SCHOOL OF SCIENCE AND TECHNOLOGY

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY WITH INTERNET APPLICATIONS

MT811 Advanced Java Programming (10 credits; 2 semesters)

Course Coordinator: Dr Steven Choy (Email: sochoy@ouhk.edu.hk)

The course aims to provide students with the knowledge and expertise to develop Java applications in networking, enterprise computing, and mobile computing. It covers the following topics.

- Overview of Java programming.
- Client-server networking in Java.
- Datagram and multicast networking in Java.
- Distributed computing with RMI.
- Enterprise computing with EJB.
- Mobile computing with J2ME.
- Overview of multimedia networking with Java.

There are four tutor-marked assignments (TMAs) throughout the course. Tutors will grade and comment extensively on the TMAs.

Tutors are expected to conduct about 10 to 12 tutorials with his or her group of students. The tutorials will be held on Saturday afternoon or Sunday. Surgeries will occur on about one evening every two weeks, and the duties will be shared among tutors. Tutors are also expected to allocate six hours per week before the cut-off date of each TMA.

Tutors will need access to an IBM PC compatible computer, a printer, and the Internet, preferably a broadband connection.

Applicants are expected to have a Master degree (or higher) in Computer Science or a related discipline, preferably with tertiary teaching experience and industrial experience in the relevant areas.

MT888 Multi-media Technology (10 credits; 2 semesters)

Course Coordinator: Dr Vanessa S. C. Ng (Tel: 2768 6814)

This course aims to provide students with knowledge in the current multimedia technology so that they can design and develop multimedia system. This course is part of the MSc Programme in Information Technology with Internet Applications. This course contains many illustrative programs in C language to illustrate the important concepts such as compression and coding, audio and image processing, which play a central role for multimedia system development and analysis. There are many practical activities for the students, and Borland C++ Builder is chosen as the development platform.

This 10-credit higher level course will be delivered in the distance education mode via printed materials and the Internet.

Topics include:
1. Fundamentals of Multimedia
2. Digital Audio and Video
3. Digital Processing of Audio and Video Data
4. Data Compression and Coding
5. Compression of Audio, Image and Video Data
6. Transmission of Audio and Video over Network
7. Interactive Multimedia Database
8. Multimedia Software and Hardware
9. Cryptography and Watermarking

You will need to have access to a PC with Windows 98 or above and Internet access. Dialup service will be provided by the university.

There are five tutor-marked assignments (TMAs) throughout the course. Tutors will be required to grade and comment extensively on TMAs. Each tutor is expected to conduct about 10 tutorials. Surgeries will also be held on one evening every two to three weeks. Depending on the size of the class, one or two tutors will be responsible to facilitate a surgery session. The tutorials will be held on Saturday afternoon or Sunday while surgeries will be held on a week day’s evening.
Online support of the course is available through the Online Learning Environment (OLE). You should participate actively in the discussion over there. You have to allocate six hours per week to answer queries from students either by phone or in the OLE. Applicants must have an advanced degree in Computer Science or related subject such as Information Technology, Computer Engineering, Information Engineering, etc. Experience in teaching or distance teaching would be an advantage but is not a requirement.

A higher degree in Information Technology, Computer Engineering or a related discipline. Teaching or practical experience in audio and image processing, multimedia networking and multimedia database would be an advantage.

**POSTGRADUATE CERTIFICATE IN INFORMATION TECHNOLOGY**

**MT800 Information Technology and Software Development  (20 credits; 2 semesters)**

**Course Coordinator: Dr Vanessa S.C. Ng (Tel: 2768 6814)**

This 20-credit course covers the breath of Information Technology with an emphasis on software development and current technologies. It also prepares students for the entry to the MSc program in Information Technology with Internet Applications.

The course covers the following areas:
1. Data representation in the computer
2. Computer architecture
3. Object-oriented programming with Java
4. Operating systems
5. Computer Networks
6. Database Management
7. Internet Programming
8. Software engineering
9. Project management

You will need to have access to an IBM PC compatible computer, a printer, and Internet access.

There are nine tutor-marked assignments (TMAs) throughout the course. Tutors will be required to grade and comment extensively on TMAs. A tutor is expected to conduct a 2-hour tutorial every two to three weeks. The tutorials will be held on Saturday afternoon or Sunday.

A tutor will also conduct about ten surgeries on weekday evenings during the course. In a 2-hour surgery, the tutor will spend much of the time answering questions relating to the TMAs in a classroom setting. In addition, a tutor is expected to allocate four hours a week to answer students’ questions through phone calls, email messages, or online discussion forum.

Usually one or two weeks before the due dates of TMAs an increase in the number of telephone queries or questions can be expected.

Applicants must have an advanced degree in Computer Science or a related subject such as Information Technology, Computing, Software Engineering, Information Engineering, etc. plus programming experience in Java.

**APPLIED COMPUTING PROGRAMME**

**M880 Software Engineering  (10 credits; 2 semesters)**

**Course Coordinator: Dr T.S. Li (Email: tsli@ouhk.edu.hk)**

This is a postgraduate course covering the theories and practices of software development. Students taking this course have a degree in computing or equivalent.

Contents:
The course topics are: the nature of software, process and process models, project management, software quality management, requirements specification, software design, testing, software evolution, reuse and components, professional issues, and software process review.

The course makes use of the SELECT Enterprise and SELECT Yourdon software, which are delivered on CD-ROM and should run on a PC with the following minimum configuration: Pentium or compatible 133MHz CPU, 64MB RAM, 300MB free drive space, CDROM drive, English Windows 95/98 with 1024 x 768 resolution.

A tutor is typically assigned a group of 25 students. The tutor will meet the students once a month in a tutorial over a 10-month period. The students can ask tutor questions in surgery sessions, over the telephone or Internet. About once every two months, a tutor will handle a surgery (Q&A) session.

The tutors are responsible for the marking of student assignments based on the marking scheme prepared by the course coordinator. In addition to assigning grades, the tutors are expected to write feedback to help students to learn. There are a total of four assignments.

Applicants must have a higher degree in Computer Science or a related discipline. Industrial software development experience would be an advantage.

**MT258 Computer Programming and Problem Solving (10 credits; 2 semesters)**

**Course Coordinator:** Dr Andrew K Lui (Email: alui@ouhk.edu.hk)

This is a compulsory course for students in Applied Computing degrees, Computing and Networking degrees, and sub-degree programmes.

The course aims to provide students with fundamental skills and knowledge in programming and application development. It covers the following topics.

- Introduction to C programming
- Basic elements of programming, including memory, input/output, selection, repetition, etc
- Basic data types and structures
- Problem solving and intermediate data structures
- Algorithms and efficiency analysis

There are four tutor-marked assignments (TMAs) in the course. Tutors will grade and comment extensively on the TMAs.

Tutors are expected to conduct about 12 tutorials with his or her group of students. The tutorials will be held on Saturday afternoon or Sunday. Surgeries will occur on about one evening every two weeks, and the duties will be shared among tutors. Tutors are also expected to allocate six hours per week to answer questions through email, online discussion forums, and telephone. The frequency of questions usually increases one or two weeks before the cut-off date of each TMA.

Tutors will need access to an IBM PC compatible computer, a printer, the Internet and Microsoft Word.

Applicants are expected to have an honours degree in computer science or equivalent, preferably with tertiary teaching experience and industry experience in C programming.

**MT260 Computer Architecture and Operating Systems (10 credits; 2 semesters)**

**Course Coordinator:** Dr Reggie Kwan (Tel: 2768 6807; email: kwan@ouhk.edu.hk; Web: http://learn.ouhk.edu.hk/~mt260)

Content:
The aims of the course are to enable students to describe hardware and software architectures of computer systems; compare and contrast various designs and implementation approaches to computer systems; participate in specification, design and evaluation of computer systems; explain the architectures and basic techniques of loosely coupled distributed computer systems; describe the operation, maintenance and administration aspects of distributed systems. The topics covered are:

1. Overview of software and hardware of a computer system;
2. Computer system organization;
3. CPU architectures;
4. Assembly language programming;
5. Operating systems and process concepts;
6. Memory management, input/output, and file systems;
7. Case studies of operating systems;

**TMAs:**
There are four tutor-marked assignments (TMAs) spread throughout the course. Tutors will be required to grade and comment extensively on TMAs.
Tutorials:
Each tutor is expected to conduct about twelve tutorials and one revision session before the examination. It is a requirement that tutors are available to attend these tutorials on either Sunday or Saturday mornings or afternoons. Surgeries will also be held in one weekday evening per fortnight when two tutors at a time will be on duty. Tutors are also expected to answer questions through email, discussion forums, and telephone. Usually one or two weeks before the cut-off dates of assignments there will be an increase in the number of phone or email questions. You will need to access to an IBM PC, a modem, and a printer. The University will provide an email account and free dial up access to the University network.

