



The Hong Kong Polytechnic University 香港理工大學
Department of Computing 電子計算學系

Definitive Programme Document for

Postgraduate Scheme
in
Computing

Programme Code : 61030
Self-Financed (Mixed Mode)

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The Definitive Programme Document is applicable to students admitted in 2009/10

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Part 1: General Information

1.1 Introduction

Title of Programme	: Postgraduate Scheme in Computing (61030)
Host Department	: Department of Computing
Programme Structure	: Credit-based
Credit Requirement	: 30

Students successfully completed the required content will be offered the following awards:

Awards	Mode of Study	Normal Duration* (No. of semesters)	Maximum Duration (No. of years)	Stream codes	Available Specialisms
MSc/PgD in Software Technology 軟件科技理學碩士學位 /深造文憑	Regular, FT	3	3	61030 – FST/FSP	--
	Regular, PT	5	5	61030 – PST/PSP	--
	Cyber U, PT	5	8	61803 – STM/STP	Software Engineering
MSc/PgD in Information Technology 資訊科技理學碩士學位 /深造文憑	Regular, FT	3	3	61030 – FIT/FTP	--
	Regular, PT	5	5	61030 – PIT/PTP	--
MSc/PgD in Information Systems 資訊系統理學碩士學位 /深造文憑	Regular, FT	3	3	61030 – FIS/FIP	--
	Regular, PT	5	5	61030 – PIS/PIP	--
	Outpost, PT	5	5	61030 – ISX/ISY	--
	Cyber U, PT	5	8	61802 – ISM/ISP	--
MSc/PgD in E-Commerce 電子商貿理學碩士學位 /深造文憑	Regular, FT	3	3	61030 – FEC/FEP	--
	Regular, PT	5	5	61030 – PEC/PEP	--
	Cyber U, PT	5	8	61801 – ECM/ECP	--

* It is not a guaranteed duration but dependent on students' preference and subject availability.

1.2 Aims, Objectives and Intended Learning Outcomes of the Scheme

The main objective of the Postgraduate Scheme in Computing is to provide professional IT education that suits the needs of students from different background and in different modes of learning. As a result, students can pursue lifelong learning that best suits their needs.

The aims for different awards are different and are summarized as follows:

1.2.1 MSc/PgD in Software Technology

This award aims to provide computing professionals with Computer Science or Computing academic background to pursue in-depth studies in software technologies. The award emphasizes in the application of software technologies to solve business/industrial problems and the technical know-how of software engineering and management. The specific aims of this award are:

- To provide up-to-date and in-depth knowledge in the fast-changing software technology;
- To provide opportunities to specialize on major areas in software technology;
- To develop the ability to assimilate and to apply acquired knowledge in software technology.

There is a stream specialized in Software Engineering delivered in CyberU mode, which is offered in collaboration with the Graduate University of the Chinese Academy of Sciences.

1.2.2 MSc/PgD in Information Technology

This award serves as a bridging graduate programme to allow professionals from Engineering background (not necessarily from Computing) to rapidly acquire fundamental and state of the art information technology to solve pragmatic business problems. The program is designed and structured to incrementally help students to build a strong foundation in core concepts underpinning IT. The knowledge acquired is further reinforced by allowing students to put into practice the concepts learned in class through solving IT problems in the form of projects. The specific aims are:

- To develop areas of study relevant to the student's current profession or a profession he/she intends to engage in, and to update a student's knowledge in a particular discipline;
- To develop areas of study new to the student or in areas not directly related to the scope of the student's first degree; and
- To provide an analytical in-depth study of an area already introduced at undergraduate level.

1.2.3 MSc/PgD in Information Systems

This award aims to provide management professionals with the knowledge, skill and confidence in the application of information systems within an organization to enable them:

- To identify appropriate IT driven opportunities and incorporate these into the strategic thinking process;
- To develop a framework appropriate to the organizational culture to facilitate the alignment and interplay of organizational strategies with information systems and E-commerce strategies;
- To take an active part in the decision making process surrounding the use and development of IS with a particular emphasis on the management of change which may result from the transfer of technology within the organization;

- To act as internal consultants within their organizations with regard to the evaluation of IS/IT applications, their development and implementation, to improve organizational practices, productivity and profitability;
- To manage quality issues in the processes related to effective information systems planning, development and implementation;
- To maintain and further develop standards of professional practice with regard to the organizational planning processes for effective IS/IT utilization.

1.2.4 MSc/PgD in E-Commerce

This award aims to educate a new generation of knowledge and technical personnel as well as top managers and business executives in E-Commerce. As E-Commerce generally involves the integration of technology and management, this award covers both the technology and management aspects. In the technology aspect, it offers students the opportunity to examine various issues of conducting business as related to networked and on-line commerce, with a focus on the enabling technologies and techniques. Hence, graduates will be able to effectively contribute towards the planning, development, deployment and management of E-Commerce systems and applications. More specifically, students will possess:-

- a good understanding of E-Commerce fundamentals particularly the enabling technologies;
- the ability to appraise tools like E-Commerce platforms, HTTP servers, secure transaction software and firewalls, database systems, heterogeneous networks, intelligent agents, etc.;
- the ability to understand the realities and potential of E-Commerce (e.g., costs and benefits) and to appreciate the potential and limitations of different types of technologies related to E-Commerce and Internet computing;
- the ability to construct a variety of E-Commerce systems for trading products and services, and managing vendor relations.

In the management aspect, it allows students to understand the opportunities offered by E-Commerce and the issues involved in employing and managing E-Commerce technologies. More specifically, students will possess:-

- a sound knowledge of business models and information systems in relation to E-Commerce;
- an understanding of the fundamental concepts of E-Commerce information systems;
- an understanding of business and financing issues and strategies for E-Commerce;
- an appreciation of business strategies for E-Commerce;
- the ability to explore how E-Commerce is transforming business and society.

1.2.5 Intended Learning Outcomes

The institutional learning outcomes of taught postgraduate programmes consist of:

- A. Professional competence of specialists/leaders of a discipline/profession:** Graduates of PolyU taught postgraduate programmes will possess in-depth knowledge and skills in their area of study and be able to apply their knowledge and contribute to professional leadership.
- B. Strategic thinking:** Graduates of PolyU taught postgraduate programmes will be able to think holistically and analytically in dealing with complex problems and situations pertinent to their professional practice. They will be versatile problem solvers with good mastery of critical and creative thinking skills, who can generate practical and innovative solutions.
- C. Lifelong learning capability:** Graduates of PolyU taught postgraduate programmes will have an enhanced capability for continual professional development through inquiry and reflection on professional practice.

The additional outcome specific to graduates of the Department of Computing is as below:

- D. Computer ethics and responsibilities:** Graduates of the Scheme will have critical understanding of ethical problems and issues related to computer profession, technology governance and social responsibilities.

As the Postgraduate Scheme in Computing consists of FOUR main programmes catering for participants of different background and educational needs, including those who could be fresh graduates or seniors with substantial working experience, the following learning outcomes of the Scheme are drawn up with reference to the above outcomes of taught postgraduate programmes:

1. an understanding of an advanced and up-to-date knowledge (A);
2. an ability to identify and apply current and emerging technologies (A/B);
3. demonstration of the ability to analyze, identify and define system requirements (A/B);
4. demonstration of the ability to manage and solve IS/IT/EC/ST problems (A);
5. an ability to use the techniques, skills and modern system tools necessary for the best practice and standard (A);
6. an understanding of professional and ethical responsibility (D); and
7. a recognition of the need for, and an ability to engage in life-long learning (C).

1.3 Entrance Requirements and Preferences

The entry qualifications are intended to ensure that each student has appropriate academic qualifications, sufficient work experience and the necessary motivation to benefit from, actively contribute to, and successfully complete the programme.

The Scheme is composed of four awards that suits students from different background. In general, Arts or Business students are best suited for MSc/PgD in Information Systems; Science (non-Computer Science) students for MSc/PgD in Information Technology; Computer Science students for MSc /PgD in Software Technology. The MSc/PgD in E-Commerce is suitable for most students who have a general degree and interest in E-commerce development.

In general, relevant work experience is preferred for all awards, and employers' support or sponsorship is desirable.

In particular, the requirement* for each award is as follows:

1.3.1 MSc/PgD in Software Technology

- Targets Computer Science students. Normally expected to have an honours degree in Computing, Computer Science or the equivalent.

1.3.2 MSc/PgD in Information Technology

- Targets Engineering or Science students. Normally expected to have an honours degree in Engineering, Science, Technology or the equivalent.

1.3.3 MSc/PgD in Information Systems

- Targets Arts or Business students. Normally expected to have an honours degree in Business, Management related discipline with relevant management experience or the equivalent.

1.3.4 MSc/PgD in E-Commerce

- Targets degree holders of various disciplines.

*Students without the required qualification/experience but would like to apply for a certain award are required to justify their need and capability to study in this award. This will be subject to approval by the Department and Faculty.

Part 2: Programme Structure and Curriculum Design

2.1 Award Requirements

Students are required to satisfy the following core subject and total credit requirements for each award. In general, students are required to complete 10 subjects (or 30 credits equivalent) for MSc awards and 6 subjects (or 18 credits equivalent) for PgD awards.

Awards	MSc			PgD
	Dissertation	Project	Non-Dissertation	
MSc/PgD in Software Technology	5 core subjects with 3 from core-1 and 2 from core-2 + two 3-credit subjects	6 core subjects with 4 from core-1 and 2 from core-2 + two 3-credit subjects	6 core subjects with 4 from core-1 and 2 from core-2 + four 3-credit subjects	4 core-1 subjects + two 3-credit subjects
MSc/PgD in Information Technology	3 core subjects & 2 fundamental subjects + two 3-credit subjects	4 core subjects & 2 fundamental subjects + two 3-credit subjects	4 core subjects & 2 fundamental subjects + four 3-credit subjects	2 core subjects & 2 fundamental subjects + two 3-credit subjects
MSc/PgD in Information Systems	5 core subjects + two 3-credit subjects	6 core subjects + two 3-credit subjects	6 core subjects + four 3-credit subjects	4 core subjects + two 3-credit subjects
MSc/PgD in E-Commerce	5 core subjects with 3 from core-1 and 2 from core-2 + two 3-credit subjects	6 core subjects with 4 from core-1 and 2 from core-2 + two 3-credit subjects	6 core subjects with 4 from core-1 and 2 from core-2 + four 3-credit subjects	4 core-1 subjects + two 3-credit subjects

Students are allowed to take any Master level subjects offered by the Department of Computing to satisfy their elective requirements, subject to the pre-requisite and exclusion requirements.

Students are also strongly encouraged to take electives outside the Department of Computing up to 20% of the total credit requirements to broaden their scope of study.

2.1.1 Award Requirements for MSc/PgD in Software Technology

Awards	MSc			PgD
	Dissertation	Project	Non-Dissertation	
MSc/PgD in Software Technology	5 core subjects with 3 from core-1 and 2 from core-2	6 core subjects with 4 from core-1 and 2 from core-2	6 core subjects with 4 from core-1 and 2 from core-2	4 core-1 subjects
Credits requirement	30	30	30	18

Core (1) Subjects

COMP5138 Services Science Management
COMP5151 Advanced Database Systems
COMP5212 Software Design and Architecture (CyberU mode)
COMP5224 Software Requirement Analysis and Specification
COMP5225 Software Evolution and Maintenance (CyberU mode)
COMP5226 Software Infrastructure and Configuration Management
COMP5252 Extreme Programming and Agile Software Development
COMP5311 Internet Infrastructure and Protocols
COMP5323 Web Database Technologies and Applications
COMP5332 Web Services and Project Development
COMP5351 Internetworking Infrastructure and Security
COMP5352 Advanced Internet Computing and Technology
COMP5527 Mobile Computing and Data Management

Core (2) Subjects

COMP5221 Software Project Management
COMP5222 Software Testing and Quality Assurance
COMP5228 Embedded Software Engineering
COMP5231 Project Practice and Case Studies (CyberU mode)
COMP5232 IT Outsourcing and Auditing
COMP5251 Software Engineering Process for High Quality Software (CyberU mode)
COMP5325 Distributed Computing
COMP5412 Fundamentals of Chinese Computing
COMP5422 Multimedia Computing, Systems and Applications
COMP5514 Computer Image Generation and Applications
COMP5517 Human Computer Interaction
COMP5553 Advanced Computer Graphics

Elective Subjects

Students are allowed to take any Master level subjects offered by the Department of Computing to satisfy their elective requirements, subject to the pre-requisite and exclusion requirements.

2.1.2 Award Requirements for MSc/PgD in Information Technology

Awards	MSc			PgD
	Dissertation	Project	Non-Dissertation	
MSc/PgD in Information Technology	3 core subjects & 2 fundamental subjects	4 core subjects & 2 fundamental subjects	4 core subjects & 2 fundamental subjects	2 core subjects & 2 fundamental subjects
Credits requirement	30	30	30	18

Fundamental Subjects

COMP5111 Database Systems and Management
COMP5134 IS Development with OO Methods
COMP5138 Services Science Management
COMP5211 Software Engineering Concepts
COMP5411 Fundamentals of Operating Systems
COMP5414 Computer Architecture
COMP5422 Multimedia Computing, Systems and Applications

Core Subjects

COMP5122 E-Commerce Fundamentals and Development
COMP5251 Software Engineering Process for High Quality Software
COMP5311 Internet Infrastructure and Protocols
COMP5322 Internet Computing and Applications
COMP5323 Web Database Technologies and Applications
COMP5326 Wireless Computing Systems and Applications
COMP5412 Fundamentals of Chinese Computing
COMP5511 Artificial Intelligence Concepts
COMP5527 Mobile Computing and Data Management
** COMP5552 Computer Ethics (pending for approval)

Elective Subjects

Students are allowed to take any Master level subjects offered by the Department of Computing to satisfy their elective requirements, subject to the pre-requisite and exclusion requirements.

2.1.3 Award Requirements for MSc/PgD in Information Systems

Awards	MSc			PgD
	Dissertation	Project	Non-Dissertation	
MSc/PgD in Information Systems	5 core subjects	6 core subjects	6 core subjects	4 core subjects
Credits requirement	30	30	30	18

Core Subjects

COMP5111 Database Systems and Management
COMP5121 Data Mining and Data Warehousing Applications
COMP5123 Intelligent Information Systems
COMP5131 Introduction to Information Systems
COMP5132 Information Systems Acquisition and Integration
COMP5133 Information Systems and E-Commerce Strategy
COMP5134 IS Development with OO Methods
COMP5138 Services Science Management
COMP5524 Workflow Management and Collaborative Systems
** COMP5552 Computer Ethics (pending for approval)

Elective Subjects

Students are allowed to take any Master level subjects offered by the Department of Computing to satisfy their elective requirements, subject to the pre-requisite and exclusion requirements.

2.1.4 Award Requirements for MSc/PgD in E-Commerce

Awards	MSc			PgD
	Dissertation	Project	Non-Dissertation	
MSc/PgD in E-Commerce	5 core subjects with 3 from core-1 and 2 from core-2	6 core subjects with 4 from core-1 and 2 from core-2	6 core subjects with 4 from core-1 and 2 from core-2	4 core-1 subjects
Credits requirement	30	30	30	18

Core (1) Subjects

COMP5122 E-Commerce Fundamentals and Development
COMP5133 Information Systems and E-Commerce Strategy
COMP5136 B2B & B2C E-Commerce and Management
COMP5138 Services Science Management
COMP5322 Internet Computing and Applications
COMP5331 Web Advertising and Web Publishing
COMP5352 Advanced Internet Computing and Technology

Core (2) Subjects

COMP5123 Intelligent Information Systems
COMP5222 Software Testing and Quality Assurance
COMP5324 Internet Information Retrieval
COMP5326 Wireless Computing Systems and Applications
COMP5422 Multimedia Computing, Systems and Applications
COMP5522 Biometric Authentication: System and Application
COMP5525 Information Security: Technologies and Systems
COMP5527 Mobile Computing and Data Management
COMP5531 IT Entrepreneurship and Legal Aspects at IT
** COMP5552 Computer Ethics (pending for approval)
MM534 Entrepreneurship
AF5506 Legal Aspects of Electronic Commerce

Elective Subjects

Students are allowed to take any Master level subjects offered by the Department of Computing to satisfy their elective requirements, subject to the pre-requisite and exclusion requirements.

** Pending for approval

2.1.5 Certification of Technical/ Executive Group for MSc in E-Commerce

Students can request the department to certify their specialization of study – MSc in E-Commerce (Technical group) or MSc in E-Commerce (Executive group). In order to do that, they also need to meet the additional subject selection requirement (please see below) and to submit an application after graduation to the General Office via email to enquiry@comp.polyu.edu.hk. A certificate of recognition will be issued upon approval by the Department.

**Please note that this information will not be indicated in the final transcript.*

Requirements for MSc in E-Commerce (Technical group) recognition:

Students must take at least **SIX** subjects or equivalent from the subjects listed below:

- COMP5122 E-Commerce Fundamentals and Development
- COMP5123 Intelligent Information Systems
- COMP5222 Software Testing and Quality Assurance
- COMP5322 Internet Computing and Applications
- COMP5324 Internet Information Retrieval
- COMP5326 Wireless Computing Systems and Applications
- COMP5352 Advanced Internet Computing and Technology
- COMP5422 Multimedia Computing, Systems and Applications
- COMP5522 Biometric Authentication: System and Application
- COMP5525 Information Security: Technologies and Systems
- COMP5527 Mobile Computing and Data Management

Requirements for MSc in E-Commerce (Executive group) recognition:

Students must take at least **FOUR** subjects or equivalent from the subjects listed below:

- COMP5133 Information Systems and E-Commerce Strategy
- COMP5136 B2B and B2C E-Commerce and Management
- COMP5138 Services Science Management
- COMP5331 Web Advertising and Web Publishing
- COMP5531 IT Entrepreneurship and Legal Aspects at IT
- MM534 Entrepreneurship
- AF5506 Legal Aspects of Electronic Commerce

And at least **TWO** subjects or equivalent from the subjects listed below:

- COMP5111 Database Systems and Management
- COMP5135 Information Systems Audit and Control
- COMP5512 Information Technology and Logistics
- COMP5538 Customer Relationship Management and Technology

2.2 List of Core, Fundamental and Elective Subjects

Below is the table summarizing the core subjects and fundamental subjects for each award. All subjects are 3-credit based, unless otherwise stated.

Core subjects: core

Fundamental subjects: F

Elective subjects: blank

Subjects	MSc/ PgD ST	MSc/ PgD IT	MSc/ PgD IS	MSc/ PgD EC
COMP5111 Database Systems and Management		F	core	
COMP5121 Data Mining and Data Warehousing Applications			core	
COMP5122 E-Commerce Fundamentals and Development		core		core 1
COMP5123 Intelligent Information Systems			core	core 2
COMP5131 Introduction to Information Systems			core	
COMP5132 Information Systems Acquisition and Integration			core	
COMP5133 Information Systems and E-Commerce Strategy			core	core 1
COMP5134 IS Development with OO Methods		F	core	
COMP5135 Information Systems Audit and Control				
COMP5136 B2B & B2C E-Commerce and Management				core 1
COMP5138 Services Science Management	core 1	F	core	core 1
COMP5151 Advanced Database Systems	core 1			
COMP5211 Software Engineering Concepts		F		
COMP5212 Software Design and Architecture	core 1			
COMP5221 Software Project Management	core 2			
COMP5222 Software Testing and Quality Assurance	core 2			core 2
COMP5223 Middleware and Distributed Objects				
COMP5224 Software Requirement Analysis and Specification	core 1			
COMP5225 Software Evolution and Maintenance	core 1			
COMP5226 Software Infrastructure and Configuration Management	core 1			
COMP5228 Embedded Software Engineering	core 2			
COMP5231 Project Practice and Case Studies	core 2			
COMP5232 IT Outsourcing and Auditing	core 2			
COMP5251 Software Engineering Process for High Quality Software	core 2	core		
COMP5252 Extreme Programming and Agile Software Development	core 1			
COMP5311 Internet Infrastructure and Protocols	core 1	core		
COMP5322 Internet Computing and Applications		core		core 1
COMP5323 Web Database Technologies and Applications	core 1	core		
COMP5324 Internet Information Retrieval				core 2
COMP5325 Distributed Computing	core 2			
COMP5326 Wireless Computing Systems and Applications		core		core 2
COMP5331 Web Advertising and Web Publishing				core 1

COMP5332 Web Services and Project Development	core 1			
COMP5351 Internet Infrastructure Security	core 1			
COMP5352 Advanced Internet Computing and Technology	core 1			core 1
COMP5411 Fundamentals of Operating Systems		F		
COMP5412 Fundamentals of Chinese Computing	core 2	core		
COMP5414 Computer Architecture		F		
COMP5422 Multimedia Computing, Systems and Applications	core 2	F		core 2
COMP5511 Artificial Intelligence Concepts		core		
COMP5512 Information Technology and Logistics				
COMP5513 Financial Computing				
COMP5514 Computer Image Generation and Applications	core 2			
COMP5515 Image and Video Computing				
COMP5517 Human Computer Interaction	core 2			
COMP5522 Biometric Authentication: System and Application				core 2
COMP5524 Workflow Management and Collaborative Systems			core	
COMP5525 Information Security: Technologies and Systems				core 2
COMP5527 Mobile Computing and Data Management	core 1	core		core 2
COMP5531 IT Entrepreneurship and Legal Aspects at IT				core 2
COMP5538 Customer Relationship Management and Technology				
** COMP5552 Computer Ethics (pending for approval)		core	core	core 2
COMP5553 Advanced Computer Graphics	core 2			
COMP5923 Independent Study				
COMP5933 Project (6 credits)				
COMP5940 Dissertation (9 credits)				
MM534 Entrepreneurship				core 2
AF5506 Legal Aspects of Electronic Commerce				core 2

2.3 Continuing Education Fund (CEF)

The following subjects are currently included in the list of reimbursable courses for Continuing Education Fund (CEF) purposes. Subjects / Courses may be added to or removed from this list (registered/deregistered) without notice. Local students are eligible to receive subsidies for a particular subject/ course available at the time of their enrolment. The eligibility is also subject to satisfactory completion of the CEF sponsored course (i.e. with the grade performance at C or above).

- COMP5331 Web Advertising and Web Publishing
- COMP5422 Multimedia Computing, Systems and Applications
- COMP5512 Information Technology and Logistics
- COMP5513 Financial Computing
- COMP5538 Customer Relationship Management and Technology

Students may check the current subject/course availability at <http://www.info.gov.hk/sfaa/cef/>

2.4 Teaching and Learning Methods

Teaching is conducted through lectures and tutorials/labs. Various activities can be involved in the learning process, where students are strongly encouraged to actively participate and interact with other students and the lecturers. Besides attending lectures and tutorial sessions, students may engage themselves in self-study, group discussion, class project and laboratory work.

In order to improve the attention span of the participants, a strategy of mixing in-class activities will be adopted. Some examples of these are highlighted as follows:

Class Lectures and Tutorials

In general, each subject will have a 2-hour lecture followed by a 1-hour tutorial during semester weeks. The participants will be actively involved in discussing issues and problems associated with the subject. Students may also be required to present their homework or projects in class.

Practical Sessions

Workshop or laboratory sessions can be involved for some subjects. The participants will have the opportunity to explore interesting case studies, hands-on experience of system application and development, and group project investigation.

Seminars

Experienced and guest speakers from commercial and business communities shall be arranged to conduct seminars for the Scheme. The participants will have the opportunity to discuss some real-life problems and enrich their understanding in the subject.

In addition to regular mode of teaching, the Department also offers Cyber U mode for MSc/PgD in Software Technology, MSc/PgD in Information Systems, and MSc/PgD in E-Commerce.

2.5 Examination and Assessment

The examination and assessment arrangement conforms to the Academic Regulations & Procedures for Credit-based Programmes. The Department's Subject Assessment Review Panel (SARP) monitors the academic standard and quality of subjects and has complete discretion in ratifying subject grades. It is also responsible for deciding upon the granting of re-assessment to students and the form of such re-assessment. A Board of Examiners (BOE) of the Scheme will meet at the end of each semester to consider students' classifications of award and to deal with

problematic cases. The composition and terms of reference of the SARP and BOE are stipulated in the Academic Regulations and Procedures for Credit-based Programmes.

2.5.1 Assessment and Grading

Students' performance in a subject shall be assessed by continuous assessment and/or examinations as depicted in individual subject syllabus.

Continuous Assessment

Continuous assessment may include tests, assignments, projects, quizzes, presentations and other forms of classroom participation. It may vary on different subjects contributing to 45%-70% of the overall subject grade unless otherwise specified in the syllabus. Progressive assessment will be taken through participation of students in workshops, seminars and tutorial sessions where applicable.

Final Examination

Students are generally required to sit for the final examination. They will be provided with the examination schedule in advance, which is assigned in the general examination period of the University. Students may attempt common examination papers provided that the examination date is the same.

Overall Assessment

The overall grade for a subject is obtained by combining the results for the continuous assessment and examination, where applicable, using the weightings as specified in each subject syllabus. Numerical grade is defined for each letter grade for the computation of the GPA.

Grade	Short Description	Grade Point
A+	Exceptionally Outstanding	4.5
A	Outstanding	4
B+	Very Good	3.5
B	Good	3
C+	Wholly Satisfactory	2.5
C	Satisfactory	2
D+	Barely Satisfactory	1.5
D	Barely Adequate	1
F	Inadequate	0

“F” is a subject failure grade, whilst all others (“D” to “A+”) are subject passing grades.

