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## EDUCATIONAL PROGRAMS IN ENVIRONMENTAL SCIENCES AT THE UNIVERSITY OF THE PHILIPPINES SYSTEMS[1]

by

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The charter of the University of the Philippines which was granted by the Philippine Legislature on June 18, 1908, provides among others that the purpose of the University shall be to provide advanced instruction in literature, philosophy, the sciences and arts, and to give professional and technical training. While teaching has remained the primordial function of the University, research and extension services have become an integral part of its function. This is intended to extend the frontiers of knowledge and to apply such knowledge to the benefit of mankind. Thus, university education enriches not only the individual but also the society of which he is a part.

Conscious of its duties in instituting programs that are relevant to national needs, four academic units of the University have adopted educational programs in environmental studies. The environment is looked upon as the sum total of the surroundings and conditions that effect the growth and development of life, plants and animals including man. The total environmental concept considers all conceivable systems affecting man and society. The atmosphere (air), hydrosphere (water), and lithosphere (solid) represent the physical environment while plants and animals (biosphere) constitute the biological environment. Man and his works (homosphere) will comprise the socio-cultural environment.

The central theme in environmental studies is to safeguard the quality of the environment so that it will remain safe and wholesome as a human habitat. Human ecology is a special aspect of environmental study that emphasizes the relation of the environment to man as an individual or of society as a whole. Human ecology is closely related to the study of human geography for both treat of the influence of the surroundings to the manifold activities of man. Objectively, the quality of life may be considered as the 'Bill of Rights' for man, while the quality of the environment would be the 'Bill of Rights' for nature.

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*Institute of Public Health.* — The Institute of Public Health is the first academic unit of the University of the Philippines that gives formal instruction and training to health workers in the Philippines and in neighboring Asian countries. The undergraduate program is a 4-year course leading to the degree of Bachelor of Science in Hygiene which aims to train medical technologists, sanitarians, and public health statisticians. The Institute offers also programs on the graduate level leading to the degrees of (a) Master of Public Health, (b) Master of Hospital Administration, (c) Master of Public Health Engineering, and (d) Master of Science in Hygiene. The aim of the program is to contribute to the knowledge of preventive medicine, public health, and the administration of health services. These degrees will be conferred upon the candidates who have satisfactorily completed the prescribed courses of study and have had at least one year of residence in the University. The admission requirements in the master's level are graduates of approved medical schools or graduates with professional training other than in medicine, such as in dentistry, engineering, and pharmacy and with at least a baccalaureate degree in science and at least one year experience or previous training in the field of public health.

*Institute of Planning.* — Population pressures, scientific and technological advancement in agriculture and industry, the mounting problems of urban areas, led the University of the Philippines to establish in 1965, the Institute of Planning which pioneered in advanced study of settlement and environment in Philippine milieu. The Institute offers training services in the form of seminars, in-service training, and a graduate program leading to the degree of Master in Environmental Planning. The course is designed to create a cadre of professional planners whose training and outlook will fit the needs of a developing country like the Philippines.

The program stresses the comprehensive nature of environmental planning. It covers the social, economic, and physical aspects of the planning process. It prepares the planner to be an effective agent of change for development in all scales of human settlement. Graduates of the University of the Philippines and other colleges and universities of recognized standing with a bachelor's degree in architecture, business administration, economics, engineering, geography, law, public administration, social sciences, statistics and environmental health are eligible for admission. The program requires the completion of 36 units of course work, of which 30 units shall be in environmental planning and 6 units of elective courses. While no thesis is required, the student must pass a comprehensive examination as a prerequisite for graduation.

*College of Engineering.* — The increased pollution of air, water and land coming from the factories and other industrial establishments has prompted the College of Engineering of the University to institute a master's program in Environmental Engineering. This course was first offered during the start of the academic year 1974-1975. Any holder of a bachelor's degree in engineering or its equivalent from a duly accredited institution may upon application, be admitted to the Graduate Division of the College of Engineering. If the student's academic and/or experience record indicate adequate preparation for graduate work in environmental engineering, he may be admitted as a candidate for a degree otherwise he will have the status of a non-degree student.

A minimum requirement of at least one year residence and 30 units of graduate course including 6 units of thesis must be fulfilled by its graduate student for the degree of Master of Science (Environmental Engineering). Those completing the minimum requirements of 30 units without thesis shall be eligible for the degree of Master of Engineering. Some of the courses include water quality control and management, waste water disposal and treatment, chemical and biological treatments, and plant design air pollution, abatements and control, solid waste disposal and management, and environmental engineering laboratory.