Qualifications required:
Applicants must possess an honours degree in computer science or equivalent, preferably with tertiary teaching experience or industry experience in relevant areas.

MT263 Discrete Structures  (10 credits; 2 semesters)

Course Coordinator: Mr Kelvin Lee (Tel: 2768 6815)

MT263 is primarily designed for students who intend to specialize in computing. It is an introductory course covering essential formal and theoretical concepts needed for further study of computing. The course covers fundamentals of computer science such as specification and abstraction in code, data structures, data types and classes. It then moves on to efficiency and proof of correctness of programs, so providing a basis for formal methods of software development. The course includes an introduction to formal logic. Mathematical ideas (such as sets and functions) are introduced where they help to clarify computing concepts.

The aims of the course are
• Provide students with the knowledge of code, data types, data structures and classes
• Enable students to write codes in classes
• Develop students’ knowledge and understanding in important data structures
• Introduce formal logic to write specifications and prove program correctness
• Analyse the efficiency of algorithms

The content include
• Data: Form and Function, Introduction to code, Data Types, and Introduction to Classes
• Important data structures and their associated classes: Logo-like graphics class, sequence-based collection classes, set, and binary trees
• Introduction to formal logic and aspects of databases
• Recursion. Analysis of algorithms and proof of correctness.

A total of four tutor-marked assignments (TMAs) are given throughout the course. Tutors will be required to mark and comment extensively on TMAs. Each tutor is expected to conduct about ten tutorials for his/her group as well as some surgery sessions for answering questions from students. It is a requirement that tutors are available to attend these tutorials on either Saturday afternoon or Sunday. In addition, they need to allocate a number of hours a week to give advice and help to their own group of students on the problems about the course which are raised by email, discussion forums, or phone-in queries. Usually the number of queries and questions are expected to increase as the cut-off dates of TMAs approach.

It is expected that a tutor can have access to a x86 computer with MS Windows 98/XP and Word. A modem or broadband access is also needed but the dial-up access to the Internet will be provided by OUHK. Answering questions from students through other electronic means such as discussion group are also required.

Applicants must possess an honours degree in Computer Science or a related discipline, or have passed Part I and Part II examinations of the British Computer Society or equivalent. Tertiary teaching experience in discrete structures will be an advantage, but is not a requirement.

MT311 Java Application Development and Programming Languages  (10 credits; 2 semesters)

Course Coordinator: Dr T.S. Li (Email: tsl@ouhk.edu.hk)

MT311 Java Application Development and Programming Languages is a higher level course for the B.Sc. & B.Sc. (Hons) in Computing and Networking.

The overall aims of this course are to provide students with the knowledge about the principles and concepts of different programming languages and advanced features in Java. Specially, it covers different language paradigms such as procedural programming languages, functional programming languages, logic programming languages, object oriented languages as well as advanced programming features in Java including inheritance, polymorphism, GUI, multithread, and network programming.

There are five tutor-marked assignments (TMAs) spread throughout the course. Tutors will be required to grade and comment extensively on
TMAs. Each tutor is expected to conduct about nine tutorials and one revision session before the examination. Surgeries will also be held on one evening per fortnight when one or two tutors at a time will be on duty. It is a requirement that tutors are available to attend these tutorials on either Saturday afternoon or Sunday. In addition, they need to allocate 4 to 6 hours a week to give advise and help to their own group of students through phone-in queries and online discussion.

Applicants must possess an honours degree, preferably higher degree in Computer Science or equivalent. Teaching experience would be an advantage but it is not a requirement. Preference will be given to those with experience in using or teaching Java.

MT356 Software Engineering and Project Management (10 credits; 2 semesters)

Course Coordinator: Dr Steven Choy (Email: sochoy@ouhk.edu.hk)

MT356 Software Engineering and Project Management approaches software development as an engineering discipline. In particular, an object-oriented approach using UML is adopted. It attempts to prepare the students for the complexities of real-world development.

This course is a full-year, 10-credit higher-level course. It is compulsory course for B.Sc. & B.Sc.(Hons) in Computing and Networking, Bachelor of Computing (BCOMP), and Bachelor of Computing with Honours in Internet Technology (BCOMPHIT).

There are four tutor-marked assignments (TMAs) throughout the course. Tutors will be required to grade and comment extensively on TMAs. A tutor is expected to conduct a 2-hour tutorial once a month. The tutorials will be held on Saturday afternoon or Sunday.

Throughout the course, there will be a total of sixteen surgeries to be held on weekday evenings. A tutor will be assigned to take charge of three to four surgeries. In a 2-hour surgery, the tutor will spend much of the time answering questions relating to the TMAs in a classroom setting. In addition, a tutor is expected to allocate four hours a week to answer students’ questions through phone calls, email messages, or online discussion forum.

Applicants must possess an honours degree, preferably higher degree in Computer Science or equivalent. Teaching experience would be an advantage but it is not a requirement. Preference will be given to those with experience in using or teaching UML.

MT411 Advanced Topics in Computing and Networking (10 credits; 2 semesters)

Course Coordinator: Dr Andrew K Lui (Email: alui@ouhk.edu.hk)

The course is divided into two blocks; each one examines one advanced topic. In the coming presentation, the topics of Advanced Networking and Digital Multimedia will be studied.

Block 1: Advanced Networking
- Characteristics of future high-speed WAN/LAN access technologies
- Access technologies for Small Office-Home Office (SOHO)
- Broadband technologies
- Wireless technology overview

Block 2: Digital Multimedia
- Fundamentals of multimedia
- Digital audio, image, and video formats
- Compression and processing of audio, image and video
- Internet multimedia

You will need access to an IBM PC compatible computer, a printer, the Internet, and Microsoft Word.

There are 4 tutor-marked assignments (TMAs) spread throughout the course. Tutors will be required to grade and comment extensively on TMAs. Each tutor is expected to conduct about 10 tutorials. Surgeries will also be held on one evening per two to three weeks. One or two tutors will be on duty at a time. It is a requirement that tutors are available to attend these tutorials and surgeries. Tutors are also expected to answer questions through email, discussion forums, and telephone. The frequency of questions usually increases one or two weeks before the cut-off date of each TMA.

Applicants must have an honours degree (or higher) in Computer Science or a related field. Experience in teaching or industry experience in relevant areas would be an advantage. Java will be used in the course for illustrations and in the assignments. Knowledge in the language is preferred but not required.
MT450 Applied Computing Project (10 credits; 2 semesters)

Course Coordinator: Dr Reggie Kwan (Email: rkwan@ouhk.edu.hk)

This is an advanced computing course by engaging students in independent study through a project environment. This course will provide situations that students will face in their employment that require researching, integrating and imagining ideas in finding solutions. The students will be divided into groups of about 6, and will work under the supervision of a tutor with a course coordinator as an advisor/internal examiner towards the achievement of each project objective related to each student's interest. This course is an optional course in the B.Sc.(Hons) in Applied Computing Programme.

The overall aims of the project are to teach students how to apply and integrate what they have learned from all subjects before obtaining their honours degree, and to develop the skills in planning, managing and scheduling the various tasks required to accomplish the solution of a project, and to learn how to write a technical report.

This course does not have Study Units nor set textbooks. There are three Tutor-Marked Assignments (TMAs), a student oral presentation and a possible final oral examination. These three TMAs are structured so that they guide a student through three stages of the project: getting started and the initial report, the interim report and the final report.

There are 12 tutorials of about 24 hours spreading throughout the year. Tutor is required to supervise a group of about 6 students in the tutorial on either Sunday or Saturday afternoon. In addition, tutor need to set aside couple of hours a week to give advise on phone-in queries.

Applicants must have at least an honours degree, preferably higher degree in Computer Science or equivalent. Project supervision or research experience is required. Tutors who are able to suggest project topics will be of special advantage.

