REGULATIONS FOR THE DEGREES OF MASTER OF SCIENCE IN ENGINEERING (MSc[Eng]) MASTER OF SCIENCE IN COMPUTER SCIENCE (MSc[CompSc]), AND MASTER OF SCIENCE IN ELECTRONIC COMMERCE AND INTERNET COMPUTING (MSc[ECom&IComp])

(Applicable to students admitted in the academic year 2024-25 and thereafter)

(See also General Regulations and Regulations for Taught Postgraduate Curricