PHYS 2360 Experimental Physics III (2,0,3)
Prerequisite: Year II standing or consent of the instructor
This course consists of a series of laboratory experiments complementing the courses PHYS 2260 Modern Physics, PHYS 2130 Electromagnetism I, PHYS 3120 Statistical Physics I and PHYS 2140 Electromagnetism II.

PHYS 3120 Statistical Physics I (4,4,0)
Co-requisite: Year III standing or consent of the instructor
Foundation course on thermal and statistical physics. After a discussion of thermodynamic systems and processes, the basic postulates and framework of the statistical mechanics will be laid out, and connections to the classical thermodynamic laws will be made. The formalism will then be applied to simple classical and quantum systems such as the ideal gas, paramagnetic solid, free electron gas and phonons in solids, etc. The quantum statistics of Bosons and Fermions will be introduced.

PHYS 3140 Solid State Physics I (3,3,0)
Prerequisite: PHYS 3120 Statistical Physics I or consent of the instructor
This course studies applications of statistical physics and quantum mechancis to the solid state of matter. Aspects included are crystal structures, X-ray diffraction, lattice dynamics, thermal properties, and band theory of solids.

PHYS 3150 Quantum Mechanics I (4,4,0)
Prerequisite: PHYS 2260 Modern Physics
The course begins with a revision of the elementary wave mechanics for a particle in one dimension. The basic formalism of quantum mechanics is then introduced after equipping students with tools from linear algebra. The theory is then applied to the treatment of the hydrogen atom and classification of angular momentum eigenstates. The wave functions for many-electron systems and their applications will be introducted.

PHYS 3170 Solid State Physics II (3,3,0)
Prerequisite: PHYS 3140 Solid Physics I or consent of the instructor
This course is a continuation of PHYS3140 Solid State Physics I. A wide range of properties of solids, which include charge transport phenomena, optical properties, dielectric properties, and selected new materials of current interest will be treated in detail.

PHYS 3240 Experimental Physics IV (2,0,3)
Prerequisite: Year III standing or consent of the instructor
This course consists of a series of laboratory experiments complementing the courses PHYS 2260 Modern Physics, PHYS 2130 Electromagnetism I, PHYS 3120 Statistical Physics I and PHYS 2140 Electromagnetism II.

PHYS 3250 Experimental Physics V (2,0,2)
Prerequisite: Year III standing or consent of the instructor
This course consists of a series of laboratory experiments complementing to year three courses, as well as some level two courses.

PHYS 3260 Quantum Mechanics II (3,3,0)
Prerequisite: PHYS 3150 Quantum Mechanics I or consent of the instructor
This course studies the principles and applications of quantum mechanics. The topics include: angular momentum and spin, perturbation theory, the variational principle, helium atom, molecules, and scattering.

PHYS 3270 Modern Optics (3,3,0)
Prerequisite: PHYS 3130 Electromagnetism II or consent of the instructor
The first part of this course focuses on understanding the nature of light and its interactions with matter. Though based on classical ideas, modern applications will be emphasized. The second part covers the quantum mechanical treatment of light-matter interactions, including semi-classical model of the laser and topics of current interest.

PHYS 3280 Mechanics II (3,3,0)
Prerequisite: PHYS 2330 Mechanics I or consent of the instructor
The application of particle dynamics to systems with many degrees of freedom, including, motion in noninertial frame, rigid body motion, elastic deformations and topics of current interest.

PHYS 3290 Statistical Physics II (3,3,0)
Prerequisite: PHYS 3120 Statistical Physics I or consent of the instructor
Elementary treatment of statistical mechanics of interacting particles and simple kinetic processes, with applications to condensed systems such as liquids, superfluids or superconductors. Topics covered include cluster expansion for non-ideal gas, simple transport processes, individual and collective diffusion, and collective phenomena.

