 273

Mathematics: MATH 213, AMAT 266, AMAT 267  
Statistics: STAT 235, STAT 251, STAT 252

Management: MGT 207, MGT 251, DM 204, DM 210

Economics/Agricultural Economics: AECO 240, AECO 241, AECO 248

Agricultural Engineering: AENG 201, AENG 202, AENG 204, AENG 225, AENG 231, AENG 232, AENG 233, AENG 240, AENG 247

Forestry (Pulp and Paper Technology): WST 203, WST 204, WST 205

Forestry (Forest Products Engineering): WST 212, WST 225, WST 260, WST 262

### Chemical Engineering

**ChE 204. Mathematical Methods for Chemical Engineering Analysis (3).** Numerical and analytical methods of solutions to systems of linear equations, ordinary and partial differential equations; and their applications in chemical engineering analyses. PR. ENSC 26 and ENSC 21. (1,2)

**ChE 240. Advanced Control Theory (3).** Theories for analysis and design of advanced control systems. PR. EE 130 or COI. (2)

**Ch E 242 . Advanced Chemical Engineering Thermodynamics (3).** Estimation of the thermophysical properties of substances and modeling of phase equilibrium. PR. ChE 143 and ENSC 21 or COI. (2)

**ChE 243. Advanced Transport Phenomena (3).** Heat, mass and momentum transport analysis in chemical and biochemical engineering systems. 3 hrs (class). PR. ChE 149 or COI. (1)

**ChE 245. Advanced Chemical Reaction Engineering (3).** Kinetics of heterogeneous catalytic and non-catalytic reactions; analysis and design of multiphase, non-ideal and non-isothermal reactors. PR. ChE 145 and ENSC 21 or COI. (1)

**ChE 272. Advances in Biochemical Engineering (3).** Engineering developments in bioprocesses, non-conventional biological systems; recent developments in biochemical engineering. PR. CHEM 177 or COI. (1)

**ChE 282. Physical and Chemical Wastewater Treatment Design (3).** Applications of the physical and chemical principles in the design of wastewater treatment facilities. 3 hrs (class). PR. ChE 180 or COI. (1)

**ChE 283. Biological Wastewater Treatment Design (3).** Wastewater treatment design of bioreaction systems for suspended and immobilized aerobic and anaerobic digestion processes. 3 hrs (class). PR. ChE 180 and MCB 1 or COI. (1)

**ChE 284. Solid Waste Management (3).** Technical aspects of solid waste minimization, treatment and disposal. 3 hrs (class). PR. ChE 180 or COI. (2)

**ChE 286. Air Quality and Pollution Control Engineering (3).** Air quality; elements, sources, and effects of air pollution; measurement, monitoring, and engineering control. 3 hrs (class). PR. ChE 180 or COI. (1)

**ChE 288. Hazardous Waste Management (3).** Minimization, treatment, and disposal of hazardous wastes; integrated management of hazardous wastes. 3 hrs (class). PR. ChE 180 or CE 52 or CHEM 180 or COI. (2)

**ChE 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ChE 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ChE 299. Graduate Seminar (1).** May be taken twice for a maximum of 2 units. PR. COI. (1,2)

**ChE 300. Master's Thesis (6).** (1,2,S)

## CHEMISTRY (CHEM)

*Institute of Chemistry, College of Arts and Sciences*

**Degree offered:** *Master of Science*

The MS CHEM program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses\*, 1 unit of seminar and 6 units of thesis. The major courses are composed of 12 units of core courses CHEM 205, CHEM 220, CHEM 230, CHEM 242 and 3 units of chemistry courses.

\*Minor field options are agricultural chemistry, biochemistry, computer science, environmental science, mathematics and physics.

### Chemistry

**CHEM 205. Intermediate Physical Chemistry (3).** Principles and calculations in intermediate physical chemistry, with emphasis on quantum chemistry, molecular thermodynamics, and chemical kinetics. 3 hrs (class). PR. CHEM 115 or COI. (1)

**CHEM 211. Quantum Chemistry (3).** Fundamental principles, computational methods, and chemical applications of quantum mechanics. 3 hrs (class). PR. CHEM 115 or COI. (1)

**CHEM 214. Molecular Thermodynamics (3).** Principles of statistical thermodynamics and its applications to molecular systems. 3 hrs (class). PR. CHEM 205 or COI. (2)

**CHEM 215. Advanced Physical Chemistry (3).** Classical and quantum mechanics; statistical thermodynamics. 3 hrs (class). PR. CHEM 111 or COI

**CHEM 216. Chemical Kinetics (3).** Empirical and theoretical treatments of rates of simple gas phase reactions, reactions in solutions, complex reactions; catalysis. 3 hrs (class). PR. CHEM 205 or COI. (2)

**CHEM 220. Advanced Inorganic Chemistry (3).** Structure, bonding, stereochemistry and reactivity of inorganic compounds; recent advances in the field. 3 hrs (class). PR. CHEM 120 or COI. (1)

**CHEM 225. Organometallic Chemistry (3).** Principles and applications of organotransition metal chemistry. 3 hrs (class). PR. CHEM 120 and CHEM 140 or COI. (1)

**CHEM 227. Bioinorganic Chemistry (3).** Role of metals in biological systems. 3 hrs (class). PR. CHEM 120 and CHEM 161 (or 160) or COI. (2)

**CHEM 230. Research Techniques in Chemistry (3).** Theories and principles of analytical techniques important to agricultural research. 7 hrs (1 class, 6 lab). PR. CHEM 112.1 or COI. (1)

**CHEM 231. Chromatography (3).** Principles and applications of chromatographic separations. 3 hrs (class). PR. CHEM 112 and CHEM 137 or COI. (2)

**CHEM 232. Spectrochemical Methods of Analysis (3).** Theories and principles of modern spectrometric techniques used for chemical analysis; their instrumentation and applications. 3 hrs (class). PR. CHEM 112 and CHEM 137 or COI. (2)

**CHEM 233. Electroanalytical Chemistry (3).** Principles, methodology and applications of electroanalytical chemistry. 3 hrs (class). PR. CHEM 112 and CHEM 137 or COI. (1)

**CHEM 242. Organic Reaction Mechanism (3).** Advanced study of the structure and reactivity of organic compounds; stereochemistry. 3 hrs (class). PR. CHEM 44 or COI. (2)

**CHEM 244. Organic Synthesis (3).** Principles and applications of organic synthesis. 3 hrs (class). PR. CHEM 242 or COI. (2)

**CHEM 246. Heterocyclic Compounds (3).** Structure and chemical behavior of heterocyclic systems, with emphasis on naturally occurring types. 3 hrs (class). PR. CHEM 44 or COI. (1)

**CHEM 252. Chemistry of Natural Products (3).** Isolation and identification of chemical compounds obtained from natural sources. 7 hrs (1 class, 6 lab). PR. COI. (2)

**CHEM 254. Physical Biochemistry (3).** Applications of thermodynamics and kinetics in biological systems. 3 hrs a week (class). PR. CHEM 160 or CHEM 161 and CHEM 102 or CHEM 112. (1)

**CHEM 260. Intermediary Metabolism I (3).** Metabolism of carbohydrates and lipids. 3 hrs (class). PR. CHEM 160 or CHEM 161 or COI. (1)

**CHEM 261. Intermediary Metabolism II (3).** Metabolism of proteins, nucleic acids, and biologically-active nitrogen-containing compounds. 3 hrs (class). PR. CHEM 160 or CHEM 161 or COI. (2)

**CHEM 262. Lipid Chemistry (3).** Structure and biological



functions, properties and applications of lipids. 3 hrs a week (class). PR. CHEM 160 or CHEM 161. (1)

**CHEM 263. Analytical Biochemistry (3).** Isolation, purification, and characterization of biomolecules. 7 hrs (1 class, 6 lab). PR. CHEM 32 and CHEM 160.1 or COI. (1,2)

**CHEM 265. Enzyme Chemistry (3).** Equilibrium and kinetic aspects of enzyme reactions; enzyme structure and function; allosterism. 3 hrs (class). PR. CHEM 111 and CHEM 160 or CHEM 161 or COI. (2)

**CHEM 266. Chemistry of Nucleic Acids (3).** Structure, chemical properties, metabolism and biological functions of nucleic acids. 3 hrs (class). PR. CHEM 160 or CHEM 161. (2)

**CHEM 267. Advanced Biochemistry (3).** Special topics in advanced biochemistry. 3 hrs (class). PR. CHEM 160 or CHEM 161 or COI. (1,2)

**CHEM 268. Carbohydrate Chemistry (3).** Occurrence, structure and properties, isolation and purification, characterization, synthesis, biosynthesis and application of carbohydrates. 3 hrs (class). PR. CHEM 160 or CHEM 161. (1)

**CHEM 269. Protein Chemistry (3).** Structure, function, interrelationships and applications of protein. 3 hrs (class). PR. CHEM 160 or CHEM 161. (2)

**CHEM 273. Chemical Toxicology (3).** Toxicological concepts, reaction mechanisms and regulatory policies involved in the use of and exposure to chemicals in environment. 3 hrs (class). PR. CHEM 160 or CHEM 161 or COI. (1,2)

**CHEM 275. Enzyme Technology (3).** Large-scale enzyme extraction and purification; immobilized enzyme technology; functional characteristics of enzyme reactors; recent advances in enzyme technology. 3 hrs (class). PR. CHEM 178 and CHEM 265 or COI. (1)

**CHEM 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**CHEM 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**CHEM 299. Graduate Seminar (1).** May be repeated for a maximum of 2 units. (1,2,S)

**CHEM 300. Master's Thesis (6).** (1,2,S)

**CHEM 400. Doctoral Dissertation (12).** (1,2,S)

## COMMUNICATION ARTS (COMA)

*Department of Humanities, College of Arts and Sciences*

**Degrees offered:** *Master of Arts and Master in Communication Arts*

The MCA program is a non-thesis program, it consists of 37 units, these are 24 units of major courses, 12 units of minor and 1 unit of seminar. The major courses includes 6 units of core courses COMA 201 and COMA 202; 3 units of Special Problem (COMA 290); and other major courses (COMA 211, COMA 212, COMA 213, COMA 214, COMA 215, COMA 220, COMA 224, and COMA 226) to satisfy the units required.

The MA CA program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses\*, 1 unit of seminar and 6 units of thesis. The major courses includes core courses (COMA 201, COMA 202) and 9 units of other major courses from COMA 211, COMA 212, COMA 213, COMA 214, COMA 215, COMA 220, COMA 224 and COMA 226.

\*can be taken from any of the disciplines of social sciences, human ecology, management, linguistics, philosophy, literature, mass communication, development communication, and other related areas.

### Communication Arts

**COMA 201. Critical Approaches to Communication Studies (3).** A survey of critical theories and their application to analysis of texts and to communication research. 3 hrs (class). PR. COMA 192 or COI.

**COMA 202. Discourse Analysis in Communication (3).** The study of language and its extension through communication technology using discourse analysis. 3 hrs (class). PR. COMA 104 or COI. (1)

**COMA 211\*. Rhetoric (3).** Theories of rhetoric from ancient to modern times. (1)

**COMA 212. Phonology (3).** Theories and principles of speech communication, the physiology of speech production, and transcriptions of sounds in the International Phonetic Alphabet (IPA). 3 hrs (class). PR. COI.

**COMA 213. Advanced Oral Interpretation (3).** Principles, concepts and techniques of oral interpretation applied to a variety of literary genres. 3 hrs (class). PR. COMA 212.

**COMA 214. Varieties of Public Speaking (3).** The preparation, presentation, and critical evaluation of different kinds of individual and group-speaking performances in professional and off-the-job situations. 3 hrs (class). PR. COMA 212 or COI.

**COMA 215. Speech Communication Strategies for Instruction (3).** Preparation, design and application of speech communication tools and strategies for effective teaching. 3 hrs (class). PR. COI.

**COMA 220. Grammar and Stylistics (3).** Interactive relationship between grammar, semantics, and style. 3 hrs (class). PR. COI.

**COMA 224. Writing for Corporate Communication (3).** Strategies in the design and preparation of communication forms to meet corporate objectives. 3 hrs (class). PR. ENG 102 or COI.

**COMA 226. Writing Children's Literature (3).** Writing in context, fiction, and nonfiction for children. 3 hrs (class). PR. ENG 106 or COI.

**COMA 290. Special Problems (3).**

**COMA 299. Graduate Seminar (1).**

**COMA 300. Master's Thesis (6).**

### COMMUNITY DEVELOPMENT (CD)

*Institute of Governance and Rural Development, College of Public Affairs and Development*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

The MS CD program requires a minimum of 37-38 units, these are 21-22 units of major courses, 9 units of minor courses, 1 unit of graduate seminar and 6 units of thesis. The major courses are composed of core courses (CED 232, AERS 265, AERS 282, STAT 166 or CED 291); 6 units of specialization courses (CED 250, CED 252); and 3 units of electives (CED 246, CED 253, AERS 261).

The PhD CD program requires a minimum of 45-48 units, these are 23 units of major courses, 9 or 12 units of cognate courses, 1 unit of graduate seminar and 12 units of dissertation. The major courses are composed of core courses (CED 227, CED 301, CED 365, AERS 281, AERS 282, CED 291); 6 units of specialization courses (CED 250, CED 252, CED 251, AERS 267) and 3 units of electives (DM 220, SOC 292, CED 246, CED 253).

\*Required if not taken in the MS program

\*\*If CED 291 has been taken, additional social science statistics or qualitative research methods may be required.

#### Community Education

**CED 201. Philosophy of Education (3).** Significant theories and principles of education and their implications for development education in the Philippines. 3 hrs (class). PR. COI. (1,2)

**CED 202. Theory and Practice of Community Education (3).** Theoretical underpinnings and strategies in community education. 3 hrs (class). PR. COI. (1,2)

**CED 210. Managing Education for Community Welfare (3).** Management principles and tools for productivity and quality improvement in education within the community. 3 hrs (class). PR. COI. (1,2)

**CED 211. Advanced Educational Psychology (3).** Psychological theories and principles underlying the learning processes. 3 hrs (class). PR. COI. (1)

**CED 213. Instructional Systems Design and Management (3).** Principles, approaches, and processes in designing and managing instructional systems. 3 hrs (class). PR. COI. (2)

**CED 215. Leadership for Educational and Community Productivity (3).** Leadership behavior, theories, qualities, approaches, skills and techniques. 3 hrs (class). PR. COI. (2)

**CED 217. Educational Planning (3).** Concepts, procedures and tools in developing plans at various levels and types of educational systems. 3 hrs (class). PR. COI. (2)

**CED 220. Sociology of Education (3).** Analysis of education as a factor in social change; the sociological significance of schools and other social institutions in rural development; social factors in the learning process. 3 hrs (class). PR. COI. (2)

**CED 224. Economics of Education (3).** Application of the economics in the analysis of problems and issues in financing education, both formal and nonformal, particularly in low-income countries. 3 hrs (class). PR. COI. (1)

**CED 226. Educational Evaluation (3).** Measurement approaches, evaluation techniques, models and processes in determining the effectiveness of formal education training programs. 3 hrs (class). PR. COI. (1)

**CED 227. Administrative Theory (3).** Management theories and concepts as they relate to organizations with emphasis on educational institutions; forces in the organization and the external environment and their influence on managerial roles, functions, and management policies. 3 hrs (class). PR. COI. (2)

**CED 231. Vocational Education in Agriculture (3).** Concepts of vocational education in agriculture; current trends and issues as they relate to the development process. 3 hrs (class). PR. COI. (1)

**CED 232/SOC 232. Advanced Social Psychology (3).** Issues in social perception, cognition, social influence and social relationships. 3 hrs (class). PR. COI. (2)

**CED 233. Experiential Learning Programs in Agriculture (3).** Identification and analysis of contemporary issues and problems in conducting experiential learning programs in agriculture. 3 hrs (class). PR. COI. (1)

**CED 240. Extension Science (3).** The theory and practice of extension. 3 hrs (class). PR. COI. (1)

**CED 242. Adult Education in Agriculture (3).** A course to acquaint prospective teachers, agricultural leaders,

and community workers regarding ways of developing programs for young and adult farmers, and effective methods of teaching adults. 3 hrs (class). PR. COI. (1)

**CED 244. Comparative Analysis of Extension Approaches (3).** Analysis of different extension approaches and their application under varied socioeconomic and physical milieu. 3 hrs (class). PR. COI. (2)

**CED 246. Evaluation in Rural Development (3).** The nature, principles, and role of evaluation in vocational agriculture education; extension education, and community development; selection, construction, and use of evaluation devices. 3 hrs (class). PR. COI. (1,2)

**CED 248. Participatory Extension (3).** Concepts and practice in community-based participatory extension and action research planning and development. 3 hrs (class). PR. COI. (2)

**CED 250. Community Development (3).** Philosophy, principles, and problems of community development in the Philippines. 3 hrs (class). PR. COI. (1)

**CED 251. Comparative Community Development (3).** Analysis of the characteristics of national community development programs in selected countries, with emphasis on their comparative merits and demerits and on the extraction of elements that may have universal application. 3 hrs (class). PR. COI. (2)

**CED 252. Planning and Administration of Community Development (3).** Features of community development programs in the Philippines, their organization, administrative planning, interrelationship with local government units, financing, personnel administration, field execution, and evaluation. 3 hrs (class). PR. COI. (1,2)

**CED 253. Comparative Local Government (3).** Organization, management, and finance of local rural government in selected high-income and low-income countries, including the relationship between level of government and the alternative to local autonomy. 3 hrs (class). PR. COI. (1)

**CED 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**CED 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**CED 298. Field Studies (3).** PR. COI. (1,2,S)

**CED 299. Graduate Seminar (1).** (1,2)

**CED 300. Master's Thesis (6).** (1,2,S)

**CED 301. Philosophical Ideas in Development (3).**

Philosophical traditions in development and conceptual frameworks for analyzing contemporary development programs. 3 hrs (class). PR. COI. (1)

**CED 365. Rural Institutions (3).** Identification, description, and analysis of changes taking place in rural institutions, which relate to the economic, social, political, and cultural life of the rural population. 3 hrs (class). PR. AERS 265 or AERS 261 or COI. (1,2)

**CED 400. Doctoral Dissertation (12).** (1,2,S)

## COMPUTER SCIENCE (CMSC)

*Institute of Computer Science, College of Arts and Sciences*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

Applicants will be admitted as a regular student if she/he has a BS in Computer Science degree in any accredited institution and has an average of 2.0 or better in all her/his computer science courses. Foundation courses are: CMSC 123, CMSC 124, CMSC 125, CMSC 127, CMSC 131, CMSC 141, CMSC 142. Applicants who have not taken these courses may do so as non degree students. Once a student obtains an average of 2.0 or better in these seven courses, she/he may be admitted as a regular student.

The MS CMSC consists of a minimum of 34 units, these are 18 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. The major courses are composed of core courses (CMSC 214, CMSC 215, CMSC 244, CMSC 245); and other 200 level CMSC courses to satisfy the number of units.

The core courses of the MS program serves as the foundation courses for the PhD program. Students must have passed these courses otherwise they are to be taken in addition to the courses required in the PhD program.

The PhD CMSC consists of a minimum of 38 units, these are: 15 units of major courses; 9 units of cognate courses; 2 units of seminar; and 12 units of dissertation. The major courses are composed of core courses (CMSC 241, CMSC 341, CMSC 342); and other 200 level CMSC courses to satisfy the number of units.

The minor/cognate courses may be taken from another field like Mathematics, Statistics, Management, Economics, Forestry, and other fields in UPLB with an MS program.

Graduate students may do their thesis on any of the following areas of strength of the Institute: Algorithm (Serial, Distributed, and Parallel), Computer Performance Evaluation, Computer-Assisted Instruction, Expert Systems, Information and Database Systems, Networking, Software Engineering.

**Computer Science**

**CMSC 214. Programming Language Design Concepts (3).** Formal language theory, principles, and techniques of compiler construction, programming language, design concepts; parallelism and formal semantics. 3 hrs (class). PR. CMSC 124 and CMSC 141 or COI. (2)

**CMSC 215. Advanced Computer Systems (3).** Recent developments in computer architecture and computer systems. 3 hrs (class). PR. CMSC 125 and CMSC 131 or COI. (1)

**CMSC 227. Advanced Database Systems (3).** Conceptual design of a database; models for conceptual design; database management, security and recovery; database languages. 3 hrs (class). PR. CMSC 127 or COI. (1)

**CMSC 241. Formal Languages, Automata Theory and Computations (3).** Finite automata and regular expression; context-free languages; Turing Machines, undecidability. 3 hrs (class). PR. CMSC 141 or COI. (1)

**CMSC 244. Algorithms and Advanced Data Structures I (3).** Design, analysis, and implementation of algorithms; use of advanced data structure in algorithm design. 3 hrs (class). PR. CMSC 142 or COI. (1)

**CMSC 245. Algorithms and Advanced Data Structures II (3).** Advanced topics in algorithmic graph theory, efficient polynomial and matrix algorithms; number theoretic algorithms, string processing and computational geometry; design and analysis of parallel algorithms; the theory of NP completeness and approximation algorithms. 3 hrs (class). PR. CMSC 244. (2)

**CMSC 250. Scientific Computing (3).** Principles, methodology, and tools of scientific computing. 3 hrs (class). PR. MATH 28 or 38 or COI. (1)

**CMSC 271. Management Information Systems (3).** Computer-based methodologies for the design and development of management information systems. 3 hrs (class). PR. CMSC 127 or COI. (1)

**CMSC 272. Strategic Information Systems Development (3).** Information engineering concepts and tools for strategic systems planning and development. 3 hrs (class). PR. CMSC 127 or COI. (2)

**CMSC 280. Parallel Processing (3).** Parallel machine models; design, analysis, and implementation of parallel algorithms. 3 hrs (class). PR. CMSC 132 or COI. (2)

**CMSC 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units.

**CMSC 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**CMSC 299. Graduate Seminar (1).** May be taken twice. (1,2)

**CMSC 300. Master's Thesis (6).** PR. COI.

**CMSC 341. Advanced Theory of Computation (3).** Recursive function theory, computability and decidability. 3 hrs (class). PR. CMSC 241. (1)

**CMSC 342. Computational Complexity Theory (3).** Time and space complexities of algorithms. 3 hrs (class). PR. CMSC 245. (2)

**CMSC 391. Special Topics (1-3).** PR. COI. (1,2)

**CMSC 399. Graduate Seminar (1).** PR. COI. (1,2)

**CMSC 400. Doctoral Dissertation (12).** (1,2,S)

**COOPERATIVE MANAGEMENT (CM)**

*Institute of Cooperatives and Bio-Enterprise Development (ICOPED), College of Economics and Management*

**Degree offered:** *Master of Management*

The MM CM program consists of 36 units, these are: 9 units of core courses (MGT 201, MGT 213, MGT 231); 24 units of major courses (MGT 207, MGT 215, MGT 251, ENTR 201, COST 201, COST 204, COST 291, COST 298) and 3 units of electives chosen from AECO, ABM or courses from other units relevant to student's plan of study.

**Cooperative Studies**

**COST 201. Theory and Comparative Development of Cooperatives (3).** Concepts, philosophy, history, and nature of cooperatives; comparative study of cooperatives development in different societies. 3 hrs (class). PR. COI. (1)

**COST 202. Organization and Management of Cooperatives (3).** Nature, types of operations of cooperatives as business enterprises; problems and prospects in organizing and managing cooperatives. 3 hrs (class). PR. AECO 136 or COI. (1,2)

**COST 203. Cooperatives Legislation (3).** The Philippine cooperatives movement and laws on cooperatives; analysis of legislative measures from the perspective of social and economic development in line with current national developmental goals and strategies. 3 hrs (class). PR. COI. (1)

**COST 204. Cooperative Enterprise Development (3).** Analysis and planning of cooperative enterprise development. 3 hrs (class). PR. COI. (2)

**COST 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. 2 hrs (class). PR. COI.



**COST 298. Field Studies (3).** PR. COI.(1,2,S)

**COST 299. Graduate Seminar (1).** May be taken twice. 1 hr (class). PR. COI.

*For other courses please see Business Management and Agribusiness Management & Entrepreneurship*

### **DEVELOPMENT COMMUNICATION (DEVC)**

*College of Development Communication*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

#### **Master of Science in Development Communication**

The Master of Science in Development Communication program responds to the evolving development paradigms and communication perspectives. It is designed to produce graduates who are able to:

1. Compare and contrast theories, schools of thought, principles, and strategies of communication in the context of developments;
2. Analyze issues and challenges in development that may be addressed by education and training in development communication;
3. Conduct research and evaluation in development communication; and
4. Apply development communication concepts and skills in the design and management of systems, programs, and projects in development.

#### **Doctor of Philosophy in Development Communication**

The program prepares graduates to assume leadership roles in development communication education and practice. The PhD in Development Communication is designed to produce graduates who are able to:

1. Explain the process of theory construction and critiquing towards theory formulation in development communication;
2. Analyze the research and research management process in development communication programs;
3. Conduct development communication research;
4. Examine issues and challenges towards setting directions in development communication education and practice; and
5. Formulate development communication policies for development programs.

The MS DEVC program has a minimum of 33 units, these are: 11-13 units of core courses (DEVC 202, DEVC 205, DEVC 290, DEVC 291, DEVC 295, DEVC 299); 6 units of electives; 9 units of cognate courses; and 6 units of thesis.

The PHD DEVC program has a minimum of 42 units, these are: 20-22 units of core courses (DEVC 310, DEVC 311, DEVC 320, DEVC 363, AERS 281, DEVC 391, DEVC 393, DEVC 399); 1-3 units electives; 9-12 units cognate courses; and 12 units dissertation.

For students with DEVC as minor or cognate field DEVC 202 and 6 units (3 units for PhD students with two cognates) of DEVC courses are required.

### **Development Communication**

**DEVC 202. Communication Theory in Development Communication (3).** Communication theories and their applications to development communication study and practice. 3 hrs (class). PR. None. (1,2)

**DEVC 205. Communication and Development (3).** Perspectives, theories, principles, and strategies of communication and development. 3 hrs (class). PR. COI. (1,2)

**DEVC 208. Communication Approaches in Development Programs (3).** Application of communication concepts, principles, strategies, and practices in promoting social ideas towards behavior change and mobilizing people in developmental programs. 3 hrs (class). PR. DEVC 202 or COI. (1,2)

**DEVC 212. Environmental Communication (3).** Application of environmental communication principles, strategies, and techniques to address risks, controversies, and crises associated with the environment. 3 hrs (class). PR. COI. (2)

**DEVC 215. Communication and Culture (3).** Nature and interrelationships of communication and culture, and their applications to development communication. 3 hrs (class). PR. COI. (1)

**DEVC 230. Educational Communication Systems (3).** Learning theories and approaches in educational communication systems and their application to learning. 5 hrs (2 class, 3 lab). PR. COI. (1)

**DEVC 231. Educational Communication Systems Management (3).** Theories, principles, approaches, and tools in managing an educational communication unit. 3 hrs (class). PR. COI. (2)

**DEVC 234 . Information and Communication Technologies for Development (3).** Theoretical perspectives, systems and structures, uses, and ethics in using information and communication technologies as tools in development. 3 hrs (class). PR. COI. (1)

**DEVC 290. Special Problems (1-3).** May be taken twice

provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI.