GPA Calculation

At the end of each semester/term, a Grade Point Average (GPA) will be computed as follows, and based on the grade point of all the subjects:

$$\text{GPA} = \frac{\sum \text{Subject Grade Point} \times \text{Subject Credit Value}}{\sum \text{Subject Credit Value}}$$

where n = number of all subjects (inclusive of failed subjects) taken by the student up to and including the latest semester/term, but for subjects which have been retaken, only the grade obtained in the final attempt will be included in the GPA calculation

In addition, the following subjects will be excluded from the GPA calculation:

- (i) Exempted subjects
- (ii) Ungraded subjects
- (iii) Incomplete subjects
- (iv) Subjects for which credit transfer has been approved without any grade assigned
- (v) Subjects from which a student has been allowed to withdraw (i.e. those with the grade 'W')

Subject which has been given a "S" subject code, i.e. absent from examination, will be included in the GPA calculation and will be counted as "zero" grade point. GPA is thus the unweighted cumulative average calculated for a student, for all relevant subjects taken from the start of the programme to a particular point of time. GPA is an indicator of overall performance and is capped at 4.0.

Any subjects passed after the graduation requirement has been met or subjects taken on top of the prescribed credit requirements for award shall not be taken into account in the grade point calculation for award classification. However, if a student attempts more elective subjects (or optional subjects) than those required for graduation in or before the semester in which he becomes eligible for award, the elective subjects (or optional subjects) with a higher grade/contribution shall be included in the grade point calculation (i.e. the excessive subjects attempted with a lower grade/contribution, including failed subjects, will be excluded).

2.5.2 Re-taking of Subjects

- (1) Students may retake any subject for the purpose of improving their grade without having to seek approval, but they must retake a compulsory subject which they have failed, i.e. obtained an F grade. Retaking of subjects is with the condition that the maximum study load of 21 credits per semester is not exceeded. Students wishing to retake passed subjects will be accorded a lower priority than those who are required to retake (due to failure in a compulsory subject) and can only do so if places are available.
- (2) The number of retakes of a subject is not restricted. Only the grade obtained in the final attempt of retaking (even if the retake grade is lower than the original grade for originally passed subject) will be included in the calculation of the Grade Point Average (GPA). If students have passed a subject but failed after retake, credits accumulated for passing the subject in a previous attempt will remain valid for satisfying the credit requirement for award. (The grades obtained in previous attempts will only be reflected in transcript of studies.)
- (3) In cases where a student takes another subject to replace a failed elective subject, the fail grade will be taken into account in the calculation of the GPA, despite the passing of the replacement subject.
- (4) A student may choose to take another elective subject instead of retaking an elective subject that he/she has failed.

2.5.3 Credit Enrolment

The normal workload per semester is 6 credits for part time students and 9 credits for full time students. The part time students will be allowed to register for a maximum of 6 credits and full time students for 9 credits during the subject registration period. Students willing to take more credits are required to register for additional subjects during the add/drop period. To help the Department better estimate the demand for subjects, students are required to participate in the pre-trial registration exercise if applicable. The details of which will be announced to all students via the departmental email account.

In particular, students will not be allowed to take zero subject in any semester unless they have obtained prior approval from the Department; otherwise they will be classified as having unofficially withdrawn from their study. Any semester in which the students are allowed to take zero subject will nevertheless be counted towards the maximum period of registration.

2.5.4 Deferment of Study

Deferment of study is applicable to those who have a genuine need with substantiation to extend the maximum period of registration due to, e.g., illness, family problem, etc. Approval from the Department is required. The deferment period will not be counted as part of the maximum period of registration.

2.5.5 Progression

A student progresses by credit accumulation. A student will have 'progressing' status unless he falls within the following categories, either of which may be regarded as grounds for deregistration from the programme:

- (i) the student has exceeded the maximum period of registration, programme as specified in the definitive programme document; or
- (ii) the student's GPA is lower than 2.0 for two consecutive semesters (excluding summer term*) and his Semester GPA in the second semester is also lower than 2.0; or
- (iii) the student's GPA is lower than 2.0 for three consecutive semesters (excluding summer term*)

* The progression of students to the following academic year will not be affected by the GPA obtained in Summer Term.

Notwithstanding (ii) and (iii) above, a student may be de-registered from the programme enrolled before the time specified in (ii) or (iii) above if his academic performance is poor to the extent that the Board of Examiners deems that his chance of attaining a GPA of 2.0 at the end of the programme is slim or impossible.

When a student has a Grade Point Average (GPA) (see Award Classification below) lower than 2.0, he will be put on academic probation in the following semester. Once when a student is able to pull his GPA up to 2.0 or above at the end of the probation semester, the status of "academic probation" will be lifted. The status of "academic probation" will be reflected in the examination result notification but not in transcript of studies.

2.5.6 Eligibility for Award

A student would be eligible for award if he satisfies all the conditions listed below:

- (i) Accumulation of the requisite number of credits for the particular award, as defined in the definitive programme document; and
- (ii) Satisfying the residential requirement for at least 1/3 of the credits to be completed for the award he is currently enrolled, unless the professional bodies stipulate otherwise; and
- (iii) Satisfying all the 'compulsory' and 'elective' requirements as defined in the definitive programme document; and

- (iv) Having a Grade Point Average (GPA) of 2.0 or above at the end of the programme. (See Note)
- (v) Satisfying other requirements as stipulated in the definitive programme document e.g. Work-integrated experience, co-curricular activities, and other language requirements (if applicable).

2.6 Credit Transfer Policy

You may apply for credit transfer for your previous study at postgraduate level. The subjects to be transferred should attain a normal performance grade (i.e. a minimum of grade B is expected).

The validity period of subject credits earned is eight years from the year of attainment, i.e. the year in which the subject was completed, unless otherwise specified by the department responsible for the content of the subjects (e.g. if the credit was earned in 1998/99, then the validity period should count from 1999 for eight years). Credits earned from previous studies should remain valid at the time when the student applies for transfer of credits.

Students can transfer a maximum of 50% of the total award requirement. They are allowed to transfer other Master level non-Computing subjects as electives up to 20% of the total award requirement (also counted towards the 50% upper limit for total credits to be transferred). This is subject to approval of the Scheme Leader.

If the previous study was from PolyU, the credit transfer once approved may carry the grade. For previous study not with PolyU, the grade of transferred subject will not be counted towards GPA calculation. The final discretion will be with the programme leader.

2.7 Changing Programme of Study within the Scheme

If students wish to change the award/stream within the same mode of study for which they are registered they should seek the approval of the Scheme Leader. If approved, students are reminded that all subject grades will be counted towards the GPA, and only subjects contributing to the final award will be counted towards the Award GPA.

For students wishing to switch to a different award/stream in a different mode of study (for example, from CyberU mode to regular mode), they need to apply for the other award through the normal admission procedure. Students are reminded that they need to transfer credits to the new award and is normally subject to the above mentioned credit transfer policy.

2.8 Gaining More Awards within the Scheme

Students shall apply for the second award through the normal admission procedures. Upon approval, credits studied in the first award can be transferred to the second award through credit transfer. Students are reminded that only subjects contributing to the second award should be transferred, and they will be subject to the above mentioned credit transfer policy.

2.9 Taking CyberU subjects

In addition to regular mode of teaching, the Department also offers CyberU mode for MSc/PgD in Software Technology, MSc/PgD in Information Systems, MSc/PgD in Information Technology, and MSc/PgD in E-Commerce.

Regular mode students not able to attend classes for an extended period can apply to study subjects available in CyberU mode and be subjected to the credit fee for CyberU subjects. However, students are normally expected not to obtain more than 30% of their credit requirement (assessed at the time of admission) for the award of study in CyberU mode.

2.10 Placement / Internship Opportunities

They will be subject to availability and completion of at least 40% of total credit requirement at GPA 2.5 or above.

Part 3: Programme Management, Resource and Support

3.1 Programme Operation and Management

3.1.1 Scheme Committee

The Department of Computing will be the host department responsible for the administration of the Scheme and the overall operation and management.

A Scheme committee will be responsible for the academic standards, content, delivery and assessment of all awards within its purview.

3.1.2 Departmental Teaching and Learning Committee

The Committee will be overseeing the operation and administration of all the awards hosted by the Department of Computing. Its main duties are:

- To promote quality learning and teaching in the department, particularly at the classroom level, and at the teacher-student interface;
- To keep under review the quality of learning and teaching in the department;
- To develop strategies and guidelines relating to the enhancement of learning and teaching quality in the department;
- To evaluate and prioritize proposals from departmental staff on learning and teaching development projects - for funding by the LTC and other relevant agencies; and

- To monitor progress of learning and teaching development projects carried out in the department.

3.2 Membership of Professional Bodies

Certified E-Commerce Consultant (CEC)

MScEC graduates could apply for the Certified E-Commerce professional qualification and they are to be exempted from all coursework and examinations required to become a Certified E-Commerce Consultant awarded by the Institute of Certified E-Commerce Consultants and recognized by the American E-Commerce Association.

Our students shall be given preferential discounts in the membership fee. The registration and membership fee discounted for our graduates is HK\$1,600 (subject to change).

The Certified E-Commerce Consultant certification is the first and only globally recognized e-commerce certification for e-Business professionals and executives awarded by the Institute of Certified E-Commerce Consultants (<http://www.icecc.com/>) and recognized by the American E-Commerce Association.

If you want to apply for the certification, you may simply fill out the application form available on the department's website with your student number and attach a cheque in the amount of HK\$1,600* (subject to change) payable to "The Hong Kong Polytechnic University" and send them directly to:

Department of Computing, PQ806,

The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

(Ref: CEC Application)

The fee of HK\$1,600 includes:

- Certificate fee (Gold leaf embossed CEC certificate)
- Registration with the ICECC
- 2-year membership with ICECC

- Students can apply directly via the Department, or via the ICECC website <http://www.icecc.com>. However, the cost for direct application with ICECC is US\$300 (subject to change), so students can enjoy a discount if they apply via the Department.
- For application enquiries, please visit the department's website or email to enquiry@comp.polyu.edu.hk.

Certification of E-Business Specialist at Advanced Level (CCEBS)

Our MSc in Information Systems (MScIS) and MSc in E-Commerce (MScEC) programmes are the few university programmes recognised by the China General Chamber of Commerce (CGCC) for having achieved the standard required by the Certification of Commercial E-Business Specialist at advanced level. While the Certification of Commercial E-Business Specialist at junior and intermediate level has been processed in China through a series of examinations and validations, our MScIS and MScEC graduates will be qualified and will be waived from all examination requirements to become a Senior Certified Commercial E-Business Specialist (Senior CCEBS), awarded by the Occupational Skill Testing and Instruction Centre, CGCC.

For more details on the China General Chamber of Commerce: <http://www.cgcc.org.cn>

For more details on the Certification of Commercial E-Business Specialist: <http://www.ccebs.com>

Required documents

1. two completed official application forms chopped and endorsed by our department
2. four pictures with name written on the back (from which two to be pasted on the application form)
3. one copy of academic qualification (i.e. copy of official transcript or MSc diploma)
4. one copy of identification document (i.e. passport, HKID)
5. proof of payment (i.e. original bank receipt)

Application Fee

- HK\$1,100 (subject to change)
- Proceed payment as follow:
 - **China Merchant Bank Hong Kong Branch**
Address: 21/F, Bank of America Tower, 12 Harcourt Road, Hong Kong
Business Hours: 09:30 – 16:30
 - Website: <http://hk.cmbchina.com/>
 - Tel. no. 31195555
 - Name: Yao Xin
 - A/C No: 4026 5886 0312 1365
 - Please retain the original receipt for proof of payment.

Procedures

- Interested graduates may obtain the official application forms:
 - In person at our office: **PQ806, Mong Man Wai Building, HK Polytechnic University, Hung Hom, Kowloon**
 - Via post: send a pre-paid reply-envelope (HK\$3.00, A4) to our office, and we will forward the forms to you.
- Application is made twice a year in January and August starting from 2005 to 2010. Applicants should send their CCEBS application to our office.

- Late applications will not be accepted until the next application period.
For application enquiries, please visit the department's website or email to enquiry@comp.polyu.edu.hk.

3.3 Communication Channels

Departmental Announcements

All departmental announcements will be made through your COMP email account. You are expected to check your account on a regular basis and delete unwanted emails. For enquires about email account, please contact the Technical Team at 2766-7257.

Class-related Matters

Your subject lecturer should be in contact with you through emails, WebCT or other means specified in class.

For other enquiries related to your programme, please contact:

General Office

Telephone: 2766-7317 /2766-7300

Fax: 2774-0842

Email: enquiry@comp.polyu.edu.hk

3.4 Notes for MSc Students

In order to protect the privacy and identification in communication between yourself and the department, students are expected to observe the following practice and requirements:

1. We do not entertain third party questions, i.e. you cannot make enquiry or request in the name of other without proof of authorization (email authorization is required)
2. For telephone enquiry: please identify your name, student number and programme of study (confirmation of personal details is required)
3. For email enquiry: please make use of your PolyU account. You are also advised to state your full name, student number and programme of study for a prompt response.

Please be reminded that related announcement and notice will be sent to your PolyU account directly. Therefore, you are advised to check the PolyU account regularly. You may also make arrangements to forward the emails to your other email address for convenience, if necessary.

Part 4: Subject Syllabi

The department reserves the right to revise and update the syllabi whenever appropriate and deem necessary. Course availability is subject to resources and quota limitation at the time.

SUBJECT DESCRIPTION FORM

Subject title: Database Systems and Management

Subject code: COMP5111

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Knowledge of a relational database software package or SQL is an advantage

Mutual Exclusions:

Database Systems (COMP503), Database Management (COMP566)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject aims to provide students with comprehensive and in-depth understanding of database technology. Upon completing of this subject, the student will be able to:

1. gain a good understanding of the architecture and functioning of database management systems, as well as the associated tools and techniques;
 2. understand and be able to apply the principles and practices of good database design ;
 3. appreciate the direction of database technology and their implication on management and planning of database systems;
 4. appraise and use alternative conceptual and/or data models for documenting enterprise databases;
 5. evaluate available DBMS systems against organization needs and negotiate the acquisition of DBMS.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. design database solutions to solve common business problems;
 2. evaluate the effectiveness of specific database solutions in solving business problems; and
 3. articulate the organizational impact of database solutions.
-

Keyword syllabus:

Overview of Database Management and Architecture

Relational DBMS

Entity-relationship (ER) modelling
Relational database design
SQL and relational algebra
View mechanisms

DB Implementation and Operational Issues

Data dependencies and normalization
Query processing and optimization
Security and integrity constraints
Physical database design
Transactions, recovery and concurrency issues
Commercial DBMSs

Selected Topics for Database Management

Database administration
Database applications for enterprises
Database project development

Selected Topics for Database Technology

Object-oriented and semantic data modelling
Distributed database architecture
Web databases

Indicative reading list and references:

Books

1. Michael V.Mannino. Database Design, Application Development, & Administration, 3rd edition, McGraw-Hill, 2007.
2. David Kroenke. Database Processing: Fundamentals, Design and Implementation, 10/E, Prentice Hall, 2006.
3. A Silberschatz, HF Korth, S Sudarshan. Database System Concepts 4th Edition. McGraw Hill, 2002.

Journals

ACM Transactions on Database Systems
IEEE Transactions on Knowledge and Data Engineering
VLDB Journal

SUBJECT DESCRIPTION FORM

Subject Title: Data Mining and Data Warehousing Applications

Subject Code: COMP5121

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Nil

Mutual Exclusions:

Data Mining and Applications (COMP518),
Data Mining and Data Warehouse (COMP578),
Data Mining and Data Warehousing for Business (COMP5003)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

There will be a mix of lectures, discussions and case study analysis. Recent articles in the area of data mining and data warehousing strategies will also be reviewed and discussed in lectures. Students will be given the flexibility to tailor the study material to their organization environment and pursue relevant case studies.

Assessment:

Continuous Assessment	60%
Test, and Examination	40%

Objectives:

- make more effective use of data stored in data bases
 - create a clean, consistent repository of data within a data warehouse
 - utilize various levels and types of summarization of data to support management decision making
 - discover patterns and knowledge that is embedded in the data using different data mining techniques
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. understand the need for data warehouse;
2. identify components in typical data warehouse architecture;
3. design a data warehouse in support of business problem solving;
4. understand typical knowledge discovery process and the different algorithms available by popular commercial data mining software; and
5. obtain hands-on experience with some popular data mining software.

Keyword syllabus:

Students will be presented with documentation (lecture notes, tutorial materials, practical exercises and reference papers) of a range of up-to-date methods, techniques and applications in data mining and data warehouse. More specifically, this subject covers the following topics:

- Introduction to data warehousing and data mining; possible application areas in business and finance; definitions and terminologies; types of data mining problems.
- Data warehouse and data warehousing; data warehouse and the industry; definitions; operational databases vs. data warehouses.
- Data warehouse architecture and design; two-tier and three-tier architecture; star schema and snowflake schema; data characteristics; static and dynamic data; meta-data; data marts.
- Data replication, data capturing and indexing, data transformation and cleansing; replicated data and derived data; Online Analytical Processing (OLAP); multidimensional databases; data cube
- Data Mining and knowledge discovery, the data mining lifecycle; pre-processing; data transformation; types of problems and applications.
- Mining of Association Rules; the Apriori algorithm; binary, quantitative and generalized association rules; interestingness measures.
- Classification; decision tree based algorithms; Bayesian approach; statistical approaches, nearest neighbor approach; neural network based approach; Genetic Algorithms based technique; evaluation of classification model.
- Clustering; k-means algorithm; Hierarchical algorithm; Condorset; neural network and Genetic Algorithms based approach; evaluation of effectiveness.
- Sequential data mining; time dependent data and temporal data; time series analysis; sub-sequence matching; classification and clustering of temporal data; prediction.
- Computational intelligence techniques; fuzzy logic, genetic algorithms and neural networks for data mining.

Indicative reading list and references:

Books

- Han, J., and Kamber, M., 2006, *Data Mining: Concepts and Techniques*, 2nd Ed., Morgan Kaufmann, San Francisco, CA.
- Tan, P.N., Steinbach, M., Kumar V., *Introduction to Data Mining*, Addison Wesley, 2006.
- Dunham, M.H., *Data Mining: Introductory and Advanced Topics*. Prentice Hall, 2003.
- Chakrabarti, S., *Mining the Web*. Morgan Kaufmann Publishers, 2003.
- Chan, K.C.C., 2002, *Course Notes on Data Mining & Data Warehousing*, Department of Computing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong.
- Inmon, W.H., 1996, *Building the Data Warehouse*, 2nd Edition, J. Wiley & Sons, New York, NY.
- Mattison, R., 1997, *Data Warehousing and Data Mining for Telecommunications*, Artech House, Boston.

- Wtehorn, M., 1999, *Business Intelligence: the IBM Solution: Datawarehousing and OLAP*, Springer, London.
- Pyle, D., *Data Preparation for Data Mining*. Morgan Kaufmann Publishers, 1999.
- Rud, 2001, *Data Mining Cookbook: Modeling Data for Marketing, Risk, and Customer Relationship Management*, J. Wiley, New York, NY.
- Groth, R., 1998, *Data Mining: Building Competitive Advantage*, Prentice Hall, Upper Saddle River, NJ.
- Berry, M.J.A., 2000, *Mastering Data Mining: the Art and Science of Customer Relationship Management*, Wiley, New York NY.
- Kovalerchuk, B., 2000, *Data Mining in Finance: Advances in Relational and Hybrid Methods*, Kluwer Academic, Boston.
- Berry, M.J.A., 1997, *Data Mining Techniques for Marketing, Sales and Customer Support*, Wiley, New York NY.

SUBJECT DESCRIPTION FORM

Subject Title: E-Commerce Fundamentals and Development

Subject Code: COMP5122

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Knowledge of computer networks, Internet computing and Java programming is an advantage.

Mutual Exclusions:

Fundamentals of E-Commerce (COMP514), E-Commerce and Application (COMP575), E-Commerce Application Development (COMP574), E-Commerce Systems and Applications (COMP558)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives

1. To introduce the infrastructure and functional components for e-commerce
 2. To understand the enabling technologies for e-commerce
 3. To study various e-commerce applications
-

Learning Outcomes:

After completing this subject, students should be able to:

1. acquire a good knowledge of e-commerce and its applications;
2. understand the enabling technologies for e-commerce;
3. be aware of trends of e-commerce; and
4. participate in team work, presentation and technical writing.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Web system and programming

Web system overview. HyperText Transfer Protocol (HTTP). Load balancing. Caching. HyperText Mark up Language (HTML). Client-side programming. Server-side programming.

Cryptography

Security requirements. Asymmetric key encryption. Symmetric key encryption. Message digest. Digital signature. Digital certificate. Public key infrastructure.

Internet security

IPSec. Firewall. Secure Socket Layer (SSL) Protocol/Transport Layer Security. Application layer security.

Internet payment systems

Secure electronic transaction (SET). Electronic cash. Electronic check. Micropayment methods. Smart card.

E-commerce applications

Business models. Consumer-oriented e-commerce. Business-oriented e-commerce. Auction. Case studies and examples.

Advanced/current topics

e.g., Mobile agent-based e-commerce, m-commerce.

Indicative reading list and references:

Books

- Campione, M. and Walrath, K., 1998, *The Java Tutorial: Object-Oriented Programming for the Internet*, 2nd Edition, Addison Wesley.
- Chan, H., Lee, R., Dillon, T. and Chang, E., 2001, *E-commerce: Fundamentals and Applications*, John Wiley & Sons (UK).
- Cheswick, W. and Bellovin, S., 1994, *Firewalls and Internet Security*, Addison-Wesley.
- Furche, A. and Wrightson, G., 1996, *Computer Money: A Systematic Overview of Electronic Payment Systems*, Morgan Kaufmann.
- Hunter, J. and Crawford, W., 1998, *Java Servlet Programming*, O'Reilly & Associates.
- Kalakota, R. and Whinston, A. B., 1997, *Electronic Commerce: A Manager's Guide*, Addison-Wesley.
- Kaufman, C. Perlman, R. and Speciner, M., 1995, *Network Security: Private Communication in a Public World*, Prentice Hall.
- Moss, K., 1998, *Java Servlets*, McGraw-Hill.
- O'Mahony, D., Peirce, M. and Tewari, H., 1997, *Electronic Payment Systems*, Artech House.
- Rankl, W. and Effing, W., 1997, *Smart Card Handbook*, Wiley.
- Schneider, G. and Perry, J. T., 2001, *Electronic Commerce*, Course Technology.
- Sherif, M. H., 2000, *Protocols for Secure Electronic Commerce*, CRC Press.
- Stallings, W., 1999, *Cryptography and Network Security: Principles and Practice*, 2nd Edition, Prentice Hall.
- Turban, E., et al., 2002, *Electronic Commerce 2002 - A Managerial Perspective*, Prentice Hall.
- Zakour, J., Foust, J. and Kerven, D. 1997, *HTML 4 How-To*, Waite Group Press.

SUBJECT DESCRIPTION FORM

Subject Title: Intelligent Information Systems

Subject Code: COMP5123

Credits Value: 3

Pre-requisite: Nil

Mutual Exclusions: Intelligent Information Systems (COMP579)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous assessment	60%
Test, and Examination	40%

Objectives:

This course aims to introduce the principles, concepts, theories and technologies that are developed in the fields of artificial and computational intelligence. How they can be used in the construction of information systems to support management decision making will be taught. By providing specific examples, the subject also aims to enable students to master the techniques for problem solving in various application areas in business and finance, computing and engineering.

Learning Outcomes:

After completing this subject, students should be able to:

1. understand and apply the latest techniques in artificial and computational intelligence that can be used to facilitate decision making processes;
 2. apply principles and techniques in knowledge management to solve practical business problems;
 3. design the important components to support the decision making processes in an Executive Support system;
 4. possess the knowledge to evaluate the different commercially available or public domain tools that can be used to tackle specific problems related to business decision making; and
 5. possess the ability to understand and decide if future new techniques in artificial and computational intelligence can be used to solve different practical business problems.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Introduction, Data, Information and Knowledge

Architecture of an intelligent information systems; decision making and systems; artificial intelligence techniques, concepts of data and information; methods to process data into information in organizations; transaction processing systems; database and knowledge base management.

Expert Systems for Managers

Introduction to expert systems; knowledge engineering; knowledge acquisition; knowledge representation and inference; uncertainty representation and reasoning; verification and validation; applications in business and finance.

Case Based Reasoning

Reasoning using cases, representing cases, indexing and retrieving cases, organizational and retrieval algorithms, case adaptation, case base maintenance, soft computing in case based reasoning, applications and case studies.

Data and Text Mining

Data mining and knowledge discovery life cycle, association, classification, clustering and prediction, soft computing in data mining, text mining, information extraction and retrieval.

Intelligent Decision Support Systems for Business Intelligence

Computational intelligence techniques; genetic algorithms for organizational modeling; neural networks and fuzzy logic for business applications; hybrid systems; integration of expert systems and neural networks; integrated intelligent systems.

Fuzzy Information Systems

Classical vs. fuzzy sets; membership functions; predicate vs. fuzzy logic; approximate reasoning; natural language; linguistic hedges; rule-based systems; likelihood and truth qualification; graphical techniques of inference.

Genetic algorithms for management applications

Natural evolution; a simple genetic algorithm; evaluation; population; parent selection; mutation; crossover; the inversion operator; performance enhancement; elitism; steady-state reproduction; robustness; interpolating operator fitness; applications in business, finance and management.

Neural Computation for business and finance

Biological vs. artificial neural networks; single- and multiple-layer perceptron; the learning rules; partition of pattern space; back-propagation; Kohonen Self-Organizing Networks; Hopfield Networks; supervised and unsupervised learning; associative memories.