PHYS 3310 Modern Science Experimental Lab (3,0,3)
Prerequisite: COMP 1170 Introduction to Structured Programming, COMP 1180 Structured Programming or I.T. 1180 Information Management Technology
This course provides an introductory level to graphical programming for data acquisition and instrument control encountered by science students, using LabVIEW™ as the programming platform. In contrast to other structured programming platforms such as C and BASIC which require a sophisticated programming experience, the graphical programming environment offers a simple platform for beginners to control instruments, automate data acquisition and data presentation.

PHYS 3460 Computational Physics I (3,3,0)
Prerequisite: COMP 1170 Introduction to Structured Programming or COMP 1180 Structured Programming or consent of the instructor
This is an introductory course on doing physics on the computer. By working through selected examples, students will learn basic programming strategies, as well as an appreciation of important concepts in numerical analysis, such as accuracy, stability, and efficiency of various algorithms. They will also encounter examples of modelling and simulation designed to deepen their understanding of physical phenomena such as diffusion, growth, and phase transitions. The course includes a lab component which gives the student hands-on experience in numerical computation.

PHYS 3591-2 Physics Project I & II (3,0,9)
A one-year individual project which usually relates to the interdisciplinary or applied courses in the final year, and requires knowledge and skill acquired in the course. A thesis and an oral presentation are required upon completion of the project. This course is open to Physics majors only.

PHYS 3640 Computational Physics II (3,3,0)
Prerequisite: PHYS 3460 Computational Physics I or consent of the instructor
This course focuses on the Molecular Dynamics (MD) and Monte Carlo (MC) methods applied to particle and spin systems. The basic ideas are first introduced through the simple example of a harmonic oscillator. The MD method is then applied to a many-particle classical system in a box. Some standard algorithms for numerical integration, and for bookkeeping are discussed, along with methods of data analysis. Two versions of the MC method will be applied to the Ising model. The question of relaxation time will be addressed. Finally, a version of the MC method will be introduced to simulate the liquid state of a particle system and compared with the corresponding MD simulation.

PHYS 3910 Topics in Physics I (*,*,*)
PHYS 3920 Topics in Physics II (*,*,*)
PHYS 3930 Topics in Physics III (*,*,*)
Prerequisite: Year III standing or consent of the instructor
This course covers more advanced topics or topics of current

interest. A partial list of the topics includes the following: Acoustics, Computer-controlled Instrumentation, Materials Science, Electronic Instrumentation, Lasers and Their Applications, Optoelectronics, Seminconductor Physics, and Spectroscopy. This course can be repeated for credit if the topic is different.

PHYS 7310 Introduction to Environmental Science (3,3,0)
After completion of this course, students will develop knowledge of (1) Ecosystem and (2) how the Ecosystem responses to environmental change due to population growth. Students should also comprehend the concepts of (3) physical and energy resources.

PHYS 7320 Principles and Technologies of Renewable Energy I (3,3,0)
This course introduce the principles and technologies of renewable energy. After completion of this course, students will learn (1) the origin of renewable energy flow; (2) blackbody radiation, solar spectrum and radiation; (3) the Earth's energy budget; (4) working principles of inorganic and organic photovoltaic cells; (5) device fabrication and architecture; (6) materials science and characterization methodology of photovoltaic cells; and (7) solar cell systems and installation.

PHYS 7330 Principles and Technologies of Renewable Energy II (3,3,0)
Prerequisite: PHYS 7320 Principles and Technologies of Renewable Energy I
After completion of this course, students will learn (1) the origin of renewable energy flow; (2) individual renewable energy sources, including solar radiation, wind, ocean waves, water flows and tides, heat flows and stored heat, biomass; (3) large scale energy conversion processes; and (4) power transmission and energy storage technologies.

PHYS 7340 Energy Harvesting and Energy Conservation (3,3,0)
Prerequisite: PHYS 7320 Principles and Technologies of Renewable Energy II
After completion of this course, students will learn the following: (1) renewable energy system analysis; (2) harvesting parasitic energy in daily life; (3) harvesting chemical energy; and (4) energy conservation.