ELECTRONICS and COMMUNICATIONS TECHNOLOGY PROGRAMMES

CT211 Fundamentals of Communications Technology (10 credits; 2 semesters)

Course Coordinator: Dr H.K. Lau (Tel: 2768 6845; Email: hklau@ouhk.edu.hk)

CT211 Fundamentals of Communications Technology is a one-year, 10-credit, middle-level course. This course is one of the compulsory courses in the BSc/BSc (Hons) Communications Technology with Management Programme. It is also suitable for students who simply want to learn the fundamentals of communications technology. There are no compulsory prerequisites for this course, although prior to commencing study students are advised to have a basic competency in high school mathematics including basic calculus and algebra. The course is designed to use software tools as integral learning components, so a basic knowledge of operating a computer in a Microsoft Windows environment is essential before a student commences the course.

The course aims to:
- Teach students the basic principles and building blocks of communication systems
- Provide the theoretical and technical background of major communication systems to permit further study in higher-level courses in the OUHK
- Outline the development and evolution of different transmission media
- Describe and apply communication theories underlying communication systems: for example, amplitude modulation, frequency modulation, coding and multiplexing techniques
- Outline the structure, operation and technologies for specific communication domains: for example, fixed and mobile telephones, television broadcasting, and optical and satellite communication systems
- Demonstrate the limitations or constraints in communications technology and how they can be overcome
- Guide students to further sources of knowledge and information about communications technology and systems

The course covers the following topics:
- Basic principles of communication systems and telecommunication services in Hong Kong
- Time-domain signal analysis
- Frequency-domain signal analysis
- Analogue Modulation techniques
- Principles of digital communication systems
- Transmission media and channel impairment
- Radio frequency communication systems, antenna theory and microwave devices
- Fixed telephone, mobile telephone and satellite communications systems
- Television broadcasting and optical communication systems
- Computer communication networks and the Internet
There will be five tutor-marked assignments (TMAs), and one final examination. The assignment exercises are designed to test the students on practical work and analysis skills. Tutors will be required to mark and comment extensively on TMAs.

Each tutor is expected to conduct about 10 two-hour tutorials for his/her group as well as some surgery sessions for answering questions from learners. It is a requirement that tutors are available to attend these tutorials on Sunday. In addition, they need to allocate a number of hours a week to give advice and help their own group of learners on the problems about the course which are raised by phone-in queries, e-mails or on-line discussion board. Usually the number of queries and questions are expected to increase as the cut-off dates of TMAs approach.

Applicants must possess an honours degree, preferably a higher degree in Electronic Engineering, Information Engineering, Communications Engineering or equivalent. Tertiary level teaching experience or relevant industrial experience would be an advantage.

T225 Analogue Circuits (10 credits; 2 semesters)

Course Coordinator: Dr Wilson Hon-Wai Chu (Tel: 2768 6817)

This course is intended to give a basic understanding of electronic principles, circuits and systems and to develop the fundamental theory and practical skills required to carry out engineering analysis and design. It provides essential background knowledge for higher level courses in electronics and related disciplines. It is also suitable for students of other disciplines who require a good working knowledge of electronics. However, the treatment is not superficial, and a good mathematical and scientific background is necessary.

The central theme of the course is the analysis and design of analogue circuits. The course includes: AC circuit analysis, including step and frequency response; properties of amplifiers, feedback and operational amplifiers; transistors; design of an audio pre-amplifier and power amplifier; higher frequency aspects of analogue circuits and an introduction to radio transmission and reception.

Practical skills in electronics are developed in short laboratory sessions held in our own laboratories at Homantin and two one-day Sunday Long Lab held in our own laboratory.

This course uses a computer-aided design package to help with circuit design. Both students and tutors are required to have access to an IBM PC or compatible computer to run this CAD software.

Tutors will be required to grade and comment extensively on 5 written assignments submitted by the students. Tutors are required to attend regular two-hour tutorials, surgery sessions, as well as the laboratories.

Applicants are expected to have an honours degree in Electronics. Experience of teaching Electronics at tertiary level would be a distinct advantage, but is not essential.

T323 Information Theory and Digital Communications (10 credits; 2 semesters)

Course Coordinator: Dr Wilson Hon-Wai Chu (Tel: 2768 6817)

The course aims to provide students with an understanding of fundamental limits in information theory and basic knowledge of the major principles, systems and techniques used in digital communications. More importantly, the course aims to enable students to follow and interpret descriptions of systems which are new to them, and which have not been covered specifically in the course.

The course includes: overview of communication systems; introduction to digital signals and communication systems; reliability, traffic information; time and frequency domain models of digital signals; noise sources and characterisation, noise in circuits and systems, threshold detection and error rates; digital coding and modulation; modems; fundamentals of information theory source coding theorem and channel coding theorem; linear block codes, convolutional codes, scramblers, interleaving; equalization; multiplexing, multiple access techniques.

This course uses software package such as Matlab to help student do simulation studies. Both students and tutors are required to have access to an IBM PC or compatible computer to run the software.

Tutors will be required to grade and comment extensively on 5 written assignments submitted by the students. This assignment marking amounts to about 90 hours work.

Tutors will be required to attend about 10 two-hour tutorials, plus two or three 2-hour surgery sessions.

Applicants are required to have an honours degree in Electronics, and preferably a higher degree in a suitable subject (e.g. Electronics, Communications or Information Technology). Experience of teaching Communications at a tertiary level would be a distinct advantage.
T333 Computer and PC Design (10 credits; 2 semesters)

Course Coordinator: Dr P C K Kwok (Tel: 2768 6804)

Contents
The course covers the following topics:
- Computer system design and performance measurement
- Instruction set architecture, 80x86 and MIPS
- Pipelining and performance evaluation
- Memory hierarchy, virtual memory; memory system design and technology
- Chipsets, peripherals and buses
- BIOS, drivers, firmware and operating system
- Computer networking
- Case studies of various computer design

Tutors will be required to mark 4 written assignments submitted by each student over a period of a year. Each tutor will take 9 tutorials and 9 surgeries each 2-hour long. Tutors will also be required to support the course discussion group on the Internet and to answer questions raised by students through email.

Applicants must possess at least a good honours degree in a computer-related discipline with two or more years’ of tertiary level teaching experience or experience in relevant industry.

T354 Inside Electronic Devices (10 credits; 2 semesters)

Course Coordinator: Dr Paul Kwok (Tel: 2768 6804)

Content:
Chapter 1: electronic materials in the form of pure elements, various alloys and compounds are discussed along with various types of bondings that exist in solids. A simple spread-sheet exercise helps investigate how mobility of charge carrier affects conduction
Chapter 2: aims to examine the way electronic materials are used to make components such as resistors and capacitors and then deployed in finished products. Different approaches to circuit building are examined, ranging from the traditional circuit board, with discrete components soldered into holes, to hybrid circuit assemblies, where components are integrated into the surface of the supporting substrate.
Chapter 3: two most common applications of magnetism, motors and transformers are described. Next an insight is provided inside magnetic materials at microscopic level to see what actually determines their magnetic behaviour. Magnetic recording is explained and three basic magnetic memory technologies are discussed.
Chapter 4: deals with transducers. It is examined how materials can be engineered to great effect to produce pyroelectric, piezoelectric and electro-optic responses, which are all based on one particular oxide system–lead(Pb)-lanthanum (La)-Zirconium (Zr)-titanate(TiO3).
Chapter 5: aims to give an understanding of the properties, principles and processes behind semiconductor microcircuits. Processes of etching, photolithography, masking and diffusion are described in detail and how devices like p-n diodes, p-n capacitors and MOS memories are constructed. MOS and CMOS processing sequences and industrial processes for fabrication of RAM microcircuits are described.
Chapter 6: focuses on two branches of the display technology: Cathode ray tube and liquid crystal displays. The principles of the CRT are outlined. For liquid-crystal display Introduction to the possibility of high-resolution liquid-crystal displays using matrix addressing via a thin-film transistor (TFT) attached to each pixel is given. This offers the possibility of using liquid-crystal displays for television.
Chapter 7: starts with the study of medical imaging scanners and defines the superconducting condition and its mechanism. Next principles of action of nuclear magnetic resonance is described. Realisation of a magnet using metallic superconducting wire at 4.2K is described. The chapter closes with some other interesting possible uses for superconductors
Chapter 8: introduces the concept of electrical modulation of optical properties and the optical modulation of electronic properties of materials and describes how optoelectronics contributes greatly to memory technology through magneto-optic data-storage systems and CDs alongside other magnetic and semiconductor systems. The major emphasis of the chapter is on telecommunications. It explains how the three aspects of transconduction, memory and display are all essential ingredients of information technology. It explains the principles and technology of light-emitting diodes, lasers, light detectors and optical fibres and describes in details how these devices make up ingredients of a modern telecommunication system.