Indicative Reading List and References:

- Chan, K.C.C., 2004, *Intelligent Information Systems: Course Notes*, Department of Computing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong.
- Pal, S.K., and Shiu, S.C.K., *Foundations of Soft Case-Based Reasoning*, John Wiley & Sons, Hoboken, New Jersey, 2004.
- Liebowitz, J., 2001, *Knowledge Management: Learning from Knowledge Engineering*, CRC Press, Boca Raton, FL.
- Liebowitz, J., 1998, *The Handbook of Applied Expert Systems*, CRC Press, Boca Raton, FL.
- Bojadziev, G., and Bojadziev, M., 1997, *Fuzzy Logic for Business, Finance and Management*, World Scientific, Singapore.
- Zopounidis, C., et. al, (Eds.) 2002, *Fuzzy Sets in Management, Economy & Marketing*, World Scientific, Singapore.
- Patel, N.V, 2002, *Adaptive Evolutionary Information Systems*, Idea Group, Hershey, PA.
- Shadbolt, J., Taylor, J.G., (Eds.), 2002, *Neural Networks and the Financial Markets: Predicting, Combining and Portfolio Optimisation*, Springer-Verlag.
- Miller, T.W., 2004, *Data and Text mining: A Business Application Approach*, Prentice Hall.

SUBJECT DESCRIPTION FORM

Subject Title: Introduction to Information Systems

Subject Code: COMP5131

Credits Value: 3

Pre-requisite: Nil

Mutual Exclusions: Introduction to Information Systems (COMP565)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

- To develop understanding and appreciation of the role of information systems in business environments to achieve competitive advantage.
 - To provide fundamental knowledge in information system architectures and information technology infrastructure supporting them.
 - To examine the state-of-the-art techniques and technologies that will contribute towards the future development of information systems and their applications.
 - To develop the awareness in issues contributing to the successful planning, design, development, implementation and management of information systems.
-

Learning Outcomes:

After completing the subject, students should be able to:

1. articulate the role of information systems in business environments;
 2. identify up-to-date technologies that can fulfil those roles; and
 3. articulate advantages and disadvantages of technologies with respect to specific roles and applications.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Information systems and the organizations

Computers and the new business environment; strategic use of information systems; organizations and the role of information systems.

Foundations of information systems

Computer systems components; systems software; application software and development tools; trends in hardware and software technology; managing data resources; database management systems and data modeling; data warehousing and future of data management.

Communications and networks

Components of telecommunication system; telecommunication networks; enterprise networking; internet and electronic commerce.

Information Systems Development

Overview of system development process; system implementation; alternative approaches to system development; system development methodologies.

Organizational Support Systems

Knowledge management and the organization; application of intelligent technologies; decision support systems; cooperative work support systems; executive support systems.

Managing Information Systems

Computer security and integrity; assuring system quality; assuring data quality; ethical and social issues; managing and planning of computer and communication resources.

Indicative reading:

Text book

Laudon K.C. & Laudon J.P., *Management Information Systems: Managing the Digital Firm*, 10th Edition, Prentice Hall, 2007.

Reference books

Raymond McLeod & George Schell, *Management Information Systems*, 10th Edition, Prentice Hall, 2007.

R. Kelly Rainer, Jr., Efraim Turban, *Introduction to information systems*, 2nd Edition, Wiley, 2009.

Journals and articles

Communications of ACM.

Computer (IEEE Computer Society)

MIS Quarterly.

Journal of Management Information Systems

Journal of Organizational Computing and Electronic Commerce

Computerworld.

Harvard Business Review

Sloan Management Review

SUBJECT DESCRIPTION FORM

Subject Title: Information Systems Acquisition and Integration

Subject Code: COMP5132

Credit Value: 3

Pre-requisites: Nil

Recommended background knowledge:

Basic knowledge in information systems, programming concepts.

Mutual Exclusions: Information Systems Acquisition and Integration (COMP567)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment:	55%
<i>(Individual Assignments, Group Projects, Case studies)</i>	
Test, and Examination	45%

Objectives:

This subject is aimed at teaching students to:

1. apply the techniques for information requirement determination and acquire the appropriate computer systems.
 2. obtain knowledge in cost estimates of information systems.
 3. integrate information systems in terms of hardware, software, and communications.
 4. practise system integration mechanisms by participating in case studies, team work, and case presentation.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. better understand the information requirements in business environments;
 2. be aware of the cost involved in system integration; and
 3. practise different system integration mechanisms via case studies and presentation.
-

Keyword syllabus:

IS Planning and Acquisition Methods

Information requirement analysis
IS application portfolio
Evaluating IS investments
Selection of Hardware and Software Components

Software Cost Estimation

System Cost Estimation
Work-breakdown structure
Procurement vs. Implementation
Acquisition models

System Integration

IT technologies and their applications to system integration
Some useful technologies (Object-oriented technologies, Electronic Data Exchange, Data communication and networking, Document Centre Technology, ATM and ISDN etc)
Case studies of system integration

MIS Acquisition Integration Techniques

Business Acquisition Strategies, Type, Goal
MIS Integration Strategies
Fit between Business and MIS Strategies

Indicative reading list and references:

Reference books:

B. Craig Meyers and Patricia Oberndorf, 2001, *Managing Software Acquisition: Open Systems and COTS Products*, Addison-Wesley.

Earl, 1989, *Management Strategies for Information Technology*, Prentice-Hall.

East, Stuart, 1994, *System Integration: A Management Guide for Manufacturing Engineers*, McGraw-Hill.

Lozinsky, 1998, *Enterprise-wide Software Solutions : Integration Strategies and Practices*, Addison Wesley.

Journal paper

Merali and McKiernan, 1993, The strategic positioning of information systems in post-acquisition management, *Journal of Strategic Information Systems*.

SUBJECT DESCRIPTION FORM

Subject Title: Information Systems and E-Commerce Strategy

Subject Code: COMP5133

Credit Value : 3

Pre-requisites:

Introduction to Information Systems (COMP565 / COMP5131)
[waived for MSc in Information Technology and MSc in E-Commerce students]

Mutual Exclusions: Information Systems and E-Commerce Strategy (COMP564)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable.

There will be a mix of lectures, discussions and case study analysis. Recent research articles in the area of IS/IT strategies will be reviewed and discussed in lectures. Articles are selected from journals including Harvard Business Review, MIS Quarterly, Journal of MIS, Management Science, Decision Sciences, Information Resources Management, and Communications of the ACM. Students will be given the flexibility to tailor the research material to their organization environment and pursue relevant case study.

Assessment:

Continuous Assessment	70%
Test, and Examination	30%

Objectives:

This subject provides strategies for information systems and information technology for competitive advantage in enterprises. It addresses the organizational and functional requirements in the management of different resources and gives insights into the dynamics of E-business, global competition, IS management and planning control.

Learning Outcomes:

After completing the subject, students should be able to:

1. better understand information strategies;
2. be aware of the principles and limitations of managerial decisions and be able to relate strategy formulation to the financial, human and information needs to support its implementation;
3. recognize the potential of Web-based systems on knowledge management and its potential to e-business;
4. explore feasibility and implications of alternative strategies, operations, and technological innovations; and
5. perform critical and objective study with a goal leading to productive research.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Current Research in IS & E-commerce Strategy

Introduces MIS frameworks to cater for IS revolution, stronger ties with customers and business partners using E-commerce platform, services of Internet portal, communication tools. It covers critical issues such as interfaces and integration, content management, managing visitor perceptions and relationship, brand management.

Alignment of IS & E-commerce with Business Strategy

Introduces issues such as strategic alliance, security, ethics, organization and management change in business, effect of E-brand risk to customers.

Information Resource Management

Need for corporate database; role of data administration; strategies for data centre; network, hardware, software installation and upgrade; E-commerce site management; effective use of Internet resources and technology.

IT Enabled BPR (Business Process Reengineering)

Discusses redesigning organizations with portal systems, tools and techniques for business process control and BPR, critical success factors for BPR, reengineering, IT enabled BPR.

IS Outsourcing

IS outsourcing as a strategic business decision, determinants of outsourcing, commonly outsourced E-commerce functions.

Web-based Knowledge Management

Illustrate the means of managing and utilizing information resources to achieve gains in productivity and profitability, Portal systems in support of KM to improve E-commerce success.

Intelligent Agents Technology

Illustrate the concepts of software agents and the strategy of their deployment for consumer services in E-commerce operations.

Data Warehouse Management

Technical and management issues for design of data warehouses for Web mining and decision making.

Indicative reading list and references:

General

- James Morgan (2005) *Application Cases in MIS*, McGraw Hill.
M. Lisa Miller (2009) *MIS Cases: Decision Making with Application Software*, Prentice Hall.
Colin Combe (2006) *Introduction to e-Business: management and strategy*, Butterworth-Heinemann.
Tawfik Jelassi and Albrecht Enders (2008) *Strategies for e-Business: creating value through electronic and mobile commerce: concepts and cases*, Prentice Hall.
Kenneth C. Laudon and James P. Laudon (2010) *Management Information Systems – Managing the Digital Firm*, Prentice Hall.
Gary P. Schneider (2007) *Electronic Commerce*, Thomson / Course Technology.
Efraim Turban, Jae Lee, David King and Michael Chung (2004) *Electronic Commerce*, Prentice Hall.
Robert T. Plant (2000) *e-Commerce formulation of Strategy*, Prentice Hall.
Robert Plant and Stephen Murrell (2007) *An executive's guide to information technology: principles, business models, and terminology*, Cambridge University Press

Specific

Supplementary articles from journals and magazines including:

Business Week, Fortune, Hong Kong Industrialist, Information Systems Management, Information Resources Management, Management Information Systems, MIS Quarterly, E-commerce Conference Proceedings

SUBJECT DESCRIPTION FORM

Subject Title: Information System Development with Object-Oriented Methods

Subject Code: COMP5134

Credit Value : 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge:

Nil

Mutual Exclusions:

Object-Oriented Methods in IS Development (COMP542), IS Development (COMP568)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Assessments/Term Project/Research Paper	45%
Test, and Examination	55%

Objectives:

1. To introduce IS development life cycle including information requirements determination, modelling, analysis and design, and implementation
 2. To understand, apply and be able to distinguish between structured and object-oriented development methods
 3. To enable the students with an in-depth understanding of the advanced concepts in the object-oriented approach to information system development.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. analyze business problems using the object-oriented approach;
 2. design an information system solution to business problems using the OO approach; and
 3. articulate the strengths and weaknesses of OO solutions to business problems.
-

Keyword Syllabus:

Introduction to System Development

Systems Life Cycle, Information Requirement Analysis, Systems Analysis/Design, Implementation, Testing

Requirements Engineering

Structured Development Method

Structured Techniques (e.g. SSADM)

Data Flow Diagramming

OO Development Method

Basic OO concepts and principles

UML, incremental development process

Requirements gathering and class design

System specification and design by scenarios

Indicative reading list and references:

Books

Jacobson, I., Booch, G. and Rumbaugh, J. 1999, *The Unified Software Development Process*, Addison Wesley.

Kendall, K.E. and Kendall, J.E., 2002, *Systems Analysis and Design*, Prentice Hall.

Sommerville, I., 2000, *Software Engineering, Sixth Edition*, Addison Wesley.

Other

Miscellaneous Journal papers and articles

SUBJECT DESCRIPTION FORM

Subject Title: Information Systems Audit and Control

Subject Code: COMP5135

Credit Value: 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge:

Some exposure to Computer Science, Information Systems, Business Accounting – advantageous but not essential.

Mutual Exclusions: Nil

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	60%
Tests, and Examination	40%

Objectives:

This subject allows students to acquire, in pedagogic terms, the basic core knowledge of the field of Information Systems Audit and Control, the audit process and the protection of information, consistent with the *ISACA Model Curriculum* (Note 1), and to develop, in pragmatic terms, the necessary background and skills needed to enter the Information Systems Audit and Control profession (Note 2). This course aims to:

- introduce students to the fundamental concepts, procedures and standards of IS audit and controls;
 - describe the qualifications needed to enter and become successful in this field;
 - develop students' practical skills in handling various types of IS audits and examining the IS controls; and
 - prepare students to develop generic skills in communication, individual and team works, case analysis and reporting, and creative problem solving.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes if applicable.

Learning Outcomes:

After completing the subject, students should be able to:

1. understand the IS audit key elements and the standards of performance required by the profession;
 2. understand the complexities of IS controls;
 3. develop good practical skills in developing and testing IS controls;
 4. assess the impacts of IS audit and control on the operation of organisations;
 5. perform the audit process including the planning of an audit, the application of IS audit tools and techniques and evaluation methods used in performing IS audits, the differentiation of the specialty areas within the IS audit field, and the making of an informed choice as to which emphasis is best for them, and documenting work performed and collecting evidence to support work performed;
 6. exercise good communication and interpersonal skills in handling IS audit projects and presenting the audit results;
 7. demonstrate problem solving skills by applying risk management approaches in the audit life cycle; and
 8. attempt the CISA examination (Note 3).
-

Keyword Syllabus:

The IS Audit process

IS Audit
Concepts of auditing and internal control
Audit planning
Audit evidence

IT governance

IT governance framework
IT strategies vs. corporate strategies
Risk Management methodologies and tools
Control frameworks: CobiT, COSO, Basel II, ISO/IEC27002
Auditing IT governance structure and implementation

Protection of information assets

Information security management
Logical IT security and applied IT security
Physical and environmental security
Auditing information security management framework

Business continuity and disaster recovery

Concepts related to business continuity plan and disaster recovery
The planning process and components

Reference Books

1. *CISA Review Manual*, ISACA publications
2. Hunton, J.E., Bryant, S.M., and Bagranoff, N.A., *Core Concepts of Information Technology Auditing*, John Wiley & Sons, 2004
3. Champlain, J.J., *Auditing Information Systems*, John Wiley, 2003

Journals

ISACA publications, including the *IS Audit and Control Journal*

Notes:

Note 1: The *ISACA Model Curriculum for IS Audit and Control* (2009) was designed and created, primarily as an educational resource for academics, assurance and control professionals, by a Task Force appointed by the Information Systems Audit and Control Association (ISACA), and reviewed by the ISACA Board of Directors and the Academic Relations Committee, and others. ISACA (www.isaca.org), founded in 1969, is a recognized world leader in IT governance, control, security and assurance, with more than 86,000 members in more than 160 countries. The topics covered by the Model Curriculum are grouped in six *domains*:

1. The IS Audit process;
2. IT governance;
3. Systems and infrastructure lifecycle management;
4. IT service delivery and support;
5. Protection of information assets; and
6. Business continuity and disaster recovery.

Note 2: This course provides an additional career venue to a challenging and rewarding field. Those qualified are highly in demand, and prospective employers include the Big-4 international audit/consulting firms, multinational and national corporations, government agencies, as well as SMEs, in Hong Kong, Greater China and elsewhere.

Note 3: This syllabus is designed to cover domains 1, 2, 5 and 6 (see Note 1 above) while the topics of domains 3 and 4 are expected to be covered in other courses in Computer Science and/or Information Systems, or Business/Management or Accounting. Students should be well prepared to attempt the CISA examination where Certified Information Systems Auditor™ (CISA®), a globally respected professional qualification, was developed and administered by ISACA, and the CISA designation is awarded to those individuals who have met, and continue to meet, the following requirements: successful completion of the CISA examination; IS auditing, control and security experience (minimum 5 years); continuing professional education; and compliance with the IS Auditing standards.

SUBJECT DESCRIPTION FORM

Subject Title: B2B & B2C E-Commerce and Management

Subject Code: COMP5136

Credit Value : 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge: Nil

Mutual Exclusions:

Business Focused E-Commerce & Managing E-Commerce Systems Development (COMP5001), Customer Focused E-Commerce (COMP5002)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

The growth of the Internet continues to have a tremendous impact on commerce. Companies and organizations of all types and sizes are rethinking their strategies of running business in the digital era. This course challenges students to explore the realities and implications of e-commerce using different lens including the perspectives of an owner, a collaborator, and a consumer. Business-to-consumer (B2C) and business-to-business (B2B) e-commerce markets are the focus of examination. This course describes the most common electronic commerce applications and issues of complementation, aiming to:

- introduce the theories and concepts underlying B2B and B2C e-commerce;
 - describe the managerial and necessary infrastructure, technologies, and functional elements for B2B and B2C e-commerce; and
 - examine the contemporary issues related to B2B and B2C e-commerce
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. describe the most common B2B and B2C applications;
 2. appreciate the effects of infrastructures and technologies on enabling e-commerce;
 3. evaluate business strategies and initiatives regarding e-commerce and the integration of e-commerce into organizations;
 4. apply the e-commerce theory and concepts to implement e-commerce in the real world;
 5. identify the contemporary e-commerce issues and provide recommendations; and
 6. exercise good communication and interpersonal skills in proposing and presenting appropriate e-commerce management framework.
-

Keyword Syllabus:

E-Commerce in general

- Overview of e-commerce; system model and infrastructure; types of EC systems
- Legal, ethical, and compliance issues in e-commerce
- Case studies

Customer-focused EC

- Web technologies for customer-focused e-commerce
- Security technologies for customer-focused e-commerce
- Payment technologies for customer-focused e-commerce
- E-brokers; e-marketing; e-services; e-auction

Business-focused EC

- Introduction to B2B EC
 - Impact of B2B EC to contemporary business activities
 - Key technologies for business focused EC systems
 - Applications of business focused EC such as eSCM, e-Logistics and e-Procurement
 - Virtual marketplace (VMP) such as supplier-oriented VMP and buyer-oriented VMP
-

Indicative reading list and references:

1. Turban, E., Lee, J.K., King, D., McKay, J., and Marshall, P., 2008, *Electronic Commerce: Managerial Perspective*, 5th Edition, Prentice Hall.
2. Laudon, K. C. and Traver, C.G., 2008, *E-Commerce: Business, Technology, Society*, 4th Edition, Prentice Hall.
3. Schneider, G., 2008, *Electronic Commerce*, 8th Edition, Course Technology.
4. *The International Journal of Electronic Commerce* (the leading refereed quarterly devoted to advancing the understanding and practice of electronic commerce), Publisher: M.E. Sharpe, Inc.
5. *Communications of the ACM* (the leading publication for the computing and information technology fields), Publisher: ACM.

SUBJECT DESCRIPTION FORM

Subject Title: Services Science Management

Subject Code: COMP5138

Credit Value: 3

Pre-requisite: (subject title and code no. if any)

Nil

Recommended Background Knowledge:

Background in IT, Engineering, Science, or Management

Mutual Exclusions:

Nil

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable.

Assessment:

Continuous Assessment	45%
Test and Examination	55%

Objectives:

1. To understand services in general and IT-enabled services in particular
 2. To understand the nature, design and management of services
 3. To enable the students to apply the learned techniques to their own environment to improve the service systems.
-

Learning Outcomes:

After completing the subject, students should be able to:

1. become familiar of SSME and able to recognize the applications and technologies related to IT-enabled services;
2. identify and describe the different processes, models and management requirements of IT-enabled services; and
3. compare, select and apply the design and management techniques for IT-enabled services.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Services Sciences Management and Engineering (SSME)

Overview of SSME, Services, IT-enabled services, Service systems, Service enterprises, Productivity and innovation in services

Modeling and Design of Services

Designing services, Process modeling, Service models

Managing Services

Service management, Infrastructure management, Relationship management, Service level agreement, Service delivery, Service support, Quality in Service, ITIL

SSME Challenges

Tools, Service evolution and transformation, Multidisciplinary approach

Reading List & References:

Bill Hefley and Wendy Murphy (Eds), [Service Science, Management and Engineering \(SSME\): Education for the 21st Century](#) Springer, 2008

Andrew McAfee, Will Web Services Really Transform Collaboration? MIT Sloan Management Review, Vol. 46, No. 2, 2005, pp78-84.

James and Mona Fitzsimmons, Service Management, Operations, Strategy, Information Technology, McGraw-Hill/Irwin, 5th edition, 2006.

<http://www-304.ibm.com/jct09002c/university/scholars/skills/ssme/resources.html>

SUBJECT DESCRIPTION FORM

Subject Title: Advanced Database Systems

Subject Code: COMP5151

Credit Value: 3

Pre-requisite(Subject title and code no, if any):

Database Systems and Management (COMP5111) or
Database Systems (COMP503) or equivalent
[waived for Software Technology students]

Recommended background knowledge:

Knowledge of relational database and familiar with SQL. Fundamental concept of object-oriented paradigm and familiar with C++.

Mutual Exclusions:

Modern Database System and Technology (COMP516)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

1. To equip students with principles and knowledge of distributed database systems;
 2. To discuss in details the key concepts and practical issues in the implementation and application of distributed database systems;
 3. To equip students with principles and knowledge of object oriented database system design
-

Learning Outcomes:

After completing the subject, students should be able to:

1. better understand the principles and knowledge in distributed database systems;
2. explore and identify the various issues related to the development of distributed database system;
and
3. recognize the design aspects of OO databse system and related development

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Review of database technology

Overview of object-oriented databases and distributed databases. Comparison between relational, object-oriented distributed database systems.

Distributed database systems

Distributed database vs. distributed data processing, problem areas of distributed database system, architecture of distributed database system, multimedia database

Database design and query processing

Data fragmentation, allocation, query optimization, execution strategies, object clustering and performance benchmarking.

Transaction processing and concurrency control

Serializability, locking-based concurrency control, design transactions, timestamp-based concurrency control, optimistic concurrency control, deadlock detection and prevention

Database integrity and security

Data protection and authorization control, multi-level database systems

Overview of object-oriented data modelling

Object definition, types and classes, object methods, assertions and constraints, and ODMG.

Concepts and implementation issues in object-oriented database systems

Storage structure for complex/composite objects, object identity, encapsulation, types/classes, inheritance, late binding, persistence, indexing mechanism

Optional topics

Examples may include: application of distributed database technology to the World Wide Web, web databases, ODBC, JDBC, data warehousing on the web, mobile databases, multimedia databases, spatial and temporal databases

Indicative reading list and references:

Books

Blaha, M. and Premerlani, W., 1998, *Object-Oriented Modeling and Design for Database Applications*, Prentice-Hall.

Embley, D. 1997, *Object Database Development: Concepts and Principles*, Addison-Wesley.

Kim, W., 1995, *Modern Database Systems: The Object Model, Interoperability, and Beyond*, ACM Press.

Maurer, Scherbakov, Halim and Razak, 1998, *From Databases to Hypermedia*, Springer,

Ozsu, M.T. and Valuriez, P., 1999, *Principles of Distributed Database System 2ed Edition*, Prentice-Hall.

Eaglestone, B. and Ridley, M., 2001, *Web Database Systems*, McGraw Hill.

Bernstein, Hadzolicos and Goodman, 1987, *Concurrency Control and Recovery in Database Systems*. Addison-Wesley.

Abiteboul, Buneman, and Suci, 2000, *Data on the Web*, Margan Kaufmann.

Ceri, S. and Pelagatti, G., 1985, *Distributed Databases - Principles & Systems*, McGraw Hill.

Journals

Journal of ACM

ACM Transactions on Database Systems

IEEE Transactions on Knowledge and Data Engineering

VLDB Journal

SUBJECT DESCRIPTION FORM

Subject Title: Software Engineering Concepts

Subject Code: COMP5211

Credit Value : 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Some programming experience and knowledge

Mutual Exclusions:

This subject is not available to a holder of a degree (e.g. computing) which provided specific knowledge overlapping the contents of this subject significantly

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject aims to provide the students with a sufficient insight into the software development environment, a detailed knowledge of the application of typical software engineering techniques, and an appreciation of CASE tools.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. explain the software development life cycle;
 2. know the basic techniques for requirement engineering;
 3. know the basic techniques for software design;
 4. know the basic techniques for testing;
 5. understand the CASE technology;
 6. understand the maintenance issues and process; and
 7. understand the need for coding standard, portability and reusability.
-

Keyword Syllabus:

Programming myths and software crisis

Principle of Software Engineering

The impact of CASE (Computer Aided Software Engineering) technology

Software Requirement

Software Requirement Engineering

An overview of Informal method in software specification

An overview of Formal method in software specification

Software Design

Software Structure

Software Development Tools: Notation & Techniques

Object-oriented Analysis and Design, e.g. Rumbaugh, Yourdon or Booch's OO approach

Functional-oriented Analysis and Design, e.g. Structured Systems Analysis and Design Methodologies

Critical comparison between OO Approach and Functional Approach

Software Implementation

Structured Coding Technique and Style

Portability and Reusability

Software Testing and Maintenance

Software Quality Assurance

Software Verification and Validation Techniques

Re-engineering and reverse engineering concepts

Maintenance Issues

Usability and usability engineering

Software usability

Usability engineering

Indicative reading list and references:

Pressman, R, 2009, *Software Engineering, A Practitioner's Approach*, 7th ed., McGraw Hill.

Rumbaugh, J., Jacobson, I. et al., 1999, *The Unified Modeling Language Reference Manual*, Reading, MA: Addison-Wesley.

Rumbaugh, J., Jacobson, I. et al., 1999, *The Unified Software Development Process*, Reading, MA: Addison-Wesley.

Sommerville, I., 2006, *Software Engineering*, 8th ed., Addison Wesley.

SUBJECT DESCRIPTION FORM

Subject Title: Software Design and Architecture

Subject Code: COMP5212

Credit Value: 3

Pre-requisite: Nil

Mutual Exclusions: Nil

Learning Approach:

Teaching and learning activities including self study, face-to-face/online tutorials, discussion forums, lab/workshop/seminar where applicable, are conducted to encourage interaction among the students and the subject lecturer.

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject aims to introduce design concepts such as abstraction, information hiding, functional decomposition, modularization and reusability. Students will learn how to cope with the complexity of problem specification, make design trade-offs, and use software architecture and domain knowledge for development.