**DEVC 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**DEVC 295. Development Communication Research (3).** Quantitative and qualitative research methods in development communication. 3 hrs (class). PR. DEVC 202. (1,2)

**DEVC 299. Graduate Seminar in Development Communication (1).** May be taken for one or two semesters. (2)

**DEVC 300. Master's Thesis (6).** (1,2,S)

**DEVC 310. Theorizing in Development Communication (3).** History, philosophical assumptions, communication theory traditions and praxis, and critique towards theorizing in development communication. 3 hrs (class). PR. DEVC 202 or COI. (1,2)

**DEVC 311. Organizational Communication and Leadership in Development (3).** Theories, perspectives, processes, and applications of organizational communication and leadership in development practice. 3 hrs (class). PR. None. (1,2)

**DEVC 320. Communication Systems Policies and Planning (3).** Concepts, theories, and approaches in communication systems policy formulation and planning in support of a development program. 3 hrs (class). PR. DEVC 311. (1,2)

**DEVC 363. Public Communication of Science (3).** Concepts, models, approaches, and issues in public communication of science in the context of development. 3 hrs (class). PR. COI. (1,2)

**DEVC 390. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI.

**DEVC 391. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI.

**DEVC 393. Qualitative Approaches to Communication (3).** Perspectives, approaches, concepts, and methods in qualitative communication research. 3 hrs (class). PR. DEVC 310. (2)

**DEVC 399. Graduate Seminar (1).** May be taken for one or two semesters.

**DEVC 400. Doctoral Dissertation (12).** (1,2,S)

## DEVELOPMENT MANAGEMENT AND GOVERNANCE (DMG)

*Institute of Governance and Rural Development, College of Public Affairs and Development*

**Degrees offered:** *Master of Science; Master of Development Management and Governance*

**Areas of Specializations:** Organizational and Institutional Development, Program Management, Governance of Microfinance and Microinsurance Institutions, and Local Governance and Development

MDMG is a non thesis program it has a total of 31 units that includes 15 units of core courses (DM 201, DM 204, DM 241, LGD 210, AERS 282); 9 units of specialization courses; 3 units of elective; 3 units of field study (DM 298); and 1 unit of seminar (DM 299)

MS DMG has a total of 38 units that includes 19 units of core courses (DM 201, DM 204, DM 241, LGD 210, AERS 282, PAF 203); 9 units of specialization courses; 3 units of elective; 6 units of thesis (DMG 300); and 1 unit of seminar (DM 299)

### Specialization courses

- a. Organizational and Institutional Development: DM 230, LGD 215, LGD 216, DM 210
- b. Program Management: DM 220, DM 221, DM 223, DMG 224, DMG 225
- c. Local Governance and Development: DM 224, DMG 224, DMG 244, DMG 245, DMG 246, LGD 211, LGD 213, LGD 216
- d. Governance of Microfinance and Microinsurance Institutions: DMG 230, DMG 231, DMG 232

### Development Management

**DM 201. Development Perspective (3).** Systems theory and concepts and their application to the analysis of the national development process; comparison of development patterns; and Philippine historical realities and current national development goals and strategies. 3 hrs (class). PR. COI. (1,2)

**DM 204. Management Dimensions of Development Organizations (3).** History, environment, and dynamics of development organizations; application of management principles in the analysis of development organization. 3 hrs (class). PR. COI. (1,2)

**DM 210. Research Management (3).** Principles, practices, and dynamics of research management. 3 hrs (class). (1,2)

**DM 220. Public Policy and Program Administration for Development (3).** (1,2). Policy formulation, analysis,

and implementation; program administration and project management for development. 3 hrs (class). PR. COI. (1,2)

**DM 221. Fiscal Administration in Development (3).** Theories and methods of fiscal administration and their application in the financial planning and analysis of development programs. 3 hrs (class). PR. COI. (1,2)

**DM 223. Project Development and Management (3).** Design, implementation, and evaluation of development projects. 3 hrs (class). PR. COI. (1,2)

**DM 224. Public Affairs Management in Development I (3).** Political and administrative structures and processes in national development with emphasis on rural development. 3 hrs (class). PR. COI. (1,2)

**DM 225. Public Affairs Management in Development II (3).** Concepts, scope, and components of rural development management. Analysis of management environment and behavior in the implementation of rural development programs. 3 hrs (class). PR. DM 224 or COI. (2)

**DM 230. Planned Change in Development (3).** Concepts, models, and strategies of planned transformation. 3 hrs (class). PR. COI. (1,2)

**DM 241. Managerial Leadership (3).** Leadership theories, roles, styles, and skills in various management levels. 3 hrs (class). PR. MGT. 101 or COI. (1,2)

**DM 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited in the student's program will not exceed 4 units. (1)

**DM 298. Field Studies in Development Management (3).** PR. COI. (1,2,S)

**DM 299. Graduate Seminar in Development Management (1).** May be taken twice. PR. COI. (1,2)

#### **Development Management and Governance**

**DMG 224. Governance Framework for Disaster Risk Reduction and Climate Change Adaptation (3).** Governance theories, concepts and issues, and their application in disaster risk reduction and climate change adaptation policy, plans and projects. 3 hrs (3 class). PR. COI. (1,2)

**DMG 225. Governance of Food Systems (3).** Theories, perspectives and approaches to governance of food systems for food and nutrition security. 3 hrs (class). PR. COI. (1,2)

**DMG 230. Microfinance, Microinsurance and Development (3).** Concepts, models, and management of microfinance and microinsurance institutions and their role in development. 3 hrs (class). PR. COI. (1,2)

**DMG 231. Governance of Microfinance Institutions (3).** Concepts, approaches, and tools in the governance of microfinance institutions. 3 hrs (class). PR. DM 230 or COI. (1,2)

**DMG 232. Governance of Microinsurance Institutions (3).** Concepts, approaches, and tools in the governance of microinsurance institutions. 3 hrs (class). PR. DMG 230 or COI. (1,2)

**DMG 244. Local Government Entrepreneurship (3).** Concepts, principles, practices and tools in local government entrepreneurship. 3 hrs (class). PR. COI. (1,2)

**DMG 245. Local Development Planning (3).** Theories, processes and tools for local development planning. 3 hrs (class). PR. COI. (1,2)

**DMG 246. Public Integrity and Social Accountability (3).** Anti-corruption, public integrity mechanisms and social accountability strategies. 3 hrs (class). PR. COI. (1,2)

**DMG 300. Master's Thesis (6).** (1,2)

#### **DEVELOPMENT STUDIES (DVST)**

*Graduate School, UPLB*

**Degree offered:** *Doctor of Philosophy*

The PhD DVST program combines the analytical rigor required of social science and technical fields to be able to address development issues such as food security, natural resource management, population, gender and development, and agrarian and rural development. Study of these development issues can be properly understood in an interdisciplinary perspective. The program has as its loci of disciplines the applied social sciences to be combined with the technical courses to address a development issue.

The program requires the applicants to have a Master's degree or a Master of Science degree in the Social Sciences or related fields; a development practitioner, with at least two years experience in development work or development research; and to submit a development research problem proposal upon application

The program has a total of 49 units, these are: 12 units of core courses (DVST 301, DVST 302, DVST 303, SPSS 272); 12 units of specialization courses, 12 units for cognate courses, 12 units dissertation (DVST 400) and 1 unit of seminar (DVST 399).

#### **Areas of specialization**

- I. Agriculture, Food and Nutrition Security
  - A. Molecular Biology and Biotechnology (MBB 292, MBB 295, MBB 224)
  - B. Food Safety (VPH 228, VPH 220, DSC 240)
  - C. Food and Nutrition Planning (HNF 251, HNF 252, HNF

223, HNF 254, AECO 261)

D. Production System and the Supply Chain Analysis (ABM 241, ABM 205, MGT 251, AECO 220, AECO 320, DMG 225)

#### II. Natural Resources Management

A. Plant Genetic Management and Conservation (PGR 261, PGR 262, PGR 263)

B. Forest Management (SFFG 201, SFFG 212, SFFG 229, SFFG 287)

C. Soil Management (SOIL 260, AENG 243, AGRI 211, AGRI 221)

D. Water Management (AENG 240, AENG 242, AENG 243, AENG 244)

E. Watershed Management (ENS 202, FRM 252, AENG 240, ENS 270, ENS 236\*)

F. Climate Risk Management (DMG 224, AGME 260, AECO 210, AECO 211)

#### III. Agrarian and Rural Development Studies

A. Agrarian Studies (AECO 250, AECO 251, AGRS 211, AGRS 221, AECO 250, COST 202, COST 203, AECO 230)

B. Rural Studies (CED 244, CED 246, CED 248, CED 365, DM 223, DM 230, ENS 220, AERS 261, SOC 205)

#### IV. Population, Gender and Development Studies

A. Women and Development (SOC 265, SOC 201)

B. Population and Development (SOC 240, SOC 245, SOC 260, ENS 270, ENS 220)

#### Cognate Fields

A student will choose at least two cognate fields with at least two courses from each field.

1. Strategic Planning and Policy Studies (DM 220, SPPS 202, SPPS 232, SPPS 221, SFFG 229, SFFG 212, ENS 221, SFFG 224, DEVC 220, SPPS 201, DMG 245, PLAN 201, PLAN 214)

2. Economics (AECO 220, AECO 241, AECO 240, AECO 250, AECO 251, ECON 275, ECON 271, ECON 241, ECON 285, ECON 251, ECON 202, ECON 201, CED 224, FRM 227)

3. Development Communication (DEVC 205, DEVC 262, DEVC 215)

4. Development Management and Governance (LGD 210, LGD 213, AERS 265)

5. Political Science (POLSCI 260, PAF 201)

6. Sociology (SOC 212, SOC 240)

7. Community Education (CED 202, CED 224, Comparative and International)

#### Development Studies

**DVST 301. Development Theories and Frameworks (3).** Theories, paradigm shifts and frameworks from colonial era to contemporary times. 3 hrs. (class). PR. COI. (1)

**DVST 302. Development Practice. (3).** Multidisciplinary frameworks in the analysis of development practice. 3 hrs (class). PR. DVST 301. (2)

**DVST 303. Mixed Methods Research for Development Studies. (3).** Concepts, processes and applications of mixed methods research to development studies. 3 hrs (class). PR. COI. (1)

**DVST 399. Graduate Seminar (1).** (1, 2)

**DVST 400. Doctoral Dissertation (12).** (1, 2, S)

### ECONOMICS (ECON)

*Department of Economics, College of Economics and Management*

**Degree offered:** *Master of Science*

**Areas of specialization:** Economics of Growth and Development and Quantitative Methods in Economics

The MS ECON program requires students to earn at least 32 units of graduate work. This consists of 15 units of core courses (ECON 201, ECON 202, ECON 230, ECON 237, ECON 203 or ECON 204); 9 units of specialization courses; 2 units of seminar (ECON 299) 6 units of master's thesis (ECON 300).

All applicants will be given validation examination in undergraduate level macroeconomic theory, microeconomic theory, mathematical economics, and econometrics. Applicants who pass this examinations will not be required to undergo the Summer Program in Economics.

The Summer Program in Economics (SPE) is a two month program offered regularly from June to July of each year. For the prospective applicant to proceed to the regular graduate program, he/she must obtain a weighted average grade of 2.00 or better in four modules in the SPE.

#### Economics

**ECON 201. Macroeconomic Theory I (3).** Theories of income and employment determination and the business cycle; theories of inflation and unemployment; the macroeconomy and the fiscal, monetary, and external sectors; open economy macroeconomics; stabilization policies. 3 hrs (class). PR. ECON 101 or COI. (1)

**ECON 202. Microeconomic Theory I (3).** Preference and choice; consumer choice and demand; production costs, profits, and supply; competitive markets; market structure; externalities, public goods, and market failure; general equilibrium and welfare. 3 hrs (class). PR. ECON 102 or COI. (1)

**ECON 231. Economic Dynamics (3).** Dynamic analysis and dynamic optimization with applications in economics. 3 hrs (class). PR. ECON 230. (2)

**ECON 237. Econometrics (3).** Single equation and simultaneous equation problems; techniques of estimation,



specification, and identification problems in economic analysis. 3 hrs (class). PR. AECO 103, ECON 137, or COI. (1)

**ECON 238. Econometric Time-series Analysis. (3).** Theory of difference equations, stationary time-series models, unit root processes, multi-equation time-series models, cointegration and error-correction models. 3 hrs (class). PR. ECON 237. (2)

**ECON 239. Economy-Wide Modeling (3).** Macro-economic models and applied general equilibrium models. 3 hrs (class). PR. ECON 201, ECON 202, ECON 230 and ECON 237. (2)

**ECON 241. International Trade and Commercial Policy (3).** Causes of trade and effects on resource allocation, economic growth, and income distribution. Selected issues in international commercial trade policies particularly those relating to agricultural commodity trade. 3 hrs (class). PR. ECON 201 and ECON 202. (2)

**ECON 271. Advanced Resource Economics (3).** Applications of economic concepts such as social welfare, externalities, social cost and gains to decision-making associated with optimizing use of natural resources. 3 hrs (class). PR. AECO 240 or COI. (2)

**ECON 275. Economic Valuation of Environmental and Natural Resource System (3).** Approaches and techniques for economic measurements and valuation of natural resources and environmental impacts of development. 3 hrs (class). PR. COI. (2)

**ECON 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI.

**ECON 299. Graduate Seminar in Economics (1).** PR. COI. (1,2). May be taken twice for a maximum of 2 units.

**ECON 300. Master's Thesis (6).** (1,2,S)

#### ***Adopted Courses from UP Diliman***

**ECON 203. Macroeconomic Theory II (3).** Theories of consumption, saving and investment; theories of growth, theories of economic development and accumulation. 3 hrs (class). PR. ECON 201. (2)

**ECON 204. Microeconomic Theory II (3).** Information asymmetry; hidden action; equilibrium under uncertainty and over time; social choice; axiomatic bargaining; incentive and mechanism design. 3 hrs (class). PR. ECON 202 or COI. (2)

**ECON 230. Mathematical Economics (3).** Applications of linear algebra, theory of functions, linear and nonlinear optimization in economic theory. 3 hrs (class). PR. COI. (1)

**ECON 251. Public Economics (3).** Market failures; theory of public goods; public choice and incentive mechanisms for good allocation; public sector pricing; incentive effects of taxation; optimal taxation and redistribution. 3 hrs (class). PR. ECON 202 or COI. (2)

**ECON 285. Development Economics I (3).** Theories of economic growth and development; background and comparative analyses of growth in developed and developing countries. 3 hrs (class). PR. ECON 201 or COI. (2)

### **EDUCATION MANAGEMENT (EDM)**

*Institute of Governance and Rural Development, College of Public Affairs and Development*

**Degree offered:** *Master in Public Affairs*

The MPAf EDM program consist of 31 units, these are 13 units of core courses, 12 units of specialization courses and 6 units of electives. The core courses are PAF 201, PAF 203, PAF 204 and DM 224. The specialization courses are CED 201, CED 215, CED 291, CED 298 and CED 299. The 3 unit elective course can be selected from the following: CED 213, CED 217, CED 226, CED 242, CED 246.

*Please refer to Public Affairs and Community Development for the list of courses.*

### **ENTOMOLOGY (ENT)**

*Crop Protection Cluster, College of Agriculture*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

The Master of Science program has the following specific objectives: (1) to develop in the student the capacity to sort out and critically analyze the facts and train her/him in the process of scientific thinking and (2) to provide her/him with a broad basic background for independent scientific experimentation. The Doctor of Philosophy program, on the other hand, has the following additional objectives: (1) to develop in the student a keen perception for and sensitivity to diverse entomological problems and the ability to formulate and implement their solutions independently, (2) to enable the student to analyze, synthesize, and integrate seemingly unrelated and discordant facts into a meaningful, unified body of knowledge from which she/he can draw intelligent responses to specific situations, and (3) to develop in the student a sense of moral commitment and conviction towards the solution of entomological problems affecting the nation.

Applicants should have an academic background in general entomology, genetics, biology, microbiology, and

chemistry, furthermore, students should have already taken the foundation courses ( ENT 101, ENT 110, ENT 120, ENT 140, ENT 151 and ENT 209 for PhD) to ensure background adequacy, otherwise, these courses need to be included in the student's coursework.

The MS ENT program requires a minimum total number of 31 units including 15 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. Eighteen units of coursework should be beyond the 200 level.

PhD ENT is being offered in three modes namely: (a) Regular PhD, (b) PhD by Research, and (c) Straight PhD. The regular PhD program requires a minimum of 37 units, these are 15 units of major courses\*, 9 units of cognate courses\*, 1 unit of seminar and 12 units of dissertation. Graduate School and CPC's policy shall be followed for Straight and PhD by Research.

\*For students with double cognates, major and minor courses should have at least 12 units, 6 units of courses from each cognate field is required.

## Entomology

**ENT 209. History of Entomology (3).** Historical perspective in the development of world entomology. 3 hrs (class). PR. ENT 101 or COI. (2)

**ENT 220. Advanced Insect Physiology (3).** Biochemical bases of life processes in insects. 5 hrs (2 class 3 lab). PR. CHEM 160, ENT 120 or COI. (2)

**ENT 225. Advanced Insecticide Toxicology (3).** Physiochemical concepts of the action or toxic agents in biochemical systems; mechanism of action or anticholinesterase inhibitors; insecticide resistance and synergism; selective toxicity. 5 hrs (2 class 3 lab). PR. CHEM 160 or ENT 125 or COI. (1)

**ENT 240. Advance Insect Taxonomy (3).** Recent concepts in systematics; original research on taxonomic group of student's interest. 5 hrs (2 class, 3 lab). PR. ENT 140 or COI. (1)

**ENT 246. Taxonomy of Immature Insects (3).** Identification, classification, and behavior of immature forms of insects, with emphasis on the endopterygote orders. 7 hrs (1 class, 3 lab). PR. ENT 140 or COI. (2)

**ENT 247. Aphidology (3).** Systematics, ecology, behavior, and economic significance of the Aphidoidea. 7 hrs (1 class, 6 lab). PR. ENT 140 or COI. (2)

**ENT 251. Advanced Insect Ecology (3).** Contemporary ecological concepts and methods as they related to insect populations. 3 hrs (class). PR. ENT 151 or COI. (1)

**ENT 271. Insect Transmission of Plant Pathogens (3).** Insect vectors of plant pathogens, techniques of plant pathogen transmission, interrelationships of plants, insects and pathogens; physiology of insects in relation to transmission of plant pathogens. 5 hrs (2 class, 3 lab). PR. ENT 101 and PPTH 101 or COI. (2)

**ENT 272. Biology of Entomophagous Insects (3).** Life history, habits, host relationship, and other biological peculiarities of selected groups of entomophagous insects. 5 hrs (2 class, 3 lab). PR. ENT 140 or COI. (1)

**ENT 275. Insect Pathology (3).** Insect pathology and microbiology, including biological relationship between microorganisms and insects. 5 hrs (2 class, 3 lab). PR. ENT 101 and MCB or COI. (2)

**ENT 277. Economic Acarology (3).** Taxonomy and biology of mites associated with crop plants, stored products, leaf litter and soil; control of injurious species; laboratory rearing techniques. 7 hrs (1 class, 6 lab). PR. ENT 146 or COI. (1)

**ENT 279. Insect Resistance in Plants (3).** Pest control through resistant plants, methods of selection, analysis of the components of resistance interactions between resistant plants and insects. 5 hrs (2 class, 3 lab). PR. ENT 120 and BOT 20 or COI. (1)

**ENT 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**ENT 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1,2,S)

**ENT 295. Pesticide Residues (3).** Analysis of pesticide residues; their fate in the environment; and their ecological significance; pesticide legislation. 5 hrs (2 class, 3 lab). PR. ENT 125 or COI. (1)

**ENT 299. Graduate Seminar in Entomology (2).** May be taken for additional credit not exceeding 2 units. PR. Graduate standing. (1,2,S)

**ENT 300. Master's Thesis (6).** (1,2,S)

**ENT 400. Doctoral Dissertation (12).** (1,2,S)

## ENVIRONMENTAL SCIENCE (ENS)

*School of Environmental Science and Management*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

### Areas of specialization:

MS: Environmental Planning and Management,

Environmental Restoration, Community-based Resource Management, Protected Area Management, Environmental Chemistry and Toxicology, Environmental Biology

PhD: Environmental Security and Management, Protected Areas Planning, Development and Management, Social Theory and Environment

**Core courses:**

MS: ENS 201, ENS 211, ENS 275, ENS 296, ENS 299

PhD: ENS 242, ENS 270, ENS 299 if graduates of MS in Environmental Science. If non-MS in Environmental Science, foundation courses such as ENS 201 plus any other two courses from ENS 211, ENS 275, and ENS 296 are required. Core courses are ENS 242, ENS 270 and ENS 299.

**Environmental Science**

**ENS 201. Ecosystem Structure and Dynamics (3).** Ecosystem structure, function, energetics, nutrient cycles, population dynamics, ecosystem models. 3 hrs (class). PR. BOT 150 or BIO 150 or COI. (1,2)

**ENS 202. Landscape Ecology (3).** Principles, theories, research methods and application of landscape ecology in environmental and natural resource management. 3 hrs (class). PR. ENS 201, BIO 150 or COI. (2)

**ENS 203. Advanced Aquatic Ecology (3).** Recent studies in aquatic environment-organism interactions; adaptive mechanisms; species displacement and extinction; modern approaches in the evaluation of production rates. 3 hrs (class). PR. COI. (1)

**ENS 204. Issues in Aquatic Resources Management (3).** Problems and issues in the use of aquatic resources with emphasis on the Philippines situation. 3 hrs (class). (2)

**ENS 211. Systems Analysis and Quantitative Methods in Natural Resources Management (3).** Statistical concepts and data analysis; optimization techniques; stochastic modeling; application of the systems approach to resource-based problems. 3 hrs (class). PR. MGT 211 or COI. (1)

**ENS 220. Institution and the Environment (3).** Social science approaches to the study of man-environment interactions; analysis of the interrelationships between culture, population, and the natural environment, and human responses to changing habitats. 3 hrs (class). PR. COI. (2)

**ENS 221/SFFG 221. Environmental and Natural Resource Policy Formulation (3).** Theories, concepts, and issues in environmental and natural resource policy formulation, case studies with special reference to developing countries. 3 hrs (class). PR. COI.

**ENS 230. Industrial Ecology (3).** Ecological principles and their applications in the organization and management of industrial systems. 3 hrs (class). PR. ENS 201 or COI. (1)

**ENS 242 / ECO 275 . Economic Valuation of Environmental and Natural Resource System (3).** Approaches and techniques for economic measurements and valuation of natural resources and environmental impacts of development. 3 hrs (class). PR. COI. (1,2)

**ENS 255/PSY 255. Environmental Psychology (3).** Analysis of the confluence of psychological processes and environmental context from a transactional perspective. 3 hrs (class). PR. COI. (2)

**ENS 265/SOC 265. Gender and Environments (3).** Theories, research, and issues relevant to the analysis of gender relations in the home and work environments. 3 hrs (class). PR. COI. (1)

**ENS 270. Dynamics of Population, Resources and Environment (3).** Interactions of human populations with resources and environment in different ecosystems; local, national, and global in scope. 3 hrs (class). PR. HUME 2 or COI. (1)

**ENS 275. Contemporary Issues in Environment and Development (3).** Environmental issues, concerns and opportunities; environment-economy interactions; environmental administration; sustainable development policies and issues; resource-use conflict and resolution. 3 hrs (class). PR. COI. (1,2)

**ENS 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI.

**ENS 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI.

**ENS 296. Environmental Impact Assessment: Perspectives from the Natural and Social Sciences (4).** Framework and methodology for environmental impact assessment of the biophysical and socioeconomic systems; ecological, social and ethical bases of EIA; risk assessment and management; mitigation of negative impacts and enhancement of positive impacts; case studies. 6 hrs (3 class, 3 lab). PR. COI. (2,S)

**ENS 299. Graduate Seminar (1).** May be taken twice.

**ENS 300. Master's Thesis (6).** (1,2,S)

**ENS 400. Doctoral Dissertation (12).** (1,2,S)

## EXTENSION EDUCATION (EXTE)

*Institute of Governance and Rural Development, College of Public Affairs and Development*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

The MS program consists of a minimum of 37-38 units these are: 21-22 units of major courses; 9 units of minor courses; 1 unit of seminar; 6 units of thesis. The major courses are composed of 12-13 units of core courses (CED 232, AERS 265, AERS 282, STAT 166 or CED 291); 6 units of specialization courses (CED 240, CED 242); and 3 units of electives (CED 246, CED 252, AERS 261).

The PhD program requires a minimum of 45-48 units, these are 23 units of major courses, 9 or 12 units of cognate courses, 1 unit of graduate seminar (CED 299) and 12 units of dissertation (CED 400). The major courses are composed of core courses (CED 227, CED 301, CED 365, AERS 281, AERS 282, CED 291); 6 units of specialization courses (CED 240, CED 242, CED 244, CED 248); and 3 units of electives (CED 220, AERS 267, SOC 292)

\*Required if not taken in the MS program  
\*\*If CED 291 has been taken, additional social science statistics or qualitative research methods may be required.

*Please refer to Community Development for the list of courses.*

## FAMILY RESOURCE MANAGEMENT (FaRM)

*Department of Human and Family Development Studies, College of Human Ecology*

**Degree offered:** *Master of Science*

The MS FaRM program requires 31 units in the curriculum distributed as follows: 9 units of Core courses (HFDS 221, HFDS 231, HFDS 232); 6 units of major courses; 9 units of minor courses, 1 unit of seminar (HUME 299) and 6 units of thesis (HUME 300).

### Human and Family Development Studies

**HFDS 221. Family Behavior (3).** Analysis of family behavioral pattern as affected by ecological factors. 3 hrs (class). PR. COI. (1)

**HFDS 222. Problems in Family Relations (3).** Approaches and strategies in handling problems of families. 3 hrs (class). PR. HFDS 112 or COI. (2)

**HFDS 231. Family Management (3).** Current concepts and issues in family management. 3 hrs (class). PR. COI. (1)

**HFDS 232. Consumer Behavior (3).** Consumer

motivation and behavior in relation to various factors. 3 hrs (class). PR. COI. (2)

**HFDS 243. Experimental Craft Design (3).** Advanced experimental craftwork and design development. 5 hrs (2 class, 3 lab). PR. COI.

**HFDS 256. Consumer Textiles (3).** Problems related to new developments in textiles and market conditions. 5 hrs (2 class, 3 lab). PR. COI. (1)

### Human Ecology

**HUME 290. Special Problem (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (2,S)

**HUME 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**HUME 299. Graduate Seminar. (1).** May be taken twice.

**HUME 300. Master's Thesis (6).** (1,2,S).

## FOOD AND NUTRITION PLANNING (FNP)

*Institute of Human Nutrition and Food, College of Human Ecology*

**Degree offered:** *Master of Professional Studies*

The Regional Training Program is an interdisciplinary course of advanced training which leads to the degree of Master of Professional Studies in Food and Nutrition Planning (MPS-FNP). FNP utilizes a multisectoral approach to food and nutrition planning. Such an approach integrates nutrition into the overall development process as a necessary factor in policy-making and as an indicator of development.

Currently, the FNP Program is under the Institute of Human Nutrition and Food. The core and teaching staff, however, come from the three units of the university:

College of Agriculture (CA)  
Agricultural Systems Cluster  
Food Science Cluster  
College of Development Communication (CDC)  
College of Economics and Management (CEM)  
Department of Agricultural Economics  
College of Human Ecology (CHE)  
Institute of Human Nutrition and Food

The regular course covers three semesters and a summer totaling 17 months with an academic load of 41 units. The course consists of a set of interdisciplinary lectures, seminar-workshops and field work in micro planning. The 41 units consists of 20 units of core courses (HNF 251,



HNF 252, HNF 298, HUME 291, AECO 241, AECO 261); 15 units of major courses (DEVC 201, AERS 291, HNF 253, HUME 299, FST 290); and 6 units of electives.