*College of Arts and Sciences.* — The latest educational program in environmental studies was instituted at the start of the present academic year by the College of Arts and Sciences of the University of the Philippines System, leading to a Ph.D. in Environmental Science. In the introductory statement, the proponents of the program pointed out that the doctoral program in environmental science was instituted as a multidisciplinary program that will be supported mainly by the departments of Botany, Chemistry, Geology, and Geography, Meteorology, Zoology and the Social Sciences of the College of Arts and Sciences. The study of the environment cannot be contained solely within the discipline of chemistry or biology, but it involves all the natural sciences as well as economics, sociology, political science, history, geography, and even arts and aesthetics. The vital need to advance knowledge on broad issues is the prime justification in adopting the multidisciplinary approach so as to integrate the efforts of physical, biological, and social scientists in a single project. For the problems of the environment are not only national in scope but international as well.

The 1970's has been called the decade of the environment, the time when man is to become fully conscious of his responsibility to his surroundings. The problem of the environment may involve its pollution which may be biophysical and chemical in nature and is now becoming more intense in our cities and coastal areas. The need for maintaining a balance between economic, political and social development and ecological integrity presents a complex problem of adjustment, regulation, and conservation which is at once relevant and timely. The objective of the doctoral program shall endeavor to provide responsible leaders in industry, government, and research institutions in the scientific work affecting man's environment. The demand for such services keeps on increasing as the country's program of national development is accelerated to meet the needs of a fast growing population.

Only holders of a master's degree or its equivalent may be admitted to this program. They shall comply with the general requiremen's for the Ph.D. program in the College of Arts and Sciences. A sufficient background in Statistics is likewise required which may be fulfilled before or during the course of the program.

Every student admitted to the program is assigned a program committee, the chairman of which is the adviser of the student. Prospective candidates for the degree are required to pass a minimum of 36 units of course work. Of the 36 units of course work, 24 units are specified broad based courses related to the environment and the remaining 12 units are directly related to the area of concentration elected by the student with the guidance and approval of the program adviser.

The specified twenty four (24) units shall be chosen from the following:

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| Environmental Chemistry | 3 units |
| Marine Communities | 3 units |
| Environmental Geography | 3 units |
| Advanced Plant Ecology | 3 units |
| Urban Systems | 3 units |
| Environmental Geology | 3 units |
| Physical Oceanography | 3 units |
| Environmental Meteorology I | 3 units |
| Environmental Meteorology II | 3 units |
| Biology of Invertebrates | 3 units |
| Man and His Environment I | 3 units |
| Man and His Environment II | 3 units |

The electives of 12 units may be chosen from the graduate courses in Botany, Chemistry, Geography, Geology, Mathematics, Meteorology, Physics, Zoology, Social Science, Engineering, or Health Sciences. One foreign language to be determined by the program committee may be required.

After the completion of the course work and the foreign language requirement, the student may apply for comprehensive examination. The comprehensive examination is given to test the student's ability to integrate and apply knowledges that he has acquired in his program of studies.

After passing the comprehensive examination, the student shall be considered as having been advanced to candidacy for the degree. The student is given a dissertation committee composed of an adviser who shall be chairman and two readers who shall be members. The committee shall guide the student in the preparation of the dissertation which shall be a worthy contribution to scholarship.

After the doctoral committee shall have approved the dissertation, an examination panel of not less than five members will be appointed to conduct an oral examination on the dissertation which shall last from three to five hours. At the request of at least half of the panel members, the oral examination may be opened to the public. All requirements for the degree must be completed in not more than six (6) calendar years.

*Private Colleges and Universities.* — Aside from the educational program in environmental studies being given at the University of the Philippines, some eight (8) private colleges and universities are offering programs leading to the degree of Bachelor of Science in Sanitary Engineering. These include the National University, Cebu Institute of Technology, University of Southern Philippines, Cebu City, Mapua Institute of Technology, Feati University, Colegio de San Jose, Cebu City, University of Pangasinan, and Central Philippine University, Iloilo City, Among the schools mentioned, only the National University, Manila, offers a master's program in Sanitary Engineering. A two-year course in Hygiene and Sanitary Science is offered at the University of Nueva Caceres in Naga City and Liceo de Cagayan, Cagayan de Oro City, respectively. A four-year course leading to the degree of Bachelor of Science in Sanitary Technology is also being offered at the National University.

The objective of the course in Sanitary Engineering is to prepare the students in the proper management of the environment so as to make it safe, healthful, and pleasant to live in. The courses deal with the theories and the application of the principles involved in the control of the physical, chemical and biological elements in water, air, food or in sewage. The program covers also the design and maintenance of engineering structures such as water purification plants, sewage treatment plants, and mechanical equipment to control or abate air pollution.

The holding of this Symposium on Human Ecology is very timely as it focuses on the problems of the environment brought about by population explosion, urbanization, and industrialization. The Philippines lies at the vortex of the stage of modernization and development. It is therefore, necessary that educational programs be instituted in order to awaken our interest in the study of the environment and to provide competent manpower to attain the goal of conserving the quality of the environment so as to insure man's survival as a permanent inhabitant of the planet earth.