TMAs
There will be four Tutor-Marked Assignments (TMAs)
Tutorials
There will be 9 tutorials and 10 surgeries, each two hours long. A tutorial on weekend and a surgery in the weekday after office hours will be held almost once every month.

Experience
Applicants must possess at least a good Honours degree in Electronics or Material Science or Physics and should have tertiary level teaching experience or experience in relevant industry.

U228 Engineers in Society (5 credits; 1 semester)

Course Coordinator: Dr Paul Kwok (Tel: 2768 6804)

Content:
Unit 1: An introduction to Hong Kong industry presents an overview of the development of Hong Kong industry and explores the shift to a post-industrial society as information technology and services gain importance. The unit introduces the work of the Innovation and Technology Commission and related developments, as Hong Kong positions itself to become a major technology based business centre in the region.

Unit 2: The engineer in society explores the role of engineers in society and the particular situation for professional engineers in Hong Kong. Global ethical issues for engineers are explored through case study examples.

Unit 3: Professional practice concentrates on three specific areas: safety and health, environmental management and; intellectual property. An overview of design liability and consumer law are included.

Unit 4: An introduction to product engineering introduces the product development process as a tool to encourage innovation in product design and the unit encourages a flexible approach by engineers. The increasing role of IT in industry is explored from the perspective of design tools used and the improvements to processes which are possible. Quality management and its relevance to Hong Kong are introduced and the unit ends with the product and technology life-cycle, to lead into the next unit.

Unit 5: Engineering business development builds on the product development process introduced in Unit 4, bringing out the business issues for small technology based start-up companies. The unit introduces the development of a business plan and sources of finance in Hong Kong.

TMAs:
There will be three Tutor-Marked Assignments (TMAs). Each TMA will be considered as equivalent to one-half normal TMA

Tutorials:
There will be 5 tutorials and 2 surgeries, each two hours long. Tutorials will be held on weekend and surgeries on the weekday after office hours.

Experience:
Applicants must possess at least a good Honours degree in Electrical / Electronics / Mechanical / Manufacturing engineering or related discipline and should have sufficient academic or industrial experience in the subject matter. Corporate membership of HKIE, RPE, Engineering Council C.Eng. or equivalent will be an advantage.

U234 Web Site Design (10 credits, 2 semesters)

Course Coordinator: Mike Robertshaw (Tel: 2768 6802; email: mrobert@ouhk.edu.hk)

Web design is a challenging and dynamic field of endeavour. It’s challenging because it is multi-disciplinary in nature and encompasses skills such as process management, creative design, business know-how and technical architecture. It’s dynamic because there are so many variables involved in the process – browsers, servers, network access, authoring and multi-media standards, and website stakeholders.

With such a wide variety of topics to cover, this course aims to introduce the students to the primary concepts and techniques they need to know, and to provide them with a good starting point from which to venture deeper into their specific areas of interest. It also acquaints them with current and emerging trends in authoring, site design and Internet access that may influence Web development in the not-so-distant future.

The broad prerequisites for students are familiarity with accessing and using the Internet, basic Web page publishing and a basic knowledge of HTML. U234 then aims to equip students with the practical skills needed to design and manage Web sites for small-scale Web commerce.

Students will take on the role of Web site designer for a small business and will build upon the given case studies to produce a Web site that includes Web commerce features, using good design and professional practices. They will typically host their Web site in a standard
‘public_html’ directory on a shared server with CGI access. They will also become familiar with developing trends in technology and their likely effects on Web design.

The course is divided into three phases and ten Units.

**Phase 1. Preparing for Web Design** presents the basic concepts for the course:
- **Unit 1: Web Design Basics and Process** introduces basic design guidelines used in building and evaluating Web sites, the common tools and technologies for constructing Web sites, and the Web site development process.
- **Unit 2: E-Commerce Concepts** describes the design and implementation issues that apply to Web commerce sites.
- **Unit 3: Analysis and Planning** is the first stage of the Web site development process. This step is where the goals and scope of the project are defined and agreed upon, and site-wide architectural decisions are made. The output of this step will feed into the succeeding steps in the process.

**Phase 2. Design and Production** focuses on the detailed design and production of the individual elements that make up a Web page and how they are all put together.
- **Unit 4: Page Layout** discusses the structuring and organization of content on a Web page and the use of storyboards and prototyping techniques in presenting the layout.
- **Unit 5: Text and Typography** looks at the design issues affecting the text content on a Web page. It introduces formatting techniques using both HTML and Style Sheets.
- **Unit 6: Graphics and Multimedia** deals with the production and appropriate use of graphics and multimedia elements.
- **Unit 7: Interactive Elements** describes the programming languages that operate on the client (i.e. browser) and the server and how they can be used to implement interactivity and applications on a Web site.

**Phase 3. Going Live** discusses the testing and on-going support and maintenance that must be performed after the site launch.
- **Unit 8: Testing and Deployment** discusses testing methods to ensure that the Web site performs according to the original project specifications. It describes the process of moving the site to a live production server.
- **Unit 9: Promotion and Maintenance** covers site promotion and operational issues to consider in managing an active business Web site effectively.
- **Unit 10: The Future of Web Design** takes a look at the emerging trends in Internet access and technology that can have a major influence on the field of Web design.

Tutorials:
It is expected that there will be about 24 hours of tutorials spread over the course. Tutors will be expected to provide online support through the course discussion board as well as through email.

Assessment:
There will be 5 TMAs, which are to be submitted and processed electronically.

Applicants are required to have an honours degree in a related area and to demonstrate extensive experience in Web site design incorporating the types of features taught in U234. Familiarity with Dreamweaver and Fireworks is expected.

**ENGINEERING MECHANICS, MATERIALS AND DESIGN PROGRAMME**

**S271 Discovering Physics  (10 credits; 2 semesters)**

**Course Coordinator : Dr Jimmy Chan  (Tel: 2768 6821)**

S271 is an optional course for B.Sc.(EMMD), B.Sc.(AC) and B.Sc.(Hons) (AC) (Electronics Strand) programmes and a compulsory course for B.Sc.(Hons) (EMMD), B.Sc.(Electronics) and B.Sc.(Hons) (Electronics) programmes.

This course extends the range and depth of treatment of the physics topics in S111/S121 (or S102) and provides a broad grounding in physics. It has been designed for those students who require a basic knowledge of physics to underpin their study of subsequent courses in the degree programmes in Electronics, Engineering Mechanics, Materials and Design, and Applied Computing (Electronics Strand).

The course has the following aims:
1. To introduce learners to the fundamental ideas constituting the core of today's physics so that they may gain an understanding of the basic laws that govern the world, from the subatomic to the cosmic scale;
2. To stimulate learners to merge the knowledge they have learnt from the course to describe the physical picture of stellar evolution; and
3. To provide learners with an opportunity to engage in experimental activities related to the materials studied during the course and provide them with skills to manipulate experimental data and present analysis of data with critical comments and discussion.
This introduction to physics, assumes some mathematical skills such as graphs and simple algebra. Principles of classical physics – mechanics, kinetic theory and chaos, vibrations, waves and electromagnetism – are covered as well as descriptions of twentieth – century discoveries, in particular Einstein’s theory of special relativity and the development of quantum mechanics. The study units are:

Newtonian Mechanics (Block A):
• Motion in one dimension
• Motion in two and three dimensions
• Conservation of momentum and energy
• Rotational motion;
• Kinetic theory and chaos

Waves and Electromagnetism (Block B):
• Vibrations;
• Waves
• Charges, forces and fields
• Electric potential and electric current
• Magnetic fields and the Lorentz force law
• Electric and magnetic fields that vary with time

Revolutions of Modern Physics (Block C):
• Special relativity
• The beginnings of modern atomic physics
• The quantum mechanical theory of matter
• Quantum mechanics in atoms
• Applications of quantum mechanics

Tutors will have to mark and extensively comment on 5 tutor-marked assignments (TMAs). Though marking guides will be provided, tutors will need to familiarize themselves fully with all of the components of the course in order to provide proper guidance to students through their written comments.