The student may choose courses from any of the following fields, subject to the approval of her/his guidance committee: Agrarian and Rurban Development Studies, Rural Sociology, Community Development, Development Communication, Agricultural Economics, Development Management and Governance, Agricultural Chemistry, Human Nutrition and Food, Food Science, Animal Science, Horticulture, Agronomy

*Please refer to Human Nutrition for the list of courses.*

### **FOOD SCIENCE AND TECHNOLOGY (FST)**

*Food Science Cluster, College of Agriculture*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

**Areas of specialization:** Food Chemistry, Food Engineering, Food Microbiology, Food Processing

The MS FST program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. The major courses are composed of core courses FST 202, FST 210, FST 221, FST 235 and other major courses to satisfy the required number of units.

The PhD FST program requires a minimum of 37 units, these are: 15 units of major courses; 9 units of cognate courses; 1 unit of seminar; and 12 units of dissertation.

#### **Food Science and Technology**

**FST 202. Food Analysis (3).** Physical and chemical methods in the analysis of foods. 7 hrs (1 class, 6 lab). PR. CHEM 32 or COI. (2)

**FST 210. Food Biochemistry (3).** Biochemical and physicochemical changes in foods such as meat, fish, fruits, vegetables, cereals, and root crops. 3 hrs (class). PR. CHEM 160 or COI. (1)

**FST 219. Postharvest Biochemistry of Fruits and Vegetables (3).** Biosynthetic and degradative changes occurring in fruits and vegetables after harvest. 3 hrs (class). PR. COI. (2)

**FST 220. Microbiological Aspects of Food Processing (3).** Introduction to the microbiological problems in food preservation. 5 hrs (2 class, 3 lab). PR. COI. (1)

**FST 221. Advanced Food Microbiology (3).** Important groups of food microorganisms, their isolation and characterization in relation to food processing. 7 hrs (1 class, 6 lab). PR. MCB 180 or COI. (2)

**FST 235. Thermal Processing (3).** Determination of thermal death times of spoilage microorganisms; heat penetration studies; computation of processing periods. 7 hrs (1 class, 6 lab). PR. COI. (1)

**FST 236. Dehydration and Freezing (3).** Effects of newer processing techniques on cellular structure, biochemical composition and quality of food. 7 hrs (1 class, 6 lab). PR. COI. (2)

**FST 240. Tropical Food Processing (3).** Theoretical and experimental consideration in the processing of selected tropical foods. 7 hrs (1 class, 6 lab). PR. FST 210 and FST 220 or COI.

**FST 241. Tropical Fruits and Vegetables Processing (3).** Principles underlying newer techniques of processing tropical fruits and vegetables. 7 hrs (1 class, 6 lab). PR. FST 210 and FST 220 or COI.

**FST 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. 12 units of graduate credit. (1,2)

**FST 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**FST 299. Graduate Seminar in Food Science and Technology (1).** May be taken twice. PR. 12 units of graduate credit. (1,2)

**FST 300. Master's Thesis (6).** (1,2,S)

**FST 400. Doctoral Dissertation (12).** (1,2,S)

### **FORESTRY: FOREST BIOLOGICAL SCIENCES (FOR: FBS)**

*Department of Forest Biological Sciences, College of Forestry and Natural Resources*

**Degrees offered:** *Master of Forestry, Master of Science, and Doctor of Philosophy*

#### **Areas of specialization:**

*MF and MS:* Forest Botany, Forest Ecology, Forest Entomology, Forest Genetics, Forest Pathology, Forest Physiology

*PhD:* Forest Ecology, Forest Entomology, Forest Pathology, Forest Physiology

#### **Foundation courses:**

FBS 161, FBS 136, BIO 30, STAT 164 or FRM 167 for PhD.

All graduate students in the department are required to register FBS 299 (Graduate Seminar) after 1 year of residence and should present a seminar paper on a topic related to the proposed thesis/dissertation.

**Forest Biological Sciences**

**FBS 204. Architecture of Tropical Trees (3).** Analysis of tropical trees; architectural models and ecological strategies; and applications of tree architecture. 5 hrs (2 class, 3 lab). PR. FBS 4 and FBS 36 or COI. (1)

**FBS 228. Insects in Relation to Plant Diseases (3).** Insect transmission and dissemination of plant pathogens; insect-pathogen-plant relationships. 5 hrs (2 class, 3 lab). PR. 6 units in ENT and 6 units in PPTH or equivalent. (1)

**FBS 229. Principles of Forest Entomology (3).** Principles involved in forest and forest products protection, survey methods, analysis and identification of causal agents, evaluation of hazards and losses. 5 hrs (2 class, 3 lab). PR. FBS 127. (2)

**FBS 230. Advanced Forest Tree Physiology (3).** The physical and mineral requirements of forest trees. 5 hrs (2 class, 3 lab). PR. FBS 31 or BOT 20. (1,2)

**FBS 240. Phytopathological Methods (3).** Laboratory techniques used in growing fungi, studying their physiology, and principles of bioassay. Field techniques used in the study of tree diseases. 7 hrs (1 class, 6 lab). PR. FBS 41 or FBS 42. (1)

**FBS 241. Advance Forest Pathology (3).** Advanced studies in forest pathology and forest products pathology. 5 hrs (2 class, 3 lab). PR. FBS 41 or FBS 42. (1)

**FBS 242. Control of Forest Tree Diseases (3).** Theories and practices in the control of pathogens affecting forest trees. 5 hrs (2 class, 3 lab). PR. FBS 41 and Organic Chemistry. (2)

**FBS 244. Advanced Forest Mycology I (3).** Mycomycetes, Phycomycetes, Fungi Imperfecti: Review of selected literature and laboratory training in identification. 7 hrs (1 class, 6 lab). PR. FBS 140. (2)

**FBS 245. Advanced Forest Mycology II (3).** Ascomycetes and basidiomycetes. Review of selected literature and laboratory training in identification. 7 hrs (1 class, 6 lab). PR. FBS 140. (1)

**FBS 256. Photomicrography (3).** Chemistry of photography. Techniques of making photomicrographs of biological materials. 7 hrs (1 class, 6 lab). PR. Organic Chemistry and FBS 151 or its equivalent. (2)

**FBS 268/MBB 268. Molecular Phylogenetics (3).** Applications of molecular biological techniques and molecular data to inferences of phylogenetics patterns and evolutionary processes, and to analysis of toponomic groups of organisms. 3 hrs (class). PR. BIO 101 and any basic course in systematics ( BOT 140, ZOO 140, ENT 140 or FBS 167). (2)

**FBS 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**FBS 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**FBS 299. Graduate Seminar (1).** (1,2)

**Forestry**

**FOR 300. Master's Thesis (6).** (1,2,S)

**FOR 400. Doctoral Dissertation (12).** (1,2,S)

**FORESTRY: FOREST RESOURCES MANAGEMENT (FOR: FRM)**

*Institute of Renewable Natural Resources, College of Forestry and Natural Resources*

**Degrees offered:** *Master of Forestry, Master of Science, and Doctor of Philosophy*

**Areas of specialization:**

*MF and MS: Environmental Forest Management, Forest Policy and Administration, Forest Resource Economics, Forest Biometry, Nontimber Resources Management, Watershed Management*

*PhD: Forest Policy and Administration, Forest Resource Economics, Forest Biometry, Nontimber Resource Management, Timber Resource Management, Watershed Management*

Applicants of FOR: FRM must have already taken the foundation courses (FRM 100, FRM 167, FRM 184, FRM 65 or FOR 150 (for audit)) or their equivalents, if not, these courses may be required to be taken.

The MFor: FRM is a non-thesis program, it requires a minimum of 31 units, these are: 18-21 units of major courses including core courses FRM 214, FRM 286, SFI 223 and specialization courses; 1 unit of seminar; and 9-12 units of minor courses.

The MS FOR:FRM program requires a minimum of 31 units, these are: 15 units of major courses; 9 units of minor courses; 1 unit of seminar; and 6 units of thesis. The major courses are composed of 9 units of core courses (FRM 214, FRM 286, SFI 223) and 6 units of specialization courses.

The PhD FOR:FRM program requires a minimum of 37 units, these are: 12 units of major courses; 6 units in each cognate field; 1 unit of seminar; and 12 units of dissertation. For students with only 1 cognate field, 15 units are required for major courses and 9 units of courses under the cognate field.

**Courses for each Area of Specialization:**

Environmental Forest Management: FRM 110, SFFG 120, FRM 253, SFI 261, ENS 201, ENS 296

Forest Policy and Administration: SFFG 120, SFFG 125, FRM 201, SFFG/ENS 221, SFFG 224, SFFG 229, FRM 227

Forest Resource Economics: FRM 217, FRM 227, FRM 287, ECON 237, ECON 271, ENS 242 or ECON 275

Forest Biometry: FRM 164, FRM 167, FRM 261, FRM 262, FRM 264, FRM 294

Nontimber Resources Management: FRM 130, FRM 153, FRM 167, FRM 287, SFI 123, WLDL 105

Timber Resources Management: FRM 167, FRM 287, FRM 292, FRM 293, FRM 294, SFI 221, SFI 223

Watershed Management: FRM 153, FRM 167, FRM 253, FRM 294, SFI 261, AENG 243

**Forest Resources Management**

**FRM 201. Planning and Evaluation of Forestry Research (3).** Research program, project, and study planning; analysis and interpretation; critical reviews. 3 hrs (class). PR. COI. (1)

**FRM 204. Geospatial Methods in Natural Resources Management (3).** Application of geographic information systems (GIS) technology in natural resources management; GIS operations and spatial analysis. 5 hrs (2 class, 3 lab). PR. FRM 104 or COI. (1)

**FRM 214. Introduction to Operations Research (3).** Linear transformations, vector spaces, matrix; survey of operations research and mathematical decision models; fundamentals of systems modeling. 3 hrs (class). PR. MATH 27 or COI. (1)

**FRM 217. Advanced Forestry Economics(3).** Microeconomic analysis of forestry. 3 hrs (lect). PR. FRM 117. (1)

**FRM 227. Economic Analysis of Forest Policy (3).** Economic aspects and significance of major forest policies with particular emphasis on Philippine forestry. 3 hrs (class). PR. FRM 217. (1,2)

**FRM 253. Advanced Watershed Management (3).** Interception, transpiration, evaporation, and sedimentation related to the quantity, quality, and distribution of water as affected by forestry practices. 3 hrs (lect). PR. FRM 153. (1,2)

**FRM 261. Aerial Photo Mensuration (3).** Advanced methods in the use of aerial photographs in forest inventory; photo mensurational techniques in the

preparation of tree and stand volume tables; planning large-scale photo mensurational projects. 5 hrs (2 class, 3 lab). PR. FRM 161. (1)

**FRM 264. Advanced Forest Mensuration (3).** Analysis of forest measurements; evaluation of growth prediction methods; recent developments in forest mensuration and statistics. 5 hrs (2 class, 3 lab). PR. FRM 164 or COI. (1,2)

**FRM 286. Advanced Forest Management (3).** Social, economic, and technical aspects of the organization of a forest for continuous (or managed) yield; forest regulation; forest management planning. 5 hrs (2 class, 3 lab). PR. COI. (1)

**FRM 287. Economic Analysis in Forest Management (3).** Forest management unit as a bioeconomic system, decision-making in timber management; economic sustained yield theory; current forest management practices. 5 hrs (2 class, 3 lab). PR. COI. (2)

**FRM 289. Multiple-Use Forestry (3).** Problems related to the concept and practice of multiple-use forestry; the economics of multiple-use forestry. 3 hrs (class). PR. FRM 189 or COI. (2)

**FRM 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**FRM 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**FRM 292. Log Transportation Systems (3).** Technical and economic aspects of the design and selection of log transportation systems. 5 hrs (2 class, 3 lab). PR. FRM 192. (1,2)

**FRM 294. Optimization Models in Forestry (3).** Deterministic and probabilities mathematical decision models applied to forestry with special emphasis on forest management harvesting and wood resource allocation problems. 3 hrs (class). PR. FRM 214 or COI. (2)

**FRM 299. Graduate Seminar (1).** May be taken twice. (1,2)

**Forestry**

**FOR 300. Master's Thesis (6).** (1, 2, S)

**FOR 400. Doctoral Dissertation (12).** (1, 2, S)  
**FORESTRY: SILVICULTURE AND FOREST INFLUENCES (FOR: SFI)**

*Institute of Renewable Natural Resources, College of Forestry and Natural Resources*

**Degrees offered:** *Master of Forestry, Master of Science, and Doctor of Philosophy*

**Areas of specialization:**

Silviculture, Agroforestry, Tree Improvement

**Foundation courses for MF, MS and PhD students:**

SFI 101, FBS 130, SFI 221, SFI 223, SFI 271

The MFor: SFI is a non-thesis program, it requires a minimum of 31 units, these are: 18-21 units of major courses including core courses SFI 221, SFI 223, SFI 271 and specialization courses; 1 unit of seminar; and 9-12 units of minor courses.

The MS FOR: SFI program requires a minimum of 31 units, these are: 15 units major courses; 9 units of minor courses; 1 unit of seminar; and 6 units of thesis. The major courses consists of core courses SFI 221, SFI 223, SFI 271 and specialization courses to satisfy the minimum units required.

The PhD FOR: SFI program requires a minimum of 37 units, these are: 12 units of major courses; 6 units in each cognate field; 1 unit of seminar; and 12 units of dissertation. For students with only 1 cognate field, 15 units are required for major courses and 9 units of courses under the cognate field.

Additional courses which may be required for MF/MS students specializing in Silviculture: FBS 161, FBS 172, FRM 167 or STAT 162, SFI 261

For those specializing in Tree Improvement: FBS 161, FBS 172, SFI 141, SFI 241, FRM 167 or STAT 162

For those specializing in Agroforestry: SFI 122, SFI 123, SFI 261, FRM 167 or STAT 162

Additional courses which may be required for PhD students specializing in Silviculture: SFI 141, SFI 201, FBS 172, FBS 230, CHEM 160, FRM 167 or STAT 162

For those specializing in Tree Improvement: SFI 201, SFI 241, FBS 230, CHEM 160, FPPS 111, WST 201, FRM 167 or STAT 162

For those specializing in Agroforestry: SFFG 133, SFFG 233, SFI 291, FBS 291, SOIL 170, FRM 167 or STAT 162

**Silviculture and Forest Influences**

**SFI 201. Advanced Forest Soils (3).** Physical and chemical properties of soils; soil microbiology; soil as related to the growth and development of timber stands. 5 hrs (2 class, 3 lab). PR. SFI 101.

**SFI 221 . Advanced Nursery and Plantation Techniques (3).** Recent developments in nursery and forest planting techniques. 5 hrs (2 class, 3 lab). PR. SFI 121 or COI. (1)

**SFI 223. Advanced Silviculture (3).** Stand improvements and regeneration methods in tropical forests. (Field trip required). 5 hrs (2 class, 3 lab). PR. SFI 121 or COI. (1,2)

**SFI 241. Advanced Forest Tree Improvement (3).** Approaches to forest tree improvement, selection, species introduction, seed orchards, hybridization, mutation, and progeny testing. 3 hrs (class). PR. SFI 141 and FRM 167. (2)

**SFI 261. Forest Influences (3).** The influence of forests on local and microclimate, stream flow, and soil productivity. 5 hrs (2 class, 3 lab). PR. FRM 153 or COI. (2)

**SFI 271. Advanced Silvics (3).** Analysis of the interrelation of site factors. 5 hrs (2 class, 3 lab). PR. SFI 101 and FBS 36 or COI. (1,2)

**SFI 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**SFI 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**SFI 299. Graduate Seminar (1).** May be taken twice. 1 hr (class). PR. COI. (1,2)

**Forestry**

**FOR 300. Master's Thesis (6).** (1, 2, S)

**FOR 400. Doctoral Dissertation (12).** (1,2,S)

**FORESTRY: SOCIAL FORESTRY AND FOREST GOVERNANCE (FOR: SFFG)**

*Department of Social Forestry and Forest Governance,  
College of Forestry and Natural Resources*

**Degrees offered:** *Master of Forestry and Master of Science*

The MFor: SFFG is a non-thesis program, it requires a minimum of 31 units, these are 18-21 units of major courses including core courses SFFG 201, SFFG 212, SFFG 233, SFFG 263, SFFG 290 and other major courses SFFG 280, SFFG 287, SFFG 291, SFI 123; 1 unit of seminar; and 9-12 units of minor courses.

The MS FOR: SFFG program requires a minimum of 34 units, these are: 12 units of core (SFFG 201, SFFG 212, SFFG 263, AERS 282) and 6 units of major courses (SFFG 233, SFFG 280, SFFG 287, SFFG 291); 9 units of minor courses; 1 unit of seminar (SFFG 299); and 6 units of thesis (FOR 300)

Suggested fields of cognate for MF and MS programs: Agronomy, Horticulture, Animal Science, Economics,



Food Science, Human Ecology, Agricultural Education, Extension Education, Community Development, Forest Management, Silviculture and Forest Influences, Development Communication.

### Social Forestry and Forest Governance

**SFFG 201. Comparative Social Forestry (3).** Perspectives in social forestry; analysis of social forestry programs. 3 hrs (class). PR. SFFG 101 or COI. (1)

**SFFG 212. Program Development and Evaluation in Social Forestry (3).** Theories, principles, and processes of program development and evaluation; their application to social forestry. 3 hrs (class). PR. SFFG 201 or COI. (2)

**SFFG 221/ENS 221. Environmental and Natural Resource Policy Formulation (3).** Theories, concepts and issues in environmental and natural resource policy formulation; case studies with special reference to developing countries. 3 hrs (class). PR. COI. (1,2)

**SFFG 224. Alternative Theories and Methods of Policy Analysis in Natural Resources (3).** Survey, critique and applications of alternative theories and methods in the analysis of natural resource policies. 3 hrs (class). PR. FRM 124 or COI. (2)

**SFFG 229. Public Administration of Forest Resources (3).** Execution of forest resources programs, especially administered by the forestry agencies in the Philippines. 3 hrs (lect.). PR. FRM 124 or COI. (1)

**SFFG 233. Agroforestry Management Practice (3).** Microanalysis and application of management principles on agroforestry farms. 7 hrs (1 class, 6 practicum). PR. SFFG 133 or COI. (2, S)

**SFFG 263. Cultures and Societies in Tropical Forest Ecosystems (3).** Community and forest interactions in the tropics, with special reference to Southeast Asia. 3 hrs (class). PR. SFFG 163 or COI. (1)

**SFFG 280. Swidden Farming Systems (3).** Social, economic, and cultural factors underlying the practice of swidden farming; technologies, practices, and policies involved in its management. 3 hrs (class). PR. COI. (2)

**SFFG 287. Conflict Management in Forestry (3).** Analysis and management of conflicts to promote forest resources development and conservation. 3 hrs (class). PR. SFFG 201 or COI.

**SFFG 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units.

**SFFG 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units.

**SFFG 299. Graduate Seminar (1).** May be taken twice.

### Forestry

**FOR 300. Master's Thesis (6).** (1,2,S)

## FORESTRY: WOOD SCIENCE AND TECHNOLOGY (FOR: WST)

*Department of Forest Products and Paper Science,  
College of Forestry and Natural Resources*

**Degrees offered:** *Master of Forestry, Master of Science, and Doctor of Philosophy*

### Areas of specialization:

Forest products, wood science, industrial management. PhD by Research is offered in the following areas: Pulp and Paper Technology, Timber Mechanics, Wood Adhesion, Wood Anatomy, Wood Chemistry

### Foundation courses for MF and MS students:

BOT 1, CHEM 40, PHYSICS 13, MATH 26

### Foundation courses for PhD students:

FPPS 111, FPPS 121, FPPS 131, MGT 101 (for those who will specialize in Industrial Management)

### Core courses for MF/MS students:

**FPPS 111, FPPS 121, FPPS 131, WST 299, MGT 101** (for those specializing in Industrial Management)

### Core courses for PhD students:

WST 201, WST 203, WST 221, WST 299

### Wood Science and Technology

**WST 201. Tree Growth and Wood Quality (3).** Developmental morphology of trees; internal and external control of wood formation; wood quality and variability. 5 hrs (2 class, 3 lab). PR. FPPS 111 and FBS 31. (2)

**WST 202. Wood Quality Evaluation (3).** Patterns of variation of wood quality indicators; sampling strategies and biomathematical methods of wood quality assessment. 5 hrs (2 class, 3 lab). PR. COI.(1)

**WST 203. Wood Chemistry II (3).** Chemistry and physics of cellulose and other components of the cell wall. 5 hrs (2 class, 3 lab). PR. FPPS 131. (2)

**WST 204. Wood and Bark Extractives (3).** Chemistry of extraneous components of wood and bark. 5 hrs (2 class, 3 lab). PR. FPPS 131. (2)

**WST 205. Paper Properties (3).** Evaluation of chemical, physical, and optical properties of paper and their significance to the end use of paper. 5 hrs (2 class, 3 lab). PR. FPPS 132. (1)

**WST 211. Instrumentation for Research (3).** Design and operation of instrumentation systems in wood science research. 5 hrs (2 class, 3 lab). PR. COI.

**WST 212. Advanced Quality Control in Wood Processing (3).** Sampling plans for acceptance inspection and for the control of wood production processes. Introduction to the application of reliability techniques and life testing. 5 hrs (2 class, 3 lab). PR. FPPS 181. (1)

**WST 221. Wood Physics II (3).** The physics of wood and wood-based materials. Practical considerations with respect to moisture and heat movement and their application to wood drying processes. 5 hrs (2 class, 3 lab). PR. FPPS 121. (2)

**WST 222. Elasticity of Wood and Wood-Based Materials (3).** Theory of elasticity as applied to wooden structural members and other wood-based materials. 5 hrs (2 class, 3 lab). PR. MATH 27 or its equivalent. (2)

**WST 223. Strength Properties of Timber and Glued Wood Products (3).** Test methods and specimen geometry; effects of defects, basic stresses, grading and working stresses. 5 hrs (2 class, 3 lab). PR. FPPS 124. (1)

**WST 225. Wood Moisture Relations (3).** Theories and thermodynamics of water absorption by wood; mechanisms of moisture movement through wood below and above the fiber saturation point. 5 hrs (2 class, 3 lab). PR. WST 221. (1,2)

**WST 241. Wood Machining II (3).** Industrial woodworking machines and processes. Selection and maintenance of cutting tools. 5 hrs (2 class, 3 lab). PR. FPPS 144.

**WST 260. Wood Resins Relations (3).** Physical and physicochemical aspects of wood adhesion. 5 hrs (2 class, 3 lab). PR. FPPS 171. (2)

**WST 262. Advanced Wood Preservation (3).** Theories of fluid penetration in wood and design of wood treating plant. 5 hrs (2 class, 3 lab). PR. FPPS 161. (1)

**WST 270. Advanced Kiln Drying (3).** Design of lumber kilns, moisture control, seasoning and dry kiln problems of wood-using industries. 5 hrs (2 class, 3 lab). PR. FPPS 151. (2)

**WST 282. Analysis of Decision Alternatives (3).** Application of linear programming to management problems in the wood industry. 5 hrs (2 class, 3 lab). PR. FRM 214. (2)

**WST 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. (1, 2)

**WST 299. Graduate Seminar (1).** May be taken twice. (1,2,S)

### Forestry

**FOR 300. Master's Thesis (6).** (1, 2, S)

**FOR 400. Doctoral Dissertation (12).** (1, 2, S)

## GENETICS (GEN)

*Lead unit: Institute of Biological Sciences, College of Arts and Sciences*

The MS and PhD degree programs in Genetics are offered by the Genetics and Molecular Biology Division of the Institute of Biological Sciences, together with other units in UPLB. The programs are managed by an interdepartmental Program Management Committee created by the dean of the Graduate School. An Admissions Committee screens applicants to the programs.

The two graduate programs aim to furnish the student with a firm background in Biology with specialization in Genetics; and prepare the student for competence in instruction, research, and extension.

The MS GEN program requires a minimum of 31 units, these are: 15 units of major courses including core courses (BIO 130a, BIO 130b, BIO 201, AGR 255); 9 units of minor courses; 1 unit of seminar (BIO 299); and 6 units of thesis (BIO 300)

A written examination is to be taken after the student has passed the core courses. This is scheduled regularly at the beginning of each semester. The student must pass this examination before she/he can be allowed to take the general examination.

The PhD GEN program requires applicants to have already taken BIO 130a, BIO 130b, CHEM 160 and STAT 162 or their equivalents, if not, these courses may be required to be taken. The program requires a minimum of 37 units, these are: 15 units of major courses including core courses AGR 255 and BIO 231; 9 units of cognate courses; 1 unit of seminar (BIO 299); and 12 units of dissertation (BIO 400)

BIO 130a and BIO 130b is required for MS and PhD students who have Genetics as minor/cognate field.

### Biology

**BIO 201/MBB 201. Advanced Molecular Biology (3).** Advances in molecular biology with emphasis on the structures, properties, functions, and interactions of biomolecules in basic cellular processes and manipulation of DNA. 3 hrs (class). PR. BIO 101 (2)

**BIO 206/MBB 206. Research Techniques in Molecular Biology I (3).** Experiments in molecular biology with emphasis on recombinant DNA techniques. 7 hrs (1 class, 6 lab). PR. BIO 201. (2)

**BIO 231. Advanced Cytogenetics (3).** Recent advances on the role of chromosomes in heredity, development, differentiation, and evolution. 5 hrs (2 class, 3 lab). PR. BIO 131. (1)

**BIO 235. Evolutionary Genetics (3).** Analysis of genetic mechanisms affecting evolutionary change. 3 hrs (class). PR. BIO 30 or its equivalent (1)

**BIO 236. Developmental Genetics. (3).** Genetic control of development in plants and animals. 3 hrs (class). PR. BIO 130a. (2)

**BIO 241. Biogeography (3).** The geographical distribution of plants and animals; mechanisms and modes of dispersal; dynamic changes of floral and faunal distribution patterns; continental and island biogeography; current theories on the origin of existing distribution patterns. 3 hrs (class). PR. BIO 142 or COI.

**BIO 242. Biosystematics (3).** Discussions on the species concept and specialization problems; variation; modes and measures of selection; and evolutionary mechanisms using the results on the studies of genetics, ecology, systematics, psychology, biogeography, and historical geology. 3 hrs (class). PR. BIO 142 or COI.

**BIO 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (2)

**BIO 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1)

**BIO 299. Graduate Seminar in Biology (1).** May be repeated once for a maximum of 2 units. PR. COI. (1,2)

**BIO 300. Master's Thesis (6).** (1,2)

**BIO 400. Doctoral Dissertation (12).** (1,2)

## HORTICULTURE (HORT)

*Crop Science Cluster, College of Agriculture*

**Degrees offered:** *Master of Agriculture, Master of Science, and Doctor of Philosophy*

### Areas of specialization:

MAgr: Crop Production and Management

MS: Crop Breeding, Crop Processing and Handling, Embryology and Tissue Culture, Ornamental Horticulture, Plant Propagation and Nursery Management, Postharvest Physiology, Seed Technology

PhD: Crop Breeding, Crop Physiology, Crop Production and Management, Embryology and Tissue Culture, Postharvest Physiology

Foundation courses: HORT 132, STAT 162 or AGR 112, BIO 30 and CHEM 40.

