

Environmental Science

The Environmental Science Programme is jointly offered by the Departments of Biology, Chemistry and Biochemistry.

Course List

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Course Description

ENS 0200

Current Environmental Issues

1 U; 1 STOT 1 Sem.; 1st term

This course aims at increasing students' awareness of global environmental issues relevant to Hong Kong. Current issues of environmental policy and issues will be introduced. Active learning will be used to enhance students' knowledge on environmental issues and policy. Students will be provided with opportunities to express their opinions and to present information using evidence, data and sources pertaining to environmental issues.

ENS 0420

Directed Research in Environmental Science I

3 U; 2 STOT; 1st term

In this course students will undertake a research project under the supervision of a faculty member. Research work will be started during the summer vacation preceding the final year of attendance. The results of the research project, together with the survey of the relevant literature, will be presented as a seminar during the final year of attendance. Also, students are required to attend seminars organized by the Programme. Corequisite: ENS 0421.

ENS 0421

Directed Research in Environmental Science II

2 U; 2 STOT; 2nd term

Students will meet the supervisor periodically to discuss their research data. These efforts will culminate in the production of a written report which will be submitted at the end of the second term. Also, students are required to attend seminars organized by the Programme. Coerequisite: ENS 0420.

ENS 2270

Introduction to Environmental Science

3 U; 3 Lect.; 2nd term

This course deals with the relationships between living organisms, resources and environment. The ecological viewpoint on resource processes such as agriculture, nature conservation, energy supply and utilization, and waste production will be discussed. Case studies are included to illustrate the importance of the biological components in waste treatment as well as food and energy production from waste utilization.

ENS 2272

Introduction to Environmental Science Laboratory

2 U; 3 Lab.; 2nd term

To accompany ENS 2270.

ENS 2515

Environmental Chemistry I: General

3 U; 3 Lect.; 1st term

This is a foundation course designed to equip students with a proper understanding of the fundamental aspects of environmental chemistry. It introduces the basic concept of chemical equilibrium and kinetics, the nature and characteristics of various common types of air and water pollution arising from industrial, agricultural and domestic sources. It outlines the principles of measurement for various parameters commonly used for air and water pollution studies, their significance and limitations. It also examines the various types of aerial emission arising from combustion and industrial processes, and vehicles, and their chemical interaction leading to the formation of photochemical smog, depletion of ozone layer and global warming effects.

ENS 2517

Environmental Chemistry I Laboratory

2 U; 3 Lab.; 1st term

To accompany ENS 2515.

ENS 3230

Principles of Environmental Management and Pollution Control

3 U; 3 Lect.; 2nd term

This course discusses the anthropogenic causes of environmental degradation and the approaches to environmental protection and pollution control. Students will be introduced: 1) the causes of environmental problems from a socio-economic viewpoint, 2) the concept of sustainability in environmental management, 3) the development and implementation of effective environmental programmes, 4) the role of legislation, economic measures and voluntary approach in environmental protection, and 5) control and treatment technologies and their comparative effectiveness in the abatement of various types of pollution. Management programmes and control strategies in tackling local environmental problems will be illustrated.

ENS3320

Biochemical Toxicology

3 U; 3 Lect.; 2nd term

This course presents the fundamental basis of toxic action of chemical substances including environmental toxicants on living systems. Students will get an understanding of biologic mechanisms and principles related to toxicology.

ENS 3920

Biochemical Toxicology Laboratory

2 U; 3 Lab.; 2nd term

To accompany ENS 3320.

ENS 3415

Environmental Instrumentation Techniques

3 U; 3 Lect.; 1st term

This course aims to provide students with a basic understanding of the operational principles and application of various instrumental techniques commonly used for the studies of air and water pollution. It is designed to cover atomic absorption (AA) and emission spectrophotometry, plasma emission spectrometry (ICP), optical spectroscopy, x-ray spectroscopy, gas chromatography (GC), high-performance liquid chromatography (HPLC), mass spectrometry (MS), and electrochemical methods. Emphasis will be placed on the application of such techniques for pollution monitoring and preventive detection systems, especially with reference to the identification and determination of trace levels of toxic heavy metals, organic and organometallic compounds by means of AA, ICP Spectrometry and GC-MS. Prerequisite: ENS 2515 or by permission of the instructor.

