

FACULTY OF SCIENCE**Department of Biochemistry****BIOC1001. Basic biochemistry (6 credits)**

This course is designed to present an overview of biochemistry and to provide an understanding of the basic mechanisms underlying life processes. It is an independent course which can be taken by students from various disciplines. The course also prepares students for further studies in Biochemistry and Molecular Biology.

Prerequisite: AS Biology or AS Chemistry.

BIOC1003. Introduction to molecular genetics (6 credits)

The objectives of this course are to provide students with basic and up-to-date knowledge on the structures and functions of nucleic acids, to give students a general picture of the molecular process of gene expressions, and to introduce students to recombinant DNA technology.

Prerequisite: AS Biology or AS Chemistry.

BIOC2601. Metabolism (6 credits)

This course aims to provide the basic concepts of metabolism: the events and their importance in relation to the survival of living organisms. Taken together with BIOC1001 and BIOC2602, this will lay the foundation for the more advanced courses offered in the Biochemistry discipline.

Prerequisite: BIOC1001.

BIOC2602. Understanding metabolic diseases (6 credits)

To widen and deepen knowledge and understanding of metabolism. By using a problem-based learning (PBL) approach, students are trained in critical thinking and problem-solving skills. Students will be able to grasp the major effects on metabolic integration and control and they can use these concepts with greater confidence and success in approaching new problems and new areas of study.

Prerequisite: BIOC1001.

Co-requisite: BIOC2601.

BIOC2603. Principles of molecular genetics (6 credits)

To provide basic knowledge on molecular genetics, illustrating modern concepts with current experimental approaches and computer-assisted programmes. Together with BIOC3613 and BIOC3609 taken in the second year, a comprehensive background is provided for advanced study and/or research in molecular biology.

Prerequisite: BIOC1001 or BIOC1003 or BIOL1102 or BIOL1122 or BIOL1125 or BIOL1106.

BIOC2604. Essential techniques in biochemistry and molecular biology (6 credits)

To give students a general overview of different experimental approaches and model systems, and to provide students with hands-on experience in basic biochemical and molecular techniques.

Prerequisite: BIOC1001 or BIOC1003 or BIOL1102 or BIOL1122 or BIOL1125 or BIOL1106.

BIOC3608. Introduction to bioinformatics (6 credits)

This course will examine existing programs and services available on the World Wide Web for DNA and protein sequence analysis. Students will also learn how to use the sequence analysis GCG package installed locally. The underlying principles of these analysis programs and services will be presented. Students will learn how to retrieve, analyze, and compare protein and DNA sequence similarities. A basic introduction to protein modeling will also be presented.

Prerequisite: BIOC2603 or BIOL2303 or BIOL3308.

BIOC3609. Molecular medicine * (6 credits)

To provide up-to-date knowledge of the molecular and genetic basis of human diseases including cancer, thereby preparing the students for a career in medical molecular biology, biotechnological, pharmaceutical and genome research.

Prerequisite: BIOC2603 or BIOL2303; basic knowledge of molecular genetics and molecular biology is assumed.

* *This course is not available to students taking BIOL3308 Applied Molecular Biology and/or BIOL3213 Advanced Techniques and Instrumentation in Animal Biology.*

BIOC3610. Advanced biochemistry I (6 credits)

This is part of the advanced series designed to bring students to the understanding of current concepts, physicochemical bases and techniques in modern Biochemistry. The aim is to help students to develop critical thinking and analytical skills thus equipping them for beginning research projects or professional training in biomedical sciences.

Prerequisite: 1) BIOC1001; and 2) BIOL2301; and 3) BIOC2601 or BIOL2115.

BIOC3611. Advanced biochemistry II (6 credits)

This is part of the advanced series designed to bring students to the understanding of current concepts, physicochemical bases and techniques in modern biochemistry. Hence to equip them for beginning research projects or professional training in biomedical sciences.

Prerequisite: BIOL3610.

BIOC3612. Biochemistry seminar * (6 credits)

To strengthen the student's capacity to critically assess, think, write and talk about issues in molecular life sciences. The course employs active learning in small groups; students will be guided to optimize their performance in teamwork and their communication skills.

Prerequisite: 1) BIOC1001; and 2) BIOC2601 or BIOC2603.

Co-requisite: Nil; preferably taken in the 3rd year.

* *Not offered from 2006-2007 onwards.*

BIOC3613. Molecular biology of the gene (6 credits)

To provide an up-to-date knowledge of molecular biology, especially with respect to eukaryotic gene expression, molecular embryology.

Prerequisite: BIOC2603 or BIOL2303 or BIOL3308.

BIOC3614. Biochemistry project (12 credits)

To enable students to acquire the basic skills in scientific research: literature search, critical reasoning, communication, teamwork and time management. The course is particularly useful for those students who intend to pursue a career in life science.

Prerequisite: BIOC1001 and BIOC2604 and good overall performance in 2nd year courses.

Co-requisite: BIOC3610, BIOC3611, BIOC3612.

BIOC3615. Advanced techniques in biochemistry and molecular biology (6 credits)

This is an advanced experimental-based course for students majoring in Biochemistry and related disciplines. The aim is to provide the necessary training for students to pursue postgraduate research education and potential employment in a scientific laboratory/industry environment.

Prerequisite: 1) BIOC1001; and 2) BIOC0002 or BIOC1003; and 3) BIOC2604.

Department of Botany and/or Zoology**BIOL0002. Introduction to food and nutritional science** (3 credits)

The course enables students to gain an appreciation of the scope of Food Science as a discipline. This is an independent course which can be taken by students from various disciplines. It also prepares students for further studies in Food and Nutritional Science.

Prerequisite: Nil.

BIOL0118. Bioethics (6 credits)

The aim is to explore the ethical implications of the latest major advances in biology and medicine.

Prerequisite: Nil.

BIOL0120. The gene * (3 credits)

The objective of the course is to expose students to the impacts of gene to the modern society. With the completion of the human genome in the next three years not only promises a better quality of life, it also brings lots of technical and ethical issues that the general public need to deal with. The goal of the course is designed to open up students from all backgrounds to this basic unit of inheritance called gene and its impact on various other scientific and social disciplines. Outline includes but not limited to the chemical basis of gene, gene evolution, gene chips, animal cloning, gene and disease, human genome and computer science, gene and behavior, genetic implications to law and society.

Prerequisite: Nil (not offered to students with AL Biology).

* *Students with a pass in AL / AS Biology or who are in the Biology, Biochemistry, Animal and Plant Biotechnology, Environmental Life Science, and Food and Nutritional Science programmes and who are taking or have taken YSCN0004 are not allowed to take this course.*

BIOL0126. Fundamentals of biology * (6 credits)

This course is designed to provide students a general concept of the various disciplines of experimental biology and prepare them for further intermediate and advanced courses in biology. It takes a systematic approach to look at the key principles that govern the survival of life forms. The course is

opened to those who wish to take a minor in Biology or General Science but do not have A-level biology.

Prerequisite: HKCEE Biology.

* *Students who have passed HKAL Biology should take BIOL1122 Fundamental Biology. This course is not available to students who have taken BIOL1122 or any level 2 and level 3 biology courses.*

BIOL0127. Contemporary nutrition: insights and controversies * (3 credits)

What you eat greatly affects your well-being, and this is especially true in recent years when nutrition has become one of the hottest topics in town for men and women of all ages. What food is good for our health? How much do we need to eat? Which dietary plan is scientifically sound and effective? Everywhere we go, we are bombarded by different messages, from vitamins to functional food products, on how food components or treatments impact on body functions and health. How reliable is the information from the mass media? Are these facts or myths? This course aims to provide health conscious individuals with fundamental knowledge to decipher information related to nutrition and health. Such knowledge is vital to everyone not just in a trendy fashion or for a short term dietary plan, it is essential to the building of good eating habits that could promote health for a lifetime.

Prerequisite: Nil.

* *Not for students in the Food and Nutritional Science programme, major or minor.*

BIOL1104. Biological techniques, instrumentation and data processing (6 credits)

To show students the basic techniques and principles of instruments and data processing.

Prerequisite: AL or AS Biology.

BIOL1106. Genetics (3 credits)

The objective of the course is to provide an introduction to the various aspects of genetics. At the end of the course students are expected to know the fundamentals of classical, population and molecular genetics.

Prerequisite: AL Biology.

BIOL1107. Introduction to developmental biology & reproduction (3 credits)

The course is designed to provide an introduction to developmental biology and reproduction animals through an integrated approach. Reproductive and developmental processes will be examined at the cellular and organismic levels.

Prerequisite: AL Biology.

BIOL1119. Introductory microbiology * (6 credits)

The course will provide an introduction to the microbial diversity of life on earth including bacteria, fungi, microalgae, viruses, and other microorganisms. Emphasis will be placed on organisms that are of importance in our everyday lives. The course will also include components of biotechnological, food and medical microbiology. The course will provide an essential foundation for all biology students, as an understanding of the role and uses of microorganisms is a basic requirement of most biological subjects. The course leads to various 2nd and 3rd level courses in microbiology.

Prerequisite: AL Biology.

* *The Department of Ecology & Biodiversity also contributes to the teaching of the course.*

BIOL1121. Animal form and functions (3 credits)

This is a fundamental course which intends to show the students the major animal life forms on earth and how they can survive in a given environment. The relationships between body forms, body architectures, environmental interactions, functional adaptations and evolution will be illustrated.

Prerequisite: AL Biology.

BIOL1122. Functional biology * (6 credits)

The course is designed to provide an introduction to modern developments in experimental biology through an integrated approach. Life processes will be examined at the molecular, cellular and organismic level.

Prerequisite: AL Biology.

* *BIOL0126 and BIOL1122 are mutually exclusive.*

BIOL1123. Food chemistry (3 credits)

The course is designed to give students a basic understanding of chemistry of the major and minor components in food systems.

Prerequisite: AL or AS Chemistry.

BIOL1125. Introduction to biochemistry * (6 credits)

This course is designed to provide undergraduate (non-biochemistry major) an overview of fundamental concepts in biochemistry as well as hands-on experience in biochemical techniques.

Prerequisite: AL or AS Biology.

* *Students who passed BIOC1001 Basic Biochemistry are not allowed to take this course.*

BIOL1513. Food science laboratory (3 credits)

The course is designed to introduce students to some basic practical training related to food science and nutrition.

Prerequisite: AL or AS Chemistry.

BIOL1514. Nutrition and metabolism * (6 credits)

This is an independent course compulsory for students in the Food & Nutritional Science programme, but also opens to students in other life sciences disciplines. The fundamental concepts in nutrition will be introduced. An integrated approach will be used in discussing the interactions between diet and intermediary metabolism.

Prerequisite: AL or AS Biology.

* *BIOL1514 and BIOL2510 are mutually exclusive.*

BIOL2004. Bioexploitation of filamentous fungi * (3 credits)

This course provides an overview of the uses of filamentous fungi in biotechnology, the potential uses of fungal products and the methods by which scientists search for and develop these new products.

Prerequisite: BIOL1119.

BIOL2109. Crop science and economic botany * (6 credits)

To provide an understanding of the inherent characteristics of the individual plant, and of the crop, which limit their productivity; to examine cultural practices from more fundamental principles and to introduce methods in the analysis of crop productivity and economics.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122.

* *Not offered in 2005-2006.*

BIOL2111. Molecular microbiology (6 credits)

This course is intended for biology, biotechnology and biochemistry students who would like to understand the modern fundamentals of microbiology. At the end of the course the students are expected to know the physiological, biochemical and molecular aspects of microbiology.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126 or BIOL1103 or ECOL1103 or ECOL0035.

BIOL2112. Plant physiology (6 credits)

To give an understanding of plant processes such as plant growth and development and their regulatory mechanisms.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126.

BIOL2114. Plant biochemistry and molecular biology (6 credits)

To present current developments in selected areas of plant biochemistry and plant molecular biology.

Prerequisite: BIOL1102 or BIOL1122 or BIOL0126.

BIOL2115. Cell biology & cell technology (6 credits)

To provide a coherent understanding of the structure and function of cells, and the principles and applications of cell culture and instrumentation in biology and biotechnology.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126 or BIOL1103 or ECOL1103 or ECOL0035 or BIOC1001 or BIOL1125.

BIOL2116. Genetics I (6 credits)

This is the first of an integrated pair of courses, Genetics I and Genetics II, aiming to provide balanced coverage of many areas in genetics. The focus of Genetics I is on the basic principles of genetics. Genetics II will cover more advanced topics of modern genetics.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126 or BIOL1103 or ECOL1103 or ECOL0035.

BIOL2117. Genetics II (6 credits)

This is the second of an integrated pair of courses, Genetics I and Genetics II, aiming to provide balanced coverage of many areas in genetics. The focus of Genetics I is on the basic principles of genetics. Genetics II covers more advanced topics of genetics.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126 or BIOL1103 or ECOL1103 or ECOL0035.

BIOL2201. Neuroscience * (6 credits)

To provide a comprehensive picture of how the nervous system and neurones work in animals both as sensory input, integrator, motor output, and for learning, memory and behavioural patterns.

Prerequisite: BIOL1101 or BIOL1121 or BIOL1102 or BIOL1122 or BIOL0126 or BIOL1103 or ECOL1103 or ECOL0035.

* *Not offered in 2005-2006.*

BIOL2202. General parasitology (6 credits)

To provide the student with a broad basic knowledge on various aspects of disease transmissions and reactions of the host against infectious agents. The course is intended to provide training for future scientists, biology teachers, and workers in public health, meat in inspection, food laboratory, diagnostic laboratory; immunodiagnosis marketing and biotechnology.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126 or BIOL1103 or ECOL1103 or ECOL0035.

BIOL2203. Reproduction (6 credits)

To provide students with the basic knowledge on various aspects of reproductive biology. Basic concepts on evolution of sex, human sexuality & sexual behavior, molecular mechanisms for sex determination & differentiation, developmental aspects of gamete formation, neuroendocrinology of reproductive functions, and recent advancements in reproductive biotechnology will be discussed.