Learning Outcomes:

After completing this subject, students should be able to:

1. apply abstraction, information hiding, functional decomposition and modularization in design;
 2. define a software architecture;
 3. understand design tradeoffs;
 4. apply various design representations;
 5. use basic design methods; and
 6. use design metrics to evaluate a design.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Concepts and Principles

Design Notations

Design Methods

- Object-Oriented Design
- Aspect-Oriented Design and Programming
- Component-based Development
- Commercial Off-the-Shelf
- Rational Unified Software
- UML

Design Quality and Metrics

Software Architecture

Design Strategies and Method

Psychology of Programming

References:

- Bass, L., 1998, *Software architecture in practice* Reading, Mass.: Addison-Wesley
- Braude, E. J., 2004, *Software design : from programming to architecture* Hoboken, NJ: Wiley
- Budgen, D., 1994, *Software design* Wokingham, England ; Reading, Mass.: Addison-Wesley
- Detienne, F., 2002, *Software design--cognitive aspects* London: Springer
- Kruchten, P., 1999, *The rational unified process* Reading, Mass.: Addison-Wesley
- Stevens, W. P., 1991, *Software design : concepts and methods* New York: Prentice Hall International

SUBJECT DESCRIPTION FORM

Subject Title: Software Project Management

Subject Code: COMP5221

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Some working experience or basic understanding of project environment is desirable.

Mutual Exclusions:

Managing Software Development and Quality (COMP517),
Advanced Topics in Software Engineering (COMP548)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Term Project/assignment	60%
Test, and Examination	40%

Objectives:

This subject aims to provide students with a systematic approach to initiating, planning, executing, controlling and closing a software project. Students will develop a basic understanding of the nine project management areas and the role of a typical project manager. Students will learn the best practices and techniques used in project management processes.

Learning Outcomes:

After completing this subject, students should be able to:

1. describe project life cycle;
 2. write a project plan;
 3. estimate project effort with COCOMO method and other common techniques;
 4. monitor and report on project progress;
 5. know the 9 knowledge areas of Project Management Institute's body of knowledge;
 6. apply risk management techniques;
 7. apply time and cost management techniques; and
 8. understand quality management concepts and models.
-

Keyword Syllabus:

Project Management Process & Technique

Project conception; Project definition; Project Life Cycle; Roles and Responsibility of project manager, Principle of Software Development.

Project Management Processes: Initiating, planning, executing, controlling, and closing

Project management techniques: planning, organizing, controlling, evaluating, reporting, costing, sizing, cost/benefit analysis, and earned value analysis

Methods for project planning: Estimation of project size, schedule and cost.

Methods for project control: Checkpoints, Reviews, Change Management, Reporting, Issues management, Team building, High performance team.

Project Management Knowledge Areas

Integration Management, Scope Management, Time Management, Cost Management, Quality Management, Human Resource Management, Communication Management, Risk Management, Procurement Management

Indicative reading lists and references:

Books

A Guide to the Project Management Body of Knowledge, PMBOK Guide 2000 Edition, Project Management Institute.

Cadle, J., Yeates, D., 2004, *Project Management for Information Systems*, Prentice Hall.

Hughes, B. and Cotterell, M., 1999, *Software Project Management*, McGraw-Hill.

Kerzner, H., 2001, *Project Management, A systems approach to Planning, Scheduling, and Controlling*, John Wiley & Sons.

SUBJECT DESCRIPTION FORM

Subject Title: Software Testing and Quality Assurance

Subject Code: COMP5222

Credit Value: 3

Pre-requisite: (subject title and code no. if any)

Software Engineering Concepts (COMP509/COMP5211) or equivalent
[waived for students of MSc in Information Systems (Outpost) , MSc in Software
Technology and MSc in E-Commerce]

Recommended Background Knowledge:

Some working experience in software development

Mutual Exclusions:

Software Quality Assurance (COMP546)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where
applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject aims to present effective testing techniques (both black-box and white-box) for ensuring high quality software. The students will learn metrics for managing quality assurance and understand capabilities of test tools.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. know the definition of quality, cost of quality, quality model;
 2. apply basic white-box testing techniques;
 3. apply basic black-box testing techniques;
 4. apply inspection techniques;
 5. know how test tools can be used in the testing life cycle;
 6. use testing metrics for product and process;
 7. understand how to do performance testing; and
 8. understand how to do usability testing.
-

Keyword Syllabus:

Software Quality Concepts

Software quality problems. Quality definition. Cost of quality, Quality model.

Code-based Testing Techniques

Control flow and data flow testing. Mutation testing. Symbolic evaluation. Domain testing.

Specification-based Testing Techniques

Equivalence partitioning. Boundary value analysis. Cause-effect graphing. Random testing. State machine testing. Formal program verification.

Inspection Technique

Process, Role, Templates

Management of Software Quality

Responsibility. Test cycle (unit, integration, system, alpha and beta testing phases). Design and code reviews. Test plans. Test tools. Quality metrics. Quality prediction. In-process quality tracking.

Reading List & References:

- Culbertson, R., Brown, C., Cobb, G., *Rapid Testing*, Prentice Hall, 2002.
Kaner, C., Falk, J., Nguyen, H.Q., 1999, *Testing Computer Software*, John Wiley.
Nguyen, H.Q., 2001, *Testing Applications on the Web*, John Wiley.
Kaner, C, Bach, J., Pettichord, B., *Lessons Learned in Software Testing*, John Wiley, 2002.
IEEE Std. 829, 1008, 1012, 1059, 1028, 1044

SUBJECT DESCRIPTION FORM

Subject Title: Middleware and Distributed Objects

Subject Code: COMP5223

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Basic knowledge in Java programming and distributed systems concepts

Mutual Exclusions:

Advanced Object-Oriented Design and Programming (COMP545)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

Upon completion of this subject, students will be able to:

- understand the motivation of middleware;
 - understand the basic theories underlying the design of middleware;
 - understand the basic concepts of CORBA; and
 - understand the basic concepts of system integration using a scripting programming language.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. understand the problems and issues encountered in building large-scale distributed systems and enterprise application integration; and
 2. solve various tasks in the construction of large-scale distributed systems and enterprise application integration using object-oriented middleware and scripting programming language.
-

Keyword Syllabus:

Introduction to Distributed Systems

- Distributed system requirements
- Transparency in distributed systems
- Object-oriented approach to distributed systems
- Local versus distributed objects

Principles of Object-Oriented Middleware

- Why middleware
- Types of middleware
- Object-oriented middleware
- Developing systems with object-oriented middleware

CORBA

- Architecture and system development
- Communication modes: synchronous requests, oneway requests, deferred synchronous requests, asynchronous requests
- Portable Object Adaptor (POA)
- Portable interceptors
- CORBA services: naming service and event service

System Integration using Scripting Programming Language

- Fundamentals of Ruby programming
 - Database integration using Ruby
 - Distributed applications in Ruby
-

Indicative reading list and references:

Books

Emmerich W., 2000, *Engineering Distributed Objects*. Wiley.
Bolton F., 2002, *Pure CORBA*. Sams.
Fulton, H., 2006, *The Ruby way: solutions and techniques in Ruby programming (2nd edition)*. Addison Wesley.
Schmidt, M., 2006, *Enterprise integration with Ruby*. The Pragmatic Programmers.

Others

IEEE Distributed Systems Online. <http://dsonline.computer.org>.
Articles from journals, magazines, and conference proceedings, including *ACM TOCS*, *IEEE TPDS*, *IEEE TSE*, *IEEE TOC*, *CACM*, *IEEE Computer*, *ICDE*, *DOA*.

SUBJECT DESCRIPTION FORM

Subject Title: Software Requirement Analysis and Specification

Subject Code: COMP5224

Credit Value: 3

Pre-requisite: Nil

Mutual Exclusions: Nil

Learning Approach:

Teaching and learning activities including self-study, face-to-face/online tutorials, discussion forums, lab/workshop/seminar where applicable, are conducted to encourage interaction among the students and the subject lecturer.

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject introduces the requirements engineering process and shows how requirements engineering dovetails with the overall software life cycle. It also covers many issues with requirement management such as stakeholder relationships with the development team, conflicts between users and developers, and quality standards for requirements.

Learning Outcomes:

After completing this subject, students should be able to:

1. know the requirement engineering process;
 2. apply basic techniques for requirement elicitation;
 3. apply basic techniques for requirement analysis;
 4. write use cases;
 5. validate requirement; and
 6. use UML and patterns for design.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Requirements Engineering Process

Requirements Taxonomy

Requirements Elicitation

Documenting a software requirements analysis

Requirements Analysis

Analyzing software requirements

Structured Functional Methods

Real-time Impact

The object-oriented approach

Artificial Intelligence Methods

Requirements by Collaboration

Requirements Validation

Validating and verifying software requirements

Requirements Management

The software design process

The process of implementing software requirements

Writing Use Cases

References:

Gottesdiener , E., 2002, *Requirements by collaboration: workshops for defining needs*, Boston [Mass.] : Addison-Wesley.

Wieringa, R., 1996, *Requirements engineering: frameworks for understanding*, Chichester ; New York : Wiley.

Alistair Cockburn, 2001, *g Effective Use Cases*, Addison-Wesley.

Donald C. Gause, Gerald M. Weinberg, 1989, *Exploring Requirements: Quality before Design*, Dorset House

Craig Larman, 2004, *Applying UML and Patterns*, Prentice Hall.

SUBJECT DESCRIPTION FORM

Subject Title: Software Evolution and Maintenance

Subject Code: COMP5225

Credit Value: 3

Pre-requisite: Nil

Mutual Exclusions: Nil

Learning Approach:

Teaching and learning activities including self-study, face-to-face/online tutorials, discussion forums, lab/workshop/seminar where applicable, are conducted to encourage interaction among the students and the subject lecturer.

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject introduces basic concepts of maintenance and how the concept of system evolution fits into maintenance, presents different technical and managerial problems of maintenance, addresses the formal types of maintenance, and discusses standard maintenance processes.

Learning Outcomes:

After completing this subject, students should be able to:

1. understand the maintenance process;
 2. understand system evolution;
 3. apply configuration management;
 4. know the problem management process;
 5. apply metrics to manage maintenance;
 6. know the basic techniques for managing organizational issues; and
 7. understand software reuse.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Software Evolution and Maintenance Concepts

Maintenance Support Processes

- Maintenance Planning
- Evolution and Maintenance Testing
- Configuration Management
- Problem Management
- Maintenance supporting tools

Maintenance Measurements

- Maintenance Metrics
- Maintenance Cost Estimation

Management and Organizational Issues

- Organization Aspect of Maintenance
- Maintenance Activities and Role
- Outsourcing IT Maintenance
- Managing the Maintenance Function
- Maintenance Teams

Maintenance Management Problems

- Problems of Software Maintenance
- Software Reuse
- Legacy Systems

References:

- Hallsteinsen, S. and Paci, M, 1997, *Experiences in software evolution and reuse : twelve real world projects*, Berlin ; New York: Springer.
- IEEE Std 1219-1998, *IEEE Standard for Software Maintenance*
- ISO/IEC FDIS 14764:2005(E), *Software engineering - Software life cycle processes - Maintenance*
- Keyes, J., 2003, *Software engineering handbook* Boca Raton: Auerbach.
- Polo, M., 2003, *Advances in software maintenance management : technologies and solutions* Hershey, PA: Idea Group Pub.
- West, R., 1993, *Improving the maintainability of software* London: HMSO.

SUBJECT DESCRIPTION FORM

Subject Title: Software Infrastructure and Configuration Management

Subject Code: COMP5226

Credit Value: 3

Pre-requisite: Nil

Mutual Exclusions: Nil

Learning Approach:

Teaching and learning activities including self-study, face-to-face/online tutorials, discussion forums, lab/workshop/seminar where applicable, are conducted to encourage interaction among the students and the subject lecturer.

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject presents different methodologies for the software configuration management process, and introduces software configuration control, status accounting and configuration auditing and their application.

Learning Outcomes:

After completing this subject, students should be able to:

1. understand the software configuration management process;
2. apply basic techniques for configuration identification;
3. apply basic techniques for configuration control;
4. apply basic techniques for configuration status accounting;
5. conduct a configuration audit; and
6. use common configuration management tools.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Management of the SCM process

System Development Methodology
Project Management Methodology
Configuration Management Methodology

Software Configuration Identification

Labeling Scheme
Functional Baseline Configuration Items, Allocated Baseline Configuration Items
Design Baseline Configuration Items, Product Baseline Configuration Items
Operational Baseline Configuration Items

Software Configuration Control

Change Management Process

Software Configuration Status Accounting

Types of Logs
Type Frequency and Distribution of Reports

Software Configuration Auditing

Functional Configuration Audit,
Physical Configuration Audit
Formal Qualification Review

Software Release Management and Delivery

References:

- Ayer, S. J., 1992, *Software configuration management : identification, accounting, control, and management*, New York, McGraw-Hill.
- Berczuk, S. P., 2003, *Software configuration management patterns : effective teamwork, practical integration* Boston, MA, Addison-Wesley.
- Keyes, J., 2003, *Software engineering handbook*, Boca Raton, Auerbach
- Sommerville, I., 2001, *Software engineering* Harlow, New York: Addison-Wesley, 6th ed.
- Jones, C., 2000, *Software assessments, benchmarks, and best practices* Boston, Mass., Addison Wesley.

SUBJECT DESCRIPTION FORM

Subject Title: Embedded Software Engineering

Subject Code: COMP5228

Credit Value: 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge: Nil

Mutual Exclusions: Embedded Software System (COMP 5227)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject aims to provide students with comprehensive knowledge on embedded software design, modelling, implementation, simulation, testing, and verification.

Learning Outcomes:

After completing this subject, the students should be able to:

1. have an understanding of definitions, scope and common properties of embedded systems from a variety of embedded applications in different industrial domains;
 2. possess the ability to represent behaviour of embedded applications with computation models;
 3. possess the knowledge of basic organization and architecture of embedded systems;
 4. have an understanding of basic design flows for implementing embedded systems with hardware/software codesign;
 5. have an understanding of pros and cons of major programming languages for embedded systems;
 6. design and implement embedded software for application-specific systems by utilizing specialized compilers, real-time operating systems, and application software development platforms; and
 7. design and conduct experiments with basic simulation, testing and verification techniques for embedded systems.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Introduction to embedded systems

Definitions, scope and common properties of embedded systems
Performance metrics and technique challenges
Design methodologies and issues

Introduction to models of computation for representing behaviours for embedded applications

Finite state machines
Discrete event models
Data flow network models
Petri nets, UML diagrams

Organizations and architectures of embedded systems

RISC and VLIW architectures
General-purpose embedded microprocessors
DSP processors
D/A converters

Implementation of embedded systems with hardware/software codesign

High-level synthesis
Hardware/Software partitioning
VHDL and FPGA implementation
Compiler

Introduction to programming languages for embedded systems

Assembly
C/C++
Java

Design and optimization for embedded software

Embedded operating systems
Real-time operating systems
Embedded compiler
Device driver
Application software development platforms

Simulation, testing and verification

Simulators for embedded systems
Testing and verification issues
Testing and verification approaches

Reference Books

- J. A. Fisher, P. Faraboschi, and C. Young, 2004, *Embedded Computing: A VLIW Approach to Architecture, Compilers and Tools*, San Francisco, CA: Morgan Kaufmann.
- W. Wolf, 2000, *Computers as Components: Principles of Embedded Computer Systems Design*, San Francisco, CA: Morgan Kaufmann.
- D. E. Simon, 1999, *An Embedded Software Primer*, MA: Addison Wesley.
- A. S. Berger, 2001, *Embedded Systems Design: An Introduction to Processes, Tools and Techniques*, Lawrence, KA: CMP Books.
- T. A. Pender, 2002, *UML Weekend Crash Course*, New York, NY: Wiley.
- M. Barr, 1999, *Programming Embedded Systems in C and C++*, O'Reilly and Associates.
- P. Lapsley, J. Bier, A. Shoham, and E. A. Lee, 1997, *DSP Processor Fundamental: Architectures and Features*, New York, NY: IEEE Press.

- J. W. S. Liu, 2000, *Real-Time Systems*, Prentice Hall.
- Albert M. K. Cheng, 2002, *Real-Time Systems: Scheduling, Analysis, and Verification*, New York, NY: Wiley.
- K. Yaghmour, 2003, *Building Embedded Linux Systems*, O'Reilly and Associates.
- J. J. Labrosse, 2002, *MicroC OS II: The Real Time Kernel*, 2nd Edition, Lawrence, KA: CMP Books.
- J. J. Labrosse, 1999, *Embedded Systems Building Blocks: Complete and Ready-To-Use Modules in C*, 2nd Edition, Lawrence, KA: CMP Books.
- I. Sommerville, 2004, *Software Engineering*, 7th Edition, MA: Addison Wesley.

Journals

- ACM Transaction on Embedded Computing Systems
- ACM Transaction on Design Automation of Electronic Systems
- IEEE Transaction on Computers

SUBJECT DESCRIPTION FORM

Subject Title: Project Practice and Case Studies

Subject Code: COMP5231

Credit Value : 3

Pre-requisite: Nil

Mutual Exclusions: Nil

Learning Approach:

Teaching and learning activities including self-study, face-to-face/online tutorials, discussion forums, lab/workshop/seminar where applicable, are conducted to encourage interaction among the students and the subject lecturer.

Assessment: Continuous Assessment 100%

Objectives:

The subject provides case studies for students to gain insight into realistic and practical project problems, and to improve the policies and practices of software project management.

Learning Outcomes:

After completing the subject, students should be able to:

1. better understand project politics;
 2. recognize realistic and practical project problems;
 3. start up, manage and close a software project; and
 4. apply knowledge and skills for project practice.
-

Keyword Syllabus:

Software Development Projects

Students work in teams, with a faculty member as coach, to analyze a problem, plan a software development project, and implement a solution. After delivering a result, students evaluate the efficacy of their solution as used by customers.

Benchmarking Software Projects

Students work on some benchmarking report for SE topics like

- Slow Programmer vs Fast Programmer
 - Small Software Project vs Large Software Project
 - Software Project vs Engineering Project
 - Business Value vs Information Technology Value
-

Note: Data and project results reported by students must be either empirical or experimental to emphasize on real life studies.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

SUBJECT DESCRIPTION FORM

Subject Title: IT Outsourcing and Auditing

Subject Code: COMP5232

Credit Value: 3

Pre-requisite: Nil

Mutual Exclusions: Nil

Learning Approach:

Teaching and learning activities including self-study, face-to-face/online tutorials, discussion forums, lab/workshop/seminar where applicable, are conducted to encourage interaction among the students and the subject lecturer.

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject presents the motivations behind global software development, difficulties encountered in a Global Software Team, and introduces a global software development methodology called Plagiarism-based Programming. It also discusses different models of IT Outsourcing and their characteristics, a framework for analyzing Open Source Software Development (OSS), and IT audit process, techniques, and standards.

Learning Outcomes:

After completing this subject, students should be able to:

1. understand the outsourcing management process;
 2. know how to select outsourcing service supplier;
 3. understand the legal issues with open source software;
 4. use selected open source tools for development;
 5. understand the IT audit process; and
 6. prepare for an IT audit.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Global Software Development

Around the sun development
Reduction in time-to market
Characteristics of GSD
Geographic Dispersion
Loss of Communication Richness
Cultural Difference
Loss of teamwork
Coordination Breakdown
Methodology
Plagiarism-based Programming

IT Outsourcing

Strategy and Decision
Implementation
IT Outsourcing Model for Software Development
Four Models and their Characteristics
Case Studies of IT Outsourcing

Open Source Development

Major Open Source Project
Linux Mozilla
Tex SendMail Perl
Open Office Tomcat
OSI-Approved License
OSD Configuration Management
CVS
Open Source Development from CMM and XP perspectives

IT Audit

Objectives
Process
Techniques
Standards: COBIT, ISO19011

References:

- Gunasekaran A., Khalil O., Syed M.R. (Ed.), 2002, *Knowledge and Information Technology Management: Human and Social Perspectives*, Idea Group, Hershey, PA
- Karolak D. W., 1998, *Global Software Development* managing virtual teams and environments, Los Alamitos, Calif. : IEEE Computer Society
- Carmel, E., 1999, *Global software teams : collaborating across borders and time zones*, Upper Saddle River, NJ : Prentice Hall
- McMahon, P. E., 2001, *Virtual project management : software solutions for today and the future*, Boca Raton, Fla. : St. Lucie Press
- Pavlicek, R. C., 2000, *Embracing insanity : open source software development*, Indianapolis, Ind. : Sams
- Feller, J., 2002, *Understanding Open Source Software development*, London : Addison-Wesley
- Aalders, R., 2001, *The IT outsourcing guide* New York ; Chichester : Wiley
- ISO 19011, *Guidelines for Quality and Environmental Management Systems Auditing*

SUBJECT DESCRIPTION FORM

Subject Title: Software Engineering Process for High Quality Software

Subject Code: COMP5251

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Software Engineering Concept (COMP509/COMP5211) or equivalent
[waived for MSc Software Technology and MSc Technology Management students]

Recommended background knowledge:

Some working experience in software development is desirable.

Mutual Exclusions:

Managing Software Development and Quality (COMP517)
Advanced Topics in Software Engineering (COMP548)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objective :

This subject starts with a discussion of the rise of Software Process Improvement and Engineering from 1990s onwards, and then presents different frameworks for software process improvement. The students will learn the key characteristics of maturity models, software assessments, and process improvement techniques.

Learning Outcomes:

After completing the subject, students should be able to:

1. be aware of the following process improvement models: CMMI, ISO 9001;
 2. better understand maturity models and their characteristics;
 3. apply process improvement techniques and tools;
 4. explore metrics for tracking process improvement;
 5. generate a six sigma process; and
 6. perform a process assessment.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

- Software methodology and process
 - Capability Maturity Model Integration (CMMI)
 - PRINCE2
 - Measurement in software quality analysis
 - Quality management models
 - ISO9000
 - Six Sigma
-

Indicative reading list and references:

Books

- Abran, A., Moore, J.W., Bourque, P., Dupuis, R., Tripp, L.L. (ed), 2001, *Guide to the Software Engineering Body of Knowledge: Trial Version*, IEEE.
- Bentley, C., 2001, *PRINCE2: a Practical Handbook*, 2nd edition, Butterworth-Heinemann.
- Breyfogle III, F.W., 2003, *Implementing Six Sigma Smarter Solutions Using Statistical Methods*, John Wiley & Sons.
- Chrissis, M.B., Konrad, M., Shrum, S., 2003, *CMMI Guidelines for Process Integration and Product Improvement*, Addison Wesley.
- Fenton, N.F., Pfleeger, S.L., 1997, *Software Metrics: a Rigorous & Practical Approach*, 2nd edition, International Thomson Computer Press.
- 雷劍文, 陳振沖, 李明樹, 2002, *CMM: 軟件過程的管理與改進*, 清華大學出版社, 北京.
- SOB, 2002, *Managing Successful Project with PRINCE2*, The Stationery Office Books.
- Mears, P., 1994, *Quality Improvement Tools & Techniques*, McGraw-Hill.
- Sami, Z., 1998, *Software Process Improvement: Practical Guidelines for Business Success*, Addison-Wesley Professional.
- Software Engineering Institute, 1995, *The Capability Maturity Model Guidelines for Improving the Software Process*, Carnegie Mellon University, Addison-Wesley Professional.
- Tayntor, C., 2002, *Six Sigma Software Development*, Auerbach.
- Wang, Y.X., King, G., 2002, *Software Engineering Processes: Principles and Applications*, CRC Press.

Articles

- CMMI Version 1.1, www.sei.cmu.edu/publications/documents/02.reports/02tr003.html
- De Feo, J.A., Bar-El, Z., 2002, *Creating Strategic Change More Efficiently with a New Design for Six Sigma Process*, Journal of Change Management, 3(1), Henry Stewart Publications.
- Department of Energy, 1997, *Guidelines for Software Measurement*, US, Quality Report SQAS97-001.
- Goldenson D.R., Gibson, D.L., 2003, *Demonstrating the Impact and Benefits of CMMI: An Update and Preliminary Results*, Software Engineering Institute, Carnegie Mellon University, CMU/SEI-2003-SR-009.
- Mutafelija, B, Stromberg, H, 2003, *ISO 9001:2000 – CMMI v1.1 Mappings*.
- UGC, 2002, *Design for Six Sigma*, NX Digital Product Development White Paper.

SUBJECT DESCRIPTION FORM

Subject Title: Extreme Programming and Agile Software Development

Subject Code: COMP5252

Credit Value: 3

Pre-requisite: Nil

Recommended background knowledge:

CMM and Basic Java Programming

Students who are not familiar with programming require completing at least two core subjects

Mutual Exclusions: Nil

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject introduces Agile Software Development, Extreme Programming and Software Development Rhythms and describes their unique features relative to traditional software practices. It also presents their applications in the real world and addresses their impacts on developing software.

Learning Outcomes:

After completing this subject, students should be able to:

1. understand the agile methodologies: extreme programming, scrum, feature driven programming, crystal method;
 2. apply refactoring techniques;
 3. understand pair programming and its characteristics;
 4. start a XP project;
 5. apply XP to a small project; and
 6. relate CMMI and XP.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

- Overview of Agile Methodologies
 - Extreme Programming,
 - Scrum,
 - Feature Driven Programming
 - Crystal Method
 - Dynamic Systems Development Method
 - eXtreme Programming
 - 12 practices
 - Test-Driven Development
 - xUnit,
 - Different Patterns
 - Refactoring
 - Bad Smells in Code
 - Building Test
 - Toward a Catalog of Refactoring
 - Composing Methods
 - Pair Programming
 - Economics,
 - Productivity and Quality
 - Pair Learning
 - Characteristics of different people pair
 - How to start up an XP project
 - The first Iteration
 - The others iteration
 - Deployment
 - CMM and XP
 - Software Development Rhythms
-

Text Book:

Lui, K.M. and Chan, KCC, Software Development Rhythms, John Wiley, 2008

References:

- Beck, K., 2003, *Extreme Programming Explained: Embrace Change*, Addison-Wesley.
- Cockburn, A., 2003, *Agile Software Development*, Addison-Wesley.
- Marchesi, M., Succi, G., Wells, D. and Williams, L., 2002, *Extreme Programming Perspectives*, Addison Wesley
- Williams, L. and Kessler, R., 2003, *Pair Programming Illuminated*, Addison-Wesley
- Ambler, S. W., 2002, *Agile modeling : effective practices for eXtreme programming and the unified process*, New York, NY : Wiley
- Martin, Robert C., 2003, *Agile software development : principles, patterns, and practices*, Upper Saddle River, N.J. : Prentice Hall
-

SUBJECT DESCRIPTION FORM

Subject Title: Internet Infrastructure and Protocols

Subject Code: COMP5311

Credit Value: 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge:

Students are expected to possess knowledge taught in a typical first course on computer networks, including layering architecture, layer-two network protocols, and some higher-layer network protocols.