Tutors will be required to conduct a series of 8 two-hour tutorials at intervals of about 4-5 weeks. In addition, tutors will also be expected to attend a number of laboratory classes throughout the course. These classes are of two types: (1) ‘Short lab’ sessions involving brief and simple experiments, (2) ‘Long lab’ sessions will normally held on Sundays and run from 9:00 a.m. to 6:00p.m. either at the OUHK laboratory or at the Chinese University of Hong Kong. Tutors will also be expected to provide support and help to students through 2 or 3 surgery sessions.

Applicants are expected to have an honours degree in Physics and preferably with some experience in teaching physics at tertiary level.

**T235 Engineering Mechanics : Solids (10 credits; 2 semesters)**

**Course Coordinator : Mr C C Chan (Tel: 2768 6820)**

T235 is a course within the degree programmes in Product Design and Technology and Engineering Mechanics, Materials and Design. T235 is a recommended prerequisite for T395 Mechatronics.

This course has the following aims:
- to introduce the fundamentals of solid mechanics, including statistics and dynamics. This basic understanding is an important element in the training of engineers with a wide range of interests and specialisms.
- to provide the basic analytical tools which design engineers need to create and assess the design of mechanical components and systems.

The course is divided into several principal areas of study: kinematics, statics, dynamics and structures.

Kinematics is the representation and analysis of motion itself, i.e. the position, speed and acceleration of mechanisms and free bodies. Graphical methods in terms of velocity and acceleration diagrams are introduced.

Statics is the study of forces in equilibrium and hence leads to an appreciation of the design of structures.

Dynamics is the study of the relationship between force and motion. It tells us how to find the forces needed to cause a required motion or how to find the motion that will result from known forces. The dynamics section includes the concepts of momentum, work, power and energy and the elements of vibration.

When the forces are known, their effect on the components of the structure of machine can be investigated, a process called stress analysis.
The course is concluded by a case study.

Tutors will be required to conduct 9 tutorials of 2 hours duration each and will also attend some surgeries. There are eight TV programmes and two audio-visual cassettes. The video materials will be available for viewing in the OUHK library. Tutors are expected to view these in their own time to become familiar with the contents.

There are four day-long classes on Saturdays or Sundays of which at least three must be attended by students in order to pass the course. Tutors will have to be present in each day long session for their group and guide the students.

Tutors are required to mark and comment extensively on four Tutor-marked assignments. Besides this, there will also be 8 CMA's. Tutors may be appointed as script markers during the final examination.

Applicants must possess an honours degree in Mechanical Engineering or related subject and at least 2 years relevant working or teaching experience.

**ENVIRONMENTAL STUDIES PROGRAMME**

**S122  A Foundation Course in Biology and Earth Science  (10 credits; 2 semesters)**

*Course Coordinator: Prof K. C. Ho (Tel: 2768 6803; email: kcho@ouhk.edu.hk)*

S122 was developed at OUHK for people in Hong Kong. This foundation course in Biology and Earth Science aims:

- To bring students without an existing knowledge of biology and Earth Science into contact with key concepts and principles in current biology and Earth Science.
- To enable students who desire a refresher course in biology and earth science to update their knowledge.
- To provide students with a solid foundation in biological and Earth Sciences thus empowering them, if desired, to embrace further studies in degree programmes offered by the School of Science and Technology, OUHK.
- To help students to appreciate, value, assess, understand and enjoy the roles and position of biological and Earth Sciences in HKSAR, greater China and globally.

**Topic overview:**

1. Biology consists of four units covering the central themes and topics which unify the science of life today. These themes include:
   - Chemical basis of life
   - energy transformations
   - DNA
   - plant and animal way of life
   - keeping life steady (homeostasis)
   - Evolution
   - Adaptation
   - Ecology
   - Biodiversity

2. Earth Science, like its biological counterpart, also consists of four units covering these topics:
   - This place on Earth : Hong Kong (geology and climate),
   - The shape of Hong Kong : landscapes
   - The shape of Hong Kong : coastlines
   - Dynamic landscapes : weathering
   - Dynamic landscapes : water, slopes and erosion
   - Landscape resources : soils and biota
   - Earth Science in action : visiting the earth in Hong Kong

The course is organized around two set textbooks, one in biology and one in earth science. Each text is supported by course companions which guide the students along a pathway of learning designed on the distance mode of educational delivery. At the time of writing, the earth science text is at the final edit stage before publication. Chapters from this text are included with the course materials interact with a group of students via Tutor Marked Assignments (TMAs). Tutors shall provide face to face and telephone tutorials, conduct surgeries, run two dayschools, lead three evening lab sessions and communicate with students through Webct discussion board.
As can be deduced from the topic overview, a strong local flavour exists. It is important that tutors of S122 can relate the concepts of the biological and Earth Sciences to the Hong Kong environment. Thus an interest in local (Hong Kong/South China) natural history, ecology, physical geography and geology is highly desirable.

Tutors should have a degree and or post-graduate qualifications in a biological science for the biology stream and similar qualifications in geography, geomorphology, earth science or geology for the Earth Science stream. Experiences in using Webct and a teaching qualification are added recommendations.

S204  Biology: Uniformity and Diversity  (20 credits; 2 semesters)

Course Coordinator : Dr Gordon S. Maxwell (Tel : 2768 6812; email: gmaxwell@ouhk.edu.hk)

S204 is recommended for students who have an interest in the natural sciences and the environment. The course provides a solid and wide coverage of biological science for those who wish to proceed to any higher-level course in environmental studies upon which a good understanding of the biological sciences rests.

The course emphasizes three themes: (i) the dynamic nature of living organisms as shown by studies at the molecular, cellular and whole organism level of biological organization (ii) the interactions between organisms and their environment and (iii) the important place of investigation and experimentation in bioscience.

The course comes with seven textbooks supported by Study Guides, Glossaries, 6 CDRoms and II Videos (9 of the videos are from the UKOU and two are OUHK productions called, Hong Kong Habitats shown on TVB). Book 1 introduces biodiversity and Book 2, extends the material to cover environmental biology, genetic diversity, reproduction and longevity. Book 3 comes in two volumes and looks at metabolism, gene action and membranes. Book 4 covers microbes while Books 5 and 6 deal with plant and Animal biology respectively. A strong current of investigation runs through all books. The texts are colourful with very good graphs and all have such didactic features as questions with answers, section by section summaries and conclusions. Study Guides (or Study Files) provide students with a ‘map’ of how to approach the texts and how to use videos and CDRoms as well as built in questions with feedback.

Tutors will be required to grade, comment on and teach via 7 written assignments (TMAs) and to answer queries arising from these assignments.

Tutors are expected to take about 9 tutorial classes. Also, they will attend surgeries on rotation. Telephone tutoring is also important. As information technology expands in affordable availability tutors will need to be accessible via e-mail and the use of WebCT in which instruction will be given by OUHK.

Laboratory classes are led by tutors. There are two types of laboratory classes: the Short laboratory held in the evenings which lasts for 3 hours and the Long Laboratory held on Sundays which lasts for 9 hours. There will be 8 Short Laboratory classes and 4 Long Laboratory classes.

Applicants will be expected to have both a solid Bachelor’s degree in a biological science and a Masters degree in at least one discipline within the biosciences. Preference will be given to applicants with a PhD that includes some aspect of biology, environmental biology, botany, zoology or ecology relevant to Hong Kong.

S328  Ecology  (10 credits; 2 semesters)

Course Coordinator: Dr Gordon Maxwell (Tel: 2768 6812; email: gmaxwell@ouhk.edu.hk)

S328 is a higher-level compulsory course for students who intend to follow the degree programme in Environmental Studies. The course aims to provide students with a good understanding of ecological principles and to enable students to obtain the basic skills for advanced ecological analysis. While the course is mainly based on distance-learning materials, special emphasis is placed on investigational approaches which are likely to be the best for training students in solving ecological problems and in making predictions about ecosystems.

S328 is organized into five text books. Each book is a stand alone text which emphasises a major theme in modern ecology.