Prerequisite: BIOC1001 or BIOL1125 or BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126.

BIOL2205. Basic immunology * (6 credits)

To provide a broad understanding of animal immune systems. Topics will also include the application of a variety of immunological methods to research and disease diagnosis.

Prerequisite: BIOC1001 or BIOL1125 or BIOL1101 or BIOL1121 or BIOL1102 or BIOL1122 or BIOL0126.

* *BIOL2205 Basic Immunology is not available to students taking BIOC2606 Applied Human Biochemistry.*

BIOL2207. Endocrinology (6 credits)

To provide an advanced course on hormones and regulation of metabolism.

Prerequisite: BIOC1001 or BIOL1125 or BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126.

BIOL2208. Vertebrate comparative anatomy and palaeontology * (6 credits)

This course provides the anatomical background to comprehend the evolutionary and functional adaptations in vertebrate animals through to the evolution of man. The course will examine both the fossil evidence and the comparison of anatomical structures in existing forms. The course is open to Biological Science students, Geology and Earth Science students and welcome others from non-science curricular.

Prerequisite: BIOL1101 or BIOL1121 or BIOL1102 or BIOL1122 or BIOL0126 or BIOL1103 or ECOL1103 or ECOL0035.

* *Not offered in 2005-2006.*

BIOL2209. Developmental biology (6 credits)

The course provides important insights into mechanisms regulating the early stages of animal life and is particularly relevant to the understanding of the functional aspects of body systems.

Prerequisite: BIOL1102 or BIOL1122 or BIOL0126 or BIOL1107.

BIOL2210. Genetics and evolution (6 credits)

To understand the evolutionary forces that have an impact on levels of genetic variation in plant, animal, and human populations. The course also covers the rapidly expanding molecular approaches for genetic studies of populations.

Prerequisite: BIOL1106.

BIOL2215. Animal physiology (6 credits)

To provide a fundamental understanding on the processes that dictate the functions and activities of living matters with particular references to animals and humans. An integrated approach is emphasized to provide students the perspective on how homeostasis is achieved through the coordination of systems and functions.

Prerequisite: BIOC1001 or BIOL1125 or BIOL1101 or BIOL1121 or BIOL1102 or BIOL1122 or BIOL0126.

BIOL2301. Protein structure and function * (6 credits)

To provide students with a good understanding of protein structure, how structure subserves function, and the methods for study of both. This course provides a strong foundation for advanced courses in biochemistry and biotechnology.

Prerequisite: BIOC1001 or BIOL1125 or BIOL1102 or BIOL1122 or BIOL0126.

* *The Department of Biochemistry also contributes to the teaching of the course.*

BIOL2302. Fermentation technology (6 credits)

To introduce the key concepts and principles involved in fermentation technology, and discuss how fermentation technology is used in the food and biotechnology industries.

Prerequisite: BIOL1102 or BIOL1122 or BIOL0126 or BIOL1105 or BIOL1123 or BIOL1119.

BIOL2303. Introduction to molecular biology (6 credits)

To provide students with basic knowledge in molecular biology and gene cloning techniques with emphasis on manufacturing of cell products. This course will give Biology students a complete picture of the recent developments and applications in gene technology and prepare biotechnology students for further advanced course in genetic engineering.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126.

BIOL2304. Aquacultural biotechnology (6 credits)

This course discusses modern technologies and laboratory support for aquaculture and the processing of aquaculture products.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1102 or BIOL1122 or BIOL0126 or BIOL1103 or ECOL1103 or ECOL0035.

BIOL2305. Agricultural biotechnology (6 credits)

This course discusses applications of biotechnology in agriculture and animal husbandry.

Prerequisite: BIOL1102 or BIOL1122 or BIOL0126.

BIOL2313. Intermediate botany project (6 credits)

This course is designed for students who wish to gain research experience at an early stage of their degree. It provides an opportunity to do an individual experimental research project supervised by a member of the Department of Botany.

Prerequisite: Relevant first year courses.

BIOL2314. Intermediate zoology project (6 credits)

This course is to provide research experience in experimental biology to second year students with good academic performance.

Prerequisite: Requires good performance in relevant first year courses.

BIOL2501. Food processing and preservation (6 credits)

An introduction to the basic principles and methodology of food processing and preservation technology with emphasis on major methods including high and low temperature processing, concentration and dehydration, and food packaging.

Prerequisite: BIOL0002 or BIOL1105 or BIOL1123.

BIOL2502. Food technology * (6 credits)

This course is intended for students planning to enter the food industry. This course offers an introduction to physical and engineering principles relevant to the food industry, and an in-depth analysis of selected methods and problems in food processing and preservation.

Prerequisite: BIOL0002 or BIOL1105 or BIOL1123.

* *Not offered in 2005-2006.*

BIOL2503. Grain production & utilization (6 credits)

To provide a broad understanding of the utilization and significance of the major cereal grains in the food industry and in human health and nutrition.

Prerequisite: BIOL0002 or BIOL1102 or BIOL1122 or BIOL1105 or BIOL1123.

BIOL2505. Food safety and quality management (6 credits)

To provide exposure to some key management concepts used to produce safe high-quality food products that will succeed in the marketplace. To introduce students to the use of the business case-study method in individual, team and class-based learning.

Prerequisite: BIOL0002 or BIOL1105 or BIOL1123.

BIOL2507. Meat and dairy science (6 credits)

To provide a broad understanding on modern practice and technology of meat and dairy production, processing and marketing.

Prerequisite: BIOL1102 or BIOL1122 or BIOL0126 or BIOL1105 or BIOL1123.

BIOL2508. Food toxicology (6 credits)

To provide an understanding of the basic concepts of toxicology and to discuss the major types of toxins found in food and food handling processes.

Prerequisite: BIOL1105 or BIOL1123.

BIOL2509. Functional foods * (6 credits)

Functional Foods or Nutraceuticals have been rapidly gaining market share as food supplements in the modern diet in addition to the traditional vitamins and mineral supplements. This course discusses the issues revolving around the development and marketing of these products, and includes topics such as the role of special food ingredients to reduce the risk of cardiovascular diseases, and cancer; to modulate immune functions, mood and performance; and in the control of food intake and weight management. The use of special proteins, amino acids, and medical foods, including Traditional Chinese Medicine, to provide support for certain medical conditions will be assessed. Testing for pharmacological activity, bioavailability, efficacy, stability, and toxicity, and manufacturing and packaging standards (GLP and GMP practices) required to gain approval by regulating agencies, e.g. U.S. Food and Drug Administration, will also be discussed.

Prerequisite: BIOL1105 or BIOL1123.

Co-requisite: BIOL3511.

* *Not for students who have taken BIOL2519.*

BIOL2515. Food microbiology * (6 credits)

This course provides the key concepts and principles of food microbiology with special emphasis on the interaction between microorganisms and food. Microbial food production, microbial food spoilage and foodborne diseases will be discussed in detail.

Prerequisite: BIOL0002 or BIOL1105 or BIOL1123.

* *The Department of Ecology & Biodiversity also contributes to the teaching of the course.*

BIOL2517. Food analysis (3 credits)

To introduce the key concepts in professional food analysis in an industry context. To discuss the choice of analytical methods and the interpretation of results. Major instrumental techniques used in food analysis will be covered.

Prerequisite: BIOC1001 or BIOL1125 or BIOL1104 or BIOL1122 or BIOL0126.

BIOL2518. Laboratory in nutritional science (3 credits)

To provide students a comprehensive training on laboratory techniques, experimental approaches and the use of different model systems in nutritional sciences. This course aims to equip students with the basic skills in conducting nutritional studies.

Prerequisite: BIOL1514.

BIOL2519. Essential nutrients & functional foods * (6 credits)

The course has two interrelated parts. First, the functional roles of essential micronutrients in physiologic and metabolic processes will be presented. Second, the concept of functional foods and their role in disease risk reduction will be discussed. The course would appeal to students who have interest in the science, marketing and regulatory aspects of health foods and dietary supplements.

Prerequisite: BIOL1514.

* *Not for students who have taken BIOL3511.*

BIOL2520. Food toxicology * (3 credits)

To provide an understanding of the basic concepts of toxicology and to discuss the major types of toxins and food contaminants found in food and food handling processes.

Prerequisite: BIOL1105 or BIOL1123.

* *Offered from 2006-2007.*

BIOL2521. Food engineering (6 credits)

This course is intended for students planning to enter the food industry. This course offers an introduction to physical and engineering principles relevant to the food industry, and an in-depth analysis of selected methods and problems in food processing and preservation.

Prerequisite: BIOL0002 or BIOL1105 or BIOL1123.

BIOL3212. Applied immunology * (6 credits)

A follow-up course of BIOL2205. The aim is to provide the latest knowledge on the practical applications of Immunology in biological research, serodiagnosis and industries.

Prerequisite: BIOL2205.

* *BIOL3212 Applied Immunology is not available to students taking BIOC2606 Applied Human Biochemistry.*

BIOL3213. Advanced techniques and instrumentation in animal biology * (6 credits)

A follow-up course of BIOL1104. The aim of this course is to introduce students with the latest techniques and instrumentation used in animal biological research.

Prerequisite: 1) BIOL1104; and 2) BIOL2303.

* *BIOL3213 Advanced Techniques and Instrumentation in Animal Biology is not available to students taking BIOC3609 Molecular Medicine. Not offered in 2005-2006.*

BIOL3214. General virology (6 credits)

This Course provides the fundamental principles of virology so that students can understand the pathogenesis of major viral diseases that affect animal health. The course will prepare students for profession or graduate work in virology, medicine and biotechnology.

Prerequisite: BIOC2603 or BIOC1003 or BIOL2303 or BIOL2205.

BIOL3306. Applied genetic engineering (6 credits)

This is a follow-up course on the application of molecular biology techniques in problem solving. The course content will be modified regularly so as to accommodate new advances in the rapidly expanding field of genetic engineering applications.

Prerequisite: BIOC2603 or BIOL2303.

BIOL3307. The biotechnology industry (6 credits)

This course provides an overview of the various fields of biotechnologies, the development of a biotechnology product, and the operation of biotechnology companies.

Prerequisite: BIOL2603 or BIOL2303.

BIOL3308. Applied molecular biology in mammalian science * (6 credits)

A follow-up course of BIOL2303 or BIOC2603. The aim is to provide the latest knowledge on the practical applications of molecular biology related to the mammalian genomes.

Prerequisite: BIOL2303.

* *BIOL3308 Applied Molecular Biology in Mammalian Science is not available to students taking BIOC3609 Molecular Medicine.*

BIOL3309. Botany project (12 credits)

To provide experience of biological research by planning and carrying out a small project under the supervision of a member of staff.

Prerequisite: Good performance in level 2 courses.

BIOL3310. Zoology project (12 credits)

To provide experience of biological research by planning and carrying out a small project under the supervision of a member of staff.

Prerequisite: Requires good performance in relevant level 2 courses.

BIOL3311. Botany dissertation (6 credits)

Students will undertake a dissertation on an agreed topic in plant sciences, microbiology or food science. The student will develop scientific writing and presentation skills, and will make extensive use of IT and library resources.

Prerequisite: Requires completion of relevant level 2 courses.

BIOL3312. Zoology dissertation (6 credits)

Students will undertake a dissertation on an agreed topic in *biological sciences*. The course will enhance the students' overall capability in producing a formal document through emphases on problem identification, content selection, efficient use of IT and library resources, scientific writing and oral presentation skills.

Prerequisite: Requires completion of relevant level 2 courses.

BIOL3315. Animal biotechnology * (6 credits)

This course discusses the key concepts and principles involved in animal biotechnology, and their applications in animal industry and molecular medicine.

Prerequisite: BIOL2303.

* Offered from 2006-2007.

BIOL3316. Plant biotechnology * (6 credits)

This course covers the principles and applications of plant biotechnology. The significance of plant biotechnology in agriculture and its emerging role in molecular farming for production of biopharmaceuticals and other high-value proteins will be discussed.

Prerequisite: BIOC2603 or BIOL2303.

* Offered from 2006-2007.

BIOL3317. Microbial biotechnology * (6 credits)

This course is intended for students who would like to understand the application of modern microbiology in biotechnology. The microbial systems being used include different types of viruses, bacteria, fungi and algae. At the end of the course the students are expected to know the parameters and conditions that affect the yield of production and the systems available for the expression of various types of biotechnology products.

Prerequisite: BIOL2303.

* Offered from 2006-2007.

BIOL3512. Diet and disease (6 credits)

The course deals with diseases associated with diet and basic dietetics.

Prerequisite: 1) BIOL1102 or BIOL1122 or BIOL0126; and 2) BIOL2506; and 3) BIOL2510.

BIOL3516. Nutrition and brain function * (3 credits)

To highlight the impact of nutrient provision on brain function and to discuss various effects of nutrition and diet on mental function and behaviour.

Prerequisite: BIOL2215 or BIOL2519.

* Offered from 2006-2007.

BIOL3522. Nutrigenomics (3 credits)

Recent advances in the understanding of human genes has resulted in the emergence of a new science called Nutrigenomics. This course aims to provide students a basic understanding on the relation between genetic variation and diet-related diseases. A genetically-based nutrition and dietary therapy intervention approach for maintenance of health will be explored.

Prerequisite: BIOC1001 or BIOL1125 or BIOL1106 or BIOL2303.

BIOL3523. Principles of Chinese medicated diet * (3 credits)

To provide basic knowledge on Chinese medicated diet. Illustrating historical and modern concepts of Chinese Medicated diet and encourage research and development with current experimental approaches. This is a valuable course for students in the Food and Nutritional Science programme, but also opens to students in other programmes.

Prerequisite: BIOL2519.

* Offered from 2006-2007.

BIOL3524. Diet and disease * (3 credits)

The course deals with diseases associated with diet and basic dietetics.

Prerequisite: BIOL1514 and BIOL2519.

* Offered from 2006-2007.

BIOL3525. Food product development (3 credits)

To introduce the key concepts and techniques used in food product development. Students will work in small groups to design, develop and produce a new food product. Appropriate for students in Food and Nutritional Science Programme or Major.