Mutual Exclusions:

Internetworking Protocols and Software I (COMP526)

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	30%
Class Project	35%
Test, and Examination	35%

Objectives:

The overall objective of this course is to build up a solid understanding on the networking technologies underpinning the current Internet infrastructure. This course would serve as an important pre-requisite for other more advanced topics, such as network security, network measurement and diagnosis, wireless and mobile networks, and multimedia networking. The teaching approach will be based on in-depth problem-solving and hands-on class projects. Specifically,

1. Understand the TCP/IP technology underpinning Internet;
 2. Understand the original design philosophy of Internet, and the strength and weaknesses of the then designed Internet in today's computing environment;
 3. Explore some most up-to-date development in the Internet technology; and
 4. Acquire knowledge in one specific Internet topic through a group project.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. read some articles in a professional computer networking magazine, such as the NetworkWorld and IEEE Network, and ACM netWorker;
2. use various network diagnosis tools, such as Wireshark, traceroute programs, and various ping and ping-like tools to study network protocols and perform simple diagnosis and troubleshooting; and
3. take on a self-study on more advanced networking topics that require foundational understanding of the TCP/IP suite.

Keyword Syllabus:

1. Data-link networks and IP: shared medium and point-to-point networks; the internetworking problem, the hour-glass model, address resolution, IP fragmentation, packet reordering, IP addressing
2. IP forwarding: longest prefix match algorithms, routing vs switching, IP address lookup, packet classification, IP tunnelling, ICMP
3. End-to-end issues and protocols: end-to-end argument, end-to-end reliability, TCP and UDP, sliding window protocol, acknowledgment strategies
4. Control congestion in Internet: TCP slow-start and congestion avoidance, TCP fast retransmit and recovery, fairness, buffer management, packet scheduling, and queue management
5. Applications protocols, e.g., DNS and HTTP, and their interactions with the lower layers
6. Internet routing: Internet topology, distance vector, link state, and path vector routing protocols, convergence and routing loops, Routing Information Protocol, Open Shortest Path Protocol, Border Gateway Protocol, Inter-AS relationship
7. Design philosophy of IP and TCP, and future challenges

Indicative reading list and references:

1. J. Kurose and K. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, Third Edition, Addison Wesley, 2004.
2. L. Peterson and B. S. Davie, *Computer Networks: A Systems Approach*, Third Edition, Morgan Kaufmann, 2003.
3. R. Perlman, *Interconnection*, Second Edition, Addison Wesley, 2000.
4. S. Keshav, *An Engineering Approach to Computer Networking*, Addison Wesley, 1997.
5. W. R. Stevens, *TCP/IP Illustrated Volume I, The Protocols*, Addison Wesley, 1994.
6. G. Varghese, *Network Algorithmics*, Morgan Kaufmann, 2005.
7. M. Medhi and K. Ramasamy, *Network Routing: Algorithms, Protocols, and Architectures*, Morgan Kaufmann, 2007.
8. J. Stewart III, *BGP4: Inter-Domain Routing in the Internet*, Addison Wesley, 1999.
9. C. Huitema, *Routing in the Internet*, Prentice Hall PTR, Second Edition, 1999.
10. C. Huitema, *IPv6: The New Internet Protocol*, Second Edition, Prentice Hall PTR, 1997.
11. C. E. Perkins, *Mobile IP: Design Principles and Practices*, Addison Wesley, 1998.
12. B. S. Davie and Y. Rekhter, *MPLS: Technology and Applications*, Morgan Kaufmann, 2000.
13. B. Krishnamurthy and J. Rexford, *Web Protocols and Practice*, Addison Wesley, 2001.

Supplementary articles from IEEE/ACM publications

SUBJECT DESCRIPTION FORM

Subject Title: Internet Computing and Applications

Subject Code: COMP5322

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Basic knowledge in programming and networking technology

Mutual Exclusions:

Internet Computing (COMP515),
Internet Computing For Managers (COMP5005),
Underlying Technologies for E-Commerce (COMP5004)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

- The subject studies the impact of Internet in facilitating a truly distributed, wide area and highly accessible computing environment.
 - It explores various web-related technologies and to gain appreciative knowledge of how these technologies synergize with one another to enable ubiquitous access of information.
 - This subject examines the analysis, design and implementation techniques required to develop the network, enterprise and Internet based information systems. In also covers the managerial perspective of Internet Computing and how this evolving technology will impact future enterprise e-solution.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. gain a good overall understanding and appreciation of technologies encompassing Internet Computing that will equip them with the skill sets to plan, design and formulate best solutions for the deployment of state-of-the-art web-based information systems;
 2. critically assess the problems and issues surrounding the challenges presented to them. In the process of formulating a holistic solution to the problems, students are taught the skill sets to incrementally assess the suitability of various technologies; and
 3. understand the core concepts that underpin Internet Computing that will provide them with the necessary skill sets to acquire further knowledge as the technology continues to evolve.
-

Keyword Syllabus:

Internet Computing for Enterprise IS

- Internet technology for enterprise IS
- Intranet vs Internet
- Network infrastructure and support for internet computing.
- Network security.

Web-based Client/Server Computing

- Revolution of Web as the intergalactic client/server internet computing platform. Web protocols and hypertext technology. HTTP data representation and response. Interactive Web-based client/server.
- Different technologies involved in Web programming and how they work together. Scripting with HTML, CGI programming and Java Servlet approaches to creating high-quality Web sites. Web security: SSL
- Web database connectivity and network interface

Future of Web and Internet Computing

- Next generation web standards: XML
 - General overview of XML and its application. XML Namespaces, Document type definitions, XSL.
 - Processing XML using DOM, SAX.
 - Developing enterprise XML-based web applications
-

Indicative reading list and references:

Marty Hall, *Core Web Programming*, Prentice-Hall
Balachander Krishnamurthy et. al., *Web Protocols and Practice*, Addison Wesley
Robert Orfali et. al., *Client/Server Survival Guide*, 3rd Edition, Wiley
Campiono Walrath, *The Java Tutorial*, Addison Wesley
Alex Ceponkus et. *Applied XML*, Wiley
Larry Wall et. *Programming in Perl*, O'Reilly
Shishir Gundavaram, *CGI Programming on the World Wide Web*, O'Reilly

SUBJECT DESCRIPTION FORM

Subject Title: Web Database Technologies and Applications

Subject Code: COMP5323

Credit Value: 3

Pre-requisite:

Database Systems (COMP 503) or
Database Systems and Management (COMP5111) or equivalent
[waived for MSc in Software Technology students]

Recommended background knowledge:

Familiar with C/C++, Java, ASP or PHP.

Mutual Exclusions:

Web Database Technologies and Applications (COMP532)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

1. To enable students with principles and knowledge of web databases and semistructured data in the Internet environment;
 2. To teach students with sound techniques in designing and querying web database;
 3. To provide detailed examples of how advance techniques are being applied in web database applications now and the near future.
-

Learning Outcomes:

After completing the subject, students should be able to:

1. become familiar of the core components of Web databases;
 2. design and develop semi-structure data models for Web databases and perform queries on them;
 3. identify and describe the different design approaches or algorithms adopted in Web databases; and
 4. compare, select and develop software programs or techniques for web database applications.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Introduction to Web Database Systems

Review of relational, object-oriented, and XML databases.

Semistructured Data

XML basics, the simple API for XML, parsing XML, W3C document object model, SAX parsing, , XML graph model.

XML Data Modeling

DTD and XML Schema. Native XML databases, transforming XML data to relations, and storing XML data in relational databases.

Querying of Web Databases

XPath, XQuery, XQL, XML-QL, unQL, grouping with nested queries, binding elements and contents, querying attributes, joining elements by value, tag variables, mediators for data integration, distributed evaluations, query processing and evaluations.

Typing and Indexing

Schema formalisms, Datalog, extracting schemas from data, data guides, inferring schemas from queries, attribute multiplicity, path constraints in semistructured data, XML schema, XML views, modelling data types, indexing and extending databases in XML.

Web Transactions Management

Serializing relational query results in XML, prefetching and caching, XML transaction servers.

Web Database Systems

Using XML with relational databases, XML support in MS/SQL and Oracle, compressing XML objects, XMill, Web intermediary, and XML wrappers. .

Web Services and Applications

Dynamic media contents composition, B2B and B2C e-commerce applications, web services, UDDI, EDI applications, ebXML, VBL, PML and education applications.

Indicative reading list and references:

Web Data Management Practices: Emerging Techniques and Technologies, By Athena Vakali, George Pallis; Idea Group Inc (IGI), 2007.

XML Data Management (Native XML and XML-Enabled Database Systems), Chaudhri, Rashid and Zicari; Addison Wesley, 2003.

Web Data Management, Bhowmick, Madria, WK Ng; Springer, 2004

JP Morgenthal, 2001, *Enterprise Application Integration with XML and Java 1/e*, Prentice Hall, Hewlett, New York.

ACM Transactions on Information Systems

IEEE Transactions on Knowledge and Data Engineering

ACM Transactions on Database Systems

Information Processing and Management

WWW Conference Proceedings

VLDB, SIGMOD, ICDE Conference Proceedings

SUBJECT DESCRIPTION FORM

Subject Title: Internet Information Retrieval

Subject Code: COMP5324

Credit Value: 3

Pre-requisite (Subject title and code no, if any) :

Nil

Recommended background knowledge:

Familiar with C/C++ or Java

Mutual Exclusions: Internet Information Retrieval (COMP533)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	55%
Examination	45%

Objectives:

1. To introduce the fundamental knowledge and techniques in information retrieval (IR) and information extraction (IE);
 2. To apply the IR and IE fundamentals to various internet applications; and
 3. To explore the use of information retrieval technology in advanced IR internet applications, like information filtering;
-

Learning Outcomes:

After completing this subject, students should be able to:

1. be aware of various classical information retrieval models;
2. comprehend the main difference between classical information retrieval and Internal information retrieval;

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

3. handle the problems particularly associated to Internal information retrieval;
 4. design and implement effective retrieval systems;
 5. apply retrieval evaluation techniques to improve retrieval system; and
 6. extract important pieces of information from the retrieved text and convert from unstructured text to structured database
-

Keyword Syllabus:

Presentation of Information in the Internet

Tagging and Processing: HTML, XML and SGML

Classical Information Retrieval

Architecture, IR models, Term selection and weighting, Ranking, Query processing, Evaluation techniques, indexing and search engine fundamentals

Information Extraction

Extraction: Keyword identification, NP extraction, String pattern extraction

Distributed Information Retrieval

Web-graph analysis, Server ranking, Meta search engines

Applications

Digital library, Wireless information access

Advanced Information Retrieval

Relevance feedback, Advanced indexing techniques, issues in Multilingual/Multimedia information retrieval, Information filtering and text categorization

Indicative reading list and references:

- G.G. Chowdhury, 2004, *An Introduction to Modern Information Retrieval*, London, Facet.
R. Baeza-Yates, B. Ribeiro-Neto., 1999, *Modern Information Retrieval*, ACM Press.
D.A. Grossman and O. Frieder., 1998, *Information Retrieval: Algorithms and Heuristics*, Kluwer.
H.I. Witten, A. Moffat and T.C. Bell., 1999, (2nd edition) *Managing gigabytes : compressing and indexing documents and images*, New York : Van Nostrand Reinhold.
W.B. Frakes and R. Baeza-Yates (Eds.), 1992, *Information Retrieval: Data Structures and Algorithms*. Prentice-Hall, Englewood Cliffs, NJ, 241-263.
G. Grefenstette (ed.), 1998, *Cross-language information retrieval*, Dordrecht, The Netherlands: Kluwer Academic Press.

ACM Transactions on Internet Technology
ACM Transactions on Information Systems
IEEE Transactions on Knowledge and Data Engineering
Information Retrieval
ACM Transactions on Database Systems
IEEE Transactions on Software Engineering
Information Processing and Management
Journal of the American Society for Information Sciences & Technology
ACM SIGIR Conference Proceedings
WWW Conference Proceedings

SUBJECT DESCRIPTION FORM

Subject Title: Distributed Computing

Subject Code: COMP5325

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Programming skills in C or C++; knowledge in Unix.
Background in Operating Systems is strongly recommended.

Mutual Exclusions:

Distributed Computing (COMP534)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous assessment	45%
Test, and Examination	55%

Objectives:

To provide in-depth study in the area of distributed computing on models, architectures, algorithms and techniques and to allow the student to:

- acquire fundamental knowledge in distributed computing;
 - learn about advanced distributed computing concepts;
 - understand limitations and appreciate innovative solutions; and
 - apply the knowledge in distributed application development and problem solving.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. understand, appreciate and apply parallel and distributed algorithms in problem solving;
2. learn advanced techniques and their application in practical systems;
3. evaluate the impact and performance of network topology on parallel / distributed algorithm formulation; and
4. gain hands-on experience with those programming techniques.

Keyword Syllabus:

1. **Overview and background of distributed computing**

Motivations; applications; distributed systems and architecture; computational model; causal dependency; physical versus logical clock; vector clock; distributed snapshot; remote procedure call; client-server interaction; broadcast versus multicast.

2. **Synchronization and coordination**

Distributed synchronization; clock synchronization; mutual exclusion; quorum consensus; leader election; other synchronization problems; deadlock prevention; deadlock detection; load balancing; process migration; fault-tolerance; synchronous and asynchronous checkpointing; recovery.

3. **Shared data access**

Atomic data access; transactions; concurrency control; atomic commitment; distributed file systems; stateful versus stateless server; replicated data management; primary copy approach; distributed shared memory.

4. **Distributed programming**

TCP/IP and sockets; POSIX threads; API; distributed operating systems.

5. **Selected topics on distributed computing**

Advanced or current topics on distributed computing; examples include MPI, DCE, Java applet and servlet, Internet computing, mobile computing.

Indicative reading list and references:

Coulouris, G.F., Dollimore, J. and Kindberg, T., 2001, *Distributed Systems: Concepts and Design*, Third Edition, Addison-Wesley.

Singhal, M. and Shivaratri, N.G., 1994, *Advanced Concepts in Operating Systems*, McGraw Hill.

Chow, R. and Johnson, T., 1997, *Distributed Operating Systems and Algorithms*, Addison-Wesley.

Goscinski, A., 1991, *Distributed Operating Systems: The Logical Design*, Addison-Wesley.

Mullender, S., ed., 1993, *Distributed Systems*, Second Edition, Addison-Wesley.

Tanenbaum, A., 1995, *Distributed Operating Systems*, Prentice-Hall.

Articles from journals, magazines, and conference proceedings, including *JACM*, *ACM TOCS*, *ACM TODS*, *ACM TOPLAS*, *IEEE TPDS*, *IEEE TKDE*, *IEEE TSE*, *IEEE TOC*, *CACM*, *IEEE Computer*, *IEEE Internet Computing*, *PODC*, *SOSP*, *SPAA*, *ISCA*, *ICDCS*, *FTCS*, *RDS*, *WWW*.

SUBJECT DESCRIPTION FORM

Subject Title: Wireless Computing Systems and Applications

Subject Code: COMP5326

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Computer Communications Networks (COMP551) or
Internet Infrastructure and Protocols (COMP5311) or equivalent
[waived for students of MSc in Software Technology and MSc in E-Commerce]

Recommended background knowledge:

Knowledge of Java programming

Mutual Exclusions: Nil

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

After completing this subject, the students will learn about:

1. underlying technologies for mobile/wireless computing systems;
2. related wireless networking standards; and
3. various mobile and wireless applications.

The focus is on technologies/standards for supporting wireless networking and mobile data applications.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. acquire a good knowledge of wireless computing systems and applications;
 2. understand the standards/technologies for various wireless computing systems;
 3. be aware of trends of wireless computing systems and applications; and
 4. participate in team work, presentation and technical writing.
-

Keyword syllabus:

Systems and standards (particularly for supporting wireless networking and mobile data applications):

Basics and technical overview of mobile/wireless systems. Management issues (e.g., mobility, security).

IEEE 802.11 LANs. Bluetooth. Mobile IP. Wireless Application Protocol (WAP). Cellular data networks. Others (e.g., Ad-hoc networks).

Applications:

Mobile commerce. Mobile payments. Other mobile/wireless data applications. Cases/examples. Development tools (e.g., J2ME).

Indicative reading list and references:

Books:

Deitel, H. M., *et al.*, 2002, *Wireless Internet and Mobile Business: How to Program*, Prentice Hall.

Gast, M. S., 2002, *802.11 Wireless Networks: The Definitive Guide*, O'Reilly & Associates.

Jamalipour, A., 2003, *The Wireless Mobile Internet: Architectures, Protocols and Services*, John Wiley and Sons.

Norris, M., 2001, *Mobile IP Technology for M-Business*, Artech House.

Pandya, R., 2000, *Mobile and Personal Communication Systems and Services*, IEEE Press.

Perkins, C. E., 1998, *Mobile IP: Design Principles and Practices*, Addison-Wesley.

Sadeh, N. M., 2002, *M-Commerce: Technologies, Services, and Business Models*, John Wiley and Sons.

Stallings, W., 2005, *Wireless Communications and Networks*, Pearson Prentice Hall.

Thurwachter, C. N., 2002, *Wireless Networking*, Prentice Hall.

Toh, C. K., 2001, *Ad Hoc Mobile Wireless Networks: Protocols and Systems*, Prentice Hall.

Journals:

IEEE Transactions on Mobile Computing

IEEE Pervasive Computing

IEEE Transactions on Wireless Communications

IEEE Journal on Selected Areas in Communications

ACM Wireless Networks

ACM Mobile Networks and Applications

SUBJECT DESCRIPTION FORM

Subject Title: Web Advertising and Web Publishing

Subject Code: COMP5331

Credit Value: 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge:

Basic Knowledge relating to the Internet and WWW

Mutual Exclusions: Web Advertising and Web Publishing (COMP5006)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

There will be a mix of lectures, discussions and case study analysis. Recent articles in the area of information systems and e-commerce strategies will also be reviewed and discussed in lectures. Students will be given the flexibility to tailor the study material to their organization environment and pursue relevant case study.

Assessment:

Continuous Assessment	70%
Test and/or Examination	30%

Objectives:

This subject explores the emerging and revolutionizing role of the WWW for marketing practice. A number of techniques of advertising over the Internet are introduced. Students will explore the potential of advertising through the Web technologies such as blog marketing, social media marketing and advertising, search engine advertising, search engine optimization, email marketing, usability test and web site measurement. After completing this module, students will be able to develop an Internet marketing plan integrated with social media tools and search engine for advertising on the Internet.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. understand web technology and its various applications in e-commerce;
2. apply the relevant techniques for web-based business including advertisement and publication;
3. integrate social media advertising tools into marketing communication mix;
4. plan and execute search engine advertising and optimization to develop business for SMEs and corporations;
5. know the future direction and trend in relation to web advertising technology and its applications; and
6. master web advertising with social medial tools and search engine marketing in real world.

Keyword Syllabus:

Web Advertising

The Internet and WWW tools for media production, different forms of media, on-line advertising paradigms in the light of the Internet, push-based and pull-based advertising, Web Site promotion, market research on-line, direct marketing, new marketing paradigm for electronic commerce, emerging marketing and advertising models, electronic marketing strategy, benchmarking and performance measures, future trends, case studies and e-commerce portals, legal and ethical aspects of Internet advertising.

Social Media Advertising

Social media tools including YouTube, Twitter and Facebook will be discussed in depth including strategies, implementation and measurement. Both successful and failing real world cases will be quoted and evaluated for identifying and mastering the key success factors of social media tools for business effectively.

Search Engine Advertising

Understand mechanism on Pay Per Click (Sponsored Search) and Search Engine Optimization, Tactics in mastering Search Engine Advertising in Google AdWords and AdSense.

Electronic Publishing

Technologies for electronic publishing, Internet entrepreneurs, setting up and publicizing a Web site, measuring user engagement, user tracking, multimedia for electronic publishing

Indicative Reading List and Reference:

1. Belch, G.E. and Belch, M.A. (2009), Advertising and Promotion : an Integrated Marketing Communications Perspective, New York, N.Y. : McGraw-Hill/Irwin,
2. Rayport, J.F and Jaworski, B.J.(2001), e-Commerce, McGraw
3. Advertising: An Inside Look At the Advertising Industry, Bendigo, Vic.; Classroom Video, 2002
4. Ives, B. 2005), Business Blogs : A Practical Guide
5. Tyler, Mary E. and Ledford J.L. (2006), Google Analytics, Wiley Technology Pub.
6. Krug, S. (2006), Don't Make Me Think! A Common Sense Approach to Web Usability (2nd Ed)
7. Ellet, William(2007), The Case Study Handbook: how to read, discuss and write persuasively

about cases, Harvard Business Press

8. Nielsen, J. & Loranger(2006), H., *Prioritizing Web Usability*, New Riders, 2006
9. Hoekman, R., Jr.(2007), *Designing the obvious: A Common Sense Approach to Web Application Design*, New Riders
10. Miller, M.(2009), *YouTube for Business: Online Video Marketing for Any Business*
11. Garrett, J.(2002) *The Elements of User Experience : User-centered Design for the Web*, New York, N.Y. : American Institute of Graphic Arts ; Indianapolis, Ind. : New Riders
12. Lastufka, A. & Dean (2009), M. W. *YouTube: An Insider's Guide to Climbing the Charts*, 2009
13. O'Reilly, T & Milstein, S. *The Twitter Book*(2009), O'Reilly Media Inc.,
14. MacFedries, P. (2009) *Twitter: Tips, Tricks, and Tweets*, Indianapolis, IN : Wiley
15. StrongMail Systems, Inc.(2009) *Best Practices in Email Marketing - Email in the Age of Social Media: The Email Marketer's Guide to Leveraging the Power of the Social Web*
16. Chaffey D. (2007), *Total E-mail Marketing- maximizing your results from integrated e-marketing* , Oxford ; Boston : Butterworth-Heinemann,
17. Morris, T. (2010) *All a twitter: a personal and professional guide to social networking with Twitter*. Indianapolis, Ind.: Que.
18. Scott, Virginia A. (2008) *Google*. Westport, Conn.: Greenwood Press.
19. Lutze H. (2009). *The Findability Formula: The Easy, Non- Technical Approach to Search Engine Marketing*. New Jersey: John Wiley & Sons, Inc.
20. Shih, C. (2009). *The Facebook Era: Tapping Online Social Networks to Build Better Products, Reach New Audiences, and Sell More Stuff*. Boston, MA: Pearson Education, Inc.
21. Holzner, S. (2009) *Facebook marketing: leverage social media to grow your business*. Indianapolis, Ind.: Que.
22. Waters, R., Burnett, E., Lamm A. & Lucas J. (2009). *Engaging stakeholders through social networking: How nonprofit organizations are using Facebook*. *Public Relations Review*, 35, pp102-106
23. Strauss, J. El-Ansary, A., Frost, R.(2009), "Chapter 5: Ethical and Legal Issues," *E-Marketing (4th Ed)*, Upper Saddle River, NJ : Pearson/Prentice Hall
24. *Harvard Business School Case Studies and Papers*

SUBJECT DESCRIPTION FORM

Subject Title: Web Services and Project Development

Subject Code: COMP5332

Credit Value: 3

Pre-requisite: (subject title and code no. if any)

Nil

Recommended Background Knowledge:

Background in IT, Engineering, Science, or Management

Mutual Exclusions:

Nil

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable.

Assessment:

Continuous Assessment	45%
Test and Examination	55%

Objectives:

1. To understand the fundamentals of developing Web-based service applications and project management;
 2. To understand the technologies and development frameworks of Web Services; and
 3. To enable students to apply the learned techniques to analyze processes and functions of Web Service applications for development or improvement.
-

Learning Outcomes:

After completing this subject, students should be able to:

7. acquire a good knowledge of Web-based services and project management;
8. understand the standard/technologies for various Web service development; and
9. apply and evaluate the techniques used for development and improvement of Web services.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Services Economy and Evaluation

Service Science introduction, service life-cycle framework, service economy

Interdependencies of Services and Business Processes

Strategy for new service development, service design and evaluation, business patterns, models of business information and processes, business process analysis

Web Services

XML review, XML data models and querying, web-based service frameworks, WSDL, SOAP, UDDI, HTTP, REST, service languages, service-oriented architectures

Web Services Project Development

Capacity and risk planning, service project initiation, execution, risk assessment, closure and change management

Document Engineering

Key concepts of document engineering, document anthropology and archeology, document component design and analysis for Web Services, assembling documents

Reading List & References:

- Bill Hefley and Wendy Murphy (Eds) (2008). [Service Science, Management and Engineering \(SSME\): Education for the 21st Century](#) Springer.
- Robert J. Glushko and Tim McGarth (2005). *Analyzing and Designing Documents for Business Informatics and Web Services* MIT Press.
- Lusch, R.F. and Vargo, S.L. (2006) *The Service-dominant Logic of Marketing: Dialog, Debate, and Directions*. M.E. Sharpe.
- Teboul, James (2006) *Service is Front Stage: Positioning Services for Value Advantage*. Insead Business Press.
- Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Dr. Keith Jones, Rawn Shah (2005) *Service-Oriented Architecture (SOA) Compass: Business Value, Planning, and Enterprise Roadmap*, Addison-Wesley / Prentice Hall.
- Steve Graham et (2006). *Building Web Services with Java: Making Sense of XML, SOAP, WSDL, and UDDI* (2nd Edition), SAM.