The MAgr HORT is a non-thesis program, it requires a minimum of 36 units, these are 24 units of major courses and 12 units of minor courses.

The MS HORT program requires a minimum of 31 units, these are: 15 units of major courses, 9 units of minor courses, 1 unit of seminar (HORT 299) and 6 units of thesis (HORT 300).

The PhD HORT program requires a minimum of 37 units, these are: 15 units of major courses, 9 units of cognate courses, 1 unit of seminar (HORT 299) and 12 units of dissertation (HORT 400).

\*Major courses vary depending on the field of specialization

Courses for MS students specializing in Propagation and Nursery Management and Embryology and Tissue Culture: CHEM 160, HORT 220 or HORT 230 and HORT 232.

For Crop Production and Management: CHEM 160, HORT 220 or HORT 230 and SOIL 260

For Crop Physiology: CHEM 160, CHEM 160.1, HORT 220 or HORT 230 and HORT 232

For Postharvest Physiology: CHEM 160, CHEM 160.1, HORT 209 and FST 219

For Seed Technology: CHEM 160, CHEM 160.1, HORT 220 or HORT 230 and HORT 234

Courses for PhD students specializing in crop production and management: DM 210, PPTH 202, ENT 170 and HORT 231

For Propagation and Nursery Management: DM 210, PPTH 202, BOT 210, and HORT 231

For Embryology and Tissue Culture: DM 210, PPTH 202, ENT 170 and HORT 231

For Crop Physiology: DM 210, BOT 220, HORT 220 or HORT 230 or HORT 231

For Postharvest: DM 210, CHEM 102, CHEM 260 and BOT 210

### Some guidelines

A foundation or core course need not be included in the program of study if the course has been taken by the student at UPLB. If an equivalent course was taken outside UPLB, the student must pass a validating examination. Determination of equivalence shall be the prerogative of the academic department offering the course.

A student entering the PhD program in Horticulture must have taken the prescribed core course for MS in Horticulture or their equivalent, otherwise, they should register the courses but cannot be considered as core or major courses for PhD.

To satisfy the minimum number of units required for the major field, the student with the guidance of the adviser, may choose from the several related course offered by UPLB.

**Horticulture**

**HORT 209. Postharvest Physiology of Perishable Crops (3).** Physical and physiochemical changes in perishable crops after harvest; mechanisms and control of deterioration. 5 hrs (2 class, 3 lab). PR. HORT 109.1. (2)

**HORT 220. Applied Vegetable Crop Physiology (3).** Effects of different environmental factors on the growth and development of various vegetable crops. 5 hrs (2 class, 3 lab). PR. HORT 132/BOT 132 or COI. (2)

**HORT 230. Applied Fruit Crops Physiology (3).** Environmental factors, cultural treatments, and growth regulators that modify basic processes controlling flowering and fruiting of fruit crops. 5 hrs (2 class, 3 lab). PR. HORT 130 and HORT 132/BOT 132 or COI. (2)

**HORT 231. Reproductive Crop Physiology (3).** The flowering process and its associated phenomena of photoperiodism, vernalization, thermoperiodism, and endogenous rhythm, sex expression, fruit-set and development and their control mechanism. 5 hrs (2 class, 3 lab). PR. HORT 132/BOT 132. (1)

**HORT 232/BOT 232. Physiology and Biochemistry of Endogenous Growth Regulators (3).** Physiology, biochemistry, transport, mode of action, assay and applications of endogenous growth regulators in agriculture. 5 hrs (2 class, 3 lab). (jointly offered with Botany of the College of Arts and Sciences). PR. COI.

**HORT 234. Crop Seed Physiology (3).** Seed development, dormancy, germination, and other physiological processes associated with seed production and storage of economically important crop plants. 5 hrs (2 class, 3 lab). PR. COI. (1)

**HORT 241. Plant Morphogenesis (3).** Processes involved, categories of the factors affecting morphogenetic phenomena and their implications on plant development and propagation. 5 hrs (2 class, 3 lab). PR. HORT 132/BOT 132. (1)

**HORT 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**HORT 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**HORT 299. Graduate Seminar (1).** May be taken twice.

**HORT 300. Master's Thesis (6).** (1,2,S)

**HORT 400. Doctoral Dissertation (12).** (1,2,S)

**HUMAN NUTRITION (HN)**

*Institute of Human Nutrition and Food, College of Human Ecology*

**Degree offered:** *Doctor of Philosophy*

The PhD HN program requires a minimum of 42 units, these are: 12 units of core courses (HNF 211, HNF 221, HNF 224, ENS 270), 9 units of major courses (HNF 222, HNF 223, HNF 251, HNF 252, HNF 254, HNF 255, HUME 290, HUME 291, AECO 261); 9 units of cognate courses; and 12 units of dissertation (HORT 400).

Cognate courses may be chosen from any of the following areas: agriculture, agronomy, horticulture, animal and veterinary sciences, genetics, environmental sciences, food science, extension education, communication, statistics, economics, sociology, anthropology, and community development.

The following background courses may be required for students with deficiencies: HUME 101, AERS 265 or DM 201, CHEM 260, CHEM 261, AERS 282, STAT 101, STAT 166, and HNF 121

**Human Nutrition and Food**

**HNF 211. Food and Culture (3).** Human food behavior and food ways as influenced by various factors; related relationships to dietary patterns and application to nutrition development programs. 3 hrs (class). PR. COI. (2)

**HNF 221. Biochemical Aspects of Human Nutrition (3).** Analysis of biochemical processes and regulations, and their interrelationships in the metabolism of nutrients. 3 hrs (class). PR. CHEM 160 or 161 or COI. (1)

**HNF 222. Nutrition in Health and Disease (3).** Nutrition in relation to physiological and biochemical changes during special health and disease conditions. 3 hrs (class). PR. COI. (2)

**HNF 223. Evaluation of Nutritional Status (3).** Principles, methods, and techniques used in the evaluation of nutritional status of population groups. 5 hrs (2 class, 3 lab). PR. COI. (1)

**HNF 224. Nutritional Epidemiology (3).** Epidemiologic principles and methods and their application to the promotion of nutrition and health; and control of nutrition-oriented diseases in human population. 5 hrs (2 class, 3 lab). PR. STAT 101 or COI. (1)

**HNF 225. Nutritional Physiology (3).** Analysis of physiological principles and processes as applied to human nutrition in health and disease. 3 hrs (class). PR. COI. (1)

**HNF 251. Ecology of Food and Nutrition (3).** Ecological, sociocultural, economic, and demographic factors affecting food consumption and nutritional status of a region and population. 3 hrs (class). PR. COI. (1)



**HNF 252. Food and Nutrition Planning (3).** Identification and analysis of problems, resources, and processes involved in the formulation of policies and planning of food and nutrition programs. 3 hrs (class). PR. COI. (2)

**HNF 253. Workshop in Food and Nutrition Planning (3).** Formulation of policies and plans for food and nutrition programs on the national and sectoral levels. 3 hrs (class). PR. HNF 252 or COI. (2)

**HNF 254. Nutrition Programs (3).** Activities involved in food and nutrition programs at local, national, and international levels; planning and evaluation of applied nutrition programs. 3 hrs (class). PR. COI. (1)

**HNF 298. Field Studies (6).** PR. COI. (S)

### Human Ecology

**HUME 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (2,S)

**HUME 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**HUME 299. Graduate Seminar (1).** May be taken twice. (1,2)

**HUME 300. Master's Thesis (6).** (1,2,S)

**HUME 400. Doctoral Dissertation (12).** (1,2,S)

## INFORMATION TECHNOLOGY (IT)

*Institute of Computer Science, College of Arts and Sciences*

**Degree offered:** *Master of Information Technology*

The Master of Information Technology (MIT) program is designed to further train IT practitioners by providing them with advanced knowledge in IT for them to be able to design and implement IT solutions in their workplace. Graduates of the Master of Information Technology program are expected to be able to: 1) demonstrate in-depth understanding of technical concepts pertaining to information technology; 2) apply the latest advances in information technology in their field of work; and 3) undertake the proper design, implementation and maintenance of a production-grade IT-based solutions.

The curriculum consists of 28 units of core courses (IT 210, IT 226, IT 227, IT 238, IT 280, IT 299, IT 295, CMSC 215, CMSC 272); and 9 units of elective courses (CMSC 214, CMSC 220, CMSC 224, CMSC 225, CMSC 227, CMSC 228, CMSC 229, CMSC 231, CMSC 250, CMSC 271, CMSC 280, CMSC 291) for a total of 37 academic units.

The Master of Information Technology is awarded if the student obtains a weighted general average of 2.00 or better in the course work, satisfies the seminar requirement, passes a general examination, and successfully implements an IT-based application project.

### Information Technology

**IT 210. Web Application Development (3).** WWW programming, Internet and Intranet applications development, designing and building active server pages and other integrated web-based solutions. 5 hrs (2 class, 3 lab). PR. CMSC 100 or COI. (1)

**IT 226. Enterprise Information Systems (3).** Framework of information systems in organizations, enterprise process modeling and development of collaborative enterprise systems using IT-tools and other enabling technologies. 3 hrs (class). PR. COI. (1)

**IT 227. E-Commerce Technologies (3).** Fundamental concepts and applications of e-commerce technologies. 5 hrs (2 class, 3 lab). PR. IT 210 and IT 226 or COI. (2)

**IT 238. Networking and Client/Server Computing (3).** Client/ Server computing techniques, system design, software and applications. 5 hrs (2 class, 3 lab). PR. CMSC 137 or COI. (1)

**IT 280. Internet Security (3).** Algorithms, IT-solutions and security issues associated with developing applications for the Internet. 5 hrs (2 class, 3 lab). PR. IT 238 or COI. (2)

**IT 295. IT-Based Application Project (6).** PR. COI. (1,2,S)

**IT 299. Graduate Seminar (1).** PR. COI. (1,2,S)

*Please refer to Computer Science for other courses*

## LOCAL GOVERNANCE AND DEVELOPMENT (LGD)

*Institute of Governance and Rural Development, College of Public Affairs and Development*

### Local Governance and Development

**LGD 210. Governance and Development (3).** Concepts, models, principles, tools, indicators, practices, issues, trends, and prospects in governance and development. 3 hrs (class). PR. None. (2)

**LGD 211. Delivery Systems for Public Services (3).** Theory and practice of public service delivery with focus on local government units. 3 hrs (class). PR. None. (2)

**LGD 213. Local Fiscal Management (3).** Concepts, principles, processes and practices in local fiscal management, local revenue generation, allocation, utilization and accountability. 3 hrs (class). PR. None. (2)

**LGD 215. Human Resource Management in Local Government Units (3).** Principles, practices, trends, and issues in human resource management in local government units 3 hrs (class). R. None. (2)

**LGD 216. Organizational Development in Local Government Units (3).** Theories, concepts, and processes in organizational development and improvement of local government units. 3 hrs (class). PR. None. (2)

**LGD 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited in the student's program will not exceed 4 units. (1,2,S)

**LGD 298. Field Studies (3).** PR. COI. (1,2,S)

**LGD 299. Graduate Seminar (1).** May be taken twice. PR. COI. (1,2,S)

## MATHEMATICS (MATH)

*Institute of Mathematical Sciences and Physics, College of Arts and Sciences*

**Degree offered:** *Master of Science*

The Master of Science in Mathematics contains a total of 34 units broken down into 18 units of core courses (MATH 211, MATH 213, MATH 222, MATH 225, MATH 230, MATH 231), 9 units of electives, 6 units of thesis (MATH 300); and 1 unit of seminar (MATH 299).

The nine (9) units of electives should be 200-level courses. They can be chosen from one program, such as statistics, economics, computer science, engineering, education management or systems biology; or all can be mathematics or applied mathematics courses such as algebra, analysis, geometry, combinatorics, coding theory or mathematical programming. The electives can be also be any combination of courses from various programs. Major electives can also be chosen from the following courses: AMAT 266, AMAT 267, MATH 215, MATH 217, MATH 220, MATH 235, MATH 291

### Applied Mathematics

**AMAT 266. Deterministic Mathematical Decision Models (3).** Linear models; inventory models; integer programming and combinatorial models; elementary dynamic programming models; introduction to nonlinear programming. 3 hrs (class). PR. AMAT 160 or COI. (1)

**AMAT 267. Probabilistic Mathematical Decision Models (3).** Basic concepts and application of probabilistic mathematical decision models such as queuing, inventory, dynamic programming and simulation, inventory, dynamic programming and simulation models. 3 hrs (class). PR. AMAT 160 or COI. (2)

### Mathematics

**MATH 211. Abstract Algebra (3).** Binary operations, algebraic systems such as semigroups, rings integral domains, field, extensions. 3 hrs (class). PR. MATH 111. (1)

**MATH 213. Theory of Matrices (3).** Operations on matrices; canonical forms, determinants; characteristic equations; eigen values. 3 hrs (class). PR. MATH 120. (1)

**MATH 215. Coding Theory and Cryptography (3).** Concepts and mathematical theory of error-correcting codes, encryption and decryption schemes. 3 hrs (class). PR. MATH 111. (1)

**MATH 217. Algebraic Combinatorics (3).** Discrete structures from an algebraic perspective. 3 hrs (class). PR. MATH 211. (2)

**MATH 220. Algebraic Geometry (3).** Concepts and theorems of algebraic geometry. 3 hrs (class). PR. MATH 211. (1)

**MATH 222. Finite Geometries (3).** The finite plane, projective plane, affine plane, hyperbolic plane; Galois geometries; combinatorial applications of finite geometries; finite inversive geometry and block design. 3 hrs (class). PR. MATH 211. (2)

**MATH 225. Topology (3).** Topological spaces; bases and subbases; continuity; metric spaces; separation axioms; compactness; product spaces; connectedness. 3 hrs (class). PR. MATH 101 or its equivalent. (2)

**MATH 230. Real Analysis (3).** The real number system; Lebesgue measures; Riemann and Lebesgue integrals; differentiation and integration. 3 hrs (class). PR. MATH 155. (1)

**MATH 231. Functions of a Complex Variable (3).** Complex differentiation and integration; analytic continuation; residue theorem; conformal mapping; and some special functions. 3 hrs (class). MATH 155. (2)

**MATH 235. Functional Analysis (3).** Concepts, principles, methods, and applications of functional analysis; normed and Banach spaces; Hilbert space theory. 3 hrs (class). PR. MATH 213. (2)

**MATH 291. Special Topics (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. May be taken twice. PR. COI.

**MATH 299. Graduate Seminar (1).** May be taken twice. (2)

**MATH 300. Master's Thesis (6).** (1,2,S)

## MICROBIOLOGY (MCB)

*Lead unit: Institute of Biological Sciences, College of Arts and Sciences*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

The microbiology program is offered jointly by the Agricultural Systems Cluster (CA), Crop Protection Cluster (CA), Food Science Cluster (CA), Department of Forest Biological Sciences (CFNR) and the Institute of Biological Sciences (CAS). The lead unit is the Institute of Biological Sciences.

The foundation courses are MCB 101 for MS and MCB 201 and MCB 220 for PhD.

The MS MCB program requires a minimum of 32 units, these are: 15 units of major courses including core courses MCB 130, MCB 201 and MCB 220; 2 units of seminar (MCB 299); 9 units of minor courses; and 6 units of thesis (MCB 300).

The PhD MCB program requires a minimum of 38 units, these are: 15 units of major courses including core courses MCB 230 and MCB 241; 9 units of cognate courses; 2 units of seminar (MCB 299) and 12 units of dissertation (MCB 400).

For MS and PhD students with MCB as minor/cognate field at least 9 units of course work in Microbiology is required.

### Microbiology

**MCB 201. Advances in Microbiology (3).** Current research and development in microbiology. 3 hrs (class). PR. COI. (1)

**MCB 220. Physiology of Bacteria (3).** Physiological processes in bacteria including study of bacterial variation and population dynamics. 5 hrs (2 class, 3 lab). PR. MCB 101 and MCB 120. (2)

**MCB 221. Physiology and Molecular Biology of Extremophiles (3).** Life processes, molecular basis of adaptation to harsh environments, and biotechnological and industrial applications of the extremophiles. 3 hrs (class). PR. MCB 120 and BIO 101, or COI. (1)

**MCB 230. Advanced Microbial Genetics (3).** Molecular genetics of microbial systems. 3 hrs (class). PR. MCB 130 or COI. (1)

**MCB 240. Determinative Bacteriology (3).** Bacterial identification, cultivation of representative groups of bacteria from their natural habitats. 7 hrs (1 class, 6 lab). PR. MCB 101. (1)

**MCB 241. Polyphasic Approach in Microbial Taxonomy (3).** Phenotypic and genotypic methods in microbial classification, nomenclature and identification. 5 hrs (2 class, 3 lab). PR. MCB 101 and BIO 101, or COI. (2)

**MCB 260. Advanced Industrial Microbiology (3).** Microbiological and physiological aspects of fermentation processes. 3 hrs (class). PR. MCB 160. (2)

**MCB 270. Microbial Toxins (3).** Nature, activity, and toxigenicity of bacterial and fungal toxins affecting man and other animals; methods of isolation, detection, and quantification. 5 hrs (2 class, 3 lab). PR. MCB 101 and CHEM 160.1 or COI. (2)

**MCB 285. Predictive Microbiology and Modeling Applications in Food Safety (4).** Assessment and control of microbiological risks in foods, process calculations on growth, survival, and inactivation of microorganisms in foods. 8 hrs (2 class, 6 lab). PR. MCB 180 and MATH 26 or COI. (1)

**MCB 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**MCB 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1)

**MCB 299. Graduate Seminar (1).** May be taken twice. (1,2)

**MCB 300. Master's Thesis (6).** (1,2)

**MCB 400. Doctoral Dissertation (12).** (1,2)

## MOLECULAR BIOLOGY AND BIOTECHNOLOGY (MBB)

**Degree offered:** *Master of Science and Doctor of Philosophy*

The MS program in Molecular Biology and Biotechnology is an interdisciplinary program which involves the following UPLB units: College of Agriculture, College of Arts and Sciences, College of Forestry and Natural Resources, College of Veterinary Medicine, College of Engineering and Agro-Industrial Technology, College of Human Ecology, College of Economics and Management, School of Environmental Science and Management, College of Public Affairs and the National Institutes of Molecular Biology and Biotechnology.

The Graduate School supervises the implementation of the program through a Management Committee composed of chairs of the clusters committees for each of the four clusters in the Basic Sciences, Plant Sciences, Animal Sciences and Physical and Engineering Sciences and Environmental Biotechnology. The members of these committees constitute the Graduate Faculty in Molecular Biology and Biotechnology (GFMBB). The GFMBB is directly under the Graduate School. The members of the GFMBB nominate and elect two members at large to the Management Committee. The Graduate School provides administrative support to the Management Committee.

**Areas of specialization**

*Basic Sciences:* Genetics, Microbiology, Biochemistry, Chemistry. *Plant Sciences:* Agronomy, Horticulture, Plant Breeding, Plant Physiology, Plant Pathology, Forestry. *Animal Sciences:* Animal Breeding, Animal Physiology, Veterinary Medicine, Zoology, Entomology. *In Physical and Engineering Sciences and Environmental Biotechnology:* Microbiology, Bioengineering, Food Science and Technology, Chemistry, Environmental Sciences

**Foundation courses**

CHEM 160, MATH 26, BIO 101, MCB 101 are the foundation courses for the MS program while CHEM 261, MBB 201/BIO 201, MBB 206/BIO 206, MBB 211, MBB 240 are for PhD.

The MS MBB program requires a minimum of 37 units, these are 21 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. The major courses are composed of core courses (MBB 201/BIO 201, CHEM 261, MBB 206/BIO 206, MBB 211, MBB 240, MBB 292) and other major courses to satisfy the required number of units.

The PhD MBB program requires a minimum of 41 units, these are 18 units of major courses, 9 units of cognate courses, 2 units of seminar and 12 units of dissertation. The major courses are composed of core courses (MBB 207/BIO 207, MBB 295/ENS 295, MBB 250, MBB 292) and other major courses to satisfy the required number of units.

**Molecular Biology and Biotechnology****MBB 201/BIO 201. Advanced Molecular Biology (3).**

Advances in molecular biology with emphasis on the structures, properties, functions, and interactions of biomolecules in basic cellular processes and manipulation of DNA. 3 hrs (class). PR. BIO 101. (2)

**MBB 206/BIO 206. Research Techniques in Molecular Biology I (3).** Experiments in molecular biology with emphasis on recombinant DNA techniques. 7 hrs (1 class, 6 lab). PR. BIO 201 (2)

**MBB 207/BIO 207. Research Techniques in Molecular Biology II (3).** Advanced experimental techniques in molecular biology. 7 hrs (1 class, 6 lab). PR. MBB 206/BIO 206 and MBB 211 (1)

**MBB 211. Biocomputing in Molecular Biology and Biotechnology (2).** Principles and applications of computational sciences in molecular biology and biotechnology. 4 hrs (1 class, 3 lab). PR. COI. (1)

**MBB 224/SOIL 224. Biotechnology of Soil-Microbe-Plant Interactions (3).** Biotechnological approaches in the study of beneficial soil-microbe-plant interactions and related principles, processes and applications. 5 hrs (2 class, 3 lab). PR. SOIL 120 or MCB 150, and BIO 101, or COI. (2)

**MBB 225/BOT 225. Biotechnology of Plant Secondary Metabolites (3).** Physiological bases of secondary plant metabolites production *in vitro*. 5 hrs (2 class, 3 lab). PR. BOT 20 and CHEM 160 or COI. (2)

**MBB 229/VMCB 229. Biotechnology in Immunoprophylaxis and Diagnostics of Animal Diseases. (2).** Principles and applications of biotechnological advances in vaccine design and development and veterinary diagnostics. 4 hrs (1 class, 3 lab). PR. VMCB 221 or VPAR 234 or COI. (1)

**MBB 235/FPPS 235. Forest Products Biotechnology (3).** Application of biotechnology to improve the quality and utilization of wood; bio-processing operations in forest-based and related industries. 3 hrs (class). PR. FPPS 131 or COI. (2)

**MBB 240. Industrial Biotechnology (3).** Principles of bioprocess and bioseparation technologies with emphasis on physico-chemical and engineering aspects. 5 hrs (2 class, 3 lab). PR. MATH 26, CHEM 160 and MCB 1. (1)

**MBB 250. Advances in Transformation Biotechnology (3).** Advances and applications of transformation of microorganisms, plants and animals using recombinant DNA techniques. 3 hrs (class). PR. MBB 201/BIO 201. (1)

**MBB 251/PPTH 251. Molecular Plant-Pathogen Interactions (3).** Molecular mechanisms of plant-pathogen interactions and application of molecular diagnostics and markers in plant pathology. 3 hrs (class). PR. PPTH 101 and BIO 101. (2)

**MBB 267 / ANSC 267 . Animal Reproductive Biotechnology (3).** Biotechnological concepts and techniques in animal reproduction. 3 hrs (class). PR. ANSC 260 or COI. (2)

**MBB 268/ FBS 268. Molecular Phylogenetics (3).** Applications of molecular biological techniques and molecular data to inferences of phylogenetic patterns and evolutionary processes, and to analyses of taxonomic groups of organisms. 3 hrs (class). PR. BIO 101 and any basic course in systematics ( BOT 140, ZOO 140, ENT 140 or FBS 167). (2)

**MBB 273/ENT 273. Insect Molecular Biology (3).** Molecular aspects of insect biology and the use of biotechnology in entomological research and integrated pest management. 3 hrs (class). PR. ENT 120 and BIO 101 or COI. (2).

**MBB 290. Special Problems (1-3).**

**MBB 291. Special Topics (1-3).**

**MBB 292. Biotechnology and Society (3).** Implications of biotechnological research and products on society and the economy. 3 hrs (class). (2)



**MBB 295/ENS 295. Environmental Biotechnology (3).** Biological and biochemical aspects of environmental biotechnology. 3 hrs (class). PR. MCB 1 and CHEM 160, or COI. (1)

**MBB 299. Graduate Seminar (1).**

**MBB 300. Master's Thesis (6).**

**MBB 390. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**MBB 391. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**MBB 399. Graduate Seminar (1).** May be taken twice. PR. Graduate Standing. (1,2)

**MBB 400. Doctoral Dissertation. (12).** (1, 2, S)

### NATURAL RESOURCES CONSERVATION (NRC)

*Lead Unit: Institute of Renewable Natural Resources, College of Forestry and Natural Resources*

**Degree offered:** *Master of Science*

**Areas of specialization:** Biodiversity Conservation, Parks and Outdoor Recreation Management, Coastal Resources Management

The MS NRC program is coordinated by a Graduate Program Management Committee under the Graduate School. It is composed of representatives of concerned academic units with offerings in natural resources conservation. Using Graduate School requirements, all applicants will be evaluated by the Management Committee in consultation with the appropriate academic departments. An applicant for admission to the MS NRC program should be a holder of baccalaureate degree in forestry, agriculture, biology, environmental science, and other allied fields.

The program requires a minimum of 34 units, these are 15 units of core courses (AECO 240, FRM 204, NRC 201, NRC 282, SFFG 221/ENS 221), 12 units of specialization courses\*, 1 unit of seminar (NRC 299), and 6 units of thesis (NRC 300) which should be a substantial contribution to the development of concepts, principles, and practices in natural resources conservation.

\*Specialization courses are as follows:

Biodiversity Conservation: BIO 241, FBS 101, MBB 268, PGR 262, WLDL 101, WLDL 105, WLDL 205

Parks and Outdoor Recreation Management: FRM 140, NRC 185, NRC 231, NRC 232, NRC 233

Coastal Resources Management: ENS 203, ENS 204, NRC 241, NRC 242, MS 254 (for cross enrollment at the Marine Science Institute, UP Diliman).

### Natural Resources Conservation

**NRC 201. Perspectives and Approaches to Natural Resources Conservation (3).** Biological, geological and social dimensions of natural resources conservation. 3 hrs (class). PR. COI. (1)

**NRC 231. Protected Areas Management (3).** Issues, practices and strategies in managing national parks and other protected areas. 3 hrs (class). PR. FRM 140 or COI. (1)

**NRC 232. Ecotourism (3).** Planning and implementation of ecotourism programs and projects. 3 hrs (class). PR. FRM 140 or COI.(1)

**NRC 233. Buffer Zone Management (3).** Land use and management planning, monitoring and evaluation, and strategies to promote social and site development activities in the buffer zone area. 5 hrs (2 class, 3 lab). PR. COI. (2)

**NRC 241. Coastal Ecosystem Dynamics (3).** Structures, functions, processes and interactions in coastal ecosystems. 3 hrs (class). PR. FBS 36 or BIO 150 or COI. (2)

**NRC 242. Coastal Ecosystem Management (3).** Theories, issues and approaches in managing coastal ecosystems. 3 hrs (class). PR. NRC 241 or COI. (1)

**NRC 282. Conservation Planning (3).** Perspectives and methods in planning for biodiversity and natural resource conservation. 5 hrs (2 class, 3 lab). PR. NRC 201 or COI. (1)

**NRC 299. Graduate Seminar (1).** (1,2)

**NRC 300. Master's Thesis (6).** (1,2,S)

### PLANT BREEDING (PB)

*Lead Unit: Crop Science Cluster, College of Agriculture*

The MS/ PhD in Plant Breeding program is a common degree program for master's and doctoral students of the Crop Science Cluster (CA) and Institute of Renewable and Natural Resources (CFNR) who are specializing in plant breeding. The student's department affiliation is generally determined by her/his crop of interest.