Prerequisite: BIOL2501 or permission of the course coordinator.

BIOL3526. Advanced laboratory in nutritional science * (3 credits)

This course is a follow-up to BIOL2518. The emphasis will be on human nutrition related techniques. Taken together, the two courses will provide students the necessary knowledge to pursue postgraduate research education as well as potential employment as a nutritionist in public and private sectors.

Prerequisite: BIOL1514 and BIOL2518.

* Offered from 2006-2007.

Department of Chemistry**CHEM0003. Chemistry and daily life** * (3 credits)

This general education course is designed as an elective for students in all disciplines and all years without strong chemistry background. It gives an overview of some important chemical aspects that we encounter in our daily life.

Prerequisite: Nil (not offered to Chemistry major students).

* Students who are taking or have taken CHEM1101, CHEM1206, CHEM1502, CHEM1506 or YSCN0011 are not allowed to take CHEM0003.

CHEM1001. Chemical principles for earth and life sciences * (6 credits)

To provide basic chemical knowledge for the understanding of the involvement of chemistry in processes taking place on earth and in biological systems.

Prerequisite: AL or AS Chemistry.

* Students who are taking or have taken any one of the courses CHEM1301, CHEM1401, CHEM1406, CHEM1502 and CHEM1506 cannot take CHEM1001.

CHEM1206. General and analytical chemistry (6 credits)

To provide basic knowledge of general and analytical chemistry. This course is a pre-requisite for the advanced chemistry courses in the second and third years.

Prerequisite: AL or AS Chemistry.

CHEM1301. Basic inorganic chemistry * (6 credits)

To provide students with the basic principles and knowledge in inorganic chemistry and to introduce its relevance to biological processes and materials science.

Prerequisite: AL Chemistry.

* *Students who are taking or have taken any one of the courses CHEM1301, CHEM1406, CHEM1502 and CHEM1506 cannot take CHEM1001.*

CHEM1401. Fundamentals of organic chemistry * (6 credits)

To provide students entering biological, health related or environmental fields with basic knowledge in organic chemistry.

Prerequisite: AL or AS Chemistry.

* *CHEM1401 and CHEM1406 are mutually exclusive.
Students who are planning to take CHEM2402 should take CHEM1406.*

CHEM1406. Basic organic chemistry * (6 credits)

To educate the student in the terminology, methodology and problem solving skills appropriate to the study of carbon based molecules in both their academic and practical applications.

This course is a pre-requisite for CHEM2402, Intermediate Organic Chemistry.

Prerequisite: AL or AS Chemistry.

Co-requisite: CHEM2507 are preferred.

* *CHEM1401 and CHEM1406 are mutually exclusive.
Students who are taking or have taken any one of the courses CHEM1301, CHEM1406, CHEM1502 and CHEM1506 cannot take CHEM1001.*

CHEM1506. Basic physical chemistry * (6 credits)

The object of the course is to provide an understanding of the fundamental concepts in physical chemistry as a basis for study at the intermediate and advanced levels.

Prerequisite: AL Chemistry.

* *Students who are taking or have taken any one of the courses CHEM1301, CHEM1406, CHEM1502 and CHEM1506 cannot take CHEM1001.
Students who are taking or have taken CHEM1101, CHEM1502 or CHEM1506 are not allowed to take CHEM0003.*

CHEM2002. Instrumental chemical analysis * (6 credits)

To cover the basic principles and applications of chemical instrumentation for biological, geological, and environmental analysis. This course aims to provide a good working knowledge, in addition to the

principles, of instruments that are commonly used in a chemical laboratory.

Prerequisite: CHEM1001.

* *CHEM2002 Instrumental Chemical Analysis is not available to students who are taking or have taken CHEM2202 Chemical Instrumentation.*

CHEM2102. Environmental chemistry (6 credits)

This course introduces students to Environmental Chemistry and enables them to understand the chemical principles involved in various environmental phenomena and processes.

Prerequisite: CHEM1001 or CHEM1502 or CHEM1506.

CHEM2103. Chemical process industries and analysis (6 credits)

To familiarize with typical chemical industries important in local and global economy. To understand the technology of chemicals manufacturing and chemical processes in general industry.

Prerequisite: CHEM1502 or CHEM1506.

CHEM2108. Intermediate chemistry project * (6 credits)

This course is designed for second year students who would like to take an early experience on research. It offers students an opportunity to carry out small scale chemical projects by themselves.

Prerequisite: CHEM1206, CHEM1301, CHEM1406, CHEM1506 and CHEM2507.

* *Exceptional academic strength of the students is required for taking this course.*

CHEM2109. Introduction to materials chemistry (6 credits)

This course provides an introduction to materials chemistry. Some basic material characterization techniques will also be introduced. This course is essential for students who wish to take advanced materials course.

Prerequisite: CHEM1301 or CHEM1406.

CHEM2202. Chemical instrumentation * (6 credits)

To cover the basic principles and applications of chemical instrumentation. This course aims to provide a good working knowledge, in addition to the principles, of instruments that are commonly used in a chemical laboratory.

Prerequisite: CHEM1001 or CHEM1201 or CHEM1206.

* *CHEM2202 Chemical Instrumentation is not available to students who are taking or have taken CHEM2002 Instrumental Chemical Analysis.*

CHEM2207. Food and water analysis (6 credits)

To cover areas in the application of Analytical Chemistry and new analytical technique development with focus on food and water analysis.

Prerequisite: CHEM1206, CHEM2002 or CHEM2202.

Co-requisite: CHEM2002 or CHEM2202.

CHEM2302. Intermediate inorganic chemistry (9 credits)

This course aims to provide a more detailed treatment of general inorganic chemistry suited to the needs of those intending to extend their studies in chemistry.

Prerequisite: CHEM1301.

CHEM2402. Intermediate organic chemistry (9 credits)

This course is a continuation from Basic Organic Chemistry. Together they provide a solid foundation of organic chemistry.

Prerequisite: CHEM1406.

CHEM2503. Intermediate physical chemistry (9 credits)

This course presents a more detailed treatment of general physical chemistry topics in order to provide a solid foundation for those students intending to extend their studies in chemistry further. This course would stand on its own.

Prerequisite: CHEM1502 or CHEM1506.

CHEM2507. Principles and applications of spectroscopic techniques (6 credits)

To cover the principles and applications of modern practical spectroscopic techniques.

Prerequisite: CHEM1001 or CHEM1206.

CHEM2508. Synthetic chemistry (6 credits)

This course provides an introduction to chemical synthesis of organic, inorganic and polymeric materials. Some basic chemical principles for the preparation of small molecules and macromolecules will be introduced. This course is essential for students who wish to have a good understanding in modern synthetic techniques.

Prerequisite: CHEM1001 or CHEM1206.

CHEM3105. Chemistry project * (12 credits)

To provide experience of research techniques by working on a short project under the direct supervision of a member of staff. This course would prepare students for graduate school work in chemistry.

Prerequisite: 1) CHEM2202; and 2) CHEM2302; and 3) CHEM2402; and 4) CHEM2503.

* *Second year students with exceptional academic achievement may also apply for this course.*

CHEM3106. Symmetry, group theory and applications (6 credits)

To introduce the concepts of symmetry and group theory and to apply them in solving chemical problems. This course also provides an introductory treatment of bonding theories, inorganic electronic and vibrational spectroscopy. This course is essential for students who wish to take advanced courses in inorganic chemistry and all types of spectroscopy.

Prerequisite: CHEM2302.

CHEM3107. Interfacial science and technology (6 credits)

To understand the science and technology of interfacial phenomena and processes often appeared in high value added products and modern technologies.

Prerequisite: CHEM2503.

CHEM3110. Advanced materials (6 credits)

This course is a continuation from Introduction to Materials Chemistry. It provides a more comprehensive overview on materials chemistry and application of materials in advanced technology. The most recent development in materials chemistry will also be introduced.

Prerequisite: CHEM2109.

CHEM3203. Analytical chemistry (9 credits)

To cover the principles and methodologies of Analytical Chemistry and its use in the analysis of gas, liquid and solid samples.

Prerequisite: CHEM2202 or CHEM2002.

CHEM3204. Modern chemical instrumentation and applications (6 credits)

The aim of the course is to provide an understanding of modern instrumentation, covering both fundamental principles and practical aspects of instrument design. The course will be of particular benefit to those pursuing a higher research degree or a career in technical sales/service.

Prerequisite: CHEM2202.

CHEM3303. Advanced inorganic chemistry (9 credits)

To give further, more detailed, treatment to topics mentioned in Intermediate Inorganic Chemistry and to develop new areas of interest. The course also aims to prepare students for graduate work in inorganic chemistry.

Prerequisite: CHEM2302.

Co-requisite: CHEM3106.

CHEM3304. Organometallic chemistry (6 credits)

To give further, more detailed, treatment to organometallic chemistry mentioned in Intermediate Inorganic Chemistry. The course also aims to introduce and familiarize students with advanced laboratory techniques, and to prepare students for graduate work in inorganic and organometallic chemistry.

Prerequisite: CHEM2302.

CHEM3403. Organic synthesis (9 credits)

This course covers modern synthetic methods, and develops the concept of synthetic planning.

Prerequisite: CHEM2402.

CHEM3404. Advanced topics in organic chemistry (6 credits)

To provide students with knowledge in organic chemistry reaction mechanisms and organic compound structure determination.

Prerequisite: CHEM2402.

CHEM3405. Organic chemistry of life (6 credits)

To understand molecules and reactions of life sciences. Useful as an introduction to research in areas of bioorganic chemistry, bioinorganic chemistry, medicinal chemistry, and biotechnology.

Prerequisite: CHEM1401 or CHEM2402.

CHEM3407. Medicinal chemistry (6 credits)

This course covers the chemical principles of drug design and drug action. Useful as an introduction to research in areas of bioorganic chemistry, bioinorganic chemistry, medicinal chemistry, pharmaceutical chemistry, and biotechnology.

Prerequisite: CHEM1401 or CHEM2402.

CHEM3504. Advanced physical chemistry (9 credits)

This course covers advanced topics in physical chemistry. It is offered for students majoring in physical chemistry and for students who are interested in postgraduate studies.

Prerequisite: CHEM2503.

CHEM3505. Molecular spectroscopy (6 credits)

This course provides a unifying treatment of the theories and applications of some important types of spectroscopy. Essential for graduate work in all branches of chemistry.

Prerequisite: CHEM2503.

Department of Earth Sciences**EASC0001. Earth's past and future** * (6 credits)

This course will provide students with knowledge of the nature and magnitude of change that has occurred in the Earth over a range of temporal and spatial scales. Specifically the course will contrast natural and anthropogenic processes of environmental change.

Prerequisite: Nil.

* *Not available to Earth Sciences major students.*

EASC0002. Peaceful use of nuclear technologies (3 credits)

To provide students with the basic knowledge on application of nuclear technologies in daily life and to invoke an awareness of current applications of nuclear sciences by case studies.

Prerequisite: Nil.

EASC0101. Maps, mapping and field geology (6 credits)

This field and class-based course introduces basic field and mapping techniques and the use of geological equipment, and presents an overview of the geology of Hong Kong and vicinity.

Prerequisite: Nil.

EASC0105. Earth through time (6 credits)

To introduce the concepts of geologic time and Uniformitarianism. To provide an understanding of the fossil record, and the integration of Earth Systems and Plate Tectonics. To gain an appreciation of our place in the Universe, an understanding of the evolution of Earth and life on Earth through time, and interaction between mankind and the geological environment.

Prerequisite: Nil.

EASC0116. Introduction to physical geology (6 credits)

The course, intended for students taking their first course in earth science, provides a basic overview of the earth's structure, material and internal and external processes.

Prerequisite: Nil.

EASC1102. Mineralogy (6 credits)

To provide a coverage of mineralogical principles: as a basis for understanding the petrography of igneous, sedimentary and metamorphic rocks.

Prerequisite: 1 AL science subject.

EASC1103. Geochemistry (6 credits)

To provide an understanding of chemical principles as they are applied to processes occurring on Earth, as a basis for the study of mineralogy, petrology and environmental geology.

Prerequisite: 1 AL science subject.

EASC1106. Introduction to petrology (6 credits)

To provide an introduction to the principal rock types: igneous, metamorphic and sedimentary, and the relationships between them.

Prerequisite: 1 AL science subject, EASC1102 or EASC0116.

EASC1107. Fluid/solid interactions in the earth (6 credits)

To provide an introduction to Earth processes and particularly to the nature of the properties and interactions of fluids and solids in the Earth system.

Prerequisite: 1 AL science subject.

EASC2108. Structural geology (6 credits)

The course covers the mechanical properties of rocks and how they are deformed, geological maps and their use in interpreting structure.

Prerequisite: EASC0101.

Co-requisite: EASC0101.

EASC2109. Igneous and metamorphic petrology (6 credits)

The object of this course is to provide a comprehensive coverage of the principles and techniques used in the study of rocks and rock-forming processes especially igneous and metamorphic.

Prerequisite: EASC1106.

EASC2110. Earth dynamics (6 credits)

To review the concepts and processes that shape the configuration of the Earth, from core to crust.

Prerequisite: 1) EASC1104; and 2) EASC1106.

EASC2111. Surficial processes and environments (6 credits)

This course provides students with an introduction to Earth surface processes, landscape evolution, and landscape diversity. Students learn to interpret natural landscapes in terms of both process-form relationships and the specific influence that geology has on landscape development. Soil formation and the importance of soils to landscape interpretation is also examined.

Prerequisite: Any level 1 Earth Sciences course.

EASC2112. Earth systems (6 credits)

The presentation of a process-oriented, integrated global approach to the study of the whole earth system and Man's place within it, with particular attention to the linkages and interactions between its parts (the geospheres).

Prerequisite: All level 1 Earth Sciences core course.

EASC2113. Sedimentology (6 credits)

The course deals with sedimentary rocks and processes, and facies models pertaining to various depositional environments.

Prerequisite: 1) EASC1106; and 2) EASC0105.

EASC2201. Hydrogeology (6 credits)

To study the role of ground water in subsurface geological process and its environmental and geotechnical importance.

Prerequisite: EASC0116 or EASC1107.

EASC2301. Field camps (6 credits)

The aims of a geological field camp are to provide 1) essential training and experience in geological mapping techniques and 2) opportunities to study at first-hand areas of particular geological interest and importance, especially outside Hong Kong.

Prerequisite: Students must have completed at least 42 credits of Earth Sciences courses at the time of taking the second year camp.

EASC2306. Intermediate earth sciences project (6 credits)

This course is designed for second year students who would have an early introduction to Earth Sciences research. It provides students with the opportunity to do a small Earth Sciences project by themselves, either field or laboratory based. These projects are of a research nature and usually without lectures.

Prerequisite: Passes in all Earth Sciences first year subjects.

Co-requisite: GPA > 3.

EASC3114. Earth resources and environments (6 credits)

To study the range of earth materials that are commercial and exploitable, and the processes that lead to their formation. To consider economic, political and environmental aspects of mineral exploitation.

Prerequisite: EASC2109.

Co-requisite: EASC2109.

EASC3115. Regional geology and tectonics (6 credits)

To cover the tectonic evolution of mainland East Asia and SE Asia, with a specific focus on the geology of Hong Kong.

Prerequisite: 1) EASC2110; and 2) EASC2113; and 3) EASC2109; and 4) EASC2108.

EASC3202. Soil and rock mechanics (6 credits)

To provide a basic knowledge of soil and rock mechanics for those wishing to consider further studies on a career in engineering geology/geotechnics.

Prerequisite: EASC2201.

EASC3203. Engineering geology (6 credits)

Introduction to the applications of geological data, techniques and principles to the study of natural materials (rock, soil and subsurface fluids), and the features and processes affecting the planning of land-use, and the planning, design, construction, operation and maintenance of engineering structures.

Prerequisite: 1) EASC3202; and 2) EASC2201.

EASC3302. Advanced topics in geosciences (6 credits)

To provide students with insights into current issues in geosciences, and options to specialize in particular subject areas.

Prerequisite: Students must have completed at least 36 credits of advanced Earth Sciences courses.

EASC3304. Applied geosciences (6 credits)

To provide students with insights in the applied fields of geosciences and allow students to acquire technical skills and training in particular field and instrumental techniques in geology, geophysics, and geochemistry.

Prerequisite: Students must have completed at least 36 credits of advanced Earth Sciences courses.

EASC3305. Geology project (6 credits)

The course is intended to provide individual students with experience of geological research by working on a project under the supervision of a member of staff.

Prerequisite: Students must have a B average in at least 36 credits of advanced Earth Sciences courses.

Department of Ecology & Biodiversity

ECOL0020. Ecology of Hong Kong (3 credits)

This course covers the ecology and biodiversity of terrestrial, marine and freshwater environments in Hong Kong. Attention will be focused on seasonality, zonation, succession and long-term changes of plants and animals in a wide range of Hong Kong habitats. Case studies on marine and terrestrial protected areas in Hong Kong will also be presented.

Prerequisite: Nil.

ECOL0036. Life in extremes & astrobiology (3 credits)

To consider the concept of the habitable zone within our solar system and beyond. The origins of life in extreme environments and modern analogues for early and possible extraterrestrial life. Astrobiology space missions and the search for life and its origins.

Prerequisite: Nil.

ECOL0040. Ecology and evolution (3 credits)

This course provides an introduction to how the ecology and behaviour of animals has been shaped by evolution, and demonstrates how we can understand and explain the significance of what we see in nature. The **course objectives** are as follows:

- To explain how the environment affects organisms in terms of their present-day ecology (determining where they live and how many can survive there) and, through natural selection acting over past generations, influences their form and adaptations.
- To introduce the basic principles of ecology and evolution, showing how they are linked to the environment by the phenomenon of adaptation.
- To describe the patterns of interactions among individuals (e.g. mating systems and reproduction, social behaviour, competition, and predation), and explain some of the simple principles that under their occurrence and evolution.

To introduce the concept of biodiversity, how it is generated by adaptive radiation, how it is estimated, and its importance to humans.

Prerequisite: Nil.

ECOL0041. Evolutionary diversity (6 credits)

To provide students with an introduction to the diversity of plant and animal life. Recent research has resulted in fundamental changes in our understanding of evolutionary history (phylogeny). Current evolutionary trees will be used as the basis for a survey of different groups in phylogenetic sequence, and for understanding how structures, processes and behaviours have changed through time.

Prerequisite: Nil.

ECOL0042. Ecology field course (3 credits)

This 5-day residential field course, including lectures and briefing sessions, provides students with an opportunity to visit a variety of habitats in Hong Kong, and to observe directly the main environmental factors that prevail in each of them. Emphasis will be placed on guiding students to become familiar with common local plants and animals and their habitats.

Prerequisite: ECOL0020, ECOL0040 are preferred but not essential.

ECOL2004. Environmental microbiology (6 credits)

To familiarize students with the role of microorganisms in natural processes which affect our environment such as the recycling of chemical elements, and the ways in which they carry out biodegradation of environmentally important pollutants. Key concepts are illustrated with local case studies and practical classes.

Prerequisite: BIOL1119.

ECOL2005. Fish biology (6 credits)

To acquaint students with the principles governing interrelationships among fishes and with the biotic and abiotic aspects of their environment thereby to provide an understanding of the factors determining species population dynamics and multispecies interactions. Special emphasis will be placed on coral reef assemblages with an introduction to local reef fishes.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1103 or ECOL1103 or ECOL0035.

ECOL2006. Biometrics (6 credits)

To introduce students to experimental design and statistical data analysis at an elementary to intermediate level, with an emphasis on practical applications of statistical methods to experimental and observational data in biology and ecology. A range of topics will be addressed, particularly those involving descriptions of populations and communities, biodiversity, ecophysiology and ecological impacts associated with pollution. To illustrate each statistical method, examples will be drawn from real cases, with consideration of the biological or ecological background of the problem and appropriate experimental design, statistical analysis and interpretation. Use will be made of statistical software such as SPSS, SAS and PRIMER for statistical computing. SPSS is powerful and easy to use, and available on HKU networked computers. Computer laboratories will be organised to familiarise students with statistical computation using the software.

Prerequisite: Students must have completed at least 18 credits of level 0 or 1 BIOL courses.

ECOL2007. Molecular ecology (6 credits)

To familiarize students with the molecular aspects of evolution, populations conservation. To review case studies where molecular data has solved ecological questions. To provide students with practical training in molecular techniques useful in ecology and environmental science.

Prerequisite: BIOL1103 or ECOL1103 or ECOL0035 or BIOL1106.

ECOL2011. Biological oceanography (6 credits)

This course provides an introduction to the physical, chemical, geological and biological processes that occur in oceans. The emphasis is on how the biological components interact with each other and with their environment by considering various marine ecosystems. Specific examples from South East Asia, the South China Sea and Hong Kong will be included.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1103 or ECOL1103 or ECOL0035 or EASC0105. The course may also be of interest to students studying CHEM2102.

ECOL2013. Systematics & phylogenetics (6 credits)

To give students an understanding of the principles of systematics and phylogenetics and an appreciation of current trends and controversies. Systematics forms an invaluable grounding for many fields of biology (including anatomy, ecology, population biology and evolutionary biology), and enables the integration of a wide range of techniques (including anatomy, biochemistry, chemistry, molecular biology, cytology, palaeontology and ethology).

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038.

ECOL2014. Conservation biology (6 credits)

To introduce students to the theory and practice of biological conservation.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1103 or ECOL1103 or ECOL0035.

ECOL2015. Fungal diversity * (3 credits)

To study the spectacular diversity of fungi and their roles in the environment. Fungi are extremely important in most of earth's processes and have developed interesting adaptations and forms. This course will examine the diversity and forms that fungi have taken and explore some of their unique roles in our environment.

Prerequisite: BIOL1119.

* *Students who have taken ECOL2039 Tropical Mycology are not allowed to take this course.*

ECOL2016. Environmental toxicology (6 credits)

To introduce students to the basic principles of environmental and ecological toxicology. Specific cases from the current literature will be used and analyzed. Emphasis will be on aquatic ecosystems.

Prerequisite: BIOL1103 or ECOL1103 or ECOL0035.

ECOL2022. Biodiversity (6 credits)

Biodiversity issues have become a growing global concern in the last decade. Students will explore these issues, defining the concept of biodiversity, exploring the methods of its evaluation and assessing the implications of its loss.

Prerequisite: BIOL1103 or ECOL1103 or ECOL0035.

ECOL2023. Freshwater ecology (6 credits)

Introduce, illustrate and explain the physical and biological processes that occur in drainage basins, their importance to human populations and biodiversity, and the impacts and management of freshwater resources subject to multiple uses. Examples from the Mekong River Basin and/or Hong Kong to human dependence on freshwater ecosystems and the important role that they play in sustaining livelihoods in Asia.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038 or BIOL1103 or ECOL1103 or ECOL0035.

ECOL2024. Plant structure and evolution (3 credits)

To survey the form and function of vascular plant body, with particular emphasis on the evolutionary significance of various structures. This forms a basis for understanding plant physiology, ecology, systematics and phylogeny.

Prerequisite: BIOL1101 or ECOL0038.

ECOL2028. Coastal ecology (6 credits)

To examine the communities of coastal systems: their distribution, composition and the factors which regulate them. This course will examine, using an experimental approach, patterns exhibited by a range of shores and the deterministic and stochastic processes that create and sustain them. Hong Kong shores will be used as examples but comparisons will be drawn from the coastlines of the world.

Prerequisite: BIOL1101 or BIOL1121 or ECOL0038, BIOL1103 or ECOL1103 or ECOL0035 and ECOL2006.

ECOL2029. How humans evolved (6 credits)

This course describes the origins of modern humans through evolution by natural selection. Major topics include tracing our evolution by means of the fossil record; our relationship to monkeys, apes and other primates; and, the main ecological and cultural transformations of our species over time. In short, this course answers the question: **where did we come from?** Emphasis is placed on ultimate causes: why have we evolved to become what we are today? And, what has driven human evolution?

Prerequisite: BIOL1103 or ECOL1103 or ECOL0035 preferred but not essential.

ECOL2032. Terrestrial ecology (6 credits)

To enable motivated students to acquire the knowledge and skills needed to solve real problems in terrestrial ecology.

Prerequisite: ECOL0020 and either BIOL1103 or ECOL1103 or ECOL0035.

ECOL2039. Tropical mycology * (3 credits)

The course will provide a “hands” on approach to studying tropical fungi. It will deal with many aspects of tropical fungi, but in particular their biodiversity and taxonomy.

Prerequisite: BIOL1119.

* *Offered in summer.*

Students who have taken ECOL2015 Fungal Diversity are not allowed to take this course.

ECOL3018. Fisheries and mariculture (6 credits)

Theoretical and practical aspects of marine fisheries and mariculture will be covered to provide an understanding of the condition of global and local fishery resources as well as the contribution of biological and ecological studies to their management. The role of mariculture in global fish supply will be examined and local fishery and mariculture examples provided.

Prerequisite: ECOL2005.

ECOL3019. Ecology & biodiversity project (12 credits)

Under the supervision of a member of staff, to plan, design and undertake a research project and then present and write up this project in a formal style.

Prerequisite: Requires good performance in level 2 courses, and ECOL2006.

ECOL3025. Ecology & biodiversity dissertation * (6 credits)

Students will undertake a dissertation on a topic related to the field of ecology and biodiversity. Conducting a dissertation is an independent learning experience and will enable students to develop skills including the use of library and Web-based resources; the logical development of scientific arguments; written presentation skills; and, personal time management.

Prerequisite: Appropriate academic background.

* *This course is also available to Year 2 students with an exceptional academic record in Year 1 courses. Students having taken this course in Year 2 can take ECOL3019 Ecology & Biodiversity Project as a follow-up course in their third year.*

ECOL3027. Pollution and environmental impact assessment (6 credits)

To familiarise students with the principles of Environmental Impact Assessment (EIA), and to examine current pollution problems and their management in Hong Kong. This course is designed to prepare students who are interested in future employment in the environmental sector. Management strategies for pollution monitoring and control will be discussed with special reference to Hong Kong case studies. This course will describe the EIA process in Hong Kong, which will be compared with approaches used in China, the United States and Europe.

Prerequisite: BIOL1103 or ECOL1103 or ECOL0035 or ECOL2004.

ECOL3030. Environmental remediation (3 credits)

To introduce the standard parameters in environmental monitoring, the scientific meaning and the practical monitoring techniques used. The focus of the course will be both the field and laboratory analysis, and implement of the monitoring. Local example will be used to illustrate the power of environmental monitoring and identification of the source of pollution.

Prerequisite: BIOL1103 or ECOL1103 or ECOL0035 or ECOL2004.

ECOL3033. Biogeography * (3 credits)

Two distinct approaches to biogeography (the study of the geographical distributions of organisms) are generally recognized, based on differences in scale: *ecological biogeography* emphasizes the effect of ecological processes on geographical distributions over short periods of time; whereas *historical biogeography* relates to processes that occur over long periods of time (e.g., evolution, plate tectonics). Historical biogeography is a rapidly developing field, with many fundamental theories having been proposed in the past 10–15 years. This course aims to explain the diverse approaches to the field, and how they can be applied in comparative biology.

Prerequisite: ECOL2013.

* *Not offered in 2005-2006.*

ECOL3034. Environmental monitoring and remediation techniques * (6 credits)

To introduce the standard parameters in environmental monitoring, and the scientific basis of practical monitoring techniques. The focus of the course will be on both the analysis and application of new environmental technology. Local examples will be used to illustrate the power of environmental monitoring and identification of pollution sources, as well as the success of implementation of treatment techniques.

Prerequisite: ECOL2004.

* *Not offered in 2005-2006.*

Department of Mathematics**MATH0011. Numbers and patterns in nature and life** (3 credits)

To explore the underlying mathematical structure in various topics in life and environmental sciences. Students from all disciplines will gain appreciation of mathematics as a potent tool for investigating and understanding nature and life.