SUBJECT DESCRIPTION FORM

Subject Title : Internet Infrastructure Security

Subject Code : COMP5351

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Internetworking Protocols and Software I (COMP526) or
Internet Infrastructure & Protocols (COMP5311) or equivalent

Recommended background knowledge: Nil

Mutual Exclusions: Nil

Learning Approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	30%
Class Project	35%
Test, and Examination	35%

Objectives:

The overall objective of this course is to build up a foundational understanding on the security issues relevant to the current Internet infrastructure. Specifically,

1. Understand the principles of the three cryptographic functions: secret key, public key, and hash;
 2. Understand the four main network security services: secrecy, message integrity, authentication, and nonrepudiation;
 3. Understand the major components in today's network security infrastructure, such as public key infrastructure, IPSec, IKE, and SSL/TLS; and
 4. Understand the inherent vulnerabilities of network protocols, such as TCP and application protocols, and other attacks, such as, buffer-flow attacks and denial-of-service attacks, and their countermeasures.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. read some articles in a professional computer and network security magazine, such as IEEE Security & Privacy and SC Magazine;
 2. use various network diagnosis tools, such as Wireshark, to study network security protocols, and educational tools, such as Cryptool, to study cryptographic algorithms; and
 3. take on a self-study on more advanced network security topics that require foundational understanding of cryptographic algorithms and network security protocols.
-

Keyword Syllabus :

1. Cryptographic preliminaries: threat analysis, security goals, security versus privacy, basic cryptographic functions, public key infrastructure and digital signatures
 2. Application layer security: DNS and email security, end-to-end security, examples of designing secure application protocols, e.g., Secure Shell, Kerberos, and Pretty Good Privacy
 3. Transport layer security: TCP security (initial sequence number attack, SYN flooding attacks, etc), Transport Layer Security protocols and vulnerability analysis
 4. IP layer security: IP security associations, authenticated Diffie-Hellman exchange, IPSec, and IKE protocols, routing security
 5. Wireless data-link and mobile network security: IEEE 802.11 security, mobile network security (e.g., redirection attacks)
 6. Network access control and Internet-wide attacks: firewalls and proxies, intrusion detection, denial-of-service attacks and Internet worms (e.g., Snapper and Code Red)
-

Indicative reading list and references:

1. C. Kaufman, R. Perlman and M. Speciner, *Network Security: Private Communication in a Public World*, Second Edition, Prentice Hall PTR, 2002.
2. M. Bishop, *Introduction to Computer Security*, Addison Wesley, 2005.
3. B. Schneier. *Applied Cryptography*, Second Edition, Wiley, 1996.
4. N. Ferguson and B. Schneier. *Practical Cryptography*, Wiley, 2003.
5. D. Stinson. *Cryptography: Theory and Practice*, Chapman & Hall/CRC, Second Edition, 2002.
6. A. Menezes and P. van Oorschot. *Handbook of Applied Cryptography*, CRC Press, 1996.
7. D. B. Chapman and E. D. Zwicky, *Building Internet Firewalls*. Second Edition, O'Reilly & Associates, 2000.
8. B. Schneier, *Secrets and Lies*, Wiley, 2000.
9. S. Flannery, *In Code: A Mathematical Journey*, Workman Publishing, 2000.

Supplementary articles from IEEE/ACM publications

SUBJECT DESCRIPTION FORM

Subject Title: Advanced Internet Computing and Technology

Subject Code: COMP5352

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Internet Computing and Applications (COMP5322) or Internet Computing (COMP515) or Internet Computing for Managers (COMP5005)

Recommended background knowledge:

Programming and some Computer Network Knowledge

Mutual Exclusions: Advanced Java Programming (COMP573)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable.

This subject aims to introduce students to the advance and evolving computing paradigm based on the Internet as the distributed infrastructure. In addition to the regular lectures, students are required to work on lab exercises that are designed to complement the course materials. More importantly, it provides unique opportunity for students to put into practice the concepts that are taught in the class. For advance topics, students are required to survey research papers, discuss, analyse and present the findings in the form of a written reports and classroom presentations. Students are also required to work on a practical project that requires the design and development of an application that leverages on the technologies that are taught in the class. Final assessment is in the form of a written examination.

<u>Assessment:</u>	Continuous Assessment	45%
	Test, and Examination	55%

Objectives:

- To introduce student to the advance concepts of Internet Computing and to equip student with up-to-date knowledge on state-of-the-art technologies that leverage the benefits of Internet for ubiquitous and distributed computing.
 - To provide hands-on training to the concepts learned by applying the technologies to developing real world applications.
 - To understanding and appreciate the evolving wave of next generation distributed computing paradigm based on Internet to provide intergalactic client/server framework that provide seamless interoperability and integration across heterogeneous computing and networking environments.
 - To train up student with ability to analyse and give critics to research papers, with the ultimate objective of equipping student with the necessary skill and knowledge to consolidate and produce quality technical research report
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. gain a good overall understanding and appreciation of the advanced technologies encompassing Internet Computing that will equip them with the skill sets to plan, design and formulate best solutions for the deployment of future service oriented information systems;
2. appreciate the significant benefits of service oriented architecture (SOA) in organizing increasing complex information systems that are distributed and largely heterogeneous;
3. critically assess the problems and issues surrounding the challenges presented to them. In the process of formulating a holistic solution to the problems, students are taught the skill sets to incrementally assess the suitability of various technologies; and
4. understand the core concepts that underpin SOA that will provide them with the necessary skill sets to acquire further knowledge as the technology continues to evolve.

Keyword Syllabus:

Advance XML

- Revision on fundamentals of XML.
- XML Schemas.
- Semantic Web
- Meta-XML

Distributed Computing based on Web Services

- Architecting Web Services
- Compare against CORBA and DCOM
- Building blocks of web services: SOAP
- Programming Web services using Java
- WSDL, UDDI
- NET, SUN ONE, IBM Web Services

Advanced HTTP and Content Distribution

- HTTP Security. Digest authentication, HTTPS, secured tunnelling.
- Advanced concepts of load balancing. Session persistence. URL switching
- Cooperative web caching
- Redirection and Load Balancing

Indicative reading list and references:

Books

1. Michael Papazoglou, *Web Services: Principles and Technology*, Prentice Hall, Sep 2007.
2. Thomas Erl, *Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services*, Prentice Hall, Apr 2004.

Journals

ACM Computing Surveys

Communications of the ACM

IEEE Computer

IEEE Internet Computing

Journal of the ACM

Relevant ACM Transactions: Transactions on Internet Technology

Relevant IEEE Transactions: Transactions on Mobile Computing

Other relevant journals and magazines: IEEE Communications, IEEE Personal Communications, MONET, WINET, MC2R

SUBJECT DESCRIPTION FORM

Subject Title: Fundamentals of Operating Systems

Subject Code: COMP5411

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Basic programming skill in C/C++/Java.

Mutual Exclusions:

Systems Software Technology (COMP511), Students in MScST/MScEC

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous assessment	45%
Test, and Examination	55%

Objectives:

To provide students with fundamental knowledge in operating systems and to train them with the ability to:

- learn about key concepts in operating systems;
 - understand limitations and appreciate innovative solutions; and
 - apply the knowledge in system and application development and problem solving.
-

Learning Outcomes:

After completing this subject, students should be able to:

1. quickly understand current operating systems and propose enhancement to them when given some particular requirements;
 2. develop part of operating system components to function properly by programming implementation; and
 3. use the knowledge learned in the subject to solve real problems encountered in real applications that are related to operating systems.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

- Fundamental concepts of operating systems
Operating systems architecture; process management; memory management; file management; protection and security; distributed systems.
 - Process management
Process and threads; multiprogramming; CPU scheduling; process synchronization; interprocess communication; deadlock handling.
 - Memory management
Paging; segmentation; virtual memory; page replacement.
 - File management
File and directory; storage allocation; free-space management; disk scheduling; RAID.
 - Protection and security
Access control; capabilities; authentication; encryption.
 - Advanced topics and case studies
Distributed operating systems; client/server systems; fault-tolerance; operating systems design and implementation; Unix; Linux.
-

Indicative reading list and references:

Books

- Silberschatz, A., Galvin, P. and Gagne, G., 2004, *Operating System Principles*, Seventh Edition, John Wiley and Sons.
- Silberschatz, A., Galvin, P. and Gagne, G., 2004, *Operating System Concepts*, Seventh Edition, John Wiley and Sons.
- Tanenbaum, A., 2001, *Modern Operating Systems*, Second Edition, Prentice-Hall.
- Stallings, W., 2001, *Operating Systems: Internals and Design Principles*, Fourth Edition, Prentice-Hall.
- Robbins, K.A. and Robbins, S., 1996, *Practical Unix Programming*, Prentice-Hall.
- Gray, J.S., 1998, *Interprocess Communications in Unix*, Second Edition, Prentice-Hall.
- Bar, M., 2000, *Linux Internals*, McGraw Hill, 2000.

Journals

- ACM Transactions on Computer Systems*, ACM.
- IEEE Transactions on Computers*, IEEE.
- Articles from other journals

Others

- Proceedings of SOSP, ASPLOS, OSDI, SPAA, ISCA*.
- Articles from magazines and conference proceedings.

SUBJECT DESCRIPTION FORM

Subject Title: Fundamentals of Chinese Computing

Subject Code: COMP5412

Credit Value : 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge:

Data Structures and Algorithms (COMP305) or equivalent

Mutual Exclusions: Fundamentals of Chinese Computing (COMP553)

Learning Approach:

Characteristics of Chinese language are taught before computer representation and processing of Chinese. For tutorials, exercises and computer software demonstrations will be given to consolidate understanding in class. At least one assignment will be given to develop a realistic Chinese computing application.

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

<u>Assessment:</u>	Continuous Assessment	45%
	Test, and Examination	55%

Objectives:

To provide software engineers and managers with:

1. the basic understanding of Chinese computing;
 2. the basic skill in operating within a Chinese computing environment;
 3. the basic vocabulary for effective communication when computer representation and processing of Chinese is involved;
 4. the basic programming skill for Chinese computing;
 5. the basic skill to deal with algorithmic problems posed by the large Chinese alphabet;
 6. the basic knowledge for the strategic design of software for the different language communities.
-

Learning Outcomes:

After completing this subject, students should be able to:

1. be aware of the different Chinese character sets and their encoding schemes;
2. identify and convert the character codes generated by one encoding scheme to another;

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

3. demonstrate the ability to design and implement internationalized software and localization components; and
 4. design and implement effective input and output systems.
-

Keyword Syllabus:

Characteristics of Chinese Language

Historical Development, Geographical Variations (Dialects) and Linguistic Descriptions (Character, Morph, Word, Phrase and Sentence).

Representation of Chinese Character Sets

Mathematical description of representation, character set organization, encoding schemes (ISO2022 and UTF), discussion of (*defacto*) standard character sets (for PC, workstation and network), character decoding techniques and character conversion problems.

Output Processing of Chinese

Typesetting terminology and text rendering process, Bitmap fonts (representation, compression and scaling problems), Vector/Outline fonts (Limn algorithm), X-Window Fonts (BDF and Postscript) and font related operations (Installation, Specification, Extraction and User-Defined Glyph addition), Automatic Glyph Construction.

Input Processing of Chinese

Introduction to Chinese input processing by pen, image, speech and keystrokes, Shape-based keystroke input method, Phonetic-based input method, Shape-phonetic based input method, Evaluation metrics for keystroke input method, Phrase-based input method, Sentence-based input method, Microsoft Windows Input Method Architecture, X-Windows Input Method Architecture.

Software Development for Chinese Computing

Internationalization, Localization, ANSI-C model, Windows programming for Chinese Computing (Microsoft- and X-Windows).

Algorithmic Problems in Chinese Computing

Character set selection (NP-complete), Hashing functions for Chinese character sets, String searching (KMP, BM or Sunday), Dictionary lookup for Chinese computing, String-set searching (Aho and Corasick Algorithm).

Indicative reading list and references:

胡裕樹, 現代漢語, 三聯書局 1992

Berry, K. and Hargraves, K.A. *GNU Font utilities (Limn algorithm)*, on WWW.

Hopcroft, J.E. and Ullman, J.D., 1979, *Introduction to Automata, Theory and Languages*, Addison-Wesley.

Huang, J.K.T. and Huang, T.D., 1989, *An Introduction to Chinese, Japanese and Korean Computing*, Singapore, World Scientific.

Jain, K.A., 1989, *Fundamentals of Digital Image Processing*, PHI.

Kano, N., 1995, *Developing International Software*, Microsoft Press.

Lunde, K., 1993, *Understanding Japanese Information Processing*, O Reilly & Associates.

McGilton, H. and Campione, M., 1993, *Postscript by Example*, Addison-Wesley.

The Unicode Consortium 1991-96. *The Unicode Standard, Version 2.0*, Addison-Wesley Developer Press.

Communications of COLIPS

Journal and Conference Proceedings of Computer Processing of Oriental Languages

Journal of Chinese Information Processing

SUBJECT DESCRIPTION FORM

Subject Title: Computer Architecture

Subject Code: COMP5414

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge: Nil

Mutual Exclusions:

Students with first degrees in Computer Science, Computer Engineering, or Computer Architecture (COMP550) or equivalent.

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject aims to provide students with fundamental principles and comprehensive knowledge of computer systems and organization. The students will learn the basic principles of computer architecture, the operations of the major components of a computer, how the components are interconnected, and some recent trends in computer design. This subject is intended to provide graduates of non-computing disciplines with the necessary background so the students can proceed with their MSc studies in information technology and systems.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. have an understanding of basic organization and architecture of computers;
 2. possess the knowledge of number systems and digital logics;
 3. have an understanding of computer components, their functions and interconnection, computer memory, cache memory, I/O and operating system support;
 4. possess the knowledge of the organization of central processing units; and
 5. have an understanding of the organization of parallel and multiple processors.
-

Keyword Syllabus:

Basic Principles

Overview of computer systems

Number systems: binary, octal, decimal, hexadecimal.

Boolean Algebra and Logic Networks: logic gates, flip-flops, counters, adders, etc.

Computer Organization

Computer Functions and Interconnection

Computer Memory Systems and Cache Memory

Internal Memory and External Memory

Input/Output: external devices, I/O modules, interrupt-driven I/O, direct memory access

Operating System Support

Central Processing Units

Computer Arithmetic

Instruction Sets

Processor Structure and Function: processor organization, register organization, instruction pipelining

Reduced Instruction Set Computers

Superscalar Processors

VLIW architectures and IA-64

Machine and Assembly Languages

Parallel Organization

Multiple Processor Organization

Symmetric Multiprocessor

Cache Coherence

Multithreading and Chip Multiprocessors

Clusters

Reference Books:

Stallings, W., 2006, *Computer Organization and Architecture*; 7th ed., Prentice-Hall.

Patterson, D. A. and Hennessy, J. L., 2004, *Computer Organization & Design: The hardware/software interface*, 3rd ed, Morgan Kaufman.

Britton, R., 2003, *MIPS Assembly Language Programming*, Prentice-Hall.

Hamacher, V.C., 2002, *Computer Organization*, 5th ed., McGraw-Hill.

Journals

IEEE Transactions on Computers

Journal of Systems Architecture: the Euromicro Journal

Microprocessing and Microprogramming: the Euromicro Journal

Software and Microsystems: a Journal for Practising Engineers

SUBJECT DESCRIPTION FORM

Subject title: Multimedia Computing, Systems and Applications

Subject code: COMP5422

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Background in image processing software is useful but not mandatory.

Mutual exclusions: Multimedia Systems and Applications (COMP513)
Fundamental of Multimedia Computing (COMP5421)
Multimedia Systems and Applications (COMP5451)

Learning approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	55%
Test, and Examination	45%

Objectives:

1. To provide students with knowledge in fundamentals of multimedia, e.g. compression standards, data formats, media characteristics, storage and transmission requirements
 2. To provide students with knowledge of a wide spectrum of multimedia information processing techniques
 3. To train students with the ability to apply the knowledge in multimedia system and application development
 4. To equip students with the ability to appreciate new and innovative solutions of multimedia systems and applications
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. understand the various characteristics of different media;
2. understand the requirements and techniques of processing multimedia;
3. generalize the knowledge and skills in problem solving involving multimedia databases; and
4. conduct case study in multimedia applications.

Keyword syllabus:

1. Multimedia System Primer

Introduction to different multimedia platforms, systems, tools and applications; characteristics of different media and current trend

2. Data Representation, Coding and Compression:

Data representation, processing and analysis for Sound/Audio, Image and Graphics, Video and Animation; Coding requirements, Entropy and Hybrid Coding, Compression techniques and standards: JPEG, MPEG, DVI, ASF, etc.

3. Multimedia Content Analysis and Information Retrieval

Multimedia contents: Color, shape, texture, motion, etc.

Content analysis techniques: Color histogram, shape analysis, motion analysis, etc.

Retrieval techniques: video segmentation, key frame selection, etc.

4. Multimedia Indexing

Multidimensional data structures, K-d trees, R-trees, R^+ and R^* trees, Comparison of different data structures.

5. Multimedia Information Networking

Video streaming, transmission characteristics, protocol support for multimedia networking, multicast techniques.

6. Selected Topics in Multimedia Computing, Systems and Applications

e.g., New MPEG standards, Multimedia Information Hiding and Watermarking, VoiceXML.

Indicative reading list and references:

Books

Li, Ze-Nian and Drew Mark S., 2004, *Fundamentals of multimedia*, Pearson/Prentice Hall.

Lewis, Richard , 2005, *Digital media: An introduction*, Prentice Hall.

Borko Furht (ed), 1999, *Handbook of Multimedia Computing*. CRC Press.

Alberto Del Bimbo, 1999, *Visual Information Retrieval*. Morgan Kaufmann.

Raghavan S.V. and Tripathi S.K., 1998, *Networked multimedia systems: Concepts, architecture, and design*, Prentice Hall.

V.S. Subrahmanian, 1998, *Principles of Multimedia Database Systems*. Morgan Kaufmann.

B. Furht, S.W. Smoliar and H.J. Zhang, 1996, *Video and Image Processing in Multimedia Systems*.
Kluwer Academic Pub.

Journals

[IEEE Multimedia](#)

[IEEE Trans. on Multimedia](#)

[ACM SIG Multimedia](#)

[Multimedia Systems](#)

[Multimedia Tools & Applications](#)

SUBJECT DESCRIPTION FORM

Subject Title: Artificial Intelligence Concepts

Subject Code: COMP5511

Credit Value: 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge:

Preferably has some experience with logic, computers and programming (familiar with data structures and use of recursion as a program control structure).

Mutual Exclusions:

This subject is not available to a holder of a degree (e.g. computing) which provided specific knowledge overlapping the contents of this subject significantly or Artificial Intelligence Concepts (COMP501)

Learning Approach:

This course explores the core AI concepts. It provides a comprehensive introduction to the problems and techniques of artificial intelligence. Theory and practice are both emphasized. To enhance the understanding of how conceptions and ideas in AI are actually implemented, prolog and expert system shells will be used for programming exercises and projects. Lectures will be supplemented with video sessions to enhance student's learning. A fair portion of guided reading will also be provided.

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable.

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject aims to introduce the main concepts, ideas and techniques of artificial intelligence (AI) to the students so that they could know the various aspects of AI, understand some essential principles and are able to implement some basic AI techniques in their projects or other related work.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. use logic programming (e.g. Prolog) to write programs to solve simple AI problems;
 2. master the basic searching techniques (e.g. breadth first search, depth first search, A search, etc) for problem solving;
 3. to know how to represent the knowledge and do reasoning;
 4. to do reasoning in uncertainty situations;
 5. know how to use the basic machine learning technique;
 6. to use artificial neural networks for data classification; and
 7. know the basic techniques in computer vision and image understanding.
-

Keyword syllabus:

Logic Programming

Foundations of logic programming and the PROLOG language.

Problem Solving and Search Strategies

Uninformed search and basic heuristic search strategies.

Knowledge Representation

Logic Representations, Propositional logic, First order logic, Automated reasoning

Reasoning in Uncertainty Situations

Non-monotonicity, Truth maintenance systems, Fuzzy logic, Bayesian reasoning

Artificial Neural Networks

What is ANN? The architectures of ANNs. What can ANN do? How do ANNs learn?

Symbol based machine Learning

Version space search, Decision tree, Explanation-based learning, Unsupervised learning

Selected Advanced Topics

Natural Languages Processing, Visual Image Understanding, Pattern Recognition, etc.

Indicative reading list and references:

- Bratko, I., 2001, *PROLOG, Programming for Artificial Intelligence*, 3rd ed., Addison-Wesley.
Luger, G.F., 2009, *Artificial Intelligence: Structures and Strategies for Complex Problem Solving*, 6th edition, Addison-Wesley.
Russell, S. and Norvig, P., 2003, *Artificial Intelligence - A Modern Approach*, 2nd edition, Prentice Hall.

Papers and articles selected from

Artificial Intelligence
AI Expert
AI Magazine
Applied Intelligence
IEEE Computer
IEEE Intelligent Systems and their Applications
IEEE Trans. Neural Networks

SUBJECT DESCRIPTION FORM

Subject Title: Information Technology and Logistics

Subject Code: COMP5512

Credit Value: 3

Pre-requisite: (Subject title and code no, if any)

Fundamentals of E-commerce (COMP514) or E-commerce and Applications (COMP575) or E-Commerce Fundamentals and Development (COMP5122) or equivalent

Recommended background knowledge:

Knowledge of spreadsheet modelling, operational research, and statistics & probability would be an advantage

Mutual Exclusions: NIL

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous assessment	70%
Test, and Examination	30%

Objectives:

A logistics system usually includes various processes that integrate multiple business partners such as manufacturers, distributors, retailers, and customers. In recent years, fundamental changes have been taken place in the business environment due to the service-oriented economy as well as emerging information technology (IT). For example, the adoption of the service-oriented architecture not only integrates disparate business functions but also provides adequate control over business interactions in supply chains. Such information and process integration facilitates management decision support of various parties in a quest for efficiency, cost reducing, and service quality.

This course illustrates how various contemporary information technologies can facilitate logistics and decision support in supply chain management.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning outcomes:

After completing this subject, students should be able to:

3. identify the advanced IT technology in different operational stages in logistics;
 4. understand the fundamental issues for information acquisition and processing in logistical management;
 5. apply knowledge understanding and discovery for supply chain forecasting, transportation scheduling and cost prediction; and
 6. use the advanced RFID technology for inventory control and monitoring.
-

Keyword syllabus:

- Overview of logistics & supply chain management
 - Basic concepts of logistics and supply chain management
 - IT applications in demand, transportation, inventory, and supply chain management
 - Modeling of transportation and inventory management
 - Forecasting in supply chain management
 - Bar Codes and Radio Frequency Identification (RFID), and their application in logistics
 - Other emerging IT for logistics
-

Indicative reading list and references:

Books

- Ballou, R.H., 2004, *Business Logistics/Supply Chain Management: Planning, Organizing, and Controlling the Supply Chain*, 5th Ed., Prentice Hall.
- Murphy, P.R. and Wood, Jr. D. F., 2008, *Contemporary Logistics*, 8th Ed., Pearson Prentice Hall.
- Hillier, F.S. and Hillier, M.S., 2008, *Introduction to Management Science: a modeling and case studies approach with spreadsheets*, 3rd Ed., McGraw-Hill/Irwin.

Articles

- Erickson, R.S, 1953, "The Logistics Computer", *Proceedings of the IRE*, 41(10), p.1325 – 1332.
- Hedberg, S.R., 2002 "DART: revolutionizing logistics planning", *IEEE Intelligent Systems*, 17(3), p.81 – 83.
- Gunasekaran, A., Ngai, E.W.T. and Cheng, T.C.E., 2007, "Developing an e-logistics system: a case study", *International Journal of Logistics Research and Applications*, 10(4), p.333 – 349.
- Leung, L.C., Cheung W. and Hui, Y.V., 2000 "A framework for a logistics e-commerce community network: the Hong Kong air cargo industry", *IEEE Transactions on Systems, Man, and Cybernetics – Part A: Systems and Humans*, 30(4), 446 – 455.
- Auramo, J. and Ala-risku, T., 2005, "Challenges for going downstream", *International Journal of Logistics Research and Applications*, 8(4), p.333 – 345.
- Mason, R. and Lalwani, C., 2006, "Transport integration tools for supply chain management", *International Journal of Logistics Research and Applications*, 9(1), p.57 – 74.
- Li, Z. and Kumar, A., 2005, "Supply chain network scenario design and evaluation", *International Journal of Logistics Research and Applications*, 8:2, p.107 – 123.
- Tarantilis, C.D., Spinellis D. and Gendreau, M., Eds., 2005, Special issue on "Advanced Heuristics in Transportation and Logistics", *IEEE Intelligent Systems*, 20(4).

SUBJECT DESCRIPTION FORM

Subject Title: Financial Computing

Subject Code: COMP5513

Credits Value: 3

Pre-requisite: (Subject title and code no, if any)

Data Mining and Data Warehousing Applications (COMP5121) or
Data Mining and Data Warehousing for Business (COMP5003) or
Data Mining and Applications (COMP518) or Data Mining and Data Warehouse (COMP578)

Mutual Exclusions: Nil

Learning Approach:

Formal lectures will be used to present concepts about and mathematical models in financial engineering and introduce various computational techniques to solve computational problems in finance. Students are expected to have *background knowledge of probability and statistics, (finite or infinite) series and (partial) differential calculus*. Tutorials will be used to discuss, further, techniques and problems encountered in the use of these computational techniques as well as discussing about various case-studies. Seminars will be used for presentation of assignments and discussions, mainly on selected journal articles and conference papers from the developments in computational finance.