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<tr>
<th>Book</th>
<th>Title</th>
<th>Theme</th>
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<tr>
<td>One</td>
<td>Interactions</td>
<td>How organisms interact with other organisms and with their physical</td>
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<td></td>
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<td>chemical environments</td>
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<td>Two</td>
<td>Population Ecology</td>
<td>Life histories, population dynamics, competition, coexistence and</td>
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Three Communities  Biogeography and how ecological communities hold together and change

Four Ecosystems  Ecosystem concept, energy transfer, geochemical and biogeochemical cycles; change and stability in ecosystems

Five Humans and Ecosystems  Human impacts on the worlds life support systems and how ecology can help EIA (environmental impact assessment) and ecosystem management.

As a student progresses through these 'big five' textbooks he should gain in understanding and make connections between the interconnected themes of ecology.

Practical fieldwork based on Hong Kong sites is a most important part of the course. Students will attend three compulsory field courses and conduct an ecological investigation of their own (project). Tutor support and advise is a vital component of this practical work.

Tutors will assess and interact with students via four TMA, one of which will be a student project report.

Tutors will conduct regular tutorials, some of which will be field based visits to sites of ecological interest in Hong Kong. They will also conduct surgeries on rotation.

Applicants are expected to have a higher degree in one of the biological sciences or suitable environmental subject. Working experience in ecology is a distinct advantage as is some teaching/lecturing. An on-going interest in the ecology of Hong Kong would be a most welcome attribute.

U206 Environment (20 credits; 2 semesters)

Course Coordinator: Dr C. W. Chan  (Tel: 2768 6813)

U206 is an inter-disciplinary course that introduces the technological, social scientific and philosophical concepts related to environment. It is an optional subject for the honours degree programmes in Environmental Studies and International Studies.

The course aims to:

- examine the causes and consequences of current environmental problems such as acid rain, nuclear dumping and green house effects
- widen students' environmental awareness by identifying the sociological and philosophical issues related to resources management
- to evaluate the interactions and ramifications between ecological, chemical economical and political processes in global environmental protection
- to assess the proposals in ameliorating or mitigating global environmental problems

The course is designed to show both the diversity and the interconnections of the environment. It ranges over a variety of environmental issues at different times and in different places, and stresses the relationship between the local and the global, the natural and the social and the individual and society. In this way students will be able to relate their own experience and local environment to a wider context.

There are four major blocks for the course:

- *Environment and society* presents different ways of looking at environmental issues. The opening chapter uses common-sense views to demonstrate the need for a better scientific understanding of how environments work and how society changes them. Later chapters present geological and ecological insights into the evolution of the Earth and the range of natural ecosystems and hazards. Finally, the block shows the effects human societies have had in the past and explores the nature of environmentalism.
- *Environment, population and development* considers agricultural systems and urbanization against the background of population and economic growth. Various agricultural systems are analysed in terms of sustainability and productivity. Urban environmental problems in developed and developing countries are examined, from the provision of basic services to the problems of urban planning and management.
- *Energy resources and environment* analyses the environmental consequences of use of minerals and non-renewable energy resources, moving to a consideration of the potential effects on the environment of renewable technologies. Then the block discusses the impact of industrial pollution, its regulation, the risk of catastrophic accidents in chemical plants and the disposal of toxic waste. The block ends with a discussion of the political problems of managing radioactive waste into the distant future.
- *Global environmental issues* examine the scientific, political and economic factors associated with serious global environmental problems and with the construction of international regimes to tackle them. It deals with issues such as exploitation of the oceans, ozone depletion, global warming and the conflicts involved in arriving at feasible policies. The course ends with a discussion of different strategies for sustainable development and considers the prospects for achieving it.
There are regular face-to-face sessions throughout the course. Tutors are required to lead all tutorials but surgeries are attended by tutors on rota basis.

There are some compulsory dayschools arranged at weekday evenings, Saturday or Sunday. Tutors shall attend all dayschools.

Tutors are responsible for marking assignments and shall provide guidance to the design and carrying out of projects.

Applicants shall have an honours and or post-graduate degree in science with connections to broad environmental issues or a similar degree in a social science which could include geography, environmental ethics or sociology. An active interest in the Hong Kong environment is desired.

MATHEMATICS PROGRAMME

M121 A Foundation in Pure Mathematics (10 credits; 2 semesters)

Course Coordinator: Mike Robertshaw (Email: mrobert@ouhk.edu.hk)

This is one of the two mathematics foundation courses offered to adult learners who will begin their study through distance learning.

The course starts with a Preparatory Package to introduce students to their new learning environment and to the course including the computing elements, the style of the units and the required learning skills. Students will also be introduced to an algebraic software package through a series of revision exercises and the different Internet communication channels through which they will be able to seek and obtain additional support throughout the course.

The course is divided into four blocks:

The first block is a basic introduction to the mathematics language that will be used in this course. Geometric views and algebraic representations will be used to start and to develop students’ mathematical ability on set theory, logic, relations and functions.

The second block is on proofs and combinatorics. Different strategies in writing proofs such as mathematical induction, direct proofs, proofs by contradiction and by exhaustion, etc. are introduced. Next students explore ways to count things mathematically, to write mathematically, and to observe patterns in a more logical way. They learn to apply permutations, combinations and the Binomial expansion.

The third block is on recursion and iteration. In graph theory students will be introduced to terminologies such as vertices, edges and cycles before the study of Hamiltonian cycles and Dijkstra’s shortest-path algorithm. Students will also learn how to find solutions of recurrence relations and to find approximations to roots of continuous functions.

The fourth block is on algebraic structures. Matrices, complex numbers, modular arithmetic will be introduced and studied to such a depth to help students in building up abstract concepts on groups.

Tutorials will be held every 2-3 weeks throughout the course including online sessions. Besides conducting tutorials, tutors are expected to be involved in providing support through the Internet. There will be five Tutor-marked assignments, five Computer-marked assignments and a final examination.

Students will be required to buy a computer software package called Scientific Notebook. This will be used to allow students to experiment with the mathematics taught in the course. This will encourage them to learn by discovery as well as to enable them to tackle more realistic problems without the burden of extensive calculations/manipulations. Most units and assignments will include work with the software. Tutors will be provided with a copy of this package.

Tutors must have at least an honours degree in mathematics or related discipline. Teaching experience in pure mathematics and experience in using computer for communications on the Internet would be an advantage.

M214 Fundamentals of Group Theory and Geometry (10 credits; 2 semesters)

Course Coordinator: Mrs Louisa Kwok (Tel: 2768 6808)

The course is derived from M203, a middle level pure mathematics course from British Open University. It is a compulsory course for both BSc and BSc (Hons) in Mathematics. The course is also compulsory for secondary teachers who pursue an honours degree in Secondary Education with Mathematics as an area of specialization. It aims to provide students with fundamental knowledge on Group Theory and Geometry. It is recommended for students who are interested at higher levels of mathematical abstraction.
The course has a Preparatory block, Group Theory block and Geometry block. Learners are expected to study a unit within two weeks. The course covers the following topics:

**Preparatory (3 units):** mathematical language, symmetry, groups and subgroups
**Group Theory (5 units):** permutations, cosets and Lagrange’s Theorem, Conjugacy, Isomorphisms and Homomorphisms, Group actions
**Geometry (5 units):** Affine geometry, Inversive geometry, Non-Euclidean geometry, Projective geometry: lines

There are 7 audio-CDs and 13 television programs in this course.

Tutors are expected to provide support to these adult learners in building up relevant mathematical concepts through tutorials, assignments, telephone contact and communication through the Internet. Tutors must allocate six hours every week to answer students’ queries through the telephone. As students have different mathematical backgrounds, tutors must be patient and sympathetic in helping adult learners.

Tutors must be able to communicate and to support students’ learning through the Internet.

There are 4 tutor-marked assignments spread throughout the course. Tutors are given a marking scheme on each assignment and they are expected to teach through assignment marking.

The course has nine 2-hour tutorials. All tutorials are held on either Saturday or Sunday afternoons. Tutors must prepare work to initiate discussions at these tutorials.

The course runs from October 2004 to August 2005. The next presentation of the course will be at April 2006.

Tutors for this course must have a master degree in mathematics (or equivalent) with a substantial component in Pure Mathematics. Teaching experience at an undergraduate level in Pure Mathematics is a distinct advantage.

**M337 Complex Analysis (10 credits; 2 semesters)**

**Course Coordinator: Mrs Louisa Kwok (Tel:2768 6808)**

This course is imported from British Open University. Students who study this course are those who are pursuing either the degree of Bachelor of Science (Honours) in Mathematics or the degree of Bachelor of Education (Honours) in Secondary Education.