ENS 3417

Environmental Instrumentation Techniques Laboratory

2 U; 3 Lab.; 1st term

To accompany ENS 3415.

ENS 4240

Environmental Impact Assessment

3 U; 3 Lect.; 1st term

This course discusses the rationale, techniques and procedures of evaluating environmental consequences arising from human activities such as urban development, landfill, waste disposal, sewerage discharge and resource utilization. Students will be introduced to the origin and development of environmental impact assessment in Hong Kong as well as in other countries, the design of assessment procedures, the identification and quantitative evaluation of key issues, and other special topics associated with EIA, including strategic environmental assessment, cumulative impact analysis and statistical and environmental data analysis. Prerequisite: ENS 3230 or by permission of the instructor.

ENS 4242

Environmental Impact Assessment Laboratory

2 U; 3 Lab.; 1st term

To accompany ENS 4240.

ENS 4250

Environmental Health

3 U; 3 Lect.; 2nd term

This course introduces the contemporary problems and issues in environmentally dependent aspects of health. Broad coverage of health effects of airborne and waterborne pollutants, pesticides, consumer product, and heavy metals are considered. Occupational exposure to chemical and physical hazards will also be discussed.

ENS 4252

Environmental Health Laboratory

2 U; 3 Lab.; 2nd term

To accompany ENS 4250.

ENS 4260

Conservation Biology

3 U; 3 Lect.; 2nd term

This course aims to provide an in-depth discussion of conservation problems and solution. It requires students to have fundamental knowledge of biology and ecology. Major topics include conservation genetics, biodiversity, techniques in assessing biodiversity, problems of habitat fragmentation, design and role of reserves and protected areas, conservation of soil and water resources, wildlife and fisheries management, land use, conservation of non-renewable mineral resources, energy use and conservation, conservation policy and laws. Emphasis will be given to problems critically important to today's Hong Kong.

ENS 4310

Methods in Toxicological Research

3 U; 3 Lect.; 1st term

This course introduces to students current methodologies commonly employed in toxicological studies. The following techniques, chromatographic and electrophoretic methods, sedimentation, use of radioisotope, ultraviolet and fluorescence spectrophotometry, will be included. The determination of toxic pollutants and their metabolic conversion in biological systems will be discussed. Animal models in toxicity evaluation and molecular toxicology concepts will also be covered.

ENS 4510

Methods in Toxicological Research Laboratory

2 U; 3 Lab.; 1st term

To accompany ENS 4310.

ENS 4525

Environmental Chemistry II: Industrial

3 U; 3 Lect.; 1st term

This course is designed to extend students' understanding and develop their ability in the application of various aspects of environmental chemistry in relation to the major types of air and water pollution associated with industrial and vehicle emissions. It outlines the basic processes in bleaching and dyeing, electroplating and food processing that give rise to water pollution and applies physico-chemical techniques in controlling such pollution. It examines also combustion processes and the associated applications and limitations of the absorption, adsorption, oxidation-reduction and catalytic conversion techniques in relation to aerial emissions from furnaces and vehicles. Appropriate site visits will be arranged where possible to enhance students' ability in application.

ENS 4535

The Chemical Treatment Processes

3 U; 3 Lect.; 2nd term

This course introduces the principles and applications of various chemical and physio-chemical processes applicable for treatment and control of air and water pollution. It studies the processes of neutralization, oxidation-reduction, chemical precipitation, coagulation, flocculation, physical separation, absorption, adsorption, filtration, chemical disinfection, solvent extraction, fractional distillation and incineration. It also examines the applicabilities and limitations of such processes with reference to the treatment and recovery of toxic and hazardous chemical wastes. Appropriate site visits will be arranged to enhance students' ability in application.