PHYS 7350 GIS and Remote Sensing (3,3,0)
This course introduces the knowledge of atmospheric science and radiation, meteorological instrumentation, data inversion and retrieval algorithm for environmental monitoring. After completion of this course, students will learn (1) atmospheric physics; (2) radiation transfer, absorption and scattering of solar radiation in Earth's atmosphere; (3) sensors and measurement instrumentation for atmospheric parameters and constituents; (4) working principles of GPS and its data format, and GIS data representation; (5) satellite platform, airborne, and ground-based remote sensing methodology and instrumentation; and (6) data inversion methodology and algorithm.

PHYS 7360 Green Laboratory (3,0,3)
This laboratory course includes lectures, lab exercises, and project-based experiments. The laboratory provides a set of practical experiments, which related to (1) energy harvesting; (2) energy conversion efficiency; (3) energy conservation; (4) measurements of meteorological parameters and atmospheric constituents; (5) meteorological instrumentation; and (6) characterizations of energy harvesting materials and solar cells.

PHYS 7371-2 Project in Green Technology (6,0,3)
The objective of the course is to enable students to develop mastery of green technology related concepts, including energy harvesting, energy conservation, and pollution monitoring. Students are expected to perform a highly independent work. After completion of this course, they will be able to demonstrate their mastery of course materials and apply what they have learnt in implementing practical problems. Students may propose a topic or select a project from a list of topics provided by the Department.

PHYS 7380 Advanced Topics in Physics I (3,3,0)
PHYS 7390 Advanced Topics in Physics II (3,3,0)
PHYS 7400 Advanced Topics in Physics III (3,3,0)
Prerequisite: Postgraduate standing or consent of instructor
This course are advanced courses reflecting the research interests of the time and of the faculty. Fundamental physics concepts and skills acquired from upper level undergraduate courses will be applied in these courses. Topics offered include Materials Science, Scientific Instrumentation, Modern Optics, Optoelectronics, Semiconductor Physics, Biophysics, Nonlinear Dynamic and Spectroscopy. These courses can be repeated for credit if the topics are different.

PHYS 7410 Physics for Green Technology (3,3,0)
This course covers the physics for green technology and environmental science, including classical and fluid mechanics, thermodynamics, electrostatics and electricity, electromagnetic waves, optics, and modern physics.

PHYS 7420 Energy Usage, the Environment and Sustainability (3,3,0)
This course allows students to comprehend the significance of energy sources, their capacity, security, costs and their effects on the environment. The energy production and economic distinction between non-renewable (e.g. coal, gas, oil and nuclear fuel) and renewable sources (e.g. wood, biomass, hydro, solar, wind, geothermal and ocean) upon amongst different countries will be explored. In addition, an examination on the role of nuclear energy and its concerns in radiation, spent fuel waste disposal and safety issue are addressed.

POLS 1110 Introduction to Research Methods (3,2,1)
This course is designed to enhance students' ability to perceive, evaluate and understand political phenomena through a systematic introduction to a wide range of approaches, methods and theories of political science. Basic research procedures and academic writing are the other foci of the course. Students are encouraged to analyse and explain the current political development of Europe, mainland China or Hong Kong with the help of particular perspectives and research methods. This course is open to GIS and European Studies majors only.

POLS 1120 Introduction to Political Economy (3,2,1)
Political economy, with its roots in the European 17th and 18th centuries, was the forefather of what developed in the 20th century into the two separate disciplines of political science and economics. However, it has remained as that discipline which examines the relationship of the individual to society, the economy, and the state. It is the study of relations and choices, of structures and institutions, of scales from the personal and local to the national, international, and global. Its originators include Locke, Hobbes, Adam Smith, Karl Marx, and Max Weber. Including choice theory and market theory, system theory, development theory and public policy theory, political economy examines the historic and human behavioural linkages among values/morals, politics, economic reality and economic reasoning. This course is open to GIS majors and GIS minors only.

POLS 1140 Political Movements: Chinese and European (3,2,1)
Prerequisite: POLS 1510 Foundations of Political Science or POLS 1520 Government and Politics of China (for GIS majors); or EURO 1111 Europe: Unity amd Diversity (for European Studies majors)
The course examines three major political movements—nationalism, liberalism, and socialism—within a comparative