The course is divided into four blocks:

- **"Introduction"** covering complex numbers; complex functions; sequences and continuity; differentiation of complex functions.
- **"Representation formulae"** covering integration of complex functions; Cauchy's theorem and the Cauchy integral formula; Taylor series; Laurent series.
- **"Calculus of residues"** covering residue calculus for evaluating real integrals and sums of infinite series; Riemann surfaces; winding number and the location of zeros of complex functions.
- **"Applications"** covering conformal mappings as used in fluid dynamics; complex analytic dynamics, Julia sets and the Mandelbrot set.

During the course tutors will mark four tutor-marked assignments and will present nine 2-hour tutorials to be held at certain Saturday or Sunday afternoons.

Tutors for this course should preferably have a postgraduate qualification in mathematics or should have a very good honours degree in mathematics with a major pure mathematics component. Tutors must have experience in using the Internet for searching information and for communication with others.

**M346 Linear Statistical Modelling (10 credits; 2 semesters)**

**Course Coordinator: Ms May Chan (Tel: 2768 6809)**

M346 is a course imported from the British Open University and builds upon the middle-level courses M245: Probability and Statistics or M246: Elements of Statistics. The course is an option in the Applied Computing and Mathematics degree programmes.
M346 follows course M245/M246 in its approach, using real problems and data to stimulate analyses and their interpretation. Theoretical background is not ignored, but the main emphasis is on method. After a general introductory chapter it will be reviewed the statistical methods and concepts that will be needed later. One chapter reviews general statistical background, another the basic linear regression model, extensions of which are the core of this course. A statistical software package – Genstat will be used for data analysis in these chapters. There is a chapter that gives a complete introduction to using Genstat. The later chapters introduce a wide variety of linear statistical modelling tools: one-way analysis of variance, multiple regression, more general analysis of variance and designed experiments. All these are special cases of the normal linear model. Further chapters develop linear modelling in the more general framework of the generalized linear model: binary regression, the full generalized linear model, diagnostic checking and log-linear modelling. A closing chapter applies the methods students have learnt to the analysis of further data sets.

The course involves four tutor-marked assignments spread over the course. Each tutor will be expected to meet with his/her group of students around ten to twelve 2 or 3-hour tutorials held at either weekday nights or weekends.

Tutors will be expected to communicate with students and handle the assignments through Internet and to make use of their own examples and case studies in tutorials and therefore practical experience in the use of the techniques in the course is required. As the course is a higher-level one tutors will be required to have at least an honours degree in mathematics with a statistics as a major element of the degree. Preference will be given to applicants with a Master degree or higher in statistics or related subject.

MST207  Mathematical Methods, Models and Modelling  (20 credits; 2 semesters)

Course Coordinator: Dr Anita S.M. Wong (Tel: 2768 6810; email:anwong@ouhk.edu.hk)

This is a second-level applied mathematics course for mathematics, computing, engineering, science and technology students.

The course teaches the use of mathematics with algebraic software in solving real-life problems and the skill of mathematical modelling process. The course consists of three main themes of study. One of these themes is about how to represent relevant aspects of the real world problems in the form of mathematical *models*. The second theme is about mathematical methods that are useful in working with such models. The third theme of the course is about the use of computer algebra package and software Mathcad to solve mathematical problems numerically.

The modelling component consists of nine units on mechanics, which starts with Status and Newton's second laws of motion and their consequences for a particle or for a system of particles in one-, two- and three-dimension, continuing with vibrations of such a particle system. The vibrations of systems of particles involve the moments, circular motion and motion of rigid bodies. Four units are devoted to the processes of mathematical modelling and practical skills in modelling real-life problems. With these four modelling units, two of them are on some non-mechanical models; such as the population models and heat transfer models. The television programmes for these two units show how the relevant mathematical models are used in industry. Students are required to carry out a mini-project in solving a non-mathematical problem from real world by using mathematical model, e.g. the suspension system of a push bicycle. The project involves testing their conclusions against real data, improving the model where is necessary, and to write a final project report.

The methods component consists of thirteen units. Five of these units involve differential equations, starting with first- and second-order differential equations, going on to simultaneous and non-linear differential equations, and ending with an introduction to partial differential equations. Three units involve mathematical methods for three-dimensional problems, which include functions of several variables, vector calculus, and multiple integrals. Three units deal with topics in algebra, which include vector algebra, matrix algebra, eigenvalues and eigenvectors. One unit is about Fourier series and one is concerned with numerical methods for differential equations. Most of the numerical mathematics has practical computer work associated with them. The course software will be delivered on CD-ROMS as part of the materials for the course. The use of software is based on Mathcad.

Most of students taking MST207 should have completed one or more of the mathematics foundation courses - M111, M112, M121 or M122, or have achieved relevant knowledges, therefore students should be reasonably competent in studying as independent learners.

There are eight tutor-marked assignments spread throughout the course - one of which is dedicated to the mini-project component.

For this course tutors should have an honours or preferable higher degree in mathematics, applied mathematics, or equivalent. It is helpful if tutors have had practical experience of mathematical modelling in order to assist students both with the modelling units and with the project. Teaching experience would clearly be an advantage.

Each tutor is expected to meet with his/her group in a series of 2-hour tutorials held during weekends every 3-4 weeks throughout the course. (It is a requirement that normally tutors are available to attend these tutorials on either Saturday afternoons or Sunday morning.) The tutor is required to prepare tutorial notes for students to use and demonstrate the use of the course software Mathcad in the tutorials, and supervise student’s project. There will, in addition, be longer face-to-face sessions held during weekends to address the project exercises of the course. Surgeries will be held on weekday nights or Saturday afternoon with tutors attending on a rota basis. Tutors are expected to own a computer at home to access Internet and to use the mathematical algebraic software. It is not necessary for tutors to be qualified in pure mathematics apart from those elements of algebra described above.
MST322 Mathematical Methods and Fluid Mechanics (10 credits; 2 semesters)

Course Coordinator: Mike Robertshaw (Email: mrobert@ouhk.edu.hk)

The course is divided into four blocks:

Block 1 forms a solid foundation for the rest of the course by:
• Introducing some of the physical properties of fluids and the continuum model of a fluid.
• Extending the methods of solving ordinary differential equations (odes).
• Introducing
  • the solution of first-order partial differential equations (pdes).
  • the method of dimensional analysis.
  • Stokes’ and Gauss’ Theorems.

Block 2 starts by investigating the motion of a fluid that is assumed to be incompressible and later looks at the consequences of this assumption. In particular, it:
• Develops and solves the equations of motion for the incompressible, inviscid model and the appropriate boundary conditions.
• Introduces the idea of a vortex and the effects of viscosity on flow.
• Develops a model for the forces due to viscosity and how this can be simplified through dimensionless quantities such as the Reynolds number.

Block 3 investigates analytically the solutions of second-order ‘pdes’. It:
• Shows that such an equation can be classified into:
  • Elliptic
  • Hyperbolic
  • Parabolic
• Introduces
  • the method of separation of variables.
  • the properties of power series and Fourier series.
  • Sturm-Liouville theory
• Solves Laplace’s equation.
• Investigates the flow of a fluid past a cylinder and a sphere.

Block 4 looks at waves and some of the methods of solving the wave equation before applying this to models of water waves.

About 10 two-hour tutorials will be held during the course using face-to-face and online formats. There are 4 assignments.

Tutors will need access to a PC-compatible computer with Internet connection and capable of sound input and output. A device capable of playing audio and video CDs will also be required.

Tutors must have at least an honours degree in applied mathematics or a related discipline that involves the application of partial differential equations to mathematical modelling.

NURSING PROGRAMME

BACHELOR OF NURSING (HONS) PROGRAMME

NU401 Nursing Project (10 credits; 2 semesters)

Course Coordinator: Dr Joseph Lee (Tel: 2768 6818)

This is a higher level course which aims to deepen nurses understanding of research in nursing and expose them to the process of conducting nursing research.

After studying this course students should be able to design and conduct a nursing research project, and write a report suitable for dissemination of findings.

This course is a core subject in the Bachelor of Nursing (Honours) degree. Students will need to have completed at least 60 credits before enrolling in NU401.

Continuous assessment in NU401 consists of tutor marked initial and interim reports whilst the Final Report can be regarded as a Final Examination.
There are 10 tutorials spread throughout the course. A tutor is required to supervise a group of five to seven students in the tutorials and will need to set aside time each week for telephone discussion and to mark the TMAs.