Study Scheme

I. Major Programme

A. Applicable to students admitted in 2003-04 and thereafter

Students are required to complete a minimum of 63-69 units of courses as follows:

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|------|--|-------------|
| (i) | Required Courses (Please see Note):
BCH 2030#/2730#, BIO 2210#/2212#, 4210#/4212#,
ENS 0200, 2270/2272, 2515/2517, 3230, 3320/3920,
3415/3417, 4240/4242 | 44 units |
| (ii) | Five of the following Elective Courses (Among the five courses, students should take at least two elective courses accompanied by laboratory courses, or ENS 0420/0421 with one elective course accompanied by laboratory course.): | 19-25 units |
| (a) | ENS0420/0421, 4250, 4252, 4260, 4310/4510, 4525, 4535;
and | |
| (b) | Approved electives offered by other Departments (Students should take no more than two courses from this category.):
BCH4010#/4610#, 4050#/4650#, BIO 3410#/3412#,
3710#/3712#, 4220#/4222#, CHM 3130#/3860#,
GRM 3203#, 3223#, 3321# | |

Total: 63-69 units

to be included in the Major GPA as well

Recommended course pattern

<i>First Year of Attendance</i>	21 units
1st term : BIO 2210/2212, ENS 0200, 2515/2517	
2nd term : BCH 2030/2730, ENS 2270/2272	
<i>Second Year of Attendance</i>	21-23 units
1st term : ENS 3415/3417, plus one elective course from (ii) above	
2nd term : ENS 3230, 3320/3920, BIO 4210/4212 and optionally one extra elective course from (ii) above	
<i>Third Year of Attendance</i>	
1st term : ENS 4240/4242	16-25 units
Plus three or four elective courses from (ii) above	

Total: 63-69 units

B. Applicable to students admitted in 2002-03 and before

Students are required to complete a minimum of 62-68 units of courses as follows:

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|------|---|-------------|
| (i) | Required Courses (Please see Note):
BCH2030#/2730#, BIO 2210#/2212#, 4210#/4212#,
ENS 2270/2272, 2515/2517, 3230, 3320/3920, 3415/
3417, 4240/4242 | 43 units |
| (ii) | Five of the following Elective Courses (Among the five courses, students should take at least two elective courses accompanied by laboratory courses, or ENS 0420/0421 with one elective course accompanied by laboratory course.): | 19-25 units |

- (a) ENS0420/0421, 4250, 4252, 4260, 4310/4510, 4525, 4535; and
- (b) Approved electives offered by other Departments (Students should take no more than two courses from this category.):
 BCH 4050#/4650#, 4510#/4710#, BIO 3410#/3412#, 3710#/3712#, 4220#/4222#, CHM 3130#/3860#, GRM 2203#, 3202#, 3203#

Total: 62-68 units

to be included in the Major GPA as well

Recommended course pattern

<i>First Year of Attendance</i>	20 units
1st term : BIO2210/2212, ENS2515/2517	
2nd term : BCH 2030/2730, ENS 2270/2272	
<i>Second Year of Attendance</i>	21-23 units
1st term : ENS 3415/3417, plus one elective course from (ii) above	
2nd term : ENS 3230, 3320/3920, BIO4210/4212 and optionally one extra elective course from (ii) above	
<i>Third Year of Attendance</i>	16-25 units
1st term : ENS 4240/4242	
plus three or four elective courses from (ii) above	
	<hr/> Total: 62-68 units

Note: Students should obtain Grade “D” or above in each of the courses of BCH 2030/2730, BIO 2210/2212, ENS 2270/2272 and 2515/2517. Otherwise, they are required to repeat the courses. Students who cannot meet the Grade “D” requirement in any one of the courses mentioned above after two attempts will be required to withdraw from the University. Please refer to Reg. 15.2(d) of the General Regulations Governing Full-time Undergraduate Studies.

2. Minor Programme

- (i) Students are required to complete a minimum of 18 units of courses as follows:
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|---|-----------------------|
| (a) two courses from BIO 2210, ENS 2270, 2515 | 6 units |
| (b) two courses from BCH 4050 (or BIO 4220),
ENS 3230, 3320, 3415 (or CHM 3410/3870) | 6 units |
| (c) two courses from ENS 4240, 4250, 4260, 4310,
4525, 4535 | 6 units |
| | <hr/> Total: 18 units |

- (ii) Certain prerequisite conditions for registering for the courses may be waived; intending Minor students should consult the Office of Environmental Science Programme individually.

3. Faculty Language Requirement

(Please refer to the “Faculty Language Requirement” of Faculty of Science for details.)