Prerequisite: HKCEE Mathematics.

MATH0801. Basic mathematics I (6 credits)

To provide students with a basic background of calculus that can be applied in various disciplines, aiming at students not having done much mathematics beyond HKCEE mathematics. It can be followed by MATH0802 / MATH1803 or MATH1811 / MATH1812.

Prerequisite: HKCEE Mathematics (HKCEE Additional Mathematics or AS Mathematics and Statistics or Mathematics at higher level not allowed; Mathematics students (MATH, MAEF, CMOR & MAPH) are not allowed to take this course unless prior approval has been obtained from the Department for special reasons. Students who have taken any one of the following: MATH1101, MATH1102, MATH1201, MATH1202 and MATH1803 are not allowed to take this course.)

MATH0802. Basic mathematics II (6 credits)

To provide students with a more solid background of calculus of one and several variables and of matrices that can be applied in various disciplines, aiming at students having taken an elementary calculus course. It can be followed by MATH1803.

Prerequisite: HKCEE Additional Mathematics or AS Mathematics and Statistics or MATH0801 or MATH0803 or MATH0805 (AL Mathematics not allowed; Mathematics students (MATH, MAEF, CMOR & MAPH) are not allowed to take this course unless prior approval has been obtained from the Department for special reasons. Students who have taken any one of the following: MATH1101, MATH1102, MATH1201, MATH1202 and MATH1803 are not allowed to take this course.)

MATH1101 Linear algebra I (6 credits)

The course is a foundation course for all Mathematics students, to be followed by Linear Algebra II and other more advanced courses in mathematics.

Prerequisite: AL Pure Mathematics.

MATH1102. Linear algebra II (6 credits)

The course is a foundation course for all Mathematics students. It can be followed by other more advanced courses in mathematics.

Prerequisite: AL Pure Mathematics and having taken MATH1101.

MATH1201. Calculus I (6 credits)

The course is a foundation course for all Mathematics students, to be followed by Calculus II and other more advanced courses in mathematics.

Prerequisite: AL Pure Mathematics.

MATH1202. Calculus II (6 credits)

The course is a foundation course for all Mathematics students. It can be followed by other more advanced courses in mathematics.

Prerequisite: AL Pure Mathematics and having taken MATH1201.

MATH1800. Elements of discrete mathematics (6 credits)

To introduce students to the basic ideas and techniques of discrete mathematics.

Prerequisite: AS Mathematics and Statistics, or Mathematics at higher level.

MATH1803. Basic mathematics III (6 credits)

To provide students with a background of calculus of several variables and linear algebra that can be applied in various disciplines.

Prerequisite: AL Pure Mathematics or MATH0802 or MATH0804 or MATH0806 or MATH0808 (Mathematics students (MATH, MAEF, CMOR & MAPH) are not allowed to take this course unless prior approval has been obtained from the Department for special reasons.)

MATH1811. Mathematics I (6 credits)

To provide students with the essential knowledge of linear algebra and vector calculus for further studies in the physical sciences. It is intended that the course will be followed by MATH1812.

Prerequisite: AS Mathematics and Statistics, or Mathematics at higher level (Mathematics students (MATH, MAEF, CMOR & MAPH) are not allowed to take this course unless prior approval has been obtained from the Department for special reasons.)

MATH1812. Mathematics II (6 credits)

To provide students with the essential knowledge of linear algebra and vector calculus for further studies in the physical sciences.

Prerequisite: AS Mathematics and Statistics, or Mathematics at higher level and having taken MATH1811 or MATH1801 (Mathematics students (MATH, MAEF, CMOR & MAPH) are not allowed to take this course unless prior approval has been obtained from the Department for special reasons.)

MATH2000. Intermediate mathematics project (6 credits)

This course is designed for a second year outstanding student who would like to take an early experience on independent study. It provides the student with the opportunity to do a small mathematics project close to research in nature independently.

Prerequisite: MATH1101, MATH1102, MATH1201, MATH1202.

Co-requisite: MATH2301 and MATH2401.

MATH2001. Development of mathematical ideas * (6 credits)

- (1) To acquaint the students with the origin and growth of basic mathematical concepts.
- (2) To assist the students to gain a deeper insight and broader view of mathematics as a discipline and human endeavour.
- (3) To provide the students with an opportunity to write on and talk about mathematics, and to engage in independent study.

Prerequisite: MATH1101 and MATH1102 and MATH1201 and MATH1202.

* *Not offered in 2005-2006.*

MATH2301. Algebra I (6 credits)

This course aims to present those fundamental topics and techniques of algebra that are finding wide applications in mathematics and the applied sciences. It is complete in itself, and may also be followed by Algebra II and Topics in Applied Discrete Mathematics.

Prerequisite: 1) (Two out of MATH1101, MATH1102, MATH1201, MATH1202, one of which should be MATH1102); or 2) (MATH1811/MATH1812 or MATH1803); or 3) (MATH1801/MATH1802 or MATH1807).

MATH2303. Matrix theory and its applications (6 credits)

Matrix theory has a close connection with other mathematical subjects such as linear algebra, functional analysis, and combinatorics. It also plays an important role in the development of many subjects in science, engineering, and social sciences. In this course, students will be taught the fundamentals of matrix analysis and its application to various kinds of practical problems. Mathematical software will be used in the course, so that students can learn how to use the computer to solve matrix problems.

Prerequisite: 1) (MATH1101 and MATH1102); or 2) (MATH1811/MATH1812 or MATH1803); or 3) (MATH1801/MATH1802 or MATH1807).

MATH2304. Introduction to number theory (6 credits)

This course introduces students to the basic knowledge and techniques in number theory. It is hoped that it will stimulate interested students to delve into the rich literature associated with this historically important subject of mathematics.

Prerequisite: MATH1101 and MATH1201.

Co-requisite: MATH2301.

MATH2401. Analysis I (6 credits)

This course extends to more general situations some of the results covered in the first year Mathematics courses, and introduces some further basic concepts which are essential for more advanced studies in mathematical analysis.

Prerequisite: 1) (MATH1201 and MATH1202); or 2) (MATH1811/MATH1812 or MATH1803); or 3) (MATH1801/MATH1802 or MATH1807).

MATH2402. Analysis II (6 credits)

This course gives a modern treatment of calculus in several variables which is essential for more advanced studies in analysis.

Prerequisite: 1) (MATH1201 and MATH1202) and (MATH1101 or MATH1102); or 2) (MATH1811/MATH1812 or MATH1803); or 3) (MATH1801/MATH1802 or MATH1807).

MATH2403. Functions of a complex variable (6 credits)

This course is indispensable for studies in higher mathematical analysis and the more theoretical aspects of physics. In this course, the students are introduced to the fundamental concepts and properties of analytic functions and are shown how to look at analyticity from different points of view. At the same time, the techniques of solving problems without losing sight of the geometric picture are emphasized.

Prerequisite: 1) (Two out of MATH1101, MATH1102, MATH1201, MATH1202, one of which should be MATH1201 or MATH1202); or 2) (MATH1811/MATH1812 or MATH1803); or 3) (MATH1801/MATH1802 or MATH1807).

MATH2405. Differential equations (6 credits)

The standard topics in the wide field of differential equations included in this course are of importance to students of mathematics and physical sciences as well. Our emphasis is on principles rather than routine calculations and our approach is a compromise between diversity and depth.

Prerequisite: 1) (Two out of MATH1101, MATH1102, MATH1201, MATH1202, one of which should be MATH1201 or MATH1202); or 2) (MATH1811/MATH1812 or MATH1803); or 3) (MATH1801/MATH1802 or MATH1807).

MATH2407. Mathematical methods for physicists * (6 credits)

This course is designed for students in Physics and other science subjects.

Prerequisite: MATH1811 or MATH1812 or MATH1801 or MATH1802.

* *This course is not open to students who have taken MATH1101, MATH1102, MATH1201 and MATH1202.*

Not offered in 2005-2006.

MATH2601. Numerical analysis (6 credits)

This course covers both the theoretical and practical aspects of Numerical Analysis. Emphasis will be on basic principles and practical methods of solution, using high speed computers.

Prerequisite: 1) (Two out of MATH1101, MATH1102, MATH1201, MATH1202, one of which should be MATH1201 or MATH1202) or (MATH1811/MATH1812 or MATH1803) or (MATH1801/MATH1802 or MATH1807); and 2) Knowledge of a programming language.

MATH2603. Probability theory * (6 credits)

The emphasis of this course will be on probability models and their applications. The primary aim is to elucidate the fundamental principles of probability theory through examples and to develop the ability of the students to apply what they have learned from this course to widely divergent concrete problems.

Prerequisite: 1) MATH1201 and MATH1202; or 2) MATH1811 and MATH1812; or 3) MATH1803; or 4) MATH0801 and MATH0802.

* *Students taking or having taken STAT0103 or STAT2303 are not allowed to take this course.*

MATH2901. Operations research I (6 credits)

The objective is to provide a fundamental account of the basic results and techniques of Linear Programming and its related topics in Operations Research. There is an equal emphasis on all three aspects of understanding, algorithms and applications. The course serves, together with a course on network models, as essential concept and background for more advanced studies in Operations Research.

Prerequisite: Two out of MATH1101, MATH1102, MATH1201, MATH1202, one of which should be MATH1101 or MATH1102.

MATH2904. Introduction to optimization (6 credits)

This course introduces students to the theory and techniques of optimization, aiming at preparing them for further studies in Operations Research, Mathematical Economics and related subject areas.

Prerequisite: (MATH1101 or MATH1102) and (MATH1201 or MATH1202).

MATH2905. Queueing theory and simulation (6 credits)

This course introduces students to the models and theory of queueing system, as well as the technique of simulation as a practical tool of analysis.

Prerequisite: STAT1007 and (MATH1101 or MATH1102) and (MATH1201 or MATH1202).

Co-requisite: MATH2603 or its equivalent.

MATH2906. Financial calculus (6 credits)

This course gives an elementary treatment of the modeling of financial derivatives, asset pricing and market risks from an applied mathematician's viewpoint. Stochastic calculus and numerical methods will be introduced.

Prerequisite: STAT1007 and (MATH1101 or MATH1102) and (MATH1201 or MATH1202).

Co-requisite: MATH2603 or its equivalent.

MATH2907. Numerical methods for financial calculus * (6 credits)

This course is aimed at providing effective numerical methods as well as their theoretical aspect for solving problems arisen from financial derivatives and asset pricing.

Prerequisite: (MATH1101 or MATH1102) and (MATH1201 or MATH1202).

Co-requisite: MATH2603 and MATH2906 or their equivalent.

* *Not offered in 2005-2006.*

MATH3000. Mathematics project (6 credits)

The object is to provide a student with an opportunity to formulate and investigate, in depth, a problem of practical interest and/or have a foretaste of mathematical research. The work, to be done on an individual basis, is considered a highly desirable part of the training of a mathematician.

Prerequisite: MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301 and MATH2401.

MATH3302. Algebra II (6 credits)

This course is an extension of Algebra I and goes deeper into the various topics treated in that course. Together, the two courses are complete in themselves, and may be followed by Topics in Algebra and Topics in Applied Discrete Mathematics.

Prerequisite: MATH2301.

MATH3310. Topics in algebra * (6 credits)

To provide students specializing in mathematics with the opportunity to study some topics in algebra in greater depth.

Prerequisite: MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301.

* *Not offered in 2005-2006.*

MATH3404. Functional analysis (6 credits)

This course introduces students to the basic knowledge of linear functional analysis, an important branch of modern analysis.

Prerequisite: MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2401.

MATH3406. Introduction to partial differential equations * (6 credits)

This course introduces students to the basic techniques for solving partial differential equations as well as the underlying theories.

Prerequisite: MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2401.

Co-requisite: MATH2405.

* *Not offered in 2005-2006.*

MATH3501. Geometry (6 credits)

As geometric forms often appear in nature, the study of geometry helps us to understand better the universe in which we live. Moreover, geometry has much intrinsic beauty and the study of it is an excellent training in intuitive thinking. In this course we study the differential geometry of curves and surfaces in 3-space. In the study of regular surfaces in 3-space we exhibit geometric notions that are definable in terms of metrical properties of these surfaces alone, leading to the intrinsic geometry of surfaces.

Prerequisite: MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2401.

MATH3502. Geometric topology (6 credits)

This course gives a geometric introduction to some of the methods of algebraic topology. The emphasis throughout will be on the geometric motivations and applications of the theory.

Prerequisite: MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301 and MATH2401.

MATH3602. Scientific computing (6 credits)

This course introduces mathematical theories and computational techniques for solving various kinds of matrix computation problems that are often encountered in scientific or industrial applications.

Prerequisite: MATH1101 and MATH1102 and MATH1201 and MATH1202.

Co-requisite: MATH2601.

MATH3610. Topics in applied discrete mathematics * (6 credits)

To provide students with the opportunity to study some further topics in applied discrete mathematics.

Prerequisite: MATH1800 and MATH2301.

* *Not offered in 2005-2006.*

MATH3902. Operations research II (6 credits)

The objective is to provide a fundamental account of the basic results and techniques of Integer Programming (IP), Dynamic Programming (DP) and Markov Decision Processes (MDP) in Operations Research. There is emphasis on aspects of algorithms as well as applications. The course serves, together with courses on linear programming and network models, to provide essential optimization concept and algorithms for more advanced studies in Operations Research.

Prerequisite: Two out of MATH1101, MATH1102, MATH1201, MATH1202, one of which should be MATH1101 or MATH1102.

Co-requisite: MATH2901.

MATH3903. Network models in operations research (6 credits)

The objective is to provide a fundamental account of the basic results and techniques of network models in Operations Research. There is an equal emphasis on all three aspects of understanding, algorithms and applications. The course serves, together with a course on linear programming, to provide essential concept and background for more advanced studies in Operations Research.

Prerequisite: Two out of MATH1101, MATH1102, MATH1201, MATH1202, one of which should be MATH1101 or MATH1102.