An applicant for admission to the MS program must be a holder of the degree of Bachelor of Science in Agriculture. Where the BS degree is not in agriculture, the applicant must have had at least six (6) units of crop science courses.

A student who is admitted to the MS program is expected to have taken the following foundation courses or their

equivalent: AGR 150 - Methods in Plant Breeding and STAT 162 - Experimental Designs I. Course equivalence shall be determined by the department offering the course.

Foundation courses that have not been taken previously by the student shall be included in the program of study but units earned in these courses cannot be used to satisfy the unit requirements for the degree.

The program requires a minimum of 32 units, these are 15 units of major courses, 9 units of minor courses, 2 units of seminar (AGR 299) and 6 units of thesis (AGR 300). The major courses are composed of core courses (BIO 130a, BIO 130b, CHEM 160, AGR 250, AGR 255) and other major courses to satisfy the required number of units if the under have already been taken.

A core course need not be included in the program of study if the course or its equivalent has been taken by the student. Determination of equivalence shall be the prerogative of the academic department offering the course. If an equivalent course was taken outside UPLB, the student must pass a validating examination, which shall be given by the department offering the course.

An MS student majoring in another field who would like to minor in plant breeding must take at least 6 units of plant breeding courses with graduate credit including at least 3 units in the above 200 level.

An applicant for admission to the PhD program must be a holder of an MS degree in a biological field. An applicant with an MS degree in a nonbiological field must apply for admission to the MS program. Where the BS degree is not in agriculture, the applicant must have had at least 6 units of crop science courses. An applicant is also expected to have had in her/his previous degrees the following courses or their equivalents:

|          |                           |
|----------|---------------------------|
| AGR 150  | Methods in Plant Breeding |
| BIO 130a | Advanced Genetics I       |
| BIO 130b | Advanced Genetics II      |
| CHEM 160 | Introductory Biochemistry |
| STAT 162 | Experimental Designs I    |

The department offering the course shall determine course equivalence. Foundation courses that have not been taken previously by the student shall be included in the program of study, but units earned in these courses cannot be used to satisfy the unit requirements for the degree.

The PhD PB requires a minimum of 38 units, these are 15 units of major courses, 9 units of cognate courses, 2 units of seminar and 12 units of dissertation (AGR 400). The major courses are composed of core courses (AGR 250, AGR 251, AGR 255, AGR 256) and other major courses to satisfy the required number of units for the major field.

The student may choose from several plant breeding courses offered by the three participating departments as

well as from courses in allied disciplines like genetics, plant pathology, entomology, statistics, plant/crop physiology, and biochemistry.

The student may also minor in one of such related fields. PhD core course need not be included in the program if the course or its equivalent has been taken by the student. If an equivalent course was taken outside UPLB, the student must pass a validating examination for the course which shall be given by the department offering it. Equivalence shall be determined by the department concerned.

A PhD student with plant breeding as one of two cognates must take Agronomy 250 (Advanced Plant Breeding) and at least 3 units of plant breeding courses with graduate credit while a PhD student with plant breeding as the only cognate field must take Agronomy 250 and at least 6 units of plant breeding courses with graduate credit.

The UPLB Graduate School rules and requirements for the comprehensive and final examination shall be followed. However, the written comprehensive examination for the major field (plant breeding) is common for the most part to all students in the program and is given by an interdepartmental committee once in a semester. The written comprehensive examination for the minor field(s) is given by the faculty member(s) representing the minor field in the student's advisory committee.

### Agronomy

**AGR 250. Advanced Plant Breeding I (3).** Types, uses, and induction of genetic variation; systems of pollen control; selection concepts and general breeding procedures for crops in each mode of pollination; approaches in breeding for specific characters. 3 hrs (class). PR. AGR 150. (2)

**AGR 251. Advanced Plant Breeding II (3).** Advanced concepts and methods in population breeding and cultivar development. 3 hrs (class). PR. BIO 130b and AGR 250. (1)

**AGR 254. Crop Evolution (3).** Origin and evolution of crop plants and dynamics of plant domestication. 3 hrs (class). PR. BIO 130b and AGR 250. (1)

**AGR 255. Population Genetics (3).** Genetics of population undergoing random mating and inbreeding; effects of selection, mutation, migration, and other forces on the genetic composition of natural and artificial biological population. 3 hrs (class). PR. BIO 130b and MATH 26. (1)

**AGR 256. Quantitative Genetics (3).** Genetics of quantitative characters in random and nonrandom mating population. Application of quantitative genetic theories in breeding work. 3 hrs (class). PR. AGR 255. (2)

**AGR 258. Molecular Plant Breeding (3).** Molecular

markers, recombinant DNA technology, and cell and tissue culture technology in crop improvement. 3 hrs (class). PR. AGR 150 and BIO 101 or COI. (1)

**AGR 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**AGR 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**AGR 299. Graduate Seminar in Agronomy (1).** May be taken twice for a maximum of 2 units. 1 hr (class). PR. Graduate standing. (1,2)

**AGR 300. Master's Thesis (6).** (1,2,S)

**AGR 400. Doctoral Dissertation (12).** (1,2,S)

### PLANT GENETIC RESOURCES CONSERVATION AND MANAGEMENT (PGRCM)

**Degree offered:** *Master of Science*

The MS PGRCM interdepartmental program is administered by the Graduate School. The participating colleges in the program are the Colleges of Agriculture, Arts and Sciences, and Forestry. The student's college affiliation is generally determined by her/his crop/field of interest.

The program aims to equip the student with a comprehensive understanding of the PGR concepts, principles and strategies for formal and informal PGR conservation development and management; the capacity to manage genebanks, living botanical collections, natural reserves and *in situ* conservation areas; and a broad knowledge and understanding of policy issues relating to PGR conservation and use.

The program is managed by an interdepartmental committee (Program Management and Admissions Committee) created by the dean of the Graduate School. This committee is also in charge of prescreening applicants for admission to the program.

A student entering the MSPGR program is expected to have taken the following foundation courses or their equivalent at UPLB or elsewhere: BOT 140 - Systematics of the Spermatophytes, AGR 152 - Plant Genetic Resources Conservation and Management, and AGR 170 - Fundamentals of Seed Technology

The department(s) offering the course(s) shall determine whether the course(s) taken may be considered as equivalent(s) of the required one(s).

The program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. The major courses are composed of core courses PGR 261, PGR 262, PGR 263 and other suggested major courses (AGR 254, AGR 270,

HORT 234, STAT 250) to satisfy the minimum number of units. The program of study must include any foundation courses that have not been taken by the student previously but units earned in these courses cannot be used to satisfy the unit requirements for the degree.

A core course need not be included in the program if the course or its equivalent has been taken by the student at UPLB or elsewhere. However, if the course or its equivalent was taken outside UPLB, the student must pass a validating examination for the course which will be given by the department offering it. The department shall also determine if the course previously taken may be considered as the equivalent of the required one.

To satisfy the minimum number of units required for the minor field, the student may choose from several courses in any of the following disciplines offered by the three participating colleges such as: Agronomy, Horticulture, Plant Breeding, Genetics, Sociology, Anthropology, Entomology, Plant Pathology, Seed Science, Forestry, Botany, Plant Physiology, Statistics, Biochemistry, Environmental Science, and other areas depending on the interest of the student.

### Plant Genetic Resources

**PGR 261. Assessment of Genetic Diversity in Plants. (3).** Biochemical, molecular, and cytogenetic methods of plant genetic resources characterization and evaluation; utilization and classification of plant genetic resources. 5 hrs (2 class 3 lab). PR. AGR 152 or COI. (1)

**PGR 262. Plant Genetic Resources Conservation Methods and Management (3).** Strategies in plant genetic resources conservation and genebank management. 5 hrs (2 class 3 lab). PR. AGR 152 or COI. (2)

**PGR 263. Plant Genetic Resources Documentation and Information Management (3).** Management of passport, characterization, evaluation and inventory information in genebanks. 5 hrs (2 class 3 lab). PR. AGR 152 or COI. (1)

**PGR 299. Graduate Seminar (1).** 1 hr (class).

**PGR 300. Master's Thesis (6).**

### PLANT PATHOLOGY (PPTH)

*Crop Protection Cluster, College of Agriculture*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

**Areas of specialization:** Phytobacteriology, Mycology, Nematology, Plant Virology, Epidemiology, Disease Resistance, Postharvest Pathology, Biological Control, Fungal Physiology, Seed Pathology, Extension Plant Pathology

A student entering the MS PPTH program is expected to have taken the foundation courses PPTH 101, PPTH 103,

PPTH 106, PPTH 114 or PPTH 104, PPTH 115 or their equivalent. If the student has not taken these courses, she/he shall be required to take or validate them in addition to the course requirements.

The program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar and 6 units of thesis. The major courses are composed of core courses PPTH 201, STAT 162 and other major courses to satisfy the minimum number of units. The core courses of the MS program PPTH 201 and STAT 162 serves as the foundation course for PhD.

For the PhD program, there are three options: the first is the regular PhD program which can be pursued by qualified MS graduates. The regular PhD program requires minimum of 37 units, these are 15 units of major courses, 9 units of cognate courses, 1 unit of seminar (PPTH 299) and 12 units of dissertation (PPTH 400). The major courses are composed of a core a course PPTH 241 and other major courses to satisfy the minimum number of units.

The second option is the Straight PhD program, it is open to MS students who meet the Graduate School's requirements of GPA of 1.25 or better for 18 units of 200-level courses taken during the first year of graduate study. If found to qualify by the Department's Graduate Studies Committee through a qualifying examination, the student is allowed to shift to the straight PhD program.

The third option is the PhD by Research program. This allows the candidate to earn the PhD degree through the submission of, and the successful defense of a dissertation, without the usual academic course work requirement. It requires the candidate to devote almost her/his entire residency to research.

### Plant Pathology

**PPTH 201. Pathogenesis (3).** Pathogenesis as it applies to bacterial and fungal diseases of plants. 5 hrs (2 class, 3 lab). PR. COI. (1)

**PPTH 202. Advanced Course in Plant Disease Control (3).** Exclusion and eradication of plant diseases; protection and immunization of plants; recent advances in plant disease control. 5 hrs (2 class, 3 lab). PR. PPTH 102 or COI. (2)

**PPTH 204. Advanced Mycology I (3).** Mycomycetes and phycomycetes. A comprehensive survey; field collections, identification; preservation; readings and special topics. 7 hrs (1 class, 6 lab). PR. PPTH 104 or COI. (1 every odd year)

**PPTH 206. Advanced Phytonematology (3).** Advances in phyto-nematological research with emphasis on nematode density/plant yield relationships, host-parasite relations, population dynamics, cytology, physiology, and recent developments in nematode control. 5 hrs (2 class, 3 lab). PR. PPTH 106 or COI. (1)

**PPTH 212. Disease Resistance in Plants (3).** Manifestations and genetics of disease resistance in plants, nature and causes of variation in plant pathogens, breeding for disease resistance, and utilization of resistant genes. 5 hrs (2 class, 3 lab). PR. PPTH 101 or COI. (2)

**PPTH 214. Advanced Mycology II (3).** Ascomycetes, Basidiomycetes, and Fungi Imperfecti. Comprehensive survey; field collection; identification; preservation; and mycological literature. 7 hrs (1 class, 6 lab). PR. PPTH 104 or COI. (1 every even year).

**PPTH 215. Advance Plant Virology (3).** Classification infection, reproduction, movement, and control of plant viruses. 5 hrs (2 class, 3 lab). PR. PPTH 115 or COI. (1)

**PPTH 216. Taxonomy of Plant Parasitic Nematodes (3).** Systematics, identification, classification, and nomenclature of plant parasitic nematodes. 7 hrs (1 class, 6 lab). PR. PPTH 116 or COI. (2)

**PPTH 218. Physiology of Plant Pathogenic Fungi (3).** Nutrition, growth metabolism, and variation of fungi. 5 hrs (2 class, 3 lab). PR. PPTH 104 or COI. (2)

**PPTH 224. Advanced Taxonomy of Fungi (3).** Identification of fungi at species level with emphasis on the plant pathogenic ones. 7 hrs (1 class, 6 lab). PR. PPTH 104 or COI. (2)

**PPTH 241. Advanced Plant Disease Epidemiology (3).** Quantitative aspects of plant disease epidemiology, modeling, and systems simulation, coupling models, quantifying yield loss and multiple disease effects. 5 hrs (2 class, 3 lab). PR. PPTH 141 or COI. (1)

**PPTH 251/MBB 251. Molecular Plant-Pathogen Interactions (3).** Molecular mechanisms of plant-pathogen interactions and application of molecular diagnostics and markers in plant pathology. 3 hrs (class). PR. PPTH 101 and BIO 101 (2)

**PPTH 290. Special Problems (3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2,S)

**PPTH 291. Special Topics (3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2,S)

**PPTH 299. Graduate Seminar (1).** Review of current literature in plant pathology. PR. COI. (1,2)

**PPTH 300. Master's Thesis (6).** (1,2,S)

**PPTH 400-Doctoral Dissertation (12).** (1,2,S)



## PUBLIC AFFAIRS (PAf)

### *College of Public Affairs and Development*

The Master in Public Affairs program was conceived to address the improvement of the delivery of public service in the areas of national concern. The program aims to educate both current as well as future professionals in key positions of both government and non-government institutions to make them better decision makers, leaders, planners and program implementors. It provides a strong foundation for graduates to have a better appreciation of issues and capability in dealing with these issues emerging in the process of development. See *Agrarian & Rurban Development Studies, Education Management, and Strategic Planning and Public Policy*.

### Public Affairs

**PAf 201. Political Economy of Public Affairs (3).** Various perspectives/approaches on the study of political economy with emphasis on the role of the government or the state vis-à-vis the polity and economy. PR. ECO 11 or COI. (1,2)

**PAf 203. Data Analysis and Modeling for Public Affairs (4).** Analytical tools, decision models, sources, uses and interpretation of social and economic data in public affairs. PR. STAT 1 or COI. (1,2)

**PAf 204. Ethics in Public Affairs (3).** Theories, issues, and problems relating to ethical behavior in the public service. (1,2)

**PA 242.1. Methods of Policy Analysis (3).** An examination of major concepts, principles, methods of economic analysis and their implications to problems of public policy. 3 hrs (class). (1,2)

## RURAL SOCIOLOGY (RS)

### *Agricultural Systems Cluster, College of Agriculture*

**Degree offered:** *Master of Science*

The MS RS program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar (AERS 299) and 6 units of thesis (AERS 300).

### Agricultural Education and Rural Studies

**AERS 261. Social and Cultural Change (3).** Theories and models of social and cultural change, with emphasis on technology and social change, particularly problems related to the acceptance and diffusion of innovation in agriculture and other areas. 3 hrs (class). PR. COI. (1,2)

**AERS 262. Urban Sociology (3).** Sociological principles applied to the modern city; structure, growth, social and personal life in an urban setting. 3 hrs (class). PR. COI. (2)

**AERS 265. Sociology of Development (3).** Application of sociological theories and concepts to the problems of development at the international, national, and local levels, with emphasis on operationally significant concepts derived from current research and development experience. 3 hrs (class). PR. COI. (1)

**AERS 267. Perspectives in Community Analysis (3).** Theoretical foundations of the concept of community and their application in current community studies. 3 hrs (class). PR. COI. (1)

**AERS 281. Theory Construction (3).** Postulates in science, structure, functions and formats of theory; concept formation and definitions; origination of hypotheses; and introduction to the epistemological foundation of sociological theories. 3 hrs (class). PR. COI. (1)

**AERS 282. Social Research Design (3).** Methods of social research with emphasis on the major steps in the design and conduct of social research from problem definition to analysis, interpretation and write-up of research report. 3 hrs (class). PR. COI. (1,2)

**AERS 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units (1,2)

**AERS 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units (1,2)

**AERS 299. Graduate Seminar in Agricultural Education (1).** (1,2)

**AERS 300. Master's Thesis (6).** (1,2,S)

## SOCIOLOGY (SOC)

*Department of Social Sciences, College of Arts and Sciences*

**Degree offered:** *Master of Arts*

MA SOC applicants should have already taken the foundation courses SOC 100 or SOC 105, SOC 150 or SOC 195, otherwise, these courses may be required to be taken.

The MA SOC program requires a minimum of 37 units, these are 21 units of major courses, 9 units of minor courses, 1 unit of seminar (SOC 299) and 6 units of thesis (SOC 300). The major courses are composed of core courses SOC 250, SOC 292 or SOC 295 and other major courses to satisfy the minimum number of units.

### Psychology

**PSY 255/ENS 255. Environmental Psychology (3).** Analyses of the confluence of psychological processes and environmental contexts from a transactional perspective. 3 hrs (class). PR. COI.

## Sociology

**SOC 205. Formal Organizations (3).** Comparison and critical analysis of theoretical and methodological approaches to modern formal organization in developed and developing countries. 3 hrs (class). PR. SOC 100 or COI.

**SOC 212. Sociology of Power (3).** Power as a social phenomenon; theories, structures and processes of power in society. 3 hrs (class). PR. COI. (2)

**SOC 242. Population Studies (3).** Population concepts, methods and issues related to society. 3 hrs (class). PR. COI. (1)

**SOC 250. Advanced Sociological Theories (3).** Critique of major sociological theories and neoverions as they apply to social realities and concerns. 3 hrs (class). PR. SOC 150 or COI.

**SOC 260. Technology Assessment and Impact Analysis (3).** Basic features and strategies of technology assessment with emphasis on environmental, economic, social and institutional impact analyses and evaluation; policy implications of technology. 3 hrs (class). PR. COI.

**SOC 265/ENS 265. Gender and Environments (3).** Theories, research, and issues relevant to the analyses of gender relations in the home and work environments. 3 hrs (class). PR. COI.

**SOC 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. 2 hrs (class). PR. COI.

**SOC 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. 2 hrs (class).

**SOC 292. Qualitative Social Research (3).** Perspectives, methods, analysis, and interpretation in qualitative research. 3 hrs (class). PR. SOC 250 or COI. (1)

**SOC 295. Survey Research (3).** Basic logic and skills of survey research design and analyses; uses and implications of survey research. 3 hrs (class). PR. SOC 195 or COI.

**SOC 299. Graduate Seminar (1).** May be taken twice. PR. Graduate standing.

**SOC 300. Master's Thesis (6).**

## SOIL SCIENCE (SOIL)

*Agricultural Systems Cluster, College of Agriculture*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

## Areas of specialization:

MS and PhD: Soil Chemistry and Mineralogy, Soil Conservation and Management, Soil Fertility, Soil Microbiology, Soil Morphology, Genesis and Classification, Soil Physics

Students who have been admitted to the graduate programs in Soil Science must register the foundation courses (SOIL 1, SOIL 10, SOIL 110, SOIL 120, SOIL 130, SOIL 141, and SOIL 150.) in which they are deficient during their first year of residence.

The MS SOIL program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar (SOIL 299) and 6 units of thesis (SOIL 300). The major courses are composed of core courses SOIL 151, SOIL 240, STAT 162 or AGR 112 and other major courses to satisfy the minimum number of units.

The PhD SOIL program requires a minimum of 37 units, these are 15 units of major courses, 9 units of cognate courses, 1 unit of seminar (SOIL 299) and 12 units of dissertation (SOIL 400). The major courses are composed of core courses SOIL 151, SOIL 240, STAT 162 or AGR 112, 3 units in Statistics above 100 level, and other major courses to satisfy the minimum number of units.

SOIL 1 and SOIL 110 or SOIL 111 are required for students with SOIL as minor/cognate. A student who lacks these foundation courses will not be considered as having taken a minor in Soil Science.

The required courses need not be included in the program of study of the student if she/he has previously taken these courses at UPLB. Students who have taken equivalent courses in other institutions must take placement examinations, except SOIL 1 during the first year of residence.

## Soil Science

**SOIL 210. Morphology, Genesis, and Geography of Soils (3).** Properties, development, and distribution of major soil groups and their relation to agriculture. 3 hrs (class). PR. SOIL 110. (1)

**SOIL 221. Advanced Soil Microbiology (3).** Soil microorganisms; microbiological processes involving organic matter and nitrogen transformation; nature of the soil organic fraction. 3 hrs (class). PR. SOIL 120 or COI. (2)

**SOIL 224/MBB 224. Biotechnology of Soil-Microbe-Plant Interactions (3).** Biotechnological approaches in the study of beneficial soil microbe-plant interactions and related principles, processes and applications. 5 hrs (2 class, 3 lab). PR. SOIL 120 or MCB 150 and BIO 101 or COI. (2)

**SOIL 230. Advanced Soil Physics (3).** Dynamic processes occurring in soils with emphasis on the transient

water, solute gas, and heat. 3 hrs (class). PR. SOIL 130 and MATH 28 or COI.

**SOIL 240. Advanced Soil Chemistry (3).** Important chemical phenomena in soils; physicochemical study of soils; certain fundamental properties of clays. 3 hrs (class). PR. SOIL 140. (1)

**SOIL 250. Advanced Soil Fertility (3).** Soil conditions in relation to plant growth, including soil transformation processes of both organic and inorganic constituents; concepts of nutrient availability. 3 hrs (class). PR. SOIL 150 or COI. (1,2)

**SOIL 260. Environment and Land Use (3).** Analysis of environmental factors in land-use investigations; recognition of competitive uses and land-use optimization on regional and local levels. 5 hrs (2 class, 3 lab). PR. COI. (2)

**SOIL 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2,S)

**SOIL 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1)

**SOIL 299. Graduate Seminar (1).** May be repeated once for a maximum of 2 units. PR. COI. (1,2)

**SOIL 300. Master's Thesis (6).** (1,2,S)

**SOIL 400. Doctoral Dissertation (12).** (1,2,S)

## STATISTICS (STAT)

*Institute of Statistics, College of Arts and Sciences*

**Degrees offered:** *Master of Science and Doctor of Philosophy*

The MS STAT program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar (STAT 299) and 6 units of thesis (STAT 300). The major courses are composed of core courses STAT 241, STAT 242 and other 200 level courses in statistics to satisfy the minimum number of units.

The PhD STAT program requires a minimum of 37 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar (STAT 399) and 12 units of dissertation (STAT 400). The major courses are composed of core courses STAT 341, STAT 342 and other 200 level courses in statistics to satisfy the minimum number of units.

A PhD graduate student is expected to have a wide exposure to actual problems in statistical theory and methods through practicum in statistical consultation. As an option, a graduate student may choose to gain experience in University-level teaching. This involves

assisting in a course or courses for one semester which will be determined by the Graduate Faculty of statistics.

## Statistics

**STAT 235. Mathematics in Statistics (3).** Matrices; transformations; infinite series; inequalities; generating functions; special functions. 3 hrs (class). PR. MATH 28 or MATH 38. (1)

**STAT 241. Statistical Theory I (3).** Probability, random variables, probability distributions; expectations, moments, and characteristic functions; distributions of functions of random variables; sampling distributions. 3 hrs (class). PR. STAT 142 or COI. (1)

**STAT 242. Statistical Theory II (3).** Parametric point and interval estimation; theory of hypothesis testing; introduction to linear models. 3 hrs (class). PR. STAT 241. (2)

**STAT 250. Multivariate Statistical Methods (3).** Multivariate normal populations; tests of hypotheses on means, multivariate analysis of variance; classification by linear discriminant function; inferences from covariance matrices; principal components; and factor analysis. 3 hrs (class). PR. STAT 162 and MATH 120 or COI. (1,2)

**STAT 251. Linear Models I (3).** Multidimensional normal distribution; distributions of quadratic forms; full rank models; estimation and tests of hypotheses. 3 hrs (class). PR. STAT 142 and STAT 235 or COI. (1)

**STAT 252. Linear Models II (3).** Linear models not of full rank; experimental design models and components-of-variance models; distributional properties of point estimators; test of hypotheses. 3 hrs (class). PR. STAT 251. (1,2)

**STAT 263. Sampling and Sample Surveys (3).** Simple random, stratified, systematic, multistage and multiphase sampling; ratio and regression estimation; sampling with varying probabilities. 3 hrs (class). PR. STAT 141 or COI.

**STAT 264. Statistics for Epidemiology (3).** Statistical methods in the collection, organization and analysis of epidemiologic data and subsequent interpretation. 5 hrs (2 class, 3 lab). PR. STAT 1 or COI. (1)

**STAT 266. Time Series Analysis I (3).** Stationary stochastic processes; covariance and autocorrelation functions; autoregressive and moving average processes. 3 hrs (class). PR. COI. (1,2)

**STAT 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units.

**STAT 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI.

**STAT 299. Graduate Seminar (1).** May be taken twice.

**STAT 300. Master's Thesis (6).** (1,2,S)

**STAT 341. Theory of Probability (3).** Measure-theoretic probability; characteristic functions; generalized and compound distributions; limit theorems; stochastic processes. 3 hrs (class). PR. STAT 242 or COI.

**STAT 342. Statistical Inference (3).** Statistical inference and statistical decision theory; sufficiency; most powerful tests; unbiasedness; invariance. 3 hrs (class). PR. STAT 341 or COI. (2)

**STAT 363. Sampling Theory of Surveys (3).** Stratified multistage sampling; sampling on successive occasions; problems and approaches in the development of multistage surveys. 3 hrs (class). PR. STAT 263 or COI.

**STAT 399. PhD Graduate Seminar (1).**

**STAT 400. Doctoral Dissertation (12).**

### STRATEGIC PLANNING AND POLICY STUDIES (SPPS)

*Institute of Governance and Rural Development, College of Public Affairs and Development*

**Degree offered:** *Master in Public Affairs*

The MPAf SPPS program consist of 31 units, these are 13 units of core courses, 12 units of specialization courses and 6 units of electives.

The core courses are Paf 201, Paf 203, Paf 204 and DM 224. The specialization courses are SPPS 201, SPPS 202, SPPS 291, SPPS 298 and SPPS 299. The 3 unit elective course can be selected from the following, AECO 251, DM 220, ENS 221/SFFG 221, HUME 103, SPPS 221, SPPS 232

#### Strategic Planning and Policy Studies

**SPPS 201. Strategic Planning: Theory and Methods (3).** Theoretical perspectives and techniques in strategic planning. PR. COI. (1,2)

**SPPS 202. Methods of Policy Analysis (3).** Policy analytic process and quantitative and qualitative methods of analysis. 3 hrs (class). PR. Paf 203 or COI. (1,2)

**SPPS 221. Social Policies and the Disadvantaged Groups (3).** Critique of issues and policies for the disadvantaged groups within a social development framework. 3 hrs (class). PR. SPPS 202 or COI. (1,2)

**SPPS 232. Science and Technology Policy Analysis (3).** Applications of S & T policy analysis on contemporary societal concerns. 3 hrs (class). PR. COI. (1,2)

**SPPS 272/ENS 272. Science, Technology and Development (3).** Interactions of science, technology and development in society and the nation's economy, and their implications on nation-building and human well-being. 3 hrs (class). PR. None (1, 2)

**SPPS 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited in the student's program will not exceed 4 units. (1, 2)

**SPPS 298. Field Studies (3).** PR. COI. (1,2,S)

**SPPS 299. Graduate Seminar (1).** May be taken twice. PR. COI.(1, 2)

#### Technology Management

**TM 232. Science and Technology Policy (3).** The analysis of science and technology as "public goods", the evolution of government policies on science and technology (S&T), contemporary government policies on S&T and their interrelations with trade and industrial development protection of intellectual property, research and development, development of S&T, human resources, issues on the role of government in the management of S&T policies on the economy and society. (1,2)

### VETERINARY EPIDEMIOLOGY (VE)

*College of Veterinary Medicine*

**Degree offered:** *Master in Veterinary Epidemiology*

The MVE program is designed to prepare veterinarians and other animal health professionals to design and implement epidemiological studies and surveillance system; apply epidemiological principles and methods to risk analysis, surveillance, prevention and control of diseases in animal populations; evaluate the risks and relevant factors pertaining to specific diseases and to formulate an appropriate prevention or control strategy or a research study; manage, analyze and interpret animal health data; and communicate effectively the results of an assessment, surveillance or investigation to appropriate groups involved in animal or human health, key policy makers, farmers, the media and the public.