Applicants must have at least a Post Graduate degree in Nursing, Social Science, Health Studies or related field and have experience in conducting research. Experience in supervision of nursing research projects is highly desirable.

**BACHELOR OF NURSING PROGRAMME**

**NU310  Professional Nursing Practice (10 credits; 2 semesters)**

Course Coordinator: Ms Linda Lee (Tel: 2768 6806)

NU310 is a higher level course in the Bachelor of Nursing programme. This course attempts to explore the theoretical, research and other critical issues that related to professional nursing practice.

This course aims to:

- to expand students’ understanding of the theoretical and research perspectives in nursing
- to develop students’ readiness in the areas of professional responsibility, accountability and critical mindedness

**Contents**

The course covers the following topics:

- Theoretical nursing
- Designing clinical nursing research
- Data analysis
- Power & politics
- Leadership and nursing
- Managing change and stress in nursing

There are four tutor-marked assignments in this course. Tutors are expected to hold regular tutorials of two hours every month throughout the course.

Applicants must have at least an honours degree in relevant discipline, such as nursing or health sciences. Having working experience in health care setting will be a distinct advantage.

**HIGHER DIPLOMA IN NURSING PROGRAMME**

**NU104C  精神健康 (五學分；一學期)**

學科主任：曾日坤先生 (電話: 2768 6819)

NU104C 是精神健康護理學高級文憑課程中的一個必修基礎科目，以中文教學為主，尤為適合新生修讀。本科旨在幫助學員認識精神健康的概念和了解精神障礙的根源與治療。建議學員在修讀其他中級和高級程度科目之前先修本科。此外，學員修讀本科時須同時修讀 NU202C 行為科學(護士科目)。

**目標：**

本科旨在幫助學員認識和了解精神健康的概念、心理社會因素與軀體疾病的關係，及人生階段中常見的精神障礙，為將來修讀治療性精神護理科目打下良好的基礎。

**內容：**

本科共有五個修讀單元。各修讀單元的主要內容依次列如下：

- 精神健康導論
- 兒童及青少年的精神障礙
- 心身疾病
- 成人的精神障礙
- 高齡人士的精神障礙

輔學服務：
本科安排三十小时的輔學活動，其中包括十小時導修課、八小時日間課堂，及十二小時補習課。

成績評核：
本科成績的評核，是以三份導師評改作業和一次3小時的期終考試為標準。導師亦有責任輔導學生編寫作業及在學期終結前為學生提供總結溫習。

指定教科書：
本科使用下列教科書：
Peterson, C 著，杜仲傑等譯 (2002) 《變態心理學》，臺北，桂冠圖書股份有限公司。

申請資格：
本科導師須最少具備護理學或與精神健康相關學科的榮譽學士資歷，具有高等學位或相關工作經驗的申請人將獲優先考慮。

NU202C 行為科學（十學分；兩學期）

學科主任：曾日坤先生 （電話：2768 6819）

NU202C 行為科學是護理學高級文憑課程中的一個必修科目。修讀時間為兩個學期，學分值為十學分。NU202C是一個介紹心理學、社會學和人際關係與溝通的入門科目，以中文教學為主。本科目為中級程度，建議學生在選修本科前先修讀護理學高級文憑課程的基本程度科目。

目標：
本科旨在幫助學員認識和了解在心理學、社會學上和護理學有關的課題，從而明白個人行為和人與人之間的互動，並能加以掌握其學理及應用於護理實務上。此外，本科亦結合了人際關係與溝通的理論與技巧，幫助學員認識溝通的主要概念，並擴展他們在護理工作上的溝通能力。

內容：
本科共有十個修讀單元。各修讀單元的主要內容概列如下：

- 心理學與身心發展
- 認識這個世界：感覺、知覺、學習
- 個人的差異：動機、情緒、態度、人格
- 心理與健康
- 與他人的聯繫：社會
- 醫療與社會
- 人際溝通
- 人際溝通的基礎技巧
- 護理實務上的人際溝通
- 醫護職系間的溝通

輔學服務：
本科設有導修課(24小時)，日間課堂(10小時)，及補習課(24小時)等輔學服務合共五十八小時。

成績評核：
本科成績的評核，是以五份導師評改作業和一次3小時的期終考試為標準。導師亦有責任輔導學生編寫作業及在學期終結前為學生提供總結溫習。

指定教科書：
本科使用下列教科書：
葉重新 (1999) 《心理學》 (第 2 版), 臺北, 心理出版社。
鄭佩芬 (2000) 《人際關係與溝通技巧》, 臺北：揚智文化事業股份有限公司。

申請資格：
本科導師須最少具備護理學或相關行為科學學科的榮譽學士資歷，具有高等學位或相關工作經驗的申請人將獲優先考慮。

NU213C 專科護理學 (十學分；兩學期)

學科主任：曾日坤先生 (電話：2768 6819)

NU213C 專科護理學是護理學高級文憑課程中的一個必修科目。修讀時間為一個學期，學分值為五學分。NU213C是一個介紹香港護理局「註冊護士（普通科）課程大綱」所指定的專科護理學科的入門科目，以中文教學為主。本科目為中級程度，學生應已對一般的臨床護理學有所認識，所以建議學生在選修本科前先修讀 NU112C 成人及兒童護理學(一)及 NU212C 成人及兒童護理學(二)。

目標：
本科旨在幫助學生認識和了解「社區護理學」及「高齡護理學」，以深入淺出的指導方式為學生介紹此兩門專科護理學的基礎知識。此外，有鑒於一般普通科護士對精神科護理的缺乏，本學科亦對「精神科護理學」作出引介，以幫助普通科護士了解精神科患者的病癥和護理原則，並能接納精神科患者及協助他們康復。

內容：
本科共有五個修讀單元。 各修讀單元的主要內容欄列如下：
- 社區護理學導論
- 社區護理實務
- 高齡護理學導論
- 高齡護理實務
- 精神科護理學概論

輔學服務：
本科設有導修課(10 小時)，日間課堂(8 小時)，及補習課(12 小時)等輔學服務合共三十小時。

成績評核：
本科成績的評核，是以三份導師評改作業和一次 3 小時的期終考試為標準。導師亦有責任輔導學生編寫作業及在學期終結前為學生提供總結溫習。

指定教科書：
本科使用下列教科書：
徐震主编(1997) 《老人醫療及護理實務》，臺北，桂冠圖書股份有限公司。

申請資格：
本科導師須最少具備護理學榮譽學士學位，具有高等學位或相關專科護理工作經驗的申請人將獲優先考慮。

NU214C 治療性精神護理學 (II) (十學分；兩學期)
學科主任：曾日坤先生 (電話：2768 6819)

NU214C 是精神健康護理學高級文憑課程中一個必修科目，修讀時間為兩個學期，學分值為十學分。NU214C 是一個有關精神科護理的基礎與相關知識的科目，以中文教學為主。本科目為中級程度，學生修讀本科前須先修讀 NU114C 治療性精神護理學（一）。

目標：
本科旨在幫助學員認識和了解精神科護理、精神健康條例及與精神科護理相關的倫理知識，以深入淺出的指導方式幫助學員掌握其學理及應用於護理實務上。此外，本科亦介紹精神科常用急救學及生理障礙護理，有助學員在精神科護理工作上的需要。

內容：
本科共有十個修讀單元，各修讀單元的主要內容列列如下：
- 老年精神病護理導論
- 物質濫用精神病護理導論
- 精神科康復導論
- 社區精神科護理導論
- 精神科常用急救學概論
- 精神病者患生理障礙護理概論
- 與精神科護理相關的法例、倫理和管理概論

輔導服務：
本科設有導修課（24 小時），日間課堂（10 小時），實驗室實習課（20 小時），及補習課（24 小時）等輔學服務合共 78 小時。

成績評核：
本科成績的評核，是以五份導師評改作業和一次 3 小時的期末考試為標準。導師亦有責任輔導學生編寫作業及在學期末結前為學生提供總結溫習。

指定教科書：
本科使用下列教科書：
Stuat. G. & Laraia, M. 著，王美雲等譯 (2003)《精神科護理學》，台北：五南圖書出版公司。

申請資格：
本科導師須具備護理學的榮譽學士，並具相關護理工作經驗。具有較高等學位的申請人亦將獲優先考慮。