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Coursework	55%
Test, and Examination	45%

Objectives:

The purpose of this course is to study the basic computational tools of Finance. This includes the study of *computational models* and *quantitative methods*. After completing the course, students will have:

1. some fundamental concepts of *financial engineering* in order to appreciate the need of computational tools for finance; and
 2. some appreciation of various computational techniques (e.g. data mining, numerical methods) which have been applied to solve problems in finance (e.g. options, stock prediction, etc.)
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, the students should be able to:

1. apply the fundamental concepts of financial engineering;
 2. be aware of the computational tools for finance;
 3. make reasonable judgment in choosing computation model to solve problems in finance;
 4. perform financial simulation and analysis;
 5. practice presentation and communication skills (through case study presentations);
 6. be aware of ethical issues in finance; and
 7. work in a group, presentation and technical writing skills.
-

Keyword Syllabus:

1. Introduction to Finance

Internal Rate of Return, Fisher's Effect, Valuation of Assets (e.g., Bonds and Equity), Risk Measurement of Assets, Portfolio Theory (e.g., CAP-M), Derivative, Hedging, Markov Processes, Random Walks, Ito's lemma; Black-Sholes Equations; etc.

2. Computational Tools for Finance

Numerical Methods for PDEs; Finite Difference Methods; Monte Carlo Simulation; Modelling Tools for Financial Options; Stochastic Optimization; etc.

3. Computational Intelligence Techniques for Financial Problems

Prediction, Forecasting, Classification, Technical Analysis; Neural Networks, Fuzzy Systems, Genetic Algorithms; Financial Data Mining and Information Retrieval; etc.

4. Case Studies

Mean-Variance Efficient Investment Portfolios.

Indicative reading:

Books

Bodie, Z., Kane, A., and Marcus, A., 2005, *Investment*, McGraw-Hill, 6th Edition.

Neftci, Salih, N., 2003, *Principles of Financial Engineering*, Academic Press.

Levy, G., 2003, *Computational Finance: Numerical Methods for Pricing Financial Instruments*, Elsevier.

Los, C.A., 2001, *Computational Finance: A Scientific Perspective*, World Scientific Publishing.

Rudiger Seydel, 2002, *Tools for Computational Finance*, Springer-Verlag.

Levy, H., Levy, M. and Solomon, S., 2003, *Microscopic Simulation of Financial Markets*, Academic Press.

Others

IEEE International Conference on Data Mining

Asian Journal of Business and Information System

Journal of Computational Intelligence in Finance

Journal of Computational Finance

SUBJECT DESCRIPTION FORM

Subject title: Computer Image Generation and Applications

Subject code: COMP5514

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Basic knowledge in Programming

Mutual exclusions: Computer Image Generation and Applications (COMP523)

Learning approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable.

Lectures supplemented with tutorials and small projects

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

1. To learn some fundamental techniques in Computer Graphics;
 2. To learn the basic concepts and algorithms in Image Processing; and
 3. To understand some of the important applications of Computer Graphics and Image Processing.
-

Learning outcomes:

After completing this subject, students should be able to:

1. design interesting and interactive graphics;

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

2. get familiar with OpenGL or other graphics related programming languages for software development;
 3. understand the relationship between computer graphics and image processing; and
 4. apply visual information technology to various applications.
-

Keyword Syllabus:

Basic Computer Graphics Techniques

Pixels, frame buffers, input/output devices, 2D primitive drawing, 2D transformation, 3D transformation, 3D projection, Clipping, Object modeling.

Image Generation Techniques

The three image generation techniques: polygon scan-conversion, ray-tracing and radiosity. Realistic image generation techniques including shading, anti-aliasing, depth cueing and texture mapping. Computer animation.

Basic Concepts in Image Processing

Digital image acquisition and representation, basic techniques and algorithms for image enhancement, image feature extraction, representation and classification.

Computer Graphics and Image Processing Applications

Window systems and a brief introduction to X11. Image Processing including image editing and morphing. Virtual Reality including techniques and applications. Multimedia.

Indicative reading list and references:

- Angel, 2004, *Interactive Computer Graphics: A Top-Down Approach Using OpenGL*, 4th Ed., Addison Wesley
- Hearn and Baker, 2003, *Computer Graphics with OpenGL*, 3rd Ed., Prentice Hall.
- Watt Policarpo, 2005, *The Computer Image*, Addison Wesley.
- Fisher, Y., Ed., 1995, *Fraetal Image Compression*, Springer-Verlag.
- Foley, J., Dam, A. van, Feiner, S. and Huges, J., 1990, *Computer Graphics: Principles and Practice*, 2nd ed., Addison Wesley.
- Hodges, M. and Sasnett, R., 1993, *Multimedia Computing*, Addison Wesley.
- Laurel, B., 1993, *The Art of Human-Computer Interface*, Addison Wesley.
- Pimental, K. and Teixeira, K., 1993, *Virtual Reality: Through the New Looking Glass*, McGraw Hill.
- Watkins, C. and Marenka, S., 1994, *Virtual Reality Excursions*, AP Professional.

SUBJECT DESCRIPTION FORM

Subject Title: Image and Video Computing

Subject Code: COMP5515

Credit Value: 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge: Nil

Mutual Exclusions: Nil

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject is to provide fundamental image/video computing techniques. After the completion of the subject, the students should be able to implement basic image/video processing and analysis algorithms and apply them to industrial applications and research.

Learning Outcomes:

After completing the subject, students should be able to:

1. apply image/video denoising algorithms for image/video preprocessing;
2. master the basic techniques for image enhancement (e.g. histogram equalization);
3. Master the low-level image understanding techniques such as edge detection, line detection and threshold-based segmentation;
4. know the formation of video and apply motion estimation to it;
5. apply interpolation techniques to enhance the image resolution and know the concept of super-resolution for video sequence;
6. understand the principles of color perception and know how to do color space transformation;
7. know the standard for image/video compression; and
8. know some basic concepts and techniques for image feature extraction and pattern matching.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword syllabus:

1. Introduction of Image/Video Systems

Image/video acquisition, quantization, representation and display; human visual system; applications of image/video computing.

2. Image/Video Noise Reduction

Noise models; linear filtering in spatial domain and frequency domain; nonlinear filtering methods; temporal filtering for video sequence.

3. Image Enhancement and Restoration

Linear and non-linear stretching; histogram equalization; low-pass and high-pass filtering; image degradation model and restoration methods such as inverse and Wiener filtering.

4. Edge Detection and Image Segmentation

First and second order differential edge detection; Canny edge detection; line detection; threshold-based image segmentation; region-oriented segmentation.

5. Video Motion Computing

Models and methods of motion computing, such as optical flow, block matching and multi-resolution motion estimation.

6. Color Perception and Computing

Color image/video acquisition in still/video cameras; color reproduction/demosaicking; color calibration and analysis.

7. Image/Video Resolution Enhancement

Single-frame resolution enhancement methods, such as bi-linear, bi-cubic interpolation; brief introduction of multi-frame super-resolution concepts.

8. Feature Discrimination

Feature extraction; feature selection; feature measurement; feature classification. As an example, face recognition is used to illustrate the procedure of feature discrimination.

9. Introduction of Image/Video Computing in Multimedia Systems

Data compression; JPEG; JPEG2000; MPEG-1/2; MPEG-4; data transmission; image/video retrieval; watermarking, etc.

Indicative reading list and references:

Books

1. R. C. Gonzalez and R. E. Woods, *Digital Image Processing*, Prentice Hall Inc., 2002.
2. Z.-N. Li and M.S. Drew, *Fundamentals of Multimedia*, Prentice-Hall, 2003.
3. R. O. Duda, P. E. Hart and D. G. Stork, *Pattern Classification*, 2nd Edition, Wiley, 2001.

Journals

IEEE Trans. on Image Processing
IEEE Trans. on Circuits & Systems for Video Technology
IEEE Trans. on Pattern Analysis & Machine Intelligence
IEEE Trans. on Multimedia
Pattern Recognition

SUBJECT DESCRIPTION FORM

Subject Title: Human Computer Interaction

Subject Code: COMP5517

Credit Value: 3

Pre-Requisite: Nil

Recommended Background Knowledge:

Basic knowledge of programming is required.

Mutual Exclusions: Nil

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	60%
Test and Examination	40%

Objectives:

- To provide students with a broad view of both theoretical and practical issues in human factors for design of human-computer interfaces.
 - To equip students with knowledge and understanding of the nature of human computer interactions, human characteristics, computer system and interface architecture.
 - To equip students with sound skills in design, development and evaluation of user interfaces.
-

Learning Outcomes:

After completing the subject, students should be able to:

1. better understand various human factors in the design of human-computer interfaces;
2. learn the knowledge of system architecture and its development; and
3. evaluate and analyze the system design and user interfaces.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

Nature of Human Computer Interaction (HCI)

Definitions and importance of HCI; history and intellectual roots of HCI; roles various disciplines play within HCI.

Evaluation

Role of evaluation; evaluation techniques; experiments and benchmarking

Human Characteristics

Perception and representation; models and limits of human memory; mental models; use of metaphors; support user aspects of language, social and organizational aspects; input and output devices: performance characteristics (human and system); speech input and output.

Dialogue interactions and formal models

Task analysis and predictive modeling; dialogue interaction: types and techniques; multimedia and non-graphical dialogues; response time; statistical models for describing interaction processes.

Design guidelines and metrics

User-centered design and task analysis; software engineering design models; structural HCI design and envisioning design; standards and metrics; guidelines to support design; standards and metrics; documentation and on-line information.

Development and applications

Design rationale; participatory design and prototyping; user interface management systems; WWW applications designs; groupware; collaborative work and virtual environments.

Advanced HCI

Human-robot Interaction; Ubiquitous Computing; Speech and natural language interfaces; Sensor networks; Tangible user interfaces

Indicative Reading List:

- Dix, J. Finlay, G. Abowd, and R. Beale, Human-Computer Interaction, 3rd Edition, Prentice Hall, 2004.
- D. Norman, The Design of Everyday Things, Doubleday Business, 1990
- Shneiderman, Designing the User Interface: Strategies for Effective Human-Computer Interaction, 3rd Edition, Addison Wesley, 1998.
- W.J. Smith, ISO and ANSI Ergonomic Standards for Computer Products. A Guide to Implementation and Compliance. Prentice Hall, 1996.
- P.K. Andleigh and K. Thakrar, Multimedia Systems Design, Prentice Hall, 1996.
- M.E.S. Morris and R.J. Hinrichs, Web Page Design: A Different Multimedia, Prentice Hall, 1996.
- K. Mullet and D. Sano, Designing Visual Interfaces. Prentice Hall, 1995.

SUBJECT DESCRIPTION FORM

Subject Title: Biometric Authentication: System and Application

Subject Code: COMP5522

Credit Value: 3

Pre-requisite: (Subject title and code no, if any) Nil

Recommended background knowledge: Nil

Mutual Exclusions: Nil

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

<u>Assessment:</u>	Continuous Assessment	45%
	Test, and Examination	55%

Objectives:

A “pattern” is the form of representation of an objectively existed event or object. For instance, voice, image and character are patterns. More broadly, any natural and social phenomenon may be considered as “Patterns”. But in our course we mainly concern the problems of recognizing patterns of characters, speech and images. In our course, “Pattern” is a set of measurements or observations, represented in vector or matrix notation. --- A basic intelligent ability of human being or animal; for instance, you guys come to attend this class, you have to be able to recognize the road from home to PolyU, this is the 3D scene analysis ability, you have to be able to recognize the number of classroom, which is the ability of number recognition, on the class you have to be able to understand what the teacher says and writes on the blackboard, this is the ability of speech and character recognition. From the system viewpoint, PR is an important component of intelligent systems; From the theoretical concept, PR is a mapping from feature space to class space.

The main focus of this subject is to explore the major theories of pattern recognition and image information processing (PRIP) and to discuss how these techniques and models are applied to Biometric Systems and other related applications.

Learning outcomes:

After completing this subject, students should be able to:

1. understand the basic concept of pattern and its specific application to biometrics computing;
2. apply multimedia information technology for biometric feature extraction and representation;
3. use data clustering and classification algorithms for personal authentication by biometrics features; and

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

4. combine multiple biometrics features for various applications
-

Keyword Syllabus:

Introduction to Biometrics Authentication

What is biometrics authentication? Traditional methods for personal authentication. Some definitions of biometrics authentication technologies and systems. Software and hardware biometrics systems. Image processing and pattern recognition in living body, including human head & face, the mechanism of human eye, hand & skin characteristics.

Biometrics Sensors and Data Acquisition

Biometric data acquisition and database. How to design various biometric sensors and how to evaluate their system performance?

Biometrics Pre-processing

The related biometrics preprocessing technologies, including: noise removing, edge sharpening, image restoration, image segmentation, pattern extraction and classification. etc.

Biometrics Feature Extraction

Basic elements in pattern recognition system, and some basic introduction of pattern recognition systems on biometrics (such as fingerprint, palm-print, finger, hand, face, iris, and face, as well as dental, DNA, and retina recognition).

Features Matching and Decision Making

Various matching methods, including PCA and LDA. Introduce decision theory and their examples.

Design and Implementation of Biometric Systems

Basic approaches of automated biometrics identification and verification systems. Various performance comparison and their analysis for large population authentication, accuracy and reliability of authentication in an *e*-world.

Biometric Authentication Applications

Various applications, including access control like a lock or an airport check-in area; immigration and naturalization; welfare distribution; military identification; banking, e.g., check cashing, credit card, ATM (automated teller machine); computer login; intruder detection; smart card; multi-media communication; WWW and an electronic purse; sensor fusion; decision fusion; categorization: e.g., age and gender; industrial automation; gesture interpretation; efficient enrollment; audio-visual tracking; stock market; on-line shopping; compact embedded systems and other commercialized services.

Indicative reading list and references:

Zhang, D., 2000, *Automated Biometrics: Technologies & Systems*, Kluwer Academic Publisher, USA.

Zhang, D., 2003, *Palmprint Authentication*, Kluwer Academic Publishers, USA.

Zhang, D (ed.), 2002, *Biometrics Solutions for Authentication in an e-World*, Kluwer Academic Publishers, USA.

Jain, et al., (eds), 1999, *Biometrics: Personal Identification in Networked Society*, Kluwer Publisher.

Sid-Ahmed, M.A., 1995, *Image Processing, Theory, Algorithms, & Architectures*, McGraw-Hill.

Awcock, G.W., et al., 1996, *Applied Image Processing*, McGraw-Hill.

IEEE Transaction on *Pattern Analysis and Machine Intelligence*.

IEEE Transaction on *Image Processing*.

SUBJECT DESCRIPTION FORM

Subject Title: Workflow Management and Collaborative Systems

Subject Code: COMP5524

Credit Value: 3

Pre-requisite: Nil

Exclusions: Office Information Systems (COMP577),
Workflow Management and Collaborative Systems (COMP580)

Learning Approach:

Workflow management and office automation systems are being introduced in many organizations to automate business process and enhance office productivity. Initially, such technology is mainly employed within a given organization. As Internet becomes more popular nowadays, workflow systems are increasingly being used to interconnect organizations and facilitate collaboration across business enterprises. In this course, collaborative systems will be covered from both technical and business perspectives. Case studies are used to demonstrate how to improve business performance through office automation and workflow applications. Students are expected to complete assignments in groups. Group assignments will include case studies and hands-on exercises using process analysis and XML editing tool. No programming knowledge is required.

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

To understand the design and the development of collaborative systems so as to streamline intra-organizational and inter-organizational business processes. It includes the study of business process re-engineering and balanced scorecard framework, process lifecycle, process modelling and analysis, system integration through EAI and XML technology, enterprise portal, document management and imaging system. Industry standard such as WfMC workflow reference model and XML consortiums (e.g. RosettaNet, ebXML) formed in various industry will also be covered.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. better understand workflow management;
 2. relate workflow systems to interconnect organizations to facilitate collaboration across business enterprises;
 3. explore office automation and workflow applications that can improve business performance; and
 4. perform case studies and hands-on exercises using process analysis tools.
-

Keyword Syllabus:

Process automation and engineering, end-user systems, balanced scorecard, electronic document management system, telephony, video-conferencing, computer support cooperative work (CSCW), groupware, intranet, internet, electronic commerce, business-to-business, interworkflow, WfMC (Workflow Management Coalition), Extensible Markup Language (XML) , Document Type Definition (DTD) , public key infrastructure (PKI), certificate authority (CA), RosettaNet, ebXML, Microsoft 2003

Indicative reading list and references:

Text book

Rashid N. K., 2004, Business Process Management: A Practical Guide, Meghan-Kiffer Press.

References books

Dave, C. et. al., 1998, Groupware, Workflow and Intranets: Re-engineering the Enterprise with Collaborative Software , Future Strategies.

Fischer, L. (Editor), 2001, *Workflow handbook*, Future Strategies.

Fischer, L. (Editor), 2002, *Workflow handbook*, Future Strategies.

Fischer, L. (Editor), 2003, *Workflow handbook*, Future Strategies.

Fischer, L. (Editor), 2004, *Workflow handbook*, Future Strategies.

Fischer, L. (Editor), 2005, *Workflow handbook*, Future Strategies.

Journal papers and articles

Hunt R., 2001, *Technology infrastructure for PKI and digital certification*, Computer Communication, pp. 1460 – 1471.

Lococo A. and Yen D.C., 1998, *Groupware: Computer Supported Collaboration*, Telematics and Informatics, 15, pp. 85-101. .

Rinde J., 1999, *Telephony in the year 2005* , Computer Networks, 31, pp. 157 – 168.

SUBJECT DESCRIPTION FORM

Subject Title: Information Security: Technologies and Systems

Subject Code: COMP5525

Credit Value: 3

Pre-requisite:

Nil

Recommended background knowledge:

Number System, Programming, Image Processing, Internet and Computer System

Mutual Exclusions:

Information Security: Technologies and Systems (COMP559)

Learning Approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

7. To understand the problems with current security technologies and systems; and
 8. To introduce biometric computing knowledge and methods.
-

Learning Outcomes:

After completing this subject, students should be able to:

1. apply both classical and conventional encryption algorithms for information coding;
2. understand the differences between secret key and public-key approaches for information security and their applications;

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

3. use watermarking techniques for information hiding and authentication; and
 4. apply pattern recognition techniques for biometric classification with various applications.
-

Keyword Syllabus:

Introduction to Information Security

Why information security? Some definitions of security technologies and systems. Software and hardware security and networks security. Access control.

Applied Cryptography

Classical systems. Secret key. Public key. Data encryption standard. Conventional encryption. Substitution and transposition encryption technologies. Encryption algorithms.

Best Privacy Tool: Biometrics

Current privacy tools: password and key. Advantage of using personal features. Biometrics in living body, including human head & face, the mechanism of human eye, hand & skin characteristics, personal voice & sound, and habitual behaviors.

Privacy Biometrics Techniques

Biometrics data acquisition and biometrics database. The related image processing and pattern recognition technologies, including digital image and signal representation, pattern extraction and classification. Basic approaches of automated biometrics identification and verification.

Typical Physical & Behavioral Biometrics

Basic security systems using physical and behavioral characteristics of biometrics. Some basic introduction of physical and behavioral biometrics systems (such as fingerprint, palm-print, finger, hand, face, iris, and face, as well as dental, DNA, retina recognition, voice, signature, gesture recognition, knowledge-based recognition, and keyboard-input-based recognition).

Security Applications

Internet/Intranet. E-Commerce. Banking services. Immigration and Naturalization Service. Benefit Systems. Computer Systems. National Identity. Physical Access. Telephone Systems. Time, Attendance and Monitoring.

Indicative reading list and references:

Books

- Stallings, W., 2003, *Cryptography and Network Security, Principles and Practices*, (3rd Edition), Prentice Hall.
- Stallings, W., 2000, *Network Security Essentials: Applications and Standard*, Prentice Hall.
- Jain, et al., (eds), 1998, *Biometrics: Personal Identification in Networked Society*, Kluwer Academic Publisher.
- Sid-Ahmed, M.A., 1995, *Image Processing, Theory, Algorithms, & Architectures*, McGraw-Hill.
- Awcock, G.W., 1996, *Applied Image Processing*, McGraw-Hill.
- Zhang, D., 2000, *Automated Biometrics: Technologies & Systems*, Kluwer Academic Publishers.
- Zhang, D. (ed), 2002, *Biometrics Solutions for Authentication in an E-World*, Kluwer Academic Publishers.

SUBJECT DESCRIPTION FORM

Subject title: Mobile Computing and Data Management

Subject code: COMP5527

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

Operating Systems (COMP304) and Foundations of Database Systems (COMP311) and Computer Communications Networks (COMP312) or equivalent
(waived for Software Technology students)

Recommended background knowledge:

Programming skills in C/C++/Java.

Mutual exclusions: NIL

Learning approach:

42 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous assessment	45%
Test, and Examination	55%

Objectives:

To provide students with knowledge in the area of mobile computing models, architectures, algorithms and techniques and to train them with the ability to

- acquire fundamental knowledge in mobile computing and mobile data management
 - learn about mobile computing concepts
 - understand limitations and appreciate innovative solutions
 - apply the knowledge in mobile computing application development and problem solving
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. better understand mobile computing and mobile data management;
2. be aware of innovative solution and limitations; and
3. apply different techniques to various applications.

Keyword syllabus:

- Introduction to mobile computing
Motivations; ubiquitous and pervasive computing; mobile computing infrastructure, wireless communication and protocol, GPRS and 3G; mobile computing applications.
- Mobile data management
Data communication; data dissemination; broadcast disk; data caching and invalidation; data consistency and integrity; mobile data access; mobile databases and transaction processing.
- Disconnected and weakly-connected operations
File hoarding and disconnected file systems, CODA; version and divergence control; data synchronization and reintegration.
- Location-aware computing
Location management; mobility and handoff; spatial data and query processing; trajectory; location-dependent computing.
- Mobile applications and web services
Transcoding and proxy services; wireless web access; mobile agents; Java card; M-commerce (mobile) and L-commerce (location-aware).
- Selected current topics
Sensor networks; streaming query processing; data recharging; power-aware computing; wearable computers; nano-technology.

Indicative reading list and references:

Books

- Burkhardt, J., Henn, H., Hepper, S., Raindtorff, K. and Schaeck, T., 2002, *Pervasive Computing: Technology and Architecture of Mobile Internet Applications*, Addison-Wesley.
- Tan, K.L. Tan and Ooi, B.C., 2002, *Data Dissemination in Wireless Computing Environments*, Kluwer Academic Publishers.
- Milojicic, D.S., Douglis, 1999, F. and Wheeler, R.G., *Mobility: Processes, Computers and Agents*, Addison-Wesley.
- Jing, J. and Joshi, A., 1999, *Mobile Data Management and Applications*, Kluwer Academic Publishers.
- Pitoura, E. and Samaras, G., 1997, *Data Management for Mobile Computing*, Kluwer Academic Publishers.
- Imielinski, T. and Korth, H.F., 1996, *Mobile Computing*, Kluwer Academic Publishers.

Journals

- IEEE Transactions on Mobile Computing*, IEEE.
- IEEE Pervasive Computing*, IEEE.

Articles from other journals, magazines and conference proceedings.

Others

Proceedings of International Conference on Mobile Computing and Networking, ACM.

Proceedings of International Conference on Mobile Data Management / Mobile Data Access,
IEEE and Springer-Verlag.

SUBJECT DESCRIPTION FORM

Subject Title: IT Entrepreneurship and Legal Aspects at IT

Subject Code: COMP5531

Credit Value: 3

Pre-requisite: Nil

Mutual Exclusions: Entrepreneurship (MM534), Legal Aspects of Electronic Commerce (AF5506)

Learning Approach:

Teaching and learning activities including self study, face-to-face/online tutorials, discussion forums, lab/workshop/seminar where applicable, are conducted to encourage interaction among the students and the subject lecturer.

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

- Explain the process of entrepreneurship;
- Understand how to start and run a business in the IT industry;
- Write a business plan;
- Understand some principles of law related to Information Technology;
- Understand some basics of PRC Law; and
- Master “preventive law”.

This course does not promise the success of running your own company; but it definitely maximizes the chance of your success.

Learning Outcomes:

After completing the subject, students should be able to:

1. become familiar of the entrepreneurship process; and know different entrepreneurial skills;
2. recognize the operations of running an IT company and able to develop a business plan; and
3. recognize laws related to IT in Hong Kong and PRC.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Keyword Syllabus:

A Framework for Entrepreneurship

Defining Entrepreneurship: Creation, Economic Organization, Risk and Uncertainty

Dimensions of Entrepreneurship: Individuals, Environments, Organizations

International Environment

Political Factors, Macroeconomic Factors, Technological Factors, Sociodemographic Factors

Entrepreneurial Strategies

Strategies: Rent-Seeking Strategy, Growth Strategies, Quality as a Strategy

Industry Environments: Emerging Environments, Transitional Environment, Maturing Industries, Declining Industries, Fragmented Industries

Business Plan

The Costs of Planning, The Benefits of Business Planning, Management, Resources, Projections and Returns

Entrepreneurial Skills

Negotiation Skills, Networking Skills, Buying and Selling a Business, Leadership Skills

Intellectual Property

Copyright law, Patent law, Trademark law, Trade Secret law,

Law in Business

Contracts Law, Employees, Contractors and Consultants, The Laws of Defamation, Publicity, and Privacy

Cyber Law

Business Models for the Internet, Domain Names, Privacy Policies and Procedures, E-Commerce Laws, Linking, Framing and Caching, Using Multimedia on the Web, The Law of Email, Service Provider Liability, Protecting Your Intellectual Property Rights

Indicative Reading List and References:

Kishel, G., 1998, *How to start, run, and stay in business (3rd)*, New York John Wiley,

Dollinger, M.J., 1995, *Entrepreneurship: strategies and resources*, Austen Press.