The admission requirements of the Graduate School shall be followed. In addition, applicants shall be holders of DVM or related degree in life sciences from any recognized institution and with at least one year experience in veterinary or related practice.

The MVE requires all student to earn a total of 30 units for graduation. At least 18 units of major courses, 3 units of Special Topics (VEPI 291), 6 units of Field Project (VEPI 295) and 3 units elective must be earned. The major courses are VEPI 221, VEPI 222, VEPI 223, VEPI 224, VEPI 225 and STAT 264. The electives can be chosen from the following: VEPI 226, VEPI 227, VEPI 228, VPH 222, DM 220, SPPS 202, LGD 210, DEVC 201, DEVC 202, DEVC 261, AECON 111, and AECON 241

Students begin the program with 6 units of required courses in summer. The Field project may be in the form of a research study, a case study, risk analysis study, a program evaluation or a scientific epidemiological report on animal disease and will be presented and defended orally before a panel. Students shall submit a paper in publishable form as a requirement for graduation.

*Please refer to Veterinary Medicine for the list of courses.*



## VETERINARY MEDICINE (VM)

College of Veterinary Medicine

**Degree offered:** *Master of Science, Master in Veterinary Epidemiology*

### Areas of specialization:

Veterinary Anatomy, Veterinary Pharmacology and Physiology, Veterinary Microbiology, Veterinary Parasitology, Veterinary Pathology, Veterinary Public Health, Veterinary Internal Medicine, Veterinary Surgery, Veterinary Theriogenology

The MS VM is a requires a minimum of 32 units consisting of 9 units of core courses (VPHY 241, VEPI 221, VMED 261), 9 units of courses in the chosen area of specialization, 6 units of electives, 1 unit of Special Topics, 1 unit of Graduate Seminar and 6 units of Master's thesis (VMED 300).

Major courses depend on the area of interest in which the student will eventually perform thesis work. Electives can be taken from courses offered outside the area of interest.

### Veterinary Anatomy

**VETA 201. Advanced Macroscopic Anatomy of the Dog (3).** Detailed description of the macroscopic anatomy of the dog. 7 hrs (1 class, 6 lab). PR. VETA 102 or COI. (1)

**VETA 202. Advanced Comparative Anatomy (3).** Detailed description and comparison of the macroscopic anatomy of the pig, horse, chicken, and cattle (or sheep, goat or carabao). 7 hrs (1 class, 6 lab). PR. VETA 102 and VETA 103 or COI. (2)

**VETA 203. Applied Anatomy (3).** Anatomical features essential to diagnostic, surgical, theriogenological, and postmortem procedures. 7 hrs (1 class, 6 lab). PR. VETA 102 or COI. (1)

**VETA 204. Advanced Microscopic Anatomy (3).** Comparative functional histology and ultrastructure of tissues and organs in various species of domestic animals. 7 hrs (1 class, 6 lab). PR. VETA 104 or COI. (1)

**VETA 205. Neuroanatomy (3).** Structure and function of the nervous system; anatomical diagnosis of neurologic disorders. 5 hrs (2 class, 3 lab). PR. VETA 201 and VETA 204 or COI. (2)

**VETA 207. Histological and Electron Microscopic Techniques (3).** Techniques in the preparation of animal tissues, microbes and parasites for the light and electron microscopy. 7 hrs (1 class, 6 lab). PR. VETA 104 or COI. (2)

### Veterinary Epidemiology

**VEPI 221. Veterinary Epidemiological Methods (3).** Application of epidemiological concepts and methods for systematic inquiry into disease status of animal populations. 5 hrs (2 class, 3 lab). PR. COI. (1)

**VEPI 222. Veterinary Surveillance (3).** Epidemiologic concepts and methods for surveillance of animal and zoonotic diseases. 5 hrs (2 class, 3 lab). PR. COI. (1, S).

**VEPI 223. Epidemiologic Approach in the Control of Infectious Animal Diseases (3).** Application of epidemiology in the control of infectious diseases in animals. 5 hrs (2 class, 3 lab). PR. VPH 121 or COI. (1, S).

**VEPI 224. Outbreak Investigation and Control (3).** Epidemiologic approach to the investigation and containment of disease outbreaks. 5 hrs (2 class, 3 lab). PR. VPH 121 or COI. (1,2)

**VEPI 225. Veterinary Risk Analysis (3).** Introduction to Animal Health Risk Analysis. 5 hrs (2 class, 3 lab). PR. COI (1,2).

**VEPI 226. Veterinary Informatics (3).** Application of informatics in veterinary epidemiology. 7 hrs (1 class, 6 lab). PR. COI (1,2).

**VEPI 227. Environmental Animal Health (3).** Factors that may have adverse effects on the health of animal and human populations and the wider environment, and their management. 3 hrs (class). PR. None. (2)

**VEPI 228. Veterinary Diagnostics (3).** Evaluation of veterinary diagnostic tests in populations. 5 hrs (2 class, 3 lab). PR. VPH 121 or COI (1).

**VEPI 291. Special Topics in Veterinary Epidemiology (3).** 5 hrs (2 class, 3 lab). PR. None. (1).

**VEPI 295. Field Project in Veterinary Epidemiology (6).** Research project in veterinary epidemiology. 18 hrs. PR. COI (2).

### Veterinary Microbiology

**VMCB 221. Applied Immunology (2).** Veterinary immunodiagnostic techniques; principles, applications, limitations and interpretation of results. 4 hrs (1 class, 3 lab). PR. VMCB 122, VMCB 123 and VMCB 124 or COI. (1)

**VMCB 222. Clinical Microbiology (2).** Isolation, cultivation, and identification of pathogenic bacteria and fungi affecting the domestic animals. 4 hrs (1 class, 3 lab). PR. VMCB 122 or COI. (1)

**VMCB 223. Bacterial and Viral Pathogens of Domestic Animals. (4).** Characteristics of pathogenic bacteria and viruses relevant to their pathogenesis, epidemiology, and control in domestic animals. 8 hrs (2 class, 6 lab). PR. VMCB 122 and VMCB 123 or COI. (2)

**VMCB 224. Veterinary Mycology (2).** Cultivation and identification of pathogenic fungi of veterinary importance. 4 hrs (1 class, 3 lab). PR. VMCB 122 or COI. (1)

**VMCB 225. Advances in Veterinary Immunology (3).** Current research and development in veterinary immunology. 3 hrs (3 class). PR. VMCB 124 or COI. (2)

**VMCB 226. Advances in Veterinary Virology (2).** Current research and development in veterinary virology. 2 hrs (class). PR. VMCB 123 or COI. (2)

**VMCB 227. Veterinary Anaerobic Bacteriology (2).** Isolation, cultivation, and identification of anaerobes affecting domestic animals. 4 hrs (1 class, 3 lab). PR. VMCB 122 or COI. (1,2)

**VMCB 228. Pathogenicity and Virulence of Bacteria and Viruses in Animals (3).** Mechanisms and determinants of pathogenicity and virulence of animal bacteria and viruses. 5 hrs (2 class, 3 lab). PR. COI. (2)

**VMCB 229 / MBB 229. Biotechnology in Immunoprophylaxis and Diagnostics of Animal Diseases (3).** Principles and applications of biotechnological advances in vaccine design and development and veterinary diagnostics. 5 hrs (2 class, 3 lab). PR. VMCB 221 or VPAR 234 or COI. (1)

#### Veterinary Medicine

**VMED 253. Advanced Equine Medicine (3).** Recent and advanced techniques in diagnosis, treatment, prevention and control of diseases and disorders of horses. 5 hrs (2 class, 3 lab). PR. VMED 153 or COI. (1)

**VMED 254. Advanced Swine Medicine (3).** Recent and advanced techniques in diagnosis, treatment, prevention and control of diseases and disorders of pigs. 5 hrs (2 class, 3 lab). PR. VMED 154 or COI. (1)

**VMED 255. Advanced Poultry Medicine (3).** Recent and advanced techniques in diagnosis, treatment, prevention and control of diseases and disorders of poultry. 5 hrs (2 class, 3 lab). PR. VMED 154 or COI. (2)

**VMED 256. Advanced Ruminant Medicine (3).** Recent and advanced techniques in diagnosis, treatment, prevention and control of diseases and disorders of cattle, buffaloes, sheep and goats. 5 hrs (2 class, 3 lab). PR. VMED 153 or COI. (2)

**VMED 261. Complementary and Alternative Veterinary**

**Medicine (3).** Nonconventional, traditional and new approaches, methods and techniques in the diagnosis, treatment, prevention and control of diseases and disorders of animals. 5 hrs (2 class, 3 lab). PR. VMED 151 or COI. (1)

**VMED 291. Special Topics in Veterinary Medicine (1-3).** May be repeated provided that the total number of units to be credited to the student's program will not exceed 3 units. 1 hr a week (1 class). PR. None. (1,2)

**VMED 299. Graduate Seminar in Veterinary Medicine (1).** 1 hr (class). PR. None. (2)

**VMED 300. Master's Thesis (6).**

#### Veterinary Parasitology

**VPAR 231. Advanced Veterinary Entomology (3).** Arthropods of medical and veterinary importance and their relation to animal host and environment; control and prevention. 5 hrs (2 class, 3 lab). PR. VPAR 131 or COI. (1)

**VPAR 232. Advanced Veterinary Helminthology (3).** Relationship of helminth parasites to their host and environment; immune response to parasitic infection; advances in treatment and control. 5 hrs (2 class, 3 lab). PR. VPAR 132 or COI. (2)

**VPAR 233. Advanced Veterinary Protozoology (2).** Parasitic protozoa and their relation to animal hosts and environment; control and prevention. 4 hrs (1 class, 3 lab). PR. VPAR 131 or COI. (1)

**VPAR 234. Immunology of Parasitic Infections (2).** Parasitic antigens; immunodiagnostic tests in clinical parasitology; immune reactions to parasitic protozoa, helminth and arthropods; evasion of the immune response and principles of immunoprophylaxis. 2 hrs (class). PR. VMCB 124 and VPAR 132 or COI. (2)

**VPAR 235. Clinical Parasitology (3).** Laboratory diagnostic techniques for the collection, examination, identification and preservation of parasites of domestic and wild animals, fishes and other aquatic animals. 7 hrs (1 class, 6 lab). PR. VPAR 132 or COI. (1)

**VPAR 236. Systematic Helminthology (3).** Taxonomy and nomenclature of helminth parasites. 5 hrs (2 class, 3 lab). PR. VPAR 132 or COI. (2)

#### Veterinary Public Health

**VPH 222. Microbial and Parasitic Zoonoses (3).** Biological, ecological, and epidemiological features of microbial and parasitic infections transmissible between man and vertebrate animals. 3 hrs (class). PR. VPH 122 or COI. (1, 2)

**VPH 223. Veterinary Epidemiological Investigation of Foodborne Diseases (2).** Principles and techniques in the epidemiological investigation of foodborne illnesses of man and/or animals from foods of animal origin. 2 hrs (class). PR. VPH 222 or COI. (1, 2)

**VPH 224. Veterinary Public Health Consideration in Foods of Animal Origin (3).** Veterinary public health concerns in the production, processing, handling and inspection of animal-derived foods. 5 hrs (2 class, 3 lab). PR. VPH 222 or COI. (1, 2)

**VPH 227. Advanced Epidemiology (2).** Design and conduct of epidemiological investigation; statistical methods for organization, presentation, and analysis of epidemiological data; critical evaluation of published epidemiological research on public health. 2 hrs (class). PR. COI. (2)

**VPH 228. Environmental Sanitation in Animal Industries (3).** Sanitation in animal and animal product establishments. 5 hrs (2 class, 3 lab). PR. COI. (1)  
**Veterinary Pharmacology**

**VPHM 241. Physiological Disposition of Xenobiotics (3).** Absorption, distribution, biotransformation, excretion, and pharmacokinetics of drugs and poisons in vertebrates. 3 hrs (class). PR. VPHY 241 or COI. (1)

**VPHM 242. Veterinary Toxicology (2).** Clinical aspects of common poisoning that affect domestic animals with emphasis on selected organic and heavy metal poisoning. 2 hrs (class). PR. VPHM 241 or COI. (2)

#### **Veterinary Physiology**

**VPHY 241. Physiological Biochemistry (3).** Biochemical principles as related to interpretation of normal and altered physiological state in domestic mammals and birds and other appropriate animal models. 3 hrs (class). PR. CHEM 160 and VPHY 141 or COI. (1)

**VPHY 242. Animal Cell Physiology (3).** Structural and functional aspects of molecular and subcellular processes in higher animals. 2 hrs (class). PR. VPHY 241 or COI. (1)

**VPHY 243. Advanced Mammalian Physiology (3).** The physiology of excitable tissues; cardiovascular, respiratory, gastrointestinal, renal, and autonomic nervous systems; acid-base balance. 5 hrs (2 class, 3 lab). PR. VPHY 242 or COI. (2)

**VPHY 244. Neurophysiology and Neuroendocrinology (3).** The neural circuitry and mechanisms regulating different physiological activities of animals. 3 hrs (class). PR. VPHY 242 or COI. (1)

**VPHY 245. Mechanisms of Hormone Action (2).** Cellular and molecular actions of steroid and peptide hormones; recent techniques in hormone research. 2 hrs (class). PR. VPHY 242 or COI. (2)

**VPHY 247. Experimental Physiology (2).** Methods in experimental animal physiology. 6 hrs (lab). PR. VPHY 243 or COI. (1,2)

#### **Veterinary Pathology**

**VPTH 221. Biology and Pathology of Laboratory Animals (3).** Biology and diseases of common laboratory animals used in biomedical research. 3 hrs (class). PR. COI. (1)

**VPTH 222. Veterinary Necropsy (3).** Postmortem examination, interpretation, and diagnosis; collection, preservation, and packing of specimens for laboratory examinations. 7 hrs (1 class, 6 lab). PR. VPTH 122 or COI. (2)

**VPTH 223. Histopathology (3).** Light microscopic examination of cellular changes and tissue reactions to injurious agents with emphasis on lesion description, morphologic, and etiologic diagnosis. 7 hrs (1 class, 6 lab). PR. VPTH 122 or COI. (2)

**VPTH 224. Clinical Biochemistry (2).** Measurements of various chemical constituents of body fluids and electrolytes; analysis and interpretation of results with emphasis on clinical enzymology. 4 hrs (1 class, 3 lab). PR. VPTH 123 or COI. (1)

**VPTH 225.1. Comparative Pathology I (2).** Etiology, gross and microscopic tissue alterations, interpretation and diagnosis of diseases affecting domestic animals, wildlife, and aquatic animals. 6 hrs (lab). PR. VPTH 222 and VPTH 223. (1)

**VPTH 226. Pathology of Microbial Infections (2).** Etiology, pathogenesis, and diagnosis of common microbial diseases affecting domestic animals. 2 hrs (class). PR. VMCB 223 and VMCB 224. (1,2)

**VPTH 227. Pathology of Parasitic Infections. (2).** Etiology, pathogenesis, and diagnosis of common parasitic diseases affecting domestic animals. 4 hrs (1 class, 3 lab). PR. VPTH 223 and VPAR 132. (1,2)

#### **Veterinary Surgery**

**VSUR 251. Veterinary Anesthesia (3).** Application of different methods of analgesia and anesthesia in surgical procedures. 5 hrs (2 class, 3 lab). PR. VSUR 151 or COI. (1)

**VSUR 253. Advanced Equine Surgery (3).** Recent and advanced techniques in equine surgery. 5 hrs (2 class, 3 lab). PR. VSUR 251. (2)

**VSUR 254. Veterinary Diagnostic Ultrasound (3).** Analysis and Interpretation of diagnostic ultrasound in different species of animals. 5 hrs (2 class, 3 lab). PR. VSUR 154 or COI. (2)

**VSUR 256. Advanced Ruminant Surgery (3).** Recent and advanced techniques in bovine, bubaline, caprine and ovine surgery. 5 hrs (2 class, 3 lab). PR. VSUR 251. (2)

#### **Veterinary Theriogenology**

**VTHE 251. Laboratory Animal Theriogenology (3).** Recent and advanced techniques in theriogenology of laboratory animals. 5 hrs (2 class, 3 lab). PR. VMED 155 or COI. (1)

**VTHE 253. Advanced Equine Theriogenology (3).** Recent and advanced techniques in theriogenology of horses. 5 hrs (2 class, 3 lab). PR. VTHE 251.(2)

**VTHE 254. Advanced Porcine Theriogenology (3).** Recent and advanced techniques in theriogenology of pigs. 5 hrs (2 class, 3 lab). PR. VTHE 251.(2)

**VTHE 256 . Advanced Bovine and Bubaline Theriogenology (3).** Recent and advanced techniques in theriogenology of cattle and buffaloes. 5 hrs (2 class, 3 lab). PR. VTHE 251 (2)

**VTHE 257. Advanced Ovine and Caprine Theriogenology (2).** Recent and advanced techniques in theriogenology of sheep and goats. 5 hrs (2 class, 3 lab). PR. VTHE 251 (2)

#### **WILDLIFE STUDIES (WLDL)**

The program of Wildlife Studies is a joint offering of the Institute of Biological Sciences(CAS) and Department of Forest Biological Sciences (CFNR).

**Degree offered:** *Master of Science*

#### **Areas of specialization:**

Wildlife Biology, Wildlife Conservation, Wildlife Management.

The MS WLDL program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar (WLDL 299) and 6 units of thesis (WLDL 300).

#### **Wildlife**

**WLDL 205. Advanced Wildlife Management (3).** Identification, management and conservation of large and small game species. 3 hrs (class). PR. WLDL 105 or its equivalent. (2)

**WLDL 258. Wildlife Population Dynamics (3).** Analysis and prediction of changes in wildlife population. 3 hrs (class). PR. STAT 162 or STAT 164 and WLDL 155 or its equivalent. (1)

**WLDL 290. Special Problems (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1,2)

**WLDL 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. (1)

**WLDL 299. Graduate Seminar (1).** May be taken twice. (2)

**WLDL 300. Master's Thesis (6).** (1,2)

*For other information, see listing under Botany, Forest Biological Sciences, and Zoology*

#### **ZOOLOGY (ZOO)**

*Institute of Biological Sciences, College of Arts and Sciences*

**Degree offered:** *Master of Science*

**Areas of specialization:** Animal Physiology, Animal Development, Pollution Biology, Fish Biology and Aquaculture, Animal Ecology, Invertebrate Animal Biology, Limnology

The MS ZOO program requires a minimum of 31 units, these are 15 units of major courses, 9 units of minor courses, 1 unit of seminar (ZOO 299) and 6 units of thesis (ZOO 300).

#### **Zoology**

**ZOO 225. Endocrinology (3).** Anatomy and functional relationships of the endocrine glands in vertebrates. 3 hrs (class). PR. CHEM 160 and CHEM 160.1 or COI.

**ZOO 226. Physiology of Reproduction (3).** Comparative physiology of reproduction in higher animals, factors involved in fertility mechanisms. 5 hrs (2 class, 3 lab). PR. ANSC 160 and BIO 30 or COI.



**ZOO 242. Advanced Invertebrate Biology (3).** Recent advances in the biology of invertebrates with emphasis on the free-living forms. 3 hrs (class). PR. ZOO 3 or ZOO 142. (2)

**ZOO 253. Ecology of Animal Parasites (3).** Basic concepts and recent advances in the ecology of parasites affecting man and other vertebrates. 3 hrs (class). PR. ZOO 173 or its equivalent.

**ZOO 273. Advanced Animal Parasitology (3).** Biology and control of parasite commonly affecting farm animals in the Philippines. 5 hrs (2 class, 3 lab). PR. COI. (1,2)

**ZOO 290. Special Problems (1-3).** May be taken twice provided that total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

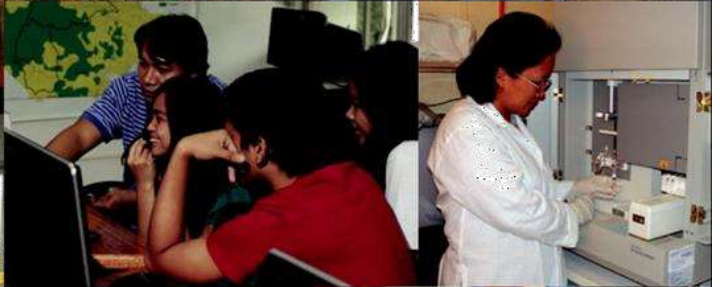
**ZOO 291. Special Topics (1-3).** May be taken twice provided that the total number of units to be credited to the student's program will not exceed 4 units. PR. COI. (1,2)

**ZOO 299. Graduate Seminar in Zoology (1).** May be repeated for a maximum of 2 units. PR. Graduate standing. (1,2)

**ZOO 300. Master's Thesis (6).** (1,2)



Faculty





# FACULTY

## PROFESSOR EMERITI

- BALTAZAR, CLARE R., BSA (*summa cum laude*), 1947, UP; MS, 1950, PhD, 1957, U of Wisconsin, (CA/GS/Crop Protection Cluster)
- BARBA, CORAZON VC., BSN (*magna cum laude*), 1961, PWU; MS, 1966, U of Hawaii; PhD, 1980, Pennsylvania State U, (CHE/GS/Human Nutrition and Food)
- BUSTRILLOS, NENAR., BSA (*cum laude*), 1948, UP; MS, 1957; Iowa State U; PhD, 1963, Michigan State U, (CHE/Home Management and Cultural Anthropology)
- CALILUNG, VENUS J., BSZoo, 1954, UP; MS, 1967, PhD, 1972, UPLB, (CA/GS/Crop Protection Cluster)
- CARPENA, AZUCENA L., BSA (*cum laude*), 1960; MS, 1966; Oklahoma State U; PhD, North Carolina State U, 1970, (CA/Crop Science Cluster)
- CASTILLO, GELIA T., AB, 1953, UP; MS, 1958, Pennsylvania State U; PhD, 1960, Cornell U, (CA/GS/Agricultural Systems Cluster)
- CERVANCIA, CLEOFAS R., BSA, 1968, MS Entom, 1972, PhD Entom, 1982, UPLB; Post Doctoral, 1986, U of Wales, UK, (CAS/Biological Sciences)
- CORONEL, ROBERTO E., BSA, 1960, UPLB; MS, 1965, U of Hawaii; PhD, 1971, U of California, (CA/Crop Science Cluster)
- CUEVAS, VIRGINIA C., Professor, BSBot, 1969, MS Bot, 1977, UPD; PhD Bot, 1987, UPLB, (CAS/GS/Biological Sciences)
- DAVIDE, ROMULO G., BSA, 1957, UP; MS, 1962, Oklahoma State U; PhD, 1965, North Carolina State U, (CA/GS/Crop Protection Cluster)
- DEL ROSARIO, ERNESTO J., BS Chem (*magna cum laude*), 1963; MS, 1966; PhD, 1970, UPLB, (CAS/Chemistry)
- EDUARDO, SALCEDO L., DVM (*magna cum laude*), 1968, Gregorio Araneta U Foundation; MS, 1973, UPD; PhD, 1981, U of London, (CVM/Veterinary Paraclinical Sciences)
- GAPUD, VICTOR P., BSA, 1967, UPLB; MS, 1969, U of Massachusetts; PhD, 1981, U of Kansas, (CA/Crop Protection Cluster)
- GARCIA, MERCEDES U., BSA, 1960, UP; MS, 1975, UPLB; PhD, 1978, U of Florida, (CFNR/GS/Forest Biological Sciences)
- GOSS, MILAGROSA M., BSBot, 1962, MS, 1968, U of Maryland; PhD 1976, UPDM (CAS/GS/Biological Sciences)
- LAMBIO, ANGEL A., BSA, 1973, MS 1977, UPLB; PhD, 1981, Ohio State U, (CA/Animal and Dairy Sciences Cluster)
- LANTICAN, RICARDO M., BSA, 1954, UP; MS, 1956, North Carolina State U; PhD, 1961, Iowa State U, (CA/GS/Crop Science Cluster)
- LEGASPI, EDELWINA C., AB (Engl) (*magna cum laude*), 1951, UPD; AM, 1954, Radcum laudeiffe Coll; PhD, 1966, Cornell U, (CAS/GS/Humanities)
- LOZADA, ERNESTOP., BSChE, 1965, U of San Agustin; MS, 1970, UPLB; PhD, 1974, Pennsylvania State U, (CEAT/GS/Agricultural Bio-Process Engineering, Institute of Agricultural Eng'g)
- MAALA, CEFERINO P., DVM, 1972, UPD; MV Sci, 1977, U of Sydney; PhD, 1983, Cornell U, USA, (CVM/GS/Basic Veterinary Sciences)
- MASANGKAY, JOSEPH S., DVM, 1970, UPD; MAgr, 1977, DAgrSc, 1993, Nagoya U, Japan (CVM/Veterinary Paraclinical Sciences)
- MATEO, CARMENCITA D., DVM, 1969, UP; MS, 1971, UPLB; PhD, 1980, U of Missouri, (CA/GS/Animal and Dairy Sciences Cluster)
- MERCA, FLORINIA E., BSAC, 19689, MS Food Sci, 1972, PhD Ag Chem, 1980, UPLB, (CAS/Chemistry)
- PACARDO, ENRIQUE P., BSA, 1963, MS, 1968, UP; PhD, 1972, U of Aberdee (Scotland), (SESAM/GS/Environmental Science)
- PADOLINA, MA. CRISTINA D., BS Chem. Eng'g., 1966; MS, 1967; PhD, 1971, UPLB, (CAS/Chemistry)
- PARKER, BENEDICTO A., BSA, 1958, UP; MS, 1961, PhD, 1967, Texas A & M U, (CA/Animal and Dairy Sciences Cluster)
- PATERNO, ERLINDA S., BSA, 1960, UPCA; MS, 1965, U of Wisconsin; PhD, 1979, UPLB, (CA/GS/Agricultural Systems Cluster)
- QUEBRAL, NORA C., AB (*magna cum laude*), 1950, UP; MS, 1961, U of Wisconsin; PhD, 1966, U of Illinois, (CDC/GS/Development Communication)
- RAMIREZ, DOLORES A., BSA (*magna cum laude*), 1956, UP; MS, 1958, U of Minnesota; PhD, 1963, Purdue U, (CA/GS/Crop Science Cluster)
- RAROS, LEONILA C., BSA, 1961, MS, 1964, UPLB; PhD, 1970, U of Minnesota, (CA/GS/Crop Protection Cluster)
- RAYMUNDO, ASUNCION K., BS Soil Micro, 1996, UPLB; MS Plant Path, 1969, U of Hawaii; PhD Bacteriology, 1980, U of Illinois, (CAS/Biological Sciences)
- RAYMUNDO, AVELINO R., BSA, 1970, UPLB; MS, 1974, PhD, 1978, U of Illinois, (CA/Crop Protection Cluster)
- RAYMUNDO, LEONCIO C., BSA, 1960, UPLB; MS, 1969; PhD, 1971, U of Rhode Island, (CA/Food Science Cluster)
- REBUGIO, LUCRECIO L., FRC, 1959, BSF, 1961, UPLB; MF, 1969, Yale U; PhD, 1977, UPLB, (CFNR/GS/Social Forestry and Forest Governance)
- REJESUS, BELEN M., BSA, 1959, UP; MS, 1966, U of Hawaii; PhD, 1969, Rutgers U, (CA/GS/Crop Protection Cluster)
- RESURRECCION, ARSENIO N., BSAE, 1971, MSAE, 1978, UPLB; PhD, 1980, Iowa State U, USA, (CA/Agricultural Machinery Division/Intitute of Agricultural Eng'g)
- REYES, TIBURCIO T., BSA, 1955, MS, 1970, UP; PhD, 1979, UPLB, (CA/GS/Crop Protection Cluster)
- RIGOR, ERNESTO M., DVM, 1955, UP; MS, 1959, PhD, 1961, U of Wisconsin, (CA/Animal and Dairy Sciences Cluster)
- ROBLES, ALBERTO Y., BS Chem, 1964, Adamson U; MS, 1971, UP; PhD, 1977, U of Missouri, (CA/GS/Animal Science Cluster)
- ROSARIO, TERESITA L., BSA, 1964, MS, 1967, UPLB; PhD, 1971, Pennsylvania State U, (CA/Crop Science Cluster)
- SEVILLA, CESAR S., BSA, 1972, MS, 1976, UPLB; PhD, 1983, U of Queensland, (CA/Animal and Dairy Sciences Cluster)
- TILO, SANTIAGO N., BSA, 1954, UP; MS, 1958, U of Wisconsin; PhD, 1967, U of Illinois, (CA/GS/