Co-requisite: MATH2901.

MATH3910. Topics in mathematical programming & optimization * (6 credits)

A study in greater depth of some special topics in mathematical programming or optimization. It is mainly intended for students in Operations Research or related subject areas.

Prerequisite: MATH2901 and MATH2904.

* *Not offered in 2005-2006.*

Department of Pharmacology**PHAR3001. Clinical pharmacology I** (3 credits)

This course presents the fundamental principles in pharmacology and relevant knowledge pertaining to drugs in common use. It will provide an understanding of pharmacokinetics and pharmacodynamics which is essential for administering and managing drug therapy. The therapeutic effects and mechanisms of action of the drugs most frequently prescribed will be covered.

Prerequisite: Preferably CHEM3405 and CHEM3407.

Co-requisite: Preferably CHEM3405 and CHEM3407.

PHAR3002. Clinical pharmacology II (3 credits)

This course presents the fundamental principles in pharmacology and relevant knowledge pertaining to drugs in common use. It will provide an understanding of pharmacokinetics and pharmacodynamics which is essential for administering and managing drug therapy. The therapeutic effects and mechanisms of action of the drugs most frequently prescribed will be covered.

Prerequisite: Preferably CHEM3405 and CHEM3407.

Co-requisite: Preferably CHEM3405 and CHEM3407.

Department of Physics**PHYS0001. Nature of the universe I: introduction to observational astronomy and the solar system** * (3 credits)

This general education course is designed as an elective for students in all disciplines and all years. No prior knowledge in astronomy, physics, and higher mathematics is required.

Prerequisite: Nil.

* *Not available to those who have taken YSCN0009 unless approved by course coordinator.*

PHYS0002. Nature of the universe II: stars, galaxies and cosmology for beginners (3 credits)

This general education course is designed as an elective for students in all disciplines and all years. It focuses on the theoretical aspect of astronomy. No prior knowledge in astronomy, physics, or higher mathematics is required.

Prerequisite: Nil.

PHYS0114. Fundamental physics I * (6 credits)

This course, together with *Fundamental Physics II*, aims at providing students who are interested in physics, or taking a minor option in physics, a first course in general physics. It covers the essential knowledge of physics on various topics. Students who have taken the course can have a smooth link-up with other courses offered in the Physics Department.

Prerequisite: HKCEE Physics/Engineering Science (students with AL/AS Physics or AL Engineering Science should first obtain approval from the course selection advisor).

- * *Not available to those who have taken or are concurrently taking PHYS1111, PHYS1112, PHYS1113, or PHYS1314 unless approved by course selection advisor.*
Not available to students who have taken HKU-SPACE course College Physics I.
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PHYS0115. Fundamental physics II * (6 credits)

This course, together with *Fundamental Physics I*, aims at providing students who are interested in physics, or taking a minor option in physics, a first course in general physics. It covers the essential knowledge of physics various topics. Students who have taken the course can have a smooth link-up with other courses offered in the Physics Department.

Prerequisite: HKCEE Physics/Engineering Science (students with AL/AS Physics or AL Engineering Science should obtain first approval from the course selection advisor).

- * *Not available to those who have taken or are concurrently taking PHYS1111, PHYS1112, PHYS1113, or PHYS1314 unless approved by course selection advisor.*
Not available to students who have taken HKU-SPACE course College Physics II.
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PHYS0601. God, the Big Bang and Stephen Hawking I (3 credits)

This course, named after a recently published book by David Wilkinson, is for both science and non-science students to recognize the absence of any real conflict between science and religion. This course (part I) deals with religion and its interactions with cosmology.

Prerequisite: Nil.

PHYS0602. Science or fiction? * (3 credits)

The course is designed as an exploration of the various way in which science, particularly physics, has been used in the creation of the literary genre known as science fiction. One of its main purposes is to provide students with experience in expressing their ideas and opinions in written and spoken form and in developing their analytical and creative powers.

Prerequisite: Nil.

- * *Not offered in 2005-2006.*
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PHYS0603. Art & physics * (3 credits)

The course is aimed at artistically inclined students who would like to know more about the New Physics, scientifically inclined students who would like to have a framework to appreciate Art, and anyone who is fascinated by both.

Prerequisite: Nil.

- * *Not offered in 2005-2006.*
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PHYS0605. Nuclear energy and the environment (3 credits)

To introduce the use of nuclear power and its impact to our environment; and to arouse an awareness of the safety use of nuclear energy.

Prerequisite: Nil.

PHYS0607. Revealing the magic in everyday life * (3 credits)

The course is designed for students who are curious about science in daily life. Students taking this course should have basic training in physics in the certificate level. The course covers the working principles and mechanisms of the things and phenomena around us. Logical thinking and appreciation of science are emphasized with mathematics kept at a minimum. Students are trained to develop scientific intuition and to appreciate that many things in everyday life are not purely magical but can also be predictable.

Prerequisite: HKCEE Physics.

* *Not available to students who have taken YSCN0018 or the HKU-SPACE course "The Science of Everyday Life".*

PHYS1111. Introduction to mechanics * (6 credits)

This course aims at providing students a solid foundation in Newtonian mechanics with the treatment of calculus. Students are expected to have basic knowledge of calculus and vectors.

Prerequisite: 1) HKCEE Additional Mathematics or AS Mathematics & Statistics or AL Pure Mathematics; and 2) AL/AS Physics or Engineering Science.

* *Not available to those who have passed PHYS0111 or PHYS1312 unless approved by course coordinator.*

PHYS1112. Electricity and magnetism * (6 credits)

This course aims at introducing the basic physics of electromagnetism.

Prerequisite: 1) HKCEE Additional Mathematics or AS Mathematics & Statistics or AL Pure Mathematics; and 2) AL/AS Physics or Engineering Science.

* *Not available to those who have passed PHYS0111 or PHYS1312 unless approved by course coordinator.*

PHYS1113. Heat, light and waves * (6 credits)

To appreciate the underlying physical principles of heat, thermodynamics, waves and related physics. This course is designed to prepare the students with basic knowledge for the more advanced courses in the department.

Prerequisite: 1) HKCEE Additional Mathematics or AS Mathematics & Statistics or AL Pure Mathematics; and 2) AL/AS Physics or Engineering Science.

* *Not available to those who have passed PHYS0111 or PHYS1312 unless approved by course coordinator.*

PHYS1303. Special relativity I (3 credits)

This course is designed as an elective for students in all disciplines and all years with science background.

Prerequisite: 1) AL/AS Physics or Engineering Science; and 2) AL Pure Mathematics or AS Mathematics & Statistics or (MATH1811 and MATH1812).

PHYS1314. Modern physics (6 credits)

This course is designed to provide students with a comprehensive introduction to the concepts and ideas that form the basis of “modern physics” - a term used to describe the revolutionary developments that took place in physics during the 20th-century and are continuing today.

Prerequisite: 1) HKCEE Additional Mathematics or AS Mathematics & Statistics or AL Pure Mathematics; and 2) AL/AS Physics or Engineering Science.

PHYS1411. Introductory experimental physics * (6 credits)

An experimental course designed to provide students with experience in laboratory techniques and instrumentations.

Prerequisite: AL/AS Physics or AL Engineering Science.

** Not available to those who have taken PHYS0411 unless approved by course coordinator.*

PHYS1412. Electronics (6 credits)

This course is designed to provide students with a broad knowledge of the theoretical background and experimental application of modern electronic devices and circuitry.

Prerequisite: AL/AS Physics or AL Engineering Science.

PHYS1315. Methods in physics I * (6 credits)

This course provides students with experience in using mathematical tools and techniques to solve problems in physics. It is complete in itself, or may also be followed by Methods in Physics II.

Prerequisite: AL Pure Mathematics or AS Mathematics & Statistics or HKCEE Additional Mathematics.

** Not available to students who have taken / are taking MATH1811 or MATH1812 unless approved by course coordinator.*

PHYS1316. Methods in physics II * (6 credits)

This course provides students with experience in using mathematical tools and techniques to solve problems in physics. It is complete in itself, or may also be taken after Methods in Physics I.

Prerequisite: AL Pure Mathematics or AS Mathematics & Statistics or HKCEE Additional Mathematics.

** Not available to students who have taken / are taking MATH1811 or MATH1812 unless approved by course coordinator.*

PHYS2021. The physical universe (6 credits)

To appreciate the underlying physical principles of astronomy. This course is designed as an elective for second or third year students with some basic science knowledge.

Prerequisite: PHYS0001 or YSCN0009.

PHYS2022. Observational astronomy * (6 credits)

To introduce the students to the techniques and methods of contemporary astronomy, with emphasis on the data reduction and analysis.

Prerequisite: Any 1st year science or engineering course.

** Preference to take this course will be given to students in the Physics and Astronomy theme.*

PHYS2023. Stellar physics (6 credits)

This course introduces the basic theory of stellar structure and evolution. It follows a mathematical treatment that stress on the underlying physical processes. This course is calculus-based. A good background in first year level classical mechanics and electromagnetism is recommended.

Prerequisite: PHYS1111 or PHYS1314.

PHYS2024. Introduction to cosmology * (6 credits)

The aim of the course is to offer an introduction to the key ideas in observational and theoretical cosmology, to familiarize students with the main observational results on which modern cosmology is based and to introduce, at an elementary level, the basic physical principles used to model the evolution and dynamics of the universe from the big bang to the present epoch.

Prerequisite: PHYS1111 or PHYS1314.

* *Not offered in 2005-2006.*

PHYS2221. Introductory solid state physics (6 credits)

To provides a broad introduction to modern theories of the behaviour and properties of the solid state of matter. It is designed as a self-contained course which at the same time will serve as a basis for more advanced courses and projects in solid state physics.

Prerequisite: PHYS1314.

PHYS2222. Waves and optics (6 credits)

To give a coherent introduction to the development of modern physical optics, with particular attention to the wave properties and quantum theories of light.

Prerequisite: PHYS1112 and PHYS1113.

PHYS2224. Computational modelling of physical systems (6 credits)

The aim of this course is to introduce the students to handling data (obtained either from physics experiments or physical models) and computational methods for modelling physical systems.

Prerequisite: 1) Any 1st year physics course; and 2) CSIS0911 or CSIS1117.

PHYS2225. Solid state devices * (6 credits)

The aim of this course is to give an introduction to the physics and operating principles of commonly used solid state devices.

Prerequisite: PHYS1314.

* *Not offered in 2005-2006.*

PHYS2227 Laser & spectroscopy (6 credits)

The aim of this course is to provide a broad introduction to modern laser spectroscopic techniques and selected applications.

Prerequisite: PHYS1314 and PHYS2222 and PHYS2323.

PHYS2228. Introductory health physics (6 credits)

This course aims at providing students with basic knowledge in the scientific and engineering aspects of health physics and to arouse students' interest in the area of peaceful application of ionizing and non-ionizing radiations.

Prerequisite: PHYS0605 or PHYS1314.

PHYS2229. Thin film physics (6 credits)

This course is intended for the advanced students, covering the basic theories and techniques of physical deposition processes and topics related to a very rapidly growing area - thin film application in material science.

Prerequisite: PHYS1111.

PHYS2234. Sensors and computer control for physical measurements (6 credits)

The aim of this course is to introduce students to basic principles of measurement and control, and sensors for measurement of different physical quantities (temperature, pressure etc.), as well as provide students with practical skills for designing and operating computer controlled measurement systems.

Prerequisite: Any 1st year science or engineering course.

PHYS2235. Physics of nanomaterials (6 credits)

Physics of Nanomaterials is a course for advanced undergraduate and beginning postgraduate students at HKU. The course is designed to introduce important concepts such as quantum size effect and fundamental physics of nanomaterials.

Prerequisite: PHYS1314.

PHYS2304. Special relativity II (3 credits)

This is a follow up course to PHYS1313, with the aim of providing an introduction to the advanced aspects of the theory of special relativity and of its applications.

Prerequisite: PHYS1303 or PHYS1314.

PHYS2321. Introductory electromagnetism (6 credits)

Introduces the physical concepts required for an understanding of electricity and magnetism. A foundation course for students majoring in physics.

Prerequisite: PHYS1111, PHYS1112 and PHYS1314.

Co-requisite: PHYS1113.

PHYS2322. Statistical mechanics and thermodynamics (6 credits)

An introduction to Statistical Mechanics and elementary Thermodynamics with reference to related phenomena in Physics. This course is taught as a basic and essential subject for students majoring in Physics.

Prerequisite: PHYS1111, PHYS1112 and PHYS1314.

Co-requisite: PHYS1113.

PHYS2323. Introductory quantum mechanics (6 credits)

This course aims at a rigorous introduction to the concepts and methods of non-relativistic quantum mechanics. It is a Prerequisite: for several advanced physics courses.

Prerequisite: PHYS1314.

PHYS2324. Classical mechanics (6 credits)

The aim of this course is to introduce general methods of studying the dynamics of particle systems, through which students can acquire experience in using mathematical techniques for solving practical problems.

Prerequisite: PHYS1111, PHYS1112 and PHYS1314.

Co-requisite: PHYS1113.

PHYS2325. Theoretical physics (6 credits)

The aim of this course is to provide students with the conceptual skills and analytical tools necessary for solving real problems in all major areas of physics.

Prerequisite: 1) PHYS1111 or PHYS1112 or PHYS1113 or PHYS1314; and 2) (MATH1811 and MATH1812) or (PHYS1315 and PHYS1316).

PHYS2426. Intermediate experimental physics * (6 credits)

This laboratory based course aims to familiarize students with some basic methods in physics experimentation, and in particular to illustrate the methods by carrying experiments related to electromagnetism and modern physics.

Prerequisite: PHYS1411 and PHYS1314.

* *Not available to those who have taken PHYS2421 or PHYS2422 unless approved by course coordinator.*

PHYS2521. Intermediate physics project (6 credits)

This course is designed for second year students who would like to take an early experience on research. It provides students with the opportunity to do small physics projects by themselves, either theoretical or experimental. These projects are close to research in nature and, usually, without lectures.

Prerequisite: Any 1st year Physics course.