Bygrave, W., 1997, *The portable MBA in entrepreneurship(2nd)*, John Wiley & Sons

Ferrera, G.R, Lichtenstein, SD, Reder, MEK, August, R and Schiano, W.T., 2001, *Cyberlaw: text and cases*, Cincinnati, Ohio: West/Thomson Learning

Marcella, A.J and Grenfield, R.S. (Ed), 2002 *Cyber forensics : a field manual for collecting, examining, and preserving evidence of computer crimes*, Boca Raton, Fla. : Auerbach.

Fishman, S., 2002, *Web and Software development : a legal guide (3rd)*, Berkeley : Nolo Press

Brinson, J.D., 2000, *Internet law and business handbook*, Ladera Press

SUBJECT DESCRIPTION FORM

Subject title: Customer Relationship Management and Technology

Subject code: COMP5538

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

Fundamentals of E-commerce (COMP514) or E-commerce and Applications (COMP575) or E-Commerce Fundamentals and Development (COMP5122) or equivalent
[waived for students of MSc Technology Management and MSc/PgD in Knowledge Management]

Recommended background knowledge:

Basic knowledge in AI technologies is an advantage

Mutual exclusions: Nil

Learning approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment:	70%
Test, and Examination	30%

Objectives:

With the advancement of IT, CRM / eCRM offers significant opportunities for organizations to better understand and serve their customers and to personalize online experiences and agent interaction in the EC environment.

In this subject, students will learn how to:

- build the knowledge info-structure to support decision making and marketing
- apply the latest development in Internet marketing / CRM tools
- develop professional skills and CRM-based business strategies

The syllabus covers theories of CRM, people management, process management and technology management, customer behavior and analysis; CRM measurement; knowledge-enabled CRM; building a data warehouse; data mining techniques and analysis; building a e-CRM application; CRM software in the market; integrated CRM solutions. The teaching methodology includes theories, case studies, group discussion and project.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. better understand the key concepts of applying customer relationship management to enable organisations to achieve sustainable competitive advantages;
2. be aware of the main functionality of industry proven CRM systems;
3. recognize the management tasks with reference to industry proven CRM systems;
4. explore creative problem solving skills in formulating specific CRM implementation and management strategies with reference to the business environment of specific organisations; and
5. perform with good communication and interpersonal skills in proposing and presenting appropriate implementation strategies of CRM systems.

Keyword syllabus:

Introduction to CRM: Definitions of CRM, goals of CRM, e-CRM, CRM process, management issues and measurement, the value potential of customers, Customer Value Propositions, CRM initiatives and economic impact

CRM Strategies Planning: customer strategy, brand strategy, channel strategy

Customer Behavior and Analysis: customer profitability, customer buying values analysis, customer profiling, customer database behavior and customer life value

E-Marketing: Four Ps in vs four Cs in Marketing; Ansoff matrix; 3Cs of Internet Marketing; e-marketing mix

Knowledge-enabled CRM and technology: Introduction to knowledge management, data warehouse; data mining, and data fusion; infostructure and agent framework; Introduction to CRM software package (e.g. customer service, online ordering, automatic invoicing, marketing and forecasting)

Neural Networks in CRM: Finding potential customers

Change Management: DISC language

Recommended Reading

1. Swift, R.S., 2001, Accelerating Customer Relationships: Using CRM and Relationship Technologies, Prentice Hall.
2. Tiwana, A., 2002, The Essential Guide to Knowledge Management: E-Business and CRM Applications, 2nd Edition, Prentice Hall.
3. Strauss, J., El-Ansary, A. and Frost, R. 2006, E-Marketing, 4th edition, Prentice Hall.
4. Zikmund, W., McLeod, R. and Gilbert, F., 2003, Customer Relationship Management: Integrating Marketing Strategy and Information Technology, Wiley.

Reference Journals

Communications of the ACM

Harvard Business Review

Applied Intelligence

ComputerWorld

IEEE Transactions on Systems, Man, and Cybernetics (SMC)

International Journal of Computer Applications in Technology

International Journal of Information Management

IT Solution Journal

Journal of Information Technology

SUBJECT DESCRIPTION FORM

Subject Title: Advanced Computer Graphics

Subject Code: COMP5553

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

Computer Image Generation and Application (COMP523/COMP5514) or equivalent

Recommended background knowledge:

Programming experience in at least one high level programming language.

Mutual exclusions: Advanced Computer Graphics (COMP544)

Learning approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

This subject provides an overview of the current state of the art in computer graphics, the objectives include:

1. to provide the students with the knowledge of the advanced graphics hardware;
 2. to expose students to the advanced graphics modelling and rendering techniques; and
 3. to discuss key issues and concepts in computer-assisted animation.
-

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing this subject, students should be able to:

1. identify the performance characteristics of advanced computer graphics pipeline;
 2. distinguish between generic computer architecture and support for high performance graphics;
 3. use surface and object modelling techniques to build 3D models;
 4. understand rendering techniques for high performance graphics; and
 5. understand computer animation and 3D motion synthesis.
-

Keyword Syllabus:

Advanced Raster Graphics Architecture

Standard graphics pipeline, introduction to multiprocessing, pipeline front-end architecture, parallel front-end architecture, multiprocessor rasterization architecture, image-parallel rasterization, object-parallel rasterization, hybrid-parallel rasterization, enhanced display capabilities.

Advanced Modeling Techniques

Procedural models, fractal models, rule-based models, particle systems, volume rendering, special models for natural and synthetic objects.

Computer-Assisted Animation

Animation languages, methods of controlling animation, basic rules of animation, problems peculiar to animation.

Indicative reading list and references:

- Wolfgang Engel, 2006, *ShaderX5: Advanced Rendering Techniques*, Charles River Media,
Hearn, D. and Baker, P. 2004. *Computer Graphics with OpenGL*, Prentice-Hall.
Alan Watt and Fabio Policarpo 2001. *3D Games Real-Time Rendering and Software Technology*,
Addison Wesley.
Carey, R. and Bell, G. *The Annotated VRML 2.0 Reference Manual*.
Hartman, J. and Wernecke, J. 1996. *The VRML 2.0 Handbook, Building Moving Works*, Reading,
Mass., SGI and Addison-Wesley.

ACM SIGGRAPH Computer Graphics Journal

ACM Transaction on Graphics Journal

IEEE Computer Graphics and Applications Journal.

SUBJECT DESCRIPTION FORM

Subject Title: Independent Study

Subject Code: COMP5923

Credit Value : 3

Pre-requisite: (Subject title and code no, if any)

Having completed 15 credits of study in the registered programme

** Full-time students may consider to do this subject anytime. Students cannot take the Dissertation option if they choose to do Independent Study.

Recommended background knowledge: Nil

Mutual Exclusions:

Information System Dissertation (COMP592), IT Dissertation (COMP590)
ST Dissertation (COMP591), E-Commerce Dissertation (COMP5091),
E-Commerce Dissertation (Executive) (COMP5092), Dissertation (COMP5940),
Independent Study in Information Systems (COMP5010),
Independent Study in E-Commerce (COMP5009)

Assessment:

Continuous assessment: 100%

Students will be assessed by the supervising staff and an independent co-examiner, in a form decided by the staff concerned. In general, assessment would typically consist of a report and presentation at the end of the term. The report may take a form similar to a paper on a literature survey as published in a journal. There may also be tests.

Objectives:

This subject is intended to give students an opportunity to carry out a research study of an area of strong interest. It shall include case study, literature review, framework design, preliminary testing and analysis. Students must have adequate preparation in the IS/IT/ST/EC area, by taking the pre-requisite subjects or equivalent.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. identify related problems and issues in real life IS/IT/ST/EC area;
 2. learn to search for and analyse primary sources relevant to the topic of study;
 3. apply certain principles and techniques of requirements, specification, software design and implementation of IS/IT/ST/EC systems; and
 4. present, in written form, the preliminary result and reporting.
-

Learning Approach:

The main purpose of this subject is to let students do independent study on a selected topic related to discipline area. Included in such work must be an examination of primary sources (such as research papers published in refereed journals and conferences) to the greatest extent possible and the presentation of results and conclusions in a scholarly fashion. Secondary sources and text books should not be the sole basis of the study. The study may be comparable to the literature review portions of a rigorous research project. In fact, it is expected that a student will take this Independent Study subject preceding, and as preparation for the Project subject. In summary, students may need to carry out the following tasks:

1. comprehensive literature review / survey / evaluation
2. proposing improvement / new solutions
3. attending related subjects

Potential supervisors should be approached for topic information. Either the supervisor or the student may propose a topic of study, subject to approval of the supervisor. The supervisor may suggest some research papers for the student as a starting reading list, but the student must learn to search for, read, and analyze relevant literature, and present the results of the study, under the guidance of the supervisor.

Note: The supervision arrangement is also subject to quota restriction and availability of faculty staff.

SUBJECT DESCRIPTION FORM

Subject Title: Project

Subject Code: COMP5933

Credit Value : 6

Pre-requisite: (Subject title and code no, if any)

Having completed not less than 15 credits of study with a GPA of 2.5 or above in the registered programme

** Full-time students who have completed 9 credits of study with GPA of 2.5 or above may consider to do Project from the second semester of their study.

Recommended background knowledge: Nil

Mutual Exclusions:

Information System Dissertation (COMP592), IT Dissertation (COMP590)
ST Dissertation (COMP591), E-Commerce Dissertation (COMP5091),
Dissertation (COMP5940), E-Commerce Dissertation (Executive) (COMP5092),
E-Commerce Project (COMP5093), Information System Project (COMP5094)

Objectives:

This subject is intended to provide an opportunity for students to carry out a group project to practise the principles and techniques of IS/IT/ST/EC system research and development. Students achieve the objective through the development of concepts, models, frameworks, and / or a software system that meets stated requirements and quality standards.

Learning Outcomes:

After completing the subject, students should be able to:

1. identify, analyse and solve real life, IS/IT/ST/EC related problems and issues;
 2. apply appropriate principles and techniques of requirements, specification, software design and implementation of IS/IT/ST/EC systems;
 3. perform collaborate and work effectively in a team environment; and
 4. present well-formed technical documentation and project report.
-

Assessment:

The group project will be assessed by the assessment panel which consists of the project supervisor and 1-2 other staff members. The assessments include:

- Project proposal including project definition and specification
- Technical merit of the proposed solutions and prototype implementation / simulation

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- Management of the project and individual development of the students
- Quality of documentation including the progress report and final project report
- Demonstration / oral examination and presentation.

The weighting for each assessment item will be determined by the students and the supervisors when the project starts. The ratio of weighting across these categories may vary from project to project due to the considerable variety of subject areas and objectives anticipated in different projects.

In general, an initial project proposal is due within 4 weeks after semester starts. A concrete proposal with details is due by the end of first semester. Final project report is due by the end of the 2-semester normal period, and a presentation comprising an oral examination will be scheduled. In addition to the group report, each member within a group should submit an individual report describing his/her own work in the project. Each group member should also participate in the assessment process.

Learning approach:

Students are to work in a group of up to 4 members. Each group is supervised by a faculty member.

The role of the supervisor is to help students identify a project topic, closely monitor the project, give advice to the students for establishing criteria for assessment and developing possible solutions to potential problems. Students are expected to work independently, show initiative, and take responsibility for the success of their work. They are required to hold regular meetings with the supervisor, at least once per fortnight, and produce regular progress reports as an integral part of the project documentation.

In summary, students may need to carry out the following tasks related to research and development on a selected IS/IT/ST/EC topic

1. Comprehensive literature review / survey / evaluation
2. Proposing improvement / new solutions
3. Developing prototypical implementation
4. Evaluate effectiveness / performance

Duration of course: Two semesters

Keyword Syllabus:

Students will group into teams of up to 4 members, and work on an IS/IT/ST/EC project under the supervision of a faculty member. Each group of students will explore an area of IS/IT/ST/EC, either by their own choice or assigned by the supervisor.

Through the project, students will integrate knowledge and techniques they have acquired in preceding and concurrent subjects of study and develop their skill and new knowledge of the selected areas. They will identify some problems to solve, develop solutions, and provide a proof-of-concept for their solutions by developing software prototypes that implement the solutions. Testing cases need to be designed to evaluate the developed systems in the light of system requirements and performance. Students will also exercise project management methods to the planning, developing, and monitoring of progress. Upon completion of the subject, the students will need to communicate their work to others effectively and efficiently, through well-prepared project reports and / or oral presentations and demonstrations.

SUBJECT DESCRIPTION FORM

Subject Title: Dissertation

Subject Code: COMP5940

Credit Value: 9

Pre-requisite: (Subject title and code no, if any)

Having completed not less than 15 credits of study in the registered programme and with a GPA of 2.5 or above.

** Full-time students who have completed 9 credits of study with GPA of 2.5 or above may consider to do Dissertation from the second semester of their study.

Recommended background knowledge: Nil

Mutual Exclusions:

IT Dissertation (COMP590), ST Dissertation (COMP591),
IS Dissertation (COMP592), E-Commerce Dissertation (COMP5091)
E-Commerce Dissertation (Executive) (COMP5092),
Independent Study in Information Systems (COMP5010),
Independent Study in E-Commerce (COMP5009),
Independent Study (COMP5923), Project (COMP5933),
E-Commerce Project (COMP5093), Information System Project (COMP5094)

Assessment:

Written dissertation and oral defense 100%

Details about standard requirements and assessment can be obtained from the Dissertation Handbook for Postgraduate Schemes of the University.

Objectives:

Dissertation study enables the student to put into practical effect the research skills acquired during the course and to work in a specific defined field with the objective of producing a substantial piece of work based on critical analysis, evaluation, independent thought and knowledge contribution.

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. conduct a literature search with appropriate information resources and produce a critical review of the findings;
 2. apply appropriate theoretical and practical computing concepts, methodologies and techniques to a non-trivial problem;
 3. demonstrate the capacity for self-appraisal with reference to the work of other;
 4. perform in-depth and critical study with a goal leading to productive research; and
 5. present clearly and accurately, in written form, the research carried out and the conclusions reached.
-

Learning approach:

Supervisors:

Students are advised to discuss with potential supervisors for topic formulation and dissertation supervision.

Tutorials:

Both the supervisor and student should arrange to meet regularly at mutually agreed times. Bi-weekly meetings are recommended. As a guideline, each student is allowed a minimum of fifteen hours of staff time for individual consultation to obtain guidance in dissertation development.

Self-study:

Students are expected to study independently, although study groups are actively encouraged. Individual student will need to be self-motivated and set his or her own goals and schedules as well as monitor these throughout the development of the dissertation

Duration of course:

Two semesters

Process

There are four stages in the preparation of the dissertation:

- (i) approval of the outline of the proposed research plan
- (ii) approval of the completed draft
- (iii) completion of dissertation document
- (iv) oral examination and presentation

The background of the students and their personal experiences and interests form the basis for them to conduct the research study. To optimize the impact of their research on their organisations, students are encouraged to undertake research within their work place and with full organisational support. Generally, the dissertation covers an area of applied research in the IS/IT/ST/EC areas. The dissertation must also contain sufficient evidence of research and original thought to justify its academic standard at MSc level.

Subject Code	MM534	
Subject Title	Entrepreneurship	
Level	5	
Credit(s)	3	
Mode of Study	Lecture / Seminar	42 Hours
Normal Duration	1 Semester	
Pre-requisite(s)	Nil	
Exclusion(s)	IT Entrepreneurship and Legal Aspects at IT (COMP5531) or Creating and Managing SMEs in Hong Kong and China (MM536)	
Consecutive Subjects	Nil	
Assessment	Continuous Assessment	100%
Minimum Pass Grade	Continuous Assessment	D

Objectives

This subject contributes to the achievement of the MBA Outcomes by enabling students to think critically in the application of entrepreneurship concepts, identify and resolve ethical issues as they arise in the context of doing business, and demonstrate a global outlook in developing business.

Learning Outcomes

After completing this subject, students should be able to:

1. apply the entrepreneurship knowledge to a new or existing company;
2. use analytical and critical thinking skills to evaluate the feasibility of a business concept; and
3. develop the communication and critical thinking skills to present and respond to critical questions related to the business plan.

Learning/ Teaching Approach

The instructor will provide students with a structured lecture on the underlying theoretical framework and highlight the importance of each topical area exemplified with real-world cases. Students will be required to participate in discussion in the lectures, and undertake guided reading and group project, which will form the basis for student presentations in the later part of each class. Local entrepreneurs will be invited to give guest lectures.

Indicative Assessment Tasks

Group project presentations and case analyses will require students to apply entrepreneurship concepts, communication skills and critical thinking to the kind of ambiguous issues and problems which arise in actual local and global business environment. Individual assignment will assess student's ability to use analytical and critical thinking skills to evaluate the feasibility of a business concept and their ability to evaluate contemporary issues and the ethical dimension.

Keyword Syllabus

Development of entrepreneurship and intrapreneurship

Definition of entrepreneurship and intrapreneurship; economic and non-economic influences on entrepreneurship; the current status of entrepreneurship in selected countries.

Analysis of entrepreneur and intrapreneur

Profiling the entrepreneur/intrapreneur - traits, skills and activities analysis; innovation and the entrepreneur/intrapreneur; risk and rewards to the entrepreneur; entrepreneurial stress and coping mechanisms.

Start-up small business

The entrepreneurial process and the start-up; entry value of small business; evaluation of start-up methods - buyout, franchise and starting from scratch.

Growth and maturity of small business to medium and big companies

Survival value and retreat value of small business; promising entrepreneurial opportunities - export markets and technology transfer; operating characteristics of small business in the growth and maturity stages.

Management techniques of small/medium business

Organisational planning; consideration of legal, financial, operational and marketing aspects; human resources management for small/medium business; preparing a business plan.

Contemporary issues

Study of key factors leading to success and failure of small/medium business; new venture opportunities in a global environment; managing growth and transition.

Indicative Reading

Textbook(s)

Hisrich, R. D., Peters, M. P. and Shepherd, D. A. (2008), *Entrepreneurship*, 7th edition, NY: McGraw-Hill/Irwin.

Reference(s)

Entrepreneurship and Regional Development
Entrepreneurship Theory and Practice
Harvard Business Review
International Small Business Journal
Journal of Business Venturing
Journal of Enterprising Culture
Journal of Small Business Management
Strategic Management Journal

Subject Code	MM5802	
Subject Title	E-Marketing	
Level	5	
Credit(s)	3	
Mode of Study	Lecture	28 Hours
	Seminar	14 Hours
Normal Duration	1 Semester	
Pre-requisite(s)	Nil	
Exclusion(s)	E-Marketing (MM580) or E-Marketing (MM5801) or Introduction to Customer Value (MM5803)	
Consecutive Subjects	Nil	
Assessment	Continuous Assessment	100%
Minimum Pass Grade	Continuous Assessment	D

OBJECTIVES

The development of the Internet has provided business with a new communication medium, distribution channel, and market place. This new platform has also created opportunities for companies to expand their scope of service, customer support and market reach. As the technology has moved towards maturity, some important realities are becoming clear.

- The Web changes many aspects of conventional business wisdom.
- It provides marketers with new capabilities such as interactivity and measurability, not present in most other media.
- Business enterprises and marketing programs that integrate activities in the physical and cyber worlds have higher chance of success.
- Above all, the Internet has not abolished the need for thorough business planning and meticulous execution.

This subject will present a marketing perspective on these issues. **The subject will provide the students with a systematic framework that associates with the value creation process for the planning and design of marketing strategies in the digital era.** Hence the subject aims to add new perspectives to marketing thinking and practice by synthesizing current academic research and industry practice in the discipline.

LEARNING OUTCOMES

On completion of this subject, students will be able to:

1. Design of marketing programs in the digital era;
2. Identify market opportunities brought by the Internet and wireless technology;
3. Systematically generate marketing ideas for new business models;
4. Analyze the behavior of the hybrid consumer;
5. Integrate online-offline segmentation, targeting and positioning (STP) strategy;
6. Apply customer lifetime value models in marketing planning;
7. Discuss challenges in customer relationship management implementation;
8. Apply contextual marketing concept to design customer experience;
9. Develop principles for measuring e-marketing performance.

LEARNING / TEACHING APPROACH

A combination of teaching and learning activities will be adopted in the classroom. This includes lectures, case studies, class discussion on topical issues and student presentations.

KEYWORD SYLLABUS

- **Marketing Management in the Networked Economy**
Marketing and technology; the digital world; networks, definitions and scope of electronic marketing and electronic commerce.
- **Analyzing Marketing Opportunities**
Market opportunity analysis in the networked, digital era; unmet need identification, value creation and delivery; value proposition; company's resource system.
- **Marketing Strategy Formulation**
Virtual value chain; marketplace and marketspace; online-offline integration; business models.
- **Understanding Customer Relationship Management**
Customer acquisition, selection, retention and extension; customer lifetime value; loyalty programs, and customer equity.
- **Designing the Marketing Program**
Product, pricing, communication, distribution, and branding; managing e-service quality; wireless technology and contextual marketing.
- **Evaluating the Marketing Program**
Qualitative and quantitative performance criteria.

INDICATIVE READING

Reference Texts

- Strauss, J., El-Ansary, A. and Frost, R. (2006), *E-Marketing*, 4th edition, Prentice Hall.
- Mohammed, Rafi A., Robert J. Fisher, Bernard J. Jaworski, and Gordon J. Paddison (2003), *Internet Marketing - Building Advantage in a Networked Economy*, McGraw Hill.
- Hanson, W. and Kirthi Kalyanam (2007), *Internet Marketing and e-Commerce*, Thomson South-Western.
- Urban, Glen L. (2004), *Digital Marketing Strategy, Text and Cases*, Prentice Hall.

Home Readings

- Rayport, Jeffrey F. and John J. Sviokla (1995), "Exploiting the Virtual Value chain," *Harvard Business Review*, Nov-Dec, pp. 75-85.
- Magretta, Joan (2002), "Why Business Models Matter," *Harvard Business Review*, May, 86-92.
- Kalyanam, K. and McIntyre, S. (2002), "The E-Marketing Mix: A Contribution of the E-Tailing Wars," *Journal of the Academy of Marketing Science*, Vol. 30, No. 4, 487-499.
- Zeithaml, Valarie A., A. Parasuraman, and Arvind Malhotra (2002), "Service Quality Delivery Through Web Sites: A Critical Review of Extant Knowledge," *Journal of the Academy of Marketing science*, Vol. 30, No. 4, 362-375.
- Loveman, Gary (2003), "Diamonds in the Data Mine," *Harvard Business Review*, May, 109-113.
- Rigby, Darrell K. and Dianne Ledingham (2004), "CRM Done Right," *Harvard Business Review*, November, 118-129.
- Kumar, V., J. Andrew Petersen, and Robert P. Leone (2007), "How Valuable is Word of Mouth?" *Harvard Business Review*, Oct., 139-146.
- Reinartz, W. and Kumar, V. (2002), "The Mismanagement of Customer Loyalty," *Harvard Business Review*, July, p.86-94
- Shapiro, Carl and Hal. R. Varian (1998), "Versioning: The Smart Way to Sell Information," *Harvard Business Review*, November-December, 106-114.
- (Kenny, David and John F. Marshall (2000), "Contextual Marketing, the Real Business of the Internet" *Harvard Business Review*, November-December, 119-125.

Subject Code	:	AF5506
Subject Title	:	Legal Aspects of E-commerce
Level	:	5
Credits	:	2
Mode of Study	:	Seminars
Pre-requisites	:	None
Co-requisites	:	None
Exclusion	:	None
Assessment	:	Coursework 50 % Final Examination 50 %
Minimum Pass Grade	:	Coursework D Final Examination D

Role and Purpose

This subject contributes to the achievement of the Postgraduate Programme Outcomes by enabling students to think critically and creatively in the application of principles of contract law to online transactions. The students learn to effectively communicate business arguments and are able to identify and resolve ethical issues arising over the internet.

Learning Outcomes:

After completing this subject, students should be able to:

1. evaluate and compare the legal framework governing commercial transactions over the internet;
2. apply legal knowledge to practical international issues;
3. evaluate the jurisdictional issues involved and resolve them through law; and
4. evaluate ethical issues and resolve disputes over the internet.

Indicative Teaching/ Learning Approach

Teaching would include introduction to the topic and discussion on various concepts and key issues relating to e-commerce, with emphasis on interaction and student discussions. Various exercise questions would be raised in the seminar to encourage students to think critically and resolve the issue. Students would then be asked to make a presentation on a contemporary issue.

Indicative Assessment Tasks

An essay type of group coursework, relating to any challenging (global) issue over the net, would assess their ability to think creatively and critically while applying the concepts of law and improve their inter-personal skills. The student presentations would encourage them to effectively communicate their ideas - clearly and forcefully. The final exam will examine their ability to evaluate and apply the principles of law.

Indicative Content/ Outline Syllabus

Contractual Obligation and E-commerce

Formation of conventional and electronic contracts. Legal effect of signature, electronic records and relevance of the ETO.

Domain names and Trademarks in e-transactions

Creation of a domain name and the issues relating to trademarks. The rights and obligations of a registered domain name holder or a trademark holder.

Law of E-commerce in different jurisdictions and conflict of laws

UNCITRAL Model Law, the USA, EU and China. The cross-border legal difficulties and jurisdictional issues.

Crimes over the net

Criminal law and abuse of the internet. The global effort to combat crimes over the net.

Data Privacy and negligence

The legal framework protecting data privacy in Hong Kong. Tort of negligence, including defamation.

Business, ethics and the internet

Introduction to ethics and the ethical issues involved in business over the net, including culture and morality.

Indicative Reading

Wright, Claire et al, *Internet law in Hong Kong*, Thomson, 2003

Pendelton, Michael, *E-commerce & the Law for Hong Kong*, THC Press Ltd., 2000.

Various Ordinances and scholarly articles, relating to the topics to be taught.