## Agricultural Systems Cluster)

- TOPACIO, TEODULO JR. M., DVM (*cum laude*), 1951, UP; MS, 1956, Michigan State U; PhD, 1963, Purdue U, (CVM/Veterinary Microbiology)
- VALMAYOR, HELEN L., BS/BSE, 1951/1953, MS, 1957, UP; PhD, 1964, U of Florida, (CA/Crop Science Cluster)
- ZAFARALLA, MACRINA T., BSA, 1970, MS Bot, 1975, UPLB; PhD Environmental Sci, 1980, UPD, (CAS/Biological Sciences)
- ZAMORA, OSCAR B., BSAC, 1972, MS, 1976, UPLB; PhD, 1983, U of Queensland, (CA/GS/Agronomy)

**REGULAR MEMBERS OF THE FACULTY**

- ABACAN, SHEILA F., Assistant Professor, BSN (*cum laude*), 2007, MS, 2014, UPLB, (CHE/Human Nutrition and Food)
- ABALOS, JOVENCIO HUBERT A., Assistant Professor, DVM, 1989, MS, 1999, UPLB, (CVM/GS/Veterinary Clinical Sciences)
- ABANTO, OLIVER D., Associate Professor, BSA, 1995, MS, 1999, PhD, 2012, UPLB, (CA/GS/Animal and Dairy Sciences Cluster)
- ABASOLO, WILLIE P., Associate Professor, BSF (*cum laude*), 1993, UPLB; MS, 1999, PhD, 2002, Nagoya U, Japan, (CFNR/GS/Forest Products and Paper Science)
- ABELLO, LARCY C., Assistant Professor, BSA, 1980, UPLB, MAEd, 1997, NDDC/SPC, PhD, 2003, UPD, (CAS/GS/Humanities)
- ABRERA, ANNABELLE T., Assistant Professor, BSChem, 2003, MS Chem, 2012, UPLB, (CAS/Chemistry)
- ABRIGO, GIRLIE NORA A., Associate Professor, BA Socio, 1987, UPLB; MA Socio, 1998, UPD, (CAS/GS/Social Sciences)
- ABUCAY, EDWIN R., Assistant Professor, BSA, 2001, MS, 2010, UPLB, (CHE/Community and Environmental Resource Planning)
- ABUEG, MYRA LUZVIMINDA G., Assistant Professor, BSE-PE, 1990, FEU, MPES, 2001, NCPE-PLM, (CAS/Human Kinetics)
- ACDA, MENANDRO N., Professor, BSFPE, 1986, MS, 1992, UPLB, PhD, 1995, Oregon State U, USA, (CFNR/GS/Forest Products and Paper Science)
- ACDA, SONIA P., Professor, BSA, 1972, MS, 1982, PhD, 1994, UPLB, (CA/GS/Animal and Dairy Sciences Cluster)
- ACOB, MARJO-ANNE B., Assistant Professor, BSMath, 2007, MS Math, 2013, UPLB, (CAS/Mathematical Sciences and Physics)
- ACORDA, JEZIE A., Professor, DVM, 1981, UPD; MAg, 1991, Obihiro U, Japan; PhD, 1995, Gifu U, Japan (CVM/GS/Veterinary Clinical Sciences)
- ADAJAR, JOAN CRISTINE O., Instructor, BSBio (*cum laude*), 2011, UPLB, (CAS/Biological Sciences)
- ADALLA, CANDIDA B., Professor, BSA, 1972, MS, 1974, PhD, 1981, UPLB, (CA/GS/Crop Protection Cluster)
- ADALLA, KRISTINE K.\*\*, Instructor, BACA, 2003, UPLB, (CAS/Humanities)
- ADIOVA, CHRISTINE B., Assistant Professor, BSAEco, 2006, MS, 2010, PhD, 2015, UPLB, (CA/Animal and Dairy Sciences Cluster)
- ADORADA, JESSAMYN R., Assistant Professor, BSA, 1988, MS, 1995, PhD, 2007, UPLB, (CA/GS/Crop

## Protection Cluster)

- AFRICA, LEILA S., Associate Professor, BSN, 1995, MS, 2003, UPLB, PhD, 2015, U of Indonesia, (CHE/GS/ Human Nutrition and Food)
- AFUANG, LETICIA E., Associate Professor, BSZoo, 1979, UPD; MS Zoo, 1985, PhD Env'l Science, 2004, UPLB, (CAS/GS/Biological Sciences)
- AGBISIT, ELPIDIO JR. M., Associate Professor, BSA, 1988, MS, 1994, PhD, 2002, UPLB, (CA/GS/Animal and Dairy Sciences Cluster)
- AGNO, KAREN-CHRISTIAN C., Assistant Professor, BSEE, 2010, UPLB; MEnergy, 2015, The U of Auckland, New Zealand, (CEAT/Electrical Engineering)
- AGRAVANTE, JOSEPHINE U., Research Assistant Professor, BSA, 1982, UPLB; PhD, 1991, Kagawa U, Japan, (CA/GS/Crop Science Cluster)
- AGUILA, IVY JOY U., Instructor, BSCS, 2012, UPLB, (CAS/Computer Science)
- AGUILAR, EDNA A., Professor, BSA, 1980, MS, 1987, UPLB; PhD, 1999, U of Western Australia, (CA/GS/ Crop Science Cluster)
- AGUILON, DIANNE JOY D., Assistant Professor, BSA, 2006, MS, 2011, UPLB, (CFNR/GS/Forest Biological Sciences)
- AGUINALDO, DENNIS ANDREW S., Associate Professor, AB (*cum laude*), 2001, MS, 2006, UPD, (CAS/ Humanities)
- AGUIRRE, AIRA THERESE A., Assistant Professor, BSA, 2008, MS, 2016, UPLB, (CA/Animal and Dairy Sciences Cluster)
- AGUIRRE, JEDIDIAH JOEL C., Instructor, BSCE (*cum laude*), 2013, UPLB, (CEAT/Civil Engineering)
- AGUIRRE, MARY GRACE ANGELIE G., Instructor, BSCS, 2012, UPLB, (CAS/Computer Science)
- AGUIRRE, RODOLFO JR. A., Assistant Professor, BSEE (*cum laude*), 2008, UPLB; MSEE, 2015, UPD, (CEAT/ Electrical Engineering)
- ALAGAD, KRISTINE R., Assistant Professor, BA Social Sci, 2000, UP Baguio; MA Educ, 2006, Union Coll, (CAS/Social Sciences)
- ALARCON, MARIA SHEILA T., Instructor, BSStat, 1992, UPLB, (CAS/Statistics)
- ALBACEA, ELIEZAR A., Professor, BSStat (*cum laude*), 1982, UPLB; MS (Hons), 1985, U of Wollongong; PhD, 1994, Australian National U, Australia, (CAS/ GS/Computer Science)
- ALBACEA, ZITA VJ.\*\*, Professor, BSStat (*cum laude*), 1982, MS, 1987, PhD, 1999, UPLB, (CAS/GS/ Statistics)
- ALBALADEJO, ANTHONY SALVADOR B., Instructor, BSChem, 2012, UPV (CAS/Chemistry)
- ALBAO, MARVIN A., Professor, BS Physics, 1992, UPD; PhD, 2005, Iowa State U, (CAS/Mathematical Sciences and Physics)
- ALBIA, JASON R., Assistant Professor, BSAP, 2008, UPLB; MS MSE, 2013, UPD, (CAS/Mathematical Sciences and Physics)
- ALBOR, RUFO GIL Z., Assistant Professor, BSHE, 2008. MPAf, 2012, UPLB, (CHE/Human and Family Development Studies)
- ALCABEDOS, RIAFLOR M., Assistant Professor, BSBio, 2005, UP Baguio; MS (Genetics), 2013, UPLB, (CAS/ Biological Sciences)
- ALCALA, JERIC S., Instructor, BSAM (*summa cum laude*), 2009, UPLB, (CAS/Mathematical Sciences

- and Physics)
- ALCALDE, JHOANA V., Assistant Professor, BSEcon, 1994, MS Ag Econ, 2000, UPLB; MA Econ, 2007, UPD, (CEM/GS/Economics)
- ALCAÑICES, MONICCALORRAINE M., Instructor, BSStat (*cum laude*), 2013, UPLB, (CAS/Statistics)
- ALCANTARA, AMADEO A., Assistant Professor, DVM, 1995; MS, 2000, UPLB (CVM/GS/Veterinary Clinical Sciences)
- ALCANTARA, JERICO Z.\*\*, Assistant Professor, BSChE (*cum laude*), 2008, MS ChE, 2015, UPLB, (CEAT/Chemical Engineering)
- ALDAMA, PRINCE KENNEX R., Instructor, BASoc (*cum laude*), 2013, UPLB, (CAS/Social Sciences)
- ALDEMITA, MA. DESIREE B., Assistant Professor, BSChem, 2004, MS Biochem, 2010, UPLB (CAS/Chemistry)
- ALEDO, RAYVEN P., Instructor, BSE, 2014, Phil Normal U, (CAS/Rural High School)
- ALFAFARA, CATALINO G., Associate Professor, BSChE (*magna cum laude*), 1980, U of San Carlos; M Eng'g Envi Eng'g, 1985, Asian Inst of Tech; PhD Fermentation Tech, 1992, Osaka U, Japan, (CEAT/GS/Chemical Engineering)
- ALFONSO, MARK M., Instructor, BSCS, 2013, UPLB, (CAS/Computer Science)
- ALGAR, ARA FATIMA C., Assistant Professor, BSFT, 2007, MS, 2013, UPLB, (CA/GS/Food Science Cluster)
- ALINSUNURIN, MARIA KRISTINA G., Assistant Professor, BSEcon, 2006, MM DM, 2011, UPLB, (CPAf/Governance and Rural Development)
- ALMANZA, DUSTIN LOREN V., Instructor, BSAP, 2013, UPLB, (CAS/Mathematical Sciences and Physics)
- ALOMIA, RALPH LAUREN M., Instructor, BSChem, 2010, UPLB (CAS/Chemistry)
- ALPECHE, ZYRELLE JOY S., Instructor, BSChem, 2013, UPLB (CAS/Chemistry)
- ALPORHA, VERONICA C., Instructor, BA Social Sciences (*cum laude*), 2014, UP Baguio, (CAS/Social Sciences)
- ALTOVEROS, NELIO C., Associate Professor, BSPT (*cum laude*), 1979, Phil Normal Coll; MS/MS, 1983/1990, DLSU/U of Central Queensland, Australia, (CAS/Mathematical Sciences and Physics)
- ALTOVEROS, NESTOR C., Associate Professor, BSA, 1976, MS, 1978, U of Birmingham, UK. (CA/GS/Crop Science Cluster)
- ALVAREZ, JADE MARK B., Instructor, BPE, 2008, UPD, (CAS/Human Kinetics)
- ALVAREZ, KRIS GERARD R., Instructor, BSBio, 2009, UPLB, (CAS/Biological Sciences)
- ALVAREZ, PAUL LLOYDSON J., Instructor, BSChem, 2011, UPLB (CAS/Chemistry)
- ALVIOLA, PHILIP A., Associate Professor, BSZoo, 1997, MS Wildlife Studies, 2008, UPLB, (CAS/Biological Sciences)
- AMIT, MAYO GRACE C., Assistant Professor, BSEco, 1991, UPLB; MS, 2006, U of Queensland, Brisbane, Australia, (CPAf/Governance and Rural Development)
- AMONGO, ROSSANA MARIE C., Associate Professor, BSAE, 1988, MS, 1995, PhD, 2007, UPLB, (CEAT/GS/Agricultural Machinery Division, Institute of Agricultural Eng'g)
- AMPARO, JENNIFER MARIE S., Assistant Professor, BSHE (*cum laude*), 1998, UPLB, MA, 2010, UPD, (CHE/Social Development Services)
- ANCOG, RICO C, Assistant Professor, BS Environmental Science, 2004, Central Mindanao U; MS, 2006, PhD, 2011, UPLB, (SESAM/GS)
- ANDAL, EMMANUEL GENESIS T., Assistant Professor, BAPhilo, 2008, MA Econ, 2011, UPD, (CEM/Economics)
- ANDRADA, ROGELIO II T., Assistant Professor, BSF (*cum laude*), 1997, MS, 2003, UPLB; PhD, 2015, West Virginia U, (CFNR/Renewable and Natural Resources)
- ANG, MARY JASMIN C.\*\*, Assistant Professor, DVM, 2013, UPLB (CVM/Basic Veterinary Sciences)
- ANGELES, AMADO A., Assistant Professor, BSA, 1995, MS, 2006, PhD, 2012, UPLB, (CA/GS/Animal and Dairy Sciences Cluster)
- ANGELES, DOMINGO E., Professor, BSA, 1976, MS, 1981, PhD, 1988, UPLB, (CA/GS/Crop Science Cluster)
- ANGELES, MARY GRACE P., Instructor, BSCS (*cum laude*), 2014, UPLB, (CAS/Computer Science)
- ANGELIA, MARK RICKARD N., Assistant Professor, BSAC (*cum laude*) 2000, MS, 2007, UPLB (CAS/Chemistry)
- ANI, ANGELO C, Assistant Professor, BSIE (*summa cum laude*), 2009, MSIE, 2015, UPD, (CEAT/Industrial Engineering)
- AÑONUEVO, AUGUSTUS T., Assistant Professor, BS (Psycho), 1978, MA Socio, 1997, UPD, (CAS/GS/Social Sciences)
- AÑOSO, PRECIOUS SARAH A., Instructor, BACA (*cum laude*), 2012, UPLB, (CAS/Humanities)
- APACIONADO, BRYAN V., Instructor, BSA, 2008, UPLB, (CA/Crop Science Cluster)
- AQUINO, ARROL JAN B., Assistant Professor, BS Bio, 2009, UST; DVM, 2013, UPLB (CVM/Basic Veterinary Sciences)
- AQUINO, NANETTE A., Assistant Professor, BSAB, 1994, MM-BM, 2007, UPLB, (CEM/GS/Agribusiness Management and Entrepreneurship)
- ARABIT, JIMYLA., Assistant Professor, BSChE, 2012, MS, 2015, UPD, (CEAT/Engineering Science)
- ARACID, SARAH BERNADETTE M., Instructor, BSStat, 2014, UPLB, (CAS/Statistics)
- ARAGONCILLO, ARIEL MIGUEL M., Instructor, BSCE, 2011, UPLB, (CEAT/Civil Engineering)
- ARAÑA, RACHELYN ANN S., Instructor, BSStat (*cum laude*), 2011, UPLB, (CAS/Statistics)
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**Legend:**

- ASC - Agricultural Systems Cluster  
 CA - College of Agriculture  
 CAS - College of Arts and Sciences  
 CDC - College of Development Communication  
 CEAT - College of Engineering and Agro-Industrial Technology  
 CEM - College of Economics and Management  
 CFNR - College of Forestry and Natural Resources  
 CHE - College of Human Ecology  
 CPAf - College of Public Affairs  
 CVM - College of Veterinary Medicine  
 DAGR - Department of Agronomy  
 DENT - Department of Entomology  
 DHORT - Department of Horticulture  
 DTRI - Dairy Training and Research Institute  
 FSC - Food Science Cluster  
 IAS - Institute of Animal Science  
 IBS - Institute of Biological Sciences  
 IC - Institute of Chemistry  
 ICOPED - Institute of Cooperatives and Bio-Enterprise Dev't.  
 NCPC - National Crop Protection Center  
 OSA - Office of Student Affairs  
 SESAM - School of Environmental Science and Management  
 YMCA - Young Men Christian Association



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| ovca.uplb@up.edu.ph                                       | 536-3468          |          | 1102    |

| Office  | Telephone No. | Fax No.  | VoIP# |
|---|---------------|----------|-------|
| <b>Accounting Office</b>                              | 536-2296      | 536-2296 | 1110  |
| accounting.uplb@up.edu.ph                             |               |          | 1111  |
| Allotment/Control Section                             |               |          | 1112  |
| EDP   | 536-1845      |          | 1113  |
| <b>Cashier's Office</b>                               | 536-3558      | 536-3558 | 1150  |
| cash.uplb@up.edu.ph                                   |               |          |       |
| <b>Human Resource Development Office</b>              | 536-2307      | 536-3457 | 1160  |
| hrdo.uplb@up.edu.ph                                   | 536-3457      |          |       |
| <b>Records Management Office</b>                      | 536-2546      | 536-2546 | 1170  |
| rmo.uplb@up.edu.ph                                    |               |          |       |
| Storage Center  | 536-6069      |          |       |
| <b>Supply and Property Management Office</b>          | 536-2282      | 536-2282 | 1180  |
| spmo.uplb@up.edu.ph                                   |               |          |       |
| BAC Secretariat (Purchasing & Requisitioning Section) | 536-8420      | 536-8419 | 1120  |
| bacsec.uplb@up.edu.ph                                 | 536-8419      | 536-8420 |       |
| Central Storeroom                                     | 536-2281      |          |       |
| Property Management Section                           | 536-2282      |          |       |

### OFFICE OF THE VICE CHANCELLOR FOR COMMUNITY AFFAIRS

|  |          |                  |          |
|--|----------|------------------|----------|
| <b>Office of the Vice Chancellor for Community Affairs</b> | 536-3358 | 536-3358         | 1200     |
| to   |          |                  |          |
| ovcca.uplb@up.edu.ph                                       |          |                  | 1202     |
| <b>Business Affairs Office</b>                             | 536-2314 | 536-2314         | 1130     |
| bao.uplb@up.edu.ph   |          |                  |          |
| Continuing Education Center                                | 536-2286 | 536-2831         | 1210     |
| cec.uplb@up.edu.ph   | 536-2831 |                  |          |
| <b>University Health Service</b>                           | 536-3247 | 536-2470         | 1240     |
| uhs.uplb@up.edu.ph   | 536-6238 |                  | 1241     |
|  | 536-2470 |                  |          |
|  | Local    | Local            | Local    |
| Administrative Officer                                     | 100      | Doctors' Quarter | 107      |
| Administrative Assistant                                   | 102      | ER-Dispensary    | 108      |
| Pharmacy   | 103      | X-ray/Ultrasound | 110      |
| Head Nurse Local   | 104      | Laboratory       | 111      |
| Ultrasound   | 105      | Dietary          | 112      |
| Dental Clinic  | 106      | Cashier          | 113      |
| <b>University Police Force</b>                             | 536-2243 |                  | 536-2243 |
| upf.uplb@up.edu.ph   | 536-2803 |                  |          |
| Administration Bldg.                                       | 536-2255 |                  |          |
| Main Gate  | 536-2552 |                  |          |
| <b>UPLB Housing Office</b>                                 | 536-4009 | 536-4009         | 1230     |
| uho.uplb@up.edu.ph   |          |                  |          |
| Student Housing Division                                   | 536-3219 |                  | 1052     |
| FOREHA   | 536-0717 |                  |          |
| IH   | 536-2233 |                  |          |
| MAREHA   | 536-3492 |                  |          |
| Men's  | 536-2580 |                  |          |
| New Dorm   | 536-7441 |                  | 1070     |
| New FOREHA   | 536-7103 |                  |          |
| Vet Med  | 536-2333 |                  |          |
| Women's  | 536-2228 |                  | 1072     |

### OFFICE OF THE VICE CHANCELLOR FOR PLANNING AND DEVELOPMENT

|   |          |          |      |
|---|----------|----------|------|
| <b>Office of the Vice Chancellor for Planning and Development</b> | 536-3484 | 536-3484 | 1400 |
| to  |          |          |      |
| Development   | 536-2748 |          | 1402 |
| ovcpd.uplb@up.edu.ph  |          |          |      |
| <b>Campus Planning and Development Office</b>                     | 536-3270 | 536-2869 | 1410 |
| cpdo.uplb@up.edu.ph   | 536-2550 |          |      |
|   | 536-2869 |          |      |

| Office  | Telephone No. | Fax No.  | VoIP# |
|---|---------------|----------|-------|
| <b>Information Technology Center</b>                    | 501-4591      | 501-4591 | 100   |
| itc.uplb@up.edu.ph                                      | 536-2886      |          |       |
| ITC Director 001  |               |          | 001   |
| ITC Data Center 101                                     |               |          | 101   |
| Technical Support Team                                  | 501-4793      |          | 105   |
| itctechnicalsupport@uplb.edu.ph                         |               |          |       |
| <b>Land Grant Management Office</b>                     | 536-3952      |          | 1220  |
| lgmo.uplb@up.edu.ph                                     |               |          |       |
| <b>Physical Plant Maintenance &amp; Services Office</b> | 536-7085      |          | 1425  |
| ppmso.uplb@up.edu.ph                                    |               |          |       |
| Buildings & Housing                                     | 536-3213      |          |       |
| Billing   | 536-3383      |          |       |
| Electrical Section                                      | 536-3383      |          |       |
| Grounds, Roads, Garbage                                 | 536-3213      |          |       |
| Motorpool   | 536-2447      | 536-2447 | 1420  |
| Waterworks & Plumbing                                   | 536-3383      |          |       |
| <b>Resource Generation and Development Office</b>       | 536-2749      | 536-2749 | 1440  |
| rgdo.uplb@up.edu.ph                                     |               |          |       |

### OFFICE OF THE VICE CHANCELLOR FOR RESEARCH AND EXTENSION

|   |          |          |      |
|---|----------|----------|------|
| <b>Office of the Vice Chancellor for Research and</b>     | 536-5326 | 536-5326 | 1500 |
| to  |          |          |      |
| <b>Extension</b>  | 536-2354 | 536-2354 | 1502 |
| ovcre.uplb@up.edu.ph                                      |          |          |      |
| PDMES   | 536-5326 | 536-5326 | 1510 |
| IMPS  | 536-2354 |          | 1515 |
| Corn Network  | 536-7181 | 536-7181 |      |
|   | 536-8750 | 536-8750 |      |
| RUDS  |          |          | 1520 |
| CHED - ZRC  | 536-7411 | 536-7411 |      |
| CTTE (ACTETSME, IPRO, STP)                                | 536-4224 |          | 1525 |
| ctte.uplb@up.edu.ph                                       | 501-4756 |          | 1580 |
| CTTE Guard  |          |          | 1503 |
| <b>BIOTECH</b>  |          | 536-1620 | 1540 |
| biotech.uplb@up.edu.ph                                    |          |          |      |
| Environment and Health Program                            | 501-1640 |          | 1545 |
| Enzyme Lab  | 536-1612 |          | 1545 |
| Food Lab  | 536-0547 |          | 1550 |
| Agri and Services Program                                 | 536-1576 |          | 1555 |
| Immuno Lab  | 536-3680 |          |      |
| Bio & Lab   | 536-8380 |          |      |
| Central Analytical Lab                                    | 536-0587 | 536-0587 |      |
| Oil & Fats Lab  | 536-3887 | 536-3887 |      |
| Guard   | 536-2725 |          |      |
| <b>Museum of Natural History</b>                          | 536-3669 | 536-3669 | 1530 |
| mnh.uplb@up.edu.ph  |          |          |      |
| <b>Office for the Initiatives in Culture and the Arts</b> | 536-3452 | 536-3452 | 1020 |
| (DL Umali Hall) oica.uplb@up.edu.ph                       |          |          |      |
| <b>UPLB Gender Center</b>                                 | 536-2239 | 536-2239 | 1570 |
| gendercenter.uplb@up.edu.ph                               |          |          |      |