PHYS2624. Introductory atmospheric physics * (6 credits)

To discuss the physical principles and mechanisms of atmospheric motions, weather phenomena, and climate. This course is designed to be an intermediate level course on modern meteorology. It is suitable for students with some background in physics or science.

Prerequisite: Any 1st year science or engineering course.

* *Course materials will be delivered by expert guest lecturers from the Hong Kong Observatory.*

PHYS3031. Astrophysics (6 credits)

To introduce students to current theories in astrophysics. It may be taken as a self-contained course or as background to research work in astrophysics.

Prerequisite: PHYS2321 and PHYS2322 and PHYS2323.

PHYS3033. General relativity (6 credits)

To introduce students to the field of general relativity and to provide conceptual skills and analytical tools necessary for astrophysical and cosmological applications of the theory.

Prerequisite: PHYS2321 and PHYS2322 and PHYS2323.

Co-requisite: PHYS1303.

PHYS3034. Cosmology * (6 credits)

The aim of the course is to offer an advanced introduction to cosmology, to familiarize students with mathematical formulation used to model the evolution and dynamics of the universe, and to provide an up to date discussion of the big bang theory and structure and galaxy formation.

Prerequisite: PHYS2321 and PHYS2322 and PHYS2323 and PHYS2024.

* *Not offered in 2005-2006.*

PHYS3231. Computational physics (6 credits)

The aim of the course is to show how the power of computers enables a computational approach to solving physics problems to be adopted, which is distinct from, and complimentary to, traditional experimental and theoretical approaches. The material covered will be found useful in any project or problem solving work that contains a strong computational or data analysis element.

Prerequisite: PHYS2321 and PHYS2322 and PHYS2323.

PHYS3232. Solid state physics * (6 credits)

To provide students with an understanding of more advanced topics in selected areas of solid state physics.

Prerequisite: PHYS2221 and PHYS2321 and PHYS2322 and PHYS2323.

* *Not offered in 2005-2006.*

PHYS3321. Nuclear and particle physics * (6 credits)

The aim of the course is to describe nuclear structure in an elementary way as a field of application of quantum mechanics and electromagnetism, and to study the fundamental interactions of subnuclear particles.

Prerequisite: PHYS2323 and PHYS2321 and PHYS2322.

* *Not available to those who have taken PHYS2326 unless approved by course coordinator.*

PHYS3331. Electromagnetic field theory (6 credits)

We study the electromagnetic properties of simple physical systems, and the relations between electromagnetism and special relativity.

Prerequisite: PHYS2321 and PHYS2322 and PHYS2323 and PHYS2325.

PHYS3332. Quantum mechanics (6 credits)

Introduces more advanced concepts of quantum mechanics. Together with PHYS2323, these will provide the basic knowledge of quantum mechanics to an undergraduate student.

Prerequisite: PHYS2321 and PHYS2322 and PHYS2323 and PHYS2325.

PHYS3333. Advanced statistical mechanics * (6 credits)

This course intends to introduce some topics in the field of equilibrium statistical physics.

Prerequisite: PHYS2321 and PHYS2322 and PHYS2323.

* *Not offered in 2005-2006.*

PHYS3334. Advanced electromagnetic field theory * (6 credits)

This is a standard course in electromagnetic field theory which provides essential background for postgraduate and advanced undergraduate students intend to do research in physics.

Prerequisite: PHYS2321 and PHYS3331.

* *Not offered in 2005-2006.*

PHYS3335. Advanced quantum mechanics (6 credits)

This course introduces postgraduate and advanced undergraduate students to advanced techniques in quantum mechanics and their applications to selected topics in physics.

Prerequisite: PHYS2323 and PHYS3332.

PHYS3431. Advanced experimental physics * (6 credits)

This course aims to introduce the student to some of the more advanced techniques in modern physics, while at the same time illustrating some of the important experiments discussed in course text books.

Prerequisite: 1) PHYS2421 or PHYS2422 or PHYS2426; and 2) PHYS2321 and PHYS2322 and PHYS2323.

* *Not available to those who have taken PHYS2423 unless approved by course coordinator.*

PHYS3531. Physics project (12 credits)

This course is designed for students who are considering doing research in the future. It provides students with the opportunity to study special physics projects by themselves, either theoretical or experimental. These projects are close to research in nature and are designed for prospective research students.

Prerequisite: 1) PHYS2321; and 2) PHYS2323.

PHYS3532. Special topics in physics (12 credits)

To provide the chance for students to learn special topics in modern physics by themselves by reviewing literature (theoretical project) or practicing special experimental skills in carrying out a small project (experimental project) under the supervision of a member of staff.

Prerequisite: 1) PHYS2321; and 2) PHYS2323.

Department of Statistics & Actuarial Science**STAT0301. Elementary statistical methods** * (6 credits)

Research findings are often fully or partly supported by data. Data, which are often concerned with situations involving variability and uncertainty, are collected from an experiment or a survey. They are

used to estimate the true value of a certain quantity or to test the acceptability of a certain new hypothesis. Valid methods of analysing the data are thus essential to any successful investigation. The course presents the fundamentals of statistical methods widely used by researchers. There is no demand of sophisticated technical mathematics.

Prerequisite: HKCEE Mathematics. Not available to students with a pass in A-level Pure Mathematics. (Students taking or having taken STAT1301 or STAT1306 or STAT0302 or STAT1000 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT1801 or STAT0601 or STAT0602 are not allowed to take this course.)

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT0302. Business statistics * (6 credits)

The discipline of statistics is concerned with situations involving uncertainty and variability. Variability greatly affects the interpretation of data. Thus statistics forms an important descriptive and analytical tool. This elementary course, which is taught without any technical mathematics, presents many standard situations of data interpretation with emphases on business examples. The statistical tests for these situations are presented. Microsoft Excel might be used to carry out some statistical analysis.

Prerequisite: HKCEE Mathematics.

* *Available only to Business School students.*

STAT1301. Probability & statistics I (6 credits)

The discipline of statistics is concerned with situations in which uncertainty and variability play an essential role and forms an important descriptive and analytical tool in many practical problems. Against a background of motivating problems this course develops relevant probability models for the description of such uncertainty and variability and provides an introduction to the concepts, principles and methodology of statistical analysis.

Prerequisite: A-level Pure Mathematics or AS-level Mathematics & Statistics or equivalent. (Students taking or having taken STAT0301 or STAT0302 or STAT1306 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT1801 or STAT0601 or STAT0602 are not allowed to take this course.)

STAT1302. Probability & statistics II (6 credits)

This course builds on STAT1301, introducing further the concepts and methods of statistics. Emphasis is on the two major areas of statistical analysis: estimation and hypothesis testing. Through the disciplines of statistical modelling, inference and decision making, students will be equipped with both quantitative skills and qualitative perceptions essential for making rigorous statistical analysis of real-life data.

Prerequisite: A-level Pure Mathematics or AS-level Mathematics & Statistics or equivalent AND taking or having taken STAT1301 or STAT1000 or STAT1007 or STAT0601.

STAT1303. Data management * (6 credits)

This course is designed for students who want to learn a statistical software (SAS or SPSS) for data management and elementary data analysis. This course focuses on using SAS or SPSS to manage data set input and output, work with different data types, manipulate and transform data, perform random sampling and descriptive data analysis, and create summary reports.

Prerequisite: HKCEE Mathematics or AS-level Mathematics & Statistics or A-level Pure Mathematics or equivalent AND taking or having taken STAT0301 or STAT0302 or STAT1301 or STAT1306 or ECON1003 or ECOL2006 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602 or STAT1801.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT1304. The analysis of sample surveys * (6 credits)

We often try to infer the characteristics of a population by taking a sample from that population. The validity and the efficiency of the findings depend on the quality of the sample. This course considers the basic theory and practical applications for the different sampling design and analysis. Examples on marketing surveys, social surveys and opinion polls will be considered.

Prerequisite: HKCEE Mathematics or AS-level Mathematics & Statistics or A-level Pure Mathematics or equivalent AND taking or having taken STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or ECON1003 or ECOL2006 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT1305. Introduction to demography * (6 credits)

Demography studies the distribution of population by age, gender, marital status, education level, culture, ethnicity, and other social and physical characteristics. It also focuses on population changes---migration, fertility and mortality rates. Knowledge in demography is vital to economic studies, business and government policymaking and investment planning. The course introduces important statistical methods pertinent to the study of demography, with attention to problems of regional interest.

Prerequisite: HKCEE Mathematics or AS-level Mathematics & Statistics or A-level Pure Mathematics or equivalent AND taking or having taken STAT0301 or STAT0302 or STAT1301 or STAT1306 or ECON1003 or ECOL2006 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602 or STAT1801.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT1306. Introductory statistics (6 credits)

The discipline of statistics is concerned with situations involving uncertainty and variability. The interpretation of data needs special techniques when variability plays a role, as it usually does. Thus statistics forms an important descriptive and analytical tool of many scientific disciplines. Candidates with a mathematical background will find this course suitable, because the language of mathematics allows the subject of statistics to be presented with economy and clarity.

Prerequisite: A-level Pure Mathematics or AS-level Mathematics & Statistics or MATH0801 or MATH0802. Students without these qualifications, but with grade C or better in A-level Physics, are deemed to have sufficient mathematical training to enrol in this course. Students who intend to major in "Risk Management" or "Statistics" should take STAT1301 instead of this course. (Students taking or having taken STAT1301 or STAT0301 or STAT0302 or STAT1801 are not allowed to take this course.)

STAT1801. Probability and statistics: foundations of actuarial science (6 credits)

This course provides the basic foundations in probability and statistics for students in BSc(ActuarSc), though the course is also suitable for mathematically-able students from other quantitative curricula. Probability theory underpins the study of statistics. The course aims firstly to develop skills in probabilistic analysis for problems involving randomness. Random variables and probability distributions are studied in depth. The concepts of statistics are then introduced, guided by motivating examples.

Prerequisite: A-Level Pure Mathematics or equivalent.

STAT1802. Financial mathematics (6 credits)

This course introduces the mathematics of finance which plays an important role in the development of basic actuarial techniques. Practical applications of the actuarial functions and notation are considered also.

Prerequisite: A-level Pure Mathematics or AS-level Mathematics & Statistics or equivalent AND taking or having taken STAT1801 or STAT1302.

STAT2301. Linear statistical analysis * (6 credits)

The analysis of variability is mainly concerned with locating the sources of the variability. Many statistical techniques investigate these sources through the use of 'linear' models. This course presents the theory and practice of these models.

Prerequisite: STAT1302 (Students taking or having taken STAT0801 or STAT2804 are not allowed to take this course.)

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2302. Statistical inference * (6 credits)

This course covers the advanced theory of point estimation, interval estimation and hypothesis testing. Using a mathematically-oriented approach, the course provides a solid and rigorous treatment of inferential problems, statistical methodologies and the underlying concepts and theory. It is suitable in particular for students intending to further their studies or to develop a career in statistical research.

Prerequisite: STAT1302.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2303. Probability modelling * (6 credits)

This is an introductory course in probability modelling. A range of important topics in stochastic processes will be discussed.

Prerequisite: STAT1301 or STAT1000 or STAT1007 or STAT0601 (Students taking or having taken STAT2803 or MATH2603 are not allowed to take this course.)

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2304. Design and analysis of experiments * (6 credits)

In this course the basic theory of experimental design is introduced. Basic principles and guidelines for designing experiments will be introduced. Analysis for experiments with a single factor, Randomised block, Latin squares and related designs will be covered. The notions of crossed and nested factorial structure, balanced incomplete factorial experiments and fixed/random effects will be discussed.

Prerequisite: STAT1302 or STAT2802 or STAT2311 or STAT0401 or STAT0603 or STAT0100 or STAT0604 or STAT0605.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2305. Quality control and management * (6 credits)

The successful control of quality in production is a matter of primary importance to a company's prosperity and good-will. This course provides an overview of quality compromise which involves both the producer and the consumer. It presents a variety of statistical solutions including control charts, acceptance sampling plans, sequential sampling procedures, analysis of measurement errors, reliability, and life-testing. Contemporary quality management systems such as total quality control, quality control circle, zero defects, and ISO-9000 will be introduced. The student is brought to the frontier of today's quality control and management ideas.

Prerequisite: ECOL2006 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or STAT0100 or STAT2802 or STAT0604 or STAT0605.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2306. Business logistics * (6 credits)

Originally, the word 'logistics' described the strategic aspects involved in moving and supplying armies and navies. Usage grew to include games of strategy, such as chess. Modern business corporations are increasingly using logistics as a management tool, for example, in capital budgeting problems, production planning, scheduling, transportation or in deciding a location for a new factory. This course addresses the business applications of logistics.

Prerequisite: ECOL2006 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602 (Students taking or having taken MATH2901 are not allowed to take this course.)

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2307. Statistics in clinical medicine and bio-medical research * (6 credits)

In clinical medicine doctors observe features (such as blood pressure, hormone level, presence/absence of a symptom, degree of infection, etc.) which are subject to natural variation between individual patients and between groups of patients with different disease types. This variability motivates the application of statistical methodology to the clinical observational and decision-making process. Part of the course deals with these applications.

The other part deals with statistical problems which come from biological and medical research, for example the controlled clinical drug trial. No knowledge in biology or medicine is assumed; the course provides all of the necessary bio-medical background when the statistical problems are introduced.

Prerequisite: STAT1302 or STAT2802 or STAT0100 or STAT0604 or STAT0605.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2308. Statistical genetics * (6 credits)

This course covers background on genetics, Mendelian Genetics; Hardy-Weinberg equilibrium; linkage equilibrium; exact test; likelihood ratio test; chi-square test; population structure; linkage analysis; non-parametric linkage analysis; association studies; forensic genetics; relatedness; kinship analysis; mixed samples.