### COLLEGE OF AGRICULTURE

Email: ca.uplb@up.edu.ph

|  |          |          |      |
|--|----------|----------|------|
| <b>Office of the Dean</b>                | 536-3546 | 536-3535 | 2000 |
| cado.uplb@up.edu.ph                      | 536-3535 |          | 2201 |
|  |          |          | 2010 |
| <b>Office of the College Secretary</b>   | 536-2329 |          | 2020 |
| ca_ocs.uplb@up.edu.ph                    |          |          |      |
| <b>Central Experiment Station</b>        | 576-0013 |          | 2430 |
| ces.uplb@up.edu.ph                       |          |          |      |
| <b>Philippine Agricultural Scientist</b> | 536-2379 |          | 2600 |



| Office   | Telephone No. | Fax No.  | VoIP#        |
|--|---------------|----------|--------------|
| <b>Agricultural Systems Cluster</b>  | 536-3229      | 536-5282 | 2100         |
| asc.uplb@up.edu.ph   | 536-5282      |          |              |
| Integrated Farming Systems and<br>Agricultural Extension Division (IFSAED) | 536-2459      |          | 2150         |
| AERS   | 536-2548      |          | 2143         |
| Soils and Agro-ecosystems Division (SAED )                                 | 536-2412      | 536-2405 | 2130         |
| Analytical Lab   | 536-2423      |          |              |
|  | 536-2405      |          |              |
| Farmer Scientist Training Program  | 536-2548      |          | 2140<br>2142 |
| to   |               |          | 2144         |
| <b>Animal and Dairy Sciences Cluster</b>                                   | 536-3426      | 536-2547 | 2200         |
| adsc.ca.uplb@up.edu.ph   | 536-2547      |          | 2201         |
| Information Management Training & Services Unit                            |               | 536-2547 |              |
| Animal Nutrition Division  | 536-2551      |          |              |
| Animal Breeding & Physiology Division                                      | 536-3450      |          |              |
| Animal Production & Products Utilization<br>Division                       | 536-3423      |          |              |
| Sales Room   | 536-2549      |          |              |
| Dairy Products & Technology Development<br>Division (DTRI)                 | 536-3744      | 536-2205 | 2240         |
| Animal Health  | 536-2205      |          |              |
| Breeding & Physiology  | 536-2513      |          |              |
| Dairy Farm Production  | 536-2513      |          |              |
|  | 536-2497      |          |              |
| Dairy Processing Plant & Services  | 536-2441      |          |              |
| Dairy Sales Bar  | 536-2203      |          |              |
| Dairy Technology   | 536-3148      | 536-3148 | 2250         |
| Husbandry & Management   | 536-2513      |          |              |
| Pasture & Forage Crop  | 536-2513      |          |              |
| <b>Crop Protection Cluster</b>   | 536-1315      | 536-1315 | 2300         |
| cpc.uplb@up.edu.ph   | 536-3534      | 536-3534 | 2301         |
| Information Management & Technical<br>Services Unit                        | 536-2409      |          | 2310         |
| Division I   | 536-2617      | 536-2617 |              |
| Division II  | 536-2467      |          |              |
| Division III   | 536-2351      | 536-2351 |              |
| NCPC   |               |          | 2330         |
| Administration/Records   | 536-2231      | 536-2409 |              |
|  | 536-2409      |          |              |
| Bio-control  | 536-2615      |          |              |
| Nematology   | 536-2615      |          |              |
| NCPC Dorm  | 536-2616      |          |              |
| Pesticide Residue  | 536-0959      |          |              |
| Quarantine Laboratory  | 536-2410      |          |              |
|  | 536-2615      |          |              |
| <b>Crop Science Cluster</b>  | 536-2468      | 536-2468 | 2400         |
| csc.uplb@up.edu.ph   | 525-7499      |          | 2410         |
| to   |               |          |              |
|  | 536-2217      |          | 2413<br>2401 |
| Division Secretaries   |               |          |              |
| Crop Biotechnology Division  | 536-0025      |          |              |
| Plant Genetic Resources Division   | 576-0045      |          |              |
| Crop Genetics & Plant Breeding<br>Division Crop Production                 | 536-2217      |          |              |
| Plantation Crops (Macapuno Lab)  | 536-2323      |          |              |
| Vegetable Crops  | 536-2598      |          |              |
| Postharvest & Seed Science Division  | 536-3138      | 536-3138 | 2511         |
| Administration   | 536-3259      | 536-3259 |              |
| Library  | 536-2444      |          | 2510         |
| Research   | 536-5283      |          |              |
| Institute of Plant Breeding  | 536-5287      | 536-5287 | 2421         |

| Office  | Telephone No. | Fax No.  | VoIP#  |
|---|---------------|----------|--------|
| Administrative Services                                 | 536-0090      |          | 2425   |
| IMTS(Extension Office)                                  |               |          | 2421   |
| Cereals Section   | 536-8750      |          | 2420   |
| Fruits and Ornamentals Section                          | 576-0089      |          |        |
| Plant Pathology Laboratory                              | 576-0046      |          |        |
| Entomology Laboratory                                   | 576-0091      |          |        |
| Plant Physiology Laboratory                             | 576-3189      |          |        |
| Crop Biotechnology Division                             |               |          |        |
| Biochemistry Laboratory                                 | 576-0025      |          |        |
| Genetics Laboratory                                     | 576-0056      |          |        |
| ABSP Office   | 536-5322      |          |        |
|   | 536-5140      |          |        |
|   | 576-0042      |          |        |
|   | 576-0045      |          |        |
| National Seed Foundation                                | 576-0012      |          |        |
| Corn Network Office                                     | 536-7181      |          | 2425   |
| <b>Food Science Cluster</b>                             | 536-3472      | 536-3472 | 2500   |
| fsc.uplb@up.edu.ph                                      |               |          |        |
| Food Sanitation and Safety (Fish & Meat Lab)            | 536-2358      |          |        |
| Food Biochemistry Lab/Food Chemistry Lab                | 536-2303      |          |        |
| Food Microbiology Laboratory                            | 536-2312      |          |        |
| Food Engineering Laboratory                             | 536-2312      |          |        |
| Sensory Evaluation Laboratory                           | 536-2358      |          | 2501   |
| <b>COLLEGE OF ARTS AND SCIENCES</b>                     |               |          |        |
| Email: cas.uplb@up.edu.ph                               |               |          |        |
| <b>Office of the Dean</b>                               | 536-2402      | 536-2437 | 3000-  |
| 02  |               |          |        |
| cas.uplb@up.edu.ph                                      | 536-2437      |          | 3010   |
| <b>Office of the College Secretary</b>                  | 536-2435      |          | 3020   |
| cas_ocs.uplb@up.edu.ph                                  | 536-2407      |          | 3021   |
| <b>Department of Human Kinetics</b>                     | 536-2534      | 536-2534 | 3100   |
| dhk.uplb@up.edu.ph                                      |               |          | 3101   |
| <b>Department of Humanities</b>                         | 536-9259      | 536-9259 | 3200   |
| dhum.uplb@up.edu.ph                                     |               |          | 3201   |
| <b>Department of Social Sciences</b>                    | 536-3446      | 536-2440 | 3300   |
| dss.uplb@up.edu.ph                                      | 536-2440      |          | 3301   |
| <b>Institute of Biological Sciences</b>                 | 536-2893      | 536-2893 | 3400   |
| ibs.uplb@up.edu.ph                                      |               |          | 3401   |
| Animal Biology Division                                 | 536-2843      | 536-2843 | 3410   |
| (Entom Wing)  | 536-3480      | 536-3480 |        |
| Environmental Biology Division                          | 526-6780      | 526-6780 | 3420   |
| Genetics & Molecular Biology Division                   | 536-3368      |          | 3430   |
| Microbiology Division                                   | 536-3368      | 536-3368 | 3450   |
| Plant Biology Division                                  | 536-2807      | 536-2807 | 3460   |
| Limnological Station                                    | 536-0188      | 536-0188 | 3470   |
| <b>Institute of Chemistry</b>                           | 536-2220      | 536-2241 | 3500   |
| ic.uplb@up.edu.ph                                       | 536-2241      |          |        |
| Analytical & Environmental Chemistry Div                | 536-2359      |          |        |
| Biochemistry & Agricultural Chemistry Div               | 536-2220      |          |        |
| General Chemistry & Chemical Educ Div                   | 536-2220      |          |        |
| Organic Chemistry & Natural Products Div                | 536-2220      |          |        |
| <b>Institute of Computer Science</b>                    | 536-2313      | 536-2302 | 3600   |
| ics.uplb@up.edu.ph                                      | 536-2302      |          | 3601   |
| <b>Institute of Mathematical Sciences &amp; Physics</b> | 536-6610      | 536-6610 | 3700   |
| imsp.uplb@up.edu.ph                                     |               |          | 3702   |
| Division of Math & Applied Math Lab                     | 501-2982      |          | 3701   |
| Division of Physics & Applied Physics Lab               | 536-1841      |          | 37560- |
| 52  |               |          |        |
| <b>Institute of Statistics</b>                          | 536-0818      | 536-2381 | 3800   |
| instat.uplb@up.edu.ph                                   | 536-2381      |          |        |

| Office  | Telephone No.        | Fax No.  | VoIP# |
|---|----------------------|----------|-------|
| <b>UP Rural High School</b><br>uprhs.uplb@up.edu.ph | 501-0389<br>573-0093 | 501-0389 | 3900  |
| <b>CAS Lite Program</b>                             |                      |          | 3022  |

### COLLEGE OF DEVELOPMENT COMMUNICATION

Email: cdc.uplb@up.edu.ph

|  |                                 |          |              |
|--|---------------------------------|----------|--------------|
| <b>Office of the Dean</b><br>cdc.uplb@up.edu.ph                                  | 536-3356<br>536-2511<br>loc 214 | 536-3356 | 4000<br>4001 |
| Information Technology Resource Unit   |                                 |          | 4010         |
| <b>Office of the College Secretary</b><br>cdc_ocs.uplb@up.edu.ph                 | 536-2511<br>loc 203             | 536-2429 | 4020         |
| <b>Department of Broadcasting &amp; Telecommunication</b><br>ddbt.uplb@up.edu.ph | 536-2433<br>536-2511<br>loc 228 |          | 4100         |
| <b>Department of Development Journalism</b><br>ddj.uplb@up.edu.ph                | 536-2511<br>loc 219/211         |          | 4200         |
| <b>Department of Educational Communication</b><br>dec.uplb@up.edu.ph             | 536-3697<br>536-2511<br>loc 231 | 536-3697 | 4300         |
| <b>Department of Science Communication</b><br>dsc.uplb@up.edu.ph                 | 536-2511<br>loc 205/208         |          | 4400         |

### COLLEGE OF ENGINEERING AND AGRO-INDUSTRIAL TECHNOLOGY

Email: ceat.uplb@up.edu.ph

|  |                                  |          |      |
|--|----------------------------------|----------|------|
| <b>Office of the Dean</b><br>ceat.uplb@up.edu.ph                   | 536-0250<br>536-2873<br>536-4728 | 536-2873 | 5000 |
| <b>Office of the College Secretary</b><br>ceat_ocs.uplb@up.edu.ph  | 536-7450                         |          | 5010 |
| <b>AMTEC</b><br>amtec.uplb@up.edu.ph                               | 536-2527                         | 536-2527 | 5100 |
| <b>Department of Chemical Engineering</b><br>dche.uplb@up.edu.ph   | 536-2315                         | 536-2315 | 5300 |
| <b>Department of Civil Engineering</b><br>dce.uplb@up.edu.ph       | 536-5614                         |          | 5350 |
| <b>Department of Electrical Engineering</b><br>dee.uplb@up.edu.ph  | 536-7089<br>536-6031             | 536-6031 | 5400 |
| Instrumentation  | 536-2465                         |          |      |
| <b>Department of Engineering Sciences</b><br>des.uplb@up.edu.ph    | 536-2874                         | 536-2874 | 5450 |
| <b>Department of Industrial Engineering</b><br>die.uplb@up.edu.ph  | 536-6625                         |          | 5500 |
| <b>Institute of Agricultural Engineering</b><br>iae.uplb@up.edu.ph | 536-8745                         | 536-8745 | 5200 |
| Agricultural Bio Processing Division                               | 536-3291                         |          | 5210 |
| Agricultural Machineries Division                                  | 536-2792                         | 536-2792 | 5220 |
| AMDP   | 536-8746<br>536-2686             | 536-3606 | 5230 |
| National Agromet Station   | 536-3898                         | 536-3898 |      |
| Agrometeorology & Farm Structures Div                              | 536-2941                         | 536-2941 | 5240 |
| Land & Water Resources Division                                    | 536-2387                         | 536-2387 | 5250 |
| <b>CEAT Library</b>  | 536-2385                         | 536-2385 | 5600 |

### COLLEGE OF ECONOMICS AND MANAGEMENT

Email: cem.uplb@up.edu.ph

|   |          |          |                      |
|---|----------|----------|----------------------|
| <b>Office of the Dean</b><br>cem.uplb@up.edu.ph | 536-4750 | 536-4750 | 6000<br>6001<br>6010 |
|---|----------|----------|----------------------|

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|---|---------------|----------|--------------|
| <b>Office of the College Secretary</b><br>cem_ocs.uplb@up.edu.ph                    | 536-2716      | 536-2716 | 6020         |
| <b>Department of Agribusiness Management</b><br>dam.uplb@up.edu.ph                  | 536-2846      | 536-2846 | 6200         |
| <b>Department of Agricultural Economics</b><br>to<br>dae.uplb@up.edu.ph             | 536-3292      | 536-3292 | 6100<br>6103 |
| <b>Department of Economics</b><br>de.uplb@up.edu.ph                                 | 536-2505      |          | 6300         |
| <b>Institute of Cooperatives and Bio-Enterprise Dev't.</b><br>icoped.uplb@up.edu.ph | 536-3266      | 536-3266 | 6400         |
| <b>CEM Library</b>  |               |          | 6030         |

### COLLEGE OF FORESTRY AND NATURAL RESOURCES

Email: cfnrdo.uplb@up.edu.ph

|   |                                  |          |              |
|---|----------------------------------|----------|--------------|
| <b>Office of the Dean</b><br>cfnrdo.uplb@up.edu.ph  | 536-3996<br>536-3206<br>536-2342 | 536-3996 | 7010         |
| Administrative Services Office  | 536-2265                         |          | 7001         |
| Office of the Coordinator for Extension & Linkages  | 536-5305                         |          | 7600         |
| <b>Office of the College Secretary</b><br>cfnr_ocs.uplb@up.edu.ph   | 536-3524                         |          | 7020         |
| <b>Department of Forest Biological Sciences</b><br>dfbs.uplb@up.edu.ph  | 536-2773                         | 536-2773 | 7300         |
| <b>Department of Forest Products &amp; Paper Science</b><br>dfpps.uplb@up.edu.ph  | 536-3432                         |          | 7100         |
| <b>Department of Social Forestry &amp; Forest Governance</b><br>dsffg.uplb@up.edu.ph  | 536-3493                         |          | 7150         |
| <b>Forestry Development Center</b><br>fdc.uplb@up.edu.ph  | 536-3097<br>536-2341             | 536-2341 | 7200         |
| Institute of Agroforestry<br>iaf.uplb@up.edu.ph   | 536-3809                         | 536-3809 | 7250         |
| <b>Institute of Renewable Natural Resources</b><br>irnr.uplb@up.edu.ph  | 536-2557                         | 536-2557 | 7350         |
| Soil and Forest Influences  | 536-2599                         |          | 7400         |
| <b>Makiling Center for Mountain Ecosystems</b><br>mcme.uplb@up.edu.ph   | 536-3572<br>536-2577             | 536-3572 | 7450         |
| Makiling Botanic Gardens  | 536-2637                         |          | 7701         |
| <b>Training Center for Tropical Resources and Ecosystems Sustainability trees@uplb.edu.ph</b><br>TREES Administrative Officer | 536-2736<br>536-2639             | 536-2639 | 7500<br>7510 |
| <b>CFNR Library</b>   | 536-2266                         |          | 7550         |

### COLLEGE OF HUMAN ECOLOGY

Email: che\_do.uplb@up.edu.ph

|   |          |          |              |
|---|----------|----------|--------------|
| <b>Office of the Dean</b><br>che_do.uplb@up.edu.ph  | 536-2682 | 536-2682 | 8000<br>8001 |
| <b>Office of the College Secretary</b><br>che_ocs.uplb@up.edu.ph                            | 530-9201 |          | 8020         |
| <b>BIDANI</b><br>bidani.uplb@up.edu.ph  | 536-3643 |          | 8200         |
| <b>Department of Community &amp; Environmental Research Planning</b><br>cerp.uplb@up.edu.ph | 536-3645 | 536-3645 | 8010         |
| <b>Department of Human and Family Development Studies</b><br>hfds.uplb@up.edu.ph            | 536-2480 | 536-2480 | 8100         |
| Child Development Laboratory  | 536-5089 |          |              |
| Day Care Laboratory   | 536-5089 |          |              |
| Day Care Resource Center  | 536-2480 |          |              |
| <b>Department of Social Development Services</b>  | 536-8409 | 536-8409 | 8500         |



| Office                                       | Telephone No. | Fax No.  | VoIP# |
|--|---------------|----------|-------|
| dsds.uplb@up.edu.ph                          |               |          |       |
| <b>Food and Nutrition Planning (FNP)</b>     |               |          | 8300  |
| <b>Institute of Human Nutrition and Food</b> | 536-2445      | 536-2445 | 8400  |
| ihnf.uplb@up.edu.ph                          |               |          |       |

### COLLEGE OF PUBLIC AFFAIRS AND DEVELOPMENT

Email: cpaf.uplb@up.edu.ph

|  |          |          |       |
|--|----------|----------|-------|
| <b>Office of the Dean</b>                                | 536-4267 | 536-0319 | 14000 |
| cpaf.uplb@up.edu.ph                                      | 536-0319 |          | 14001 |
| <b>Center of Strategic Planning &amp; Policy Studies</b> | 536-3455 | 536-3637 | 14500 |
| cpafcspps.uplb@up.edu.ph                                 | 536-3637 |          |       |
| <b>Community Innovations Studies Center</b>              | 536-2484 | 536-3284 | 14300 |
|  | 536-2453 |          |       |
|  | 536-3284 |          |       |
| <b>Institute for Governance and Rural Development</b>    | 536-0407 | 536-0407 | 14200 |
| cpafigrd.uplb@up.edu.ph                                  |          |          | 14400 |
| <b>Knowledge Management Office</b>                       | 536-3382 | 536-3382 |       |
| cpafkmo.uplb@up.edu.ph                                   |          |          |       |

### COLLEGE OF VETERINARY MEDICINE

Email: cvm.uplb@up.edu.ph

|   |          |          |       |
|---|----------|----------|-------|
| <b>Office of the Dean</b>                             | 536-2730 | 536-2730 | 10000 |
| cvm.uplb@up.edu.ph                                    |          |          | 10001 |
|   |          |          | 10010 |
| <b>Office of the College Secretary</b>                | 543-0672 | 536-2727 | 10020 |
| socvm.uplb@up.edu.ph                                  |          |          |       |
| <b>Department of Basic Veterinary Sciences</b>        | 536-7512 |          | 10100 |
| dbvs.uplb@up.edu.ph                                   |          |          |       |
| <b>Department of Veterinary Clinical Sciences</b>     | 536-6901 | 536-6901 | 10200 |
| dvcs.uplb@up.edu.ph                                   |          |          |       |
| <b>Department of Veterinary Paraclinical Sciences</b> | 536-2728 |          | 10300 |
| dvps.uplb@up.edu.ph                                   |          |          |       |
| <b>Veterinary Teaching Hospital</b>                   | 536-0863 |          | 10500 |
| vth.uplb@up.edu.ph                                    |          |          |       |
| Animal Disease & Diagnostic Lab                       | 536-0863 |          |       |
| <b>CVM Library</b>                                    |          |          | 10400 |

### GRADUATE SCHOOL

Email: gs.uplb@up.edu.ph

|                                       |          |  |       |
|---------------------------------------|----------|--|-------|
| <b>Office of the Dean</b>             | 536-3414 |  | 11000 |
| gs.uplb@up.edu.ph                     | 536-2310 |  | 11001 |
| <b>Office of the School Secretary</b> |          |  | 11020 |

### SCHOOL OF ENVIRONMENTAL SCIENCE AND MANAGEMENT

Email: sesam.uplb@up.edu.ph

|                           |          |          |       |
|---------------------------|----------|----------|-------|
| <b>Office of the Dean</b> | 536-3080 | 536-2251 | 12000 |
| sesam.uplb@up.edu.ph      | 536-2836 |          | 12001 |
|                           | 536-2251 |          | 12002 |
|                           |          |          | 12020 |

### OTHER AGENCIES – INSIDE UPLB

|                    |          |          |       |
|--------------------|----------|----------|-------|
| ATI-Region IV-A    | 536-3263 | 536-5600 |       |
| BSP Jamboree       | 536-4759 | 536-4759 |       |
| COA                | 536-3215 |          | 13000 |
|                    |          |          | 13001 |
| Credit Dev't Coop. | 536-2263 | 536-2830 |       |
|                    | 536-3638 | 536-7118 |       |

| Office  | Telephone No.                                | Fax No.                                      | VoIP#  |
|---|--|--|--|
| Christian School Inc.<br>ERDB   | 536-2521<br>536-3221<br>536-3628<br>536-2269 | 536-3658<br>536-2509<br>536-2850<br>536-0684 |  |
| FPRDI   | 536-3630<br>536-2377                         | 536-2586<br>536-2360                         | 536-3630<br>9000   |
| IRRI  | 536-2701 to                                  | 536-2705                                     |  |
| LGA, DILG   | 536-3346                                     |  |  |
| Maquiling School Inc.   | 536-2503                                     | 536-5479                                     |  |
| National Arts Center  | 536-2862                                     |  |  |
| Open University   | 536-6001 to                                  | 536-6006                                     |  |
| Phil Carabao Center   | 536-2729                                     | 536-2009                                     |  |
| Phil Rice   | 536-1917                                     | 536-8620                                     | 536-8620   |
| Pook Ni Maria Makiling  | 536-3489                                     |  | 536-3489   |
| SEARCA (Southeast Asian Regional<br>Center for Graduate Study and Research<br>in Agriculture) | 536-2287<br>536-2290                         | 536-2365                                     |  |
| St. Therese Parish  | 536-3516                                     |  |  |
| UP Provident Fund Inc.  | 536-7148                                     |  |  |
| YMCA Dorm   | 536-2840                                     |  |  |
| UPLBFI  | 536-3688                                     |  | 13100-01<br>52340-41<br>52342<br>52345<br>52344<br>52343 |
| UPLBFI – Accounting   |  |  | 52342  |
| UPLBFI – Executive Director   |  |  | 52345  |
| UPLBFI – Project Development  |  |  | 52344  |
| UPLBFI – Public Affairs   |  |  | 52343  |
| <b>Banks</b>  |  |  |  |
| Land Bank, UPLB   | 536-5058<br>536-7094                         | 536-3360                                     |  |
| Planters Bank, UPLB   | 536-3682                                     | 536-3058                                     |  |
| PNB, UPLB   | 536-2733                                     |  |  |
| Veteran’s Bank, Calamba   | 545-3006                                     |  |  |

**OTHER AGENCIES – OUTSIDE UPLB**

|   |                      |          |  |
|---|----------------------|----------|--|
| Batong Malake Barangay Hall                   | 536-4349             | 827-0579 |  |
| Bay, Mayor’s Office                           | 536-0195             | 249-5043 |  |
| BIR, Calamba                                  | 545-1424             | 545-9910 |  |
| CENRO, Los Baños                              | 827-0772             |          |  |
| DPWH, Los Baños                               | 536-0273             | 827-7960 |  |
| GSIS Pagsanjan, Laguna                        | 808-1239             |          |  |
| HDMF (Pag-Ibig), Calamba City                 | 545-1226             | 545-1246 |  |
| Los Baños, Mayor’s Office                     | 536-0050             | 536-7860 |  |
| Action Center                                 | 536-7861             | 536-8215 |  |
| Assessor’s Office                             | 536-5961             |          |  |
| Bureau of Fire Protection                     | 536-7965             |          |  |
| DA / Nutrition / Municipal Trial Court        | 536-0855             |          |  |
| DSWD /Acctg. / DILG                           | 536-6480             |          |  |
| Engineering Section                           | 536-4838             |          |  |
| Los Baños Police                              | 827-7998             |          |  |
| Sangguniang Bayan                             | 536-1191             | 827-0191 |  |
| PCAARRD                                       | 536-0014             | 536-0020 |  |
| PCAMRD  | 536-1566             | 536-1574 |  |
| PENRO   | 827-0773             |          |  |
| Hospitals                                     |                      |          |  |
| Calamba Med Center                            | 545-2934<br>545-2906 | 545-1740 |  |
| Healthserve Hospital and Medical Center       | 536-4858             |          |  |
| Los Baños Doctors Hospital and Medical Center | 536-0100<br>536-1825 | 536-4462 |  |
| St. Jude Family Hospital                      | 536-1232             | 536-1982 |  |
| DOST  | 536-4894             |          |  |



# Access and Campus Map

1. Old Administration Building (AG Samonte Hall)
2. College of Development Communication
3. National B. Tablaran Hall (Agricultural Credit and Cooperative Institute)
4. Department of Economics
5. Anacleto M. Dalabay Hall (College of Economics and Management)
6. Department of Agricultural Education
7. OYOCE Extension Office
8. Leopoldo B. Uchiano Hall (Institute of Biological Sciences) Department of Plant Pathology/Department of Entomology
9. New CAS Building/Office of the University Registrar
10. School of Environmental Science and Management
11. Rural Economic Development and Renewable Energy Center
12. CAS Annex 2 Building
13. Humanities Building/CAS Administration Building
14. UPLB Consumer Cooperative
15. SEARCO Regional Center for Graduate Study and Research in Agriculture (SEARCA)
16. Ramonillo M. Gonzalez Hall (UPLB Men Library Administration Building)
17. Dioscoro L. Limall Hall
18. Francisco O. Santos Hall (Institute of Mathematical Sciences and Physical/Institute of Computer Science/Institute of Statistics/Institute of Chemistry)
19. College of Human Ecology
20. Masaling School, Inc.
21. Old UPLB Rural High School (Mathematics Building)
22. MSP Lecture Hall
23. Department of Human and Family Development Studies
24. Institute of Human Nutrition and Food/Food and Nutrition Planning
25. Department of Horticulture-Ornamental Crops Division
26. Student Union Building
27. UPLB Foundation, Incorporated
28. College Post Office
29. Philippine National Bank-UPLB Branch
30. UPLB Police Force
31. Orchard Nursery
32. Services Social Center
33. Postharvest Horticulture Research and Training Center
34. Julian A. Ramirez Hall (Institute of Food Science and Technology)
35. Department of Military Science and Tactics
36. Baker Hall
37. Fruit Crops Nursery
38. Campus Planning & Development Office/Supply and Property Management Office/Physical Plant and Maintenance Services Office
39. Department of Civil Engineering
40. Department of Chemical Engineering
41. Institute of Agricultural Engineering/ Department of Civil Engineering/ Department of Engineering Science/ Department of Industrial Engineering
42. Farming Systems and Soil Resources Institute
43. Narciso B. Manobo Hall (Agronomy-Soil Science-Horticulture Complex)
44. Annex Husbandry
45. Institute of Animal Science/College of Veterinary Medicine Complex
46. College of Veterinary Medicine Administration Building
47. College of Veterinary Medicine
48. Edwin Bingham Capeland Gym
49. Agricultural Training Center
50. New Dormitory
51. Grounds and Parks Grounds
52. Continuing Education Center
53. Ugnayan ng Pambanaga/Obisador Corps
54. Young Men's Christian Association Building
55. Men's Co-ed Residence Hall
56. Women's Residence Hall
57. ACCI Dormitory
58. International House/ UPLB Graduate School/ Learning Resource Center/ CA/Publishers Office
59. UPLB Alumni Center
60. SEARCA Dormitory
61. University Health Services
62. College of Public Affairs and Development
63. Veterinary Medicine Residence Hall
64. DOST-Forest Products Research and Development Institute
65. Department of Forest Products and Paper Science
66. Museum of Natural History
67. OFRR Administration Building/ Forest Development Center/Institute of Apiculture
68. DENR-Ecosystems Research and Development Bureau/ ASEAN Regional Centre for Biodiversity Conservation
69. Department of Forest Biological Sciences
70. Forest Information Building/ Department of Social Forestry and Forest Governance
71. New Forestry Residence Hall
72. Old Forestry Residence Hall
73. Milling Residence Hall
74. Milling Center for Mountain Ecosystems Training Center for Tropical Resources and Ecosystem Sustainability (TREES)/ Institute of Renewable and Natural Resources
75. DILG-Local Government Academy
76. UPLB Staff Housing
77. Sompoy Village
78. PRPO Housing
79. OFRR Housing
80. TREES Guest House
81. OFRR Alumni Guest House
82. UPLB Staff Housing
83. UPLB Social Hall
84. UPLB B Guest House
85. UPLB Executive House
86. SEARCA Housing
87. SEARCA Guest House
88. National Arts Center/Philippine High School for the Arts
89. Dairy Training and Research Institute
90. Philippine Rice Research Institute - Los Baños
91. Electrical Engineering Building
92. Agricultural Mechanization Development Program/ Institute of Agricultural Engineering/Agricultural and Bio-Process Division
93. Agricultural Machinery Testing and Evaluation Center
94. Department of Industrial Engineering
95. National Crop Production Center Annex
96. Agrimatecology Station
97. International Rice Research Institute (IRRI)
98. UP Open University
99. Veterinary Teaching Hospital
100. CA AgriPark
101. Institute of Plant Breeding
102. AFCC Center for Technology Exchange and Training for Small and Medium-Enterprise Science and Technology Park
103. National Crop Production Center
104. National Seed Foundation
105. National Institute of Molecular Biology and Biotechnology