Prerequisite: STAT1302 or STAT2802 or STAT0100 or STAT0604 or STAT0605.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2309. The statistics of investment risk * (6 credits)

Most investments involve some risk. The decision to invest or not is usually made against a background of uncertainty. Whilst prediction of the future is difficult, there are statistical modelling techniques which provide a rational framework for investment decisions, particularly those relating to stock markets and the markets for interest rates, commodities and currencies. Building upon research, both in Hong Kong and abroad, this course presents the prevailing statistical theories for investment decisions in these vital markets. Particular issues include the concept of an efficient market, portfolio construction and analysis, asset pricing and management, and technical analysis.

Prerequisite: ECOL2006 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2310. Risk management and insurance * (6 credits)

The course introduces the statistical, financial and legal principles underlying the techniques for managing the insurable risks faced by organizations and individuals. It is aimed at students who have minimal background in quantitative methods and is not available to students majoring in Actuarial Science. The course emphasizes basic risk management and financial planning, and students will be able to apply these concepts immediately to their own lives.

Prerequisite: ECOL2006 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2311. Computer-aided data analysis * (6 credits)

A wide range of statistical analyses and methods are presented using data sets generated from social sciences research and scientific studies. These analyses deal with designed experiments in the laboratory or field-work setting together with data from less-rigorously planned observational studies. Measuring uncertainty, describing patterns of variability, and describing the inter-relationship between several variables are therefore essential aspects of social science and scientific investigations. These aspects require a good understanding of statistics. This computer-oriented but non-mathematical course develops the important concepts and methods of statistics. Although no knowledge of a programming language is required, the course makes extensive use of computers. This is made possible by high-quality, but user friendly statistical software like JMP or SPSS.

Prerequisite: ECOL2006 or ECON1003 or STAT0301 or STAT0302 or STAT1306 or STAT1001 or STAT1003 or STAT1006 or STAT1008 or STAT2001 or STAT0602 or (CogSc students having taken STAT1000 or STAT1301) (Students taking or having taken STAT0603 are not allowed to take this course).

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2312. Data mining * (6 credits)

With an explosion in information technology in the past decade, vast amounts of data appear in a variety of fields such as finance, marketing research, customer relations management, medicine and healthcare. The challenge of understanding these data with the aim of creating new knowledge and finding new relationships among data attributes has led to the innovative usage of statistical methodologies and development of new ones. In this process, a new area called data mining is spawned. This course provides a comprehensive and practical coverage of essential data mining concepts and statistical models for data mining.

Prerequisite: ECOL2006 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2313. Marketing engineering* (6 credits)

This course is designed to provide an overview and practical application of trends, technology and methodology used in the marketing survey process including problem formulation, survey design, data collection and analysis, and report writing. Special emphasis will be put on statistical techniques particularly for analysing marketing data including market segmentation, market response models, consumer preference analysis and conjoint analysis. Students will analyse a variety of marketing case studies.

Prerequisite: STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or ECON1003 or ECOL2006 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2314. Business forecasting * (6 credits)

In daily business operations, forecasts are routinely required on different aspects of the economy, the market and individual companies. Numerous statistical techniques have been developed in the past decades to provide forecasts for the business decision-maker. This course considers a wide range of such techniques that have proven useful to practitioners. The course will involve the use of computer software, EXCEL, in the teaching process.

Prerequisite: ECOL2006 or ECON1003 or STAT0301 or STAT0302 or STAT1306 or STAT1001 or STAT1003 or STAT1006 or STAT1008 or STAT2001 or STAT0602.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2315. Practical mathematics for investment and pensions * (6 credits)

The main focus of this course will be on financial mathematics of compound interest and life contingencies. Practical applications include local examples from commercial and car loans, mortgages, bonds, health insurance, Mandatory Provident Fund (MPF) System and other retirement security schemes.

Prerequisite: Any introductory-level or junior-level course (Students taking or having taken STAT1802 are not allowed to take this course.)

** For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2801. Life contingencies * (6 credits)

The major objectives of this course are to integrate life contingencies into a full probabilistic framework and to demonstrate the wide variety of constructs which are then possible to build from basic models at the foundation of actuarial science. The time-until-death random variable will be the basic building block by which models for life insurances, designed to reduce the financial impact of the random event of untimely death, will be developed. Techniques for calculation benefit premiums and benefit reserves of various types of life annuity and insurance will be discussed.

Prerequisite: (STAT1302 and STAT2315) or (STAT1802 and taking or having taken STAT2802) or (STAT1302 and STAT1802) or (STAT0100 and STAT0113).

** For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2804. Linear models and forecasting * (6 credits)

This course deals with applied statistical methods of linear models and investigates various forecasting procedures through time series analysis.

Prerequisite: STAT1302 or STAT2802 or STAT0100 or STAT0605 (Students taking or having taken STAT2301 or STAT3301 or STAT0102 or STAT0604 or STAT3101 are not allowed to take this course).

** For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2805. Credibility theory and loss distributions * (6 credits)

Credibility is an example of a statistical estimate. The idea of credibility is very useful in premium calculation. Insurance loss varies according to the business nature, what distribution should be used to fit a particular loss is both of theoretical interest and practical importance. This course covers important actuarial and statistical methods.

Prerequisite: STAT1302 or STAT2802 or STAT3810 or STAT0100 or STAT0604 or STAT0605 or STAT0802.

** For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT2806. Financial economics * (6 credits)

This course covers the skills necessary to construct and apply discrete stochastic models to value financial derivatives.

Prerequisite: STAT1302 or STAT2802 or STAT0100 or STAT0604 or STAT0605.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3301. Time-series analysis * (6 credits)

A time series consists of a set of observations on a random variable taken over time. Time series arise naturally in climatology, economics, environment studies, finance and many other disciplines. The observations in a time series are usually correlated; the course establishes a framework to discuss this. This course distinguishes different type of time series, investigates various representations for the processes and studies the relative merits of different forecasting procedures. Students will analyse real time-series data on the computer.

Prerequisite: STAT2301 or STAT0102 or STAT0604. (Students taking or having taken STAT0801 or STAT2804 are not allowed to take this course.)

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3302. Multivariate data analysis * (6 credits)

In many designed experiments or observational studies the researchers are dealing with multivariate data, where each observation is a set of measurements taken on the same individual. These measurements are often correlated. The correlation prevents the use of univariate statistics to draw inferences. This course develops the statistical methods for analysing multivariate data through examples in various fields of application and hands-on experience with the statistical software SAS.

Prerequisite: STAT0102 or STAT0604 or STAT0801 or STAT2301 or STAT2804.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3304. Computer-aided statistical modelling * (6 credits)

This is a computer-aided course of statistical modelling designed for the students who have taken STAT2301 Linear Statistical Analysis and like to see theory illustrated by practical computation. Numerous real data sets will be presented for modelling and analysis using statistical software, such as SAS, for gaining hands-on experience. The course also aims to develop skills of model selection and hypotheses formulation for testing, so that questions of interest can be properly formulated and answered. An important element deals with model review and improvement, when one's first attempt does not adequately fit the data. Modern computer software such as SAS makes this interactive approach easier.

Prerequisite: STAT2301 or STAT2804 or STAT0102 or STAT0801 (Students taking or having taken STAT3601 are not allowed to take this course).

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3305. Financial data analysis * (6 credits)

This course focuses on understanding financial data and methods by which they are analyzed and interpreted. It aims at enhancing the students' analytical skills of developing statistical models for analysing financial data. Techniques are motivated by examples and developed in the context of applications. Students will learn how to process financial data for purposes of financial analysis,

estimation and testing of financial models and to understand better crucial aspects of financial market movements.

Prerequisite: ECON1001 or STAT2309 or STAT2806.

* *Not offered in 2005-2006.*

STAT3306. Selected topics in statistics * (6 credits)

This course covers a range of topics necessary for work as a professional statistician. Statistical problems can be of many types. Whilst the statistician will face many non-standard situations, he/she is aided by well-developed theories and methods which bring many problems into a standard framework. This course presents such theory and methods. The emphasis may vary slightly from year to year.

Prerequisite: STAT0102 or STAT0801 or STAT0604 or STAT2301 or STAT2804.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3307. Project in statistics * (6 credits)

Each year a few projects suitable for Statistics or Actuarial Science major students will be offered. These projects, under the supervision of individual staff members involve the application of statistics and/or probability in interesting situations. They provide students with practical experience in approaching a real problem, in report writing and in oral presentation.

Prerequisite: STAT2301 or (STAT2802 and STAT2804) or STAT0102 or STAT0604 or (STAT2802 and STAT0801). Approval is subject to past academic performance. Availability of this course to Actuarial Science students is also subject to a quota.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3308. Financial engineering * (6 credits)

This course aims at demonstrating the practical use of financial derivative products to analyse various problems arisen in financial engineering. This course also examines the problems of measuring and managing financial market risk.

Prerequisite: STAT2309 or STAT2806 or STAT0109 or STAT0806.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3810. Risk theory * (6 credits)

Risk theory studies the deviations of financial results from those expected and deals with methods of avoiding inconvenient consequences from such deviations. This course deals with ruin theory; the applications of statistical models and stochastic processes to short-term insurance such as fire insurance, private motor insurance, and short-term disability insurance.

Prerequisite: (Taking or having taken STAT2803) or STAT2303 or MATH2603 or STAT0103.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3811. Survival analysis * (6 credits)

This course is concerned with how models which predict the survival pattern of humans or other entities are established. This exercise is sometimes referred to as survival-model construction.

Prerequisite: (Taking or having taken STAT2802) or STAT2301 or MATH2801 or STAT0102 or STAT0604 or STAT0801.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

STAT3812. Stochastic calculus with financial applications * (6 credits)

Stochastic calculus has become an essential tool in economics, insurance, finance and econometrics. This mathematical theory is the basis for pricing financial derivatives such as options and futures. This course is designed for students to develop professional skills in stochastic calculus and its applications to actuarial science and finance. Pure mathematical components of the course will be kept at a reasonably low level. The course begins with an overview of the basic concepts from probability theory. Stochastic processes, especially Brownian motion and martingales will be discussed.

Prerequisite: MATH2603 or STAT2303 or STAT2803 or STAT0103.

* *For students admitted in or before the academic year 2002-2003, the Prerequisites of the course can be treated as Prerequisites or Co-requisites.*

Faculty-level courses**SCNC0004. Scientific thinking and interesting discoveries** * (3 credits)

The objective of this course is to explore scientific thinking and also its relationship with the process of discovery. To provide an introduction of the logic of scientific thinking that leads eventually to interesting scientific discoveries. The course also emphasizes the appreciation of these discoveries and their implications.

Prerequisite: Nil.

* *Not offered in 2005-2006.*

SCNC1001. Science: concepts & notions * (6 credits)

To provide an introduction to scientific method, thought and concepts: to illustrate the different approaches taken within sub-disciplines to the investigation of major scientific problems and concepts.

Prerequisite: 1 AL science subject.

* *Not offered in 2005-2006.*

SCNC2002. Science and the new millennium * (6 credits)

To provide a coherent picture of modern Science by highlighting the course with topics of significant importance and with relevance to our daily life, in order for students to appreciate the importance of such significant scientific developments.

To generate a strong and intense interest in Science (life long learning) by widening the scope of the science horizon of each undergraduate in the Faculty.

To develop skills in communicating Science to laymen through posters and oral presentations.

Prerequisite: SCNC1001.

* *Not offered in 2005-2006.*

Language courses offered to BSc students

Chinese

CSCI0001. Practical Chinese language course for science students * (3 credits)

- (1) Practical Chinese Writing Skills
 - (a) Classical and modern Chinese
 - (b) The Chinese language: characteristics and usage
 - (c) Basic grammar of modern Chinese
- (2) Chinese Characters
 - (a) Traditional characters
 - (b) Simplified characters
 - (c) Variant forms
- (3) Letter-writing
 - (a) Business letter writing techniques
 - (b) Official letter writing techniques
- (4) Office Documents
 - (a) Notices and announcements
 - (b) Proposals
 - (c) Minutes and reports of meetings
- (5) Chinese for Special Purposes
 - (a) An introduction to science and technology in ancient China
 - (b) Reader-based scientific/technical writings
 - (c) Styles and rhetoric of scientific/technical writings
- (6) Presentation and Communication Techniques
 - (a) Communication and presentation techniques
 - (b) Discussion and the art of persuasion

Prerequisite: Nil.

* *This course is compulsory for all BSc students.*

CSCI0002. Putonghua course for science students * (no credit)

The course is divided into three parts:

- (i) Pronunciation;
- (ii) The *pinyin* system;
- (iii) Texts: greetings, numbers, inquiry, time & appointments, asking for direction, shopping, making phone calls, at the bank, in the post office, food and science terminology.

Prerequisite: Nil.

* *This course is available for BSc I students only.
Average class size is around 30.*

CSCI2002. Advanced language studies in Chinese (3 credits)

- (1) To hone students' communicative skills in Chinese. This course aims to improve their reading, listening, writing and speaking abilities in Chinese.
- (2) To expose students to different aspects of the language. This course covers a wide range of both linguistic and extra-linguistic subject matters, the knowledge of which would enable the students to use the language in an efficacious way.
- (3) To give pre-service language training to students. This course equips the students with language proficiency to get and secure a job.
- (4) To promote deeper understanding of Chinese culture. This course identifies areas of Chinese culture that are essential for the students to understand their society better.

Prerequisite: CSCI0001.

English

ECEN1801. Academic English for science students * (3 credits)

To build confidence in the use of English for writing and speaking about science. The focus is on:

- (1) Writing an essay which meets the requirements of good academic writing, in particular making appropriate use of published sources and avoiding plagiarism.
- (2) Speaking in an organized and coherent manner.

Prerequisite: Nil.

* *This course is compulsory for all BSc students.*

ECEN2802. Advanced academic English for science students * (3 credits)

To develop a sense of audience awareness in writing, to develop spontaneous speaking skills and to individualise language learning. The focus is on:

- (1) Writing a short article for one of a range of web journals each with a different audience and topic focus (individual choice).
- (2) Spontaneous (i.e. unrehearsed) discussion through participation in seminars and one-to-one discussions.
- (3) Developing independent language learning skills to help students address their individual language problems and focus on their future language needs.

Prerequisite: ECEN1801.

* *This course is compulsory for all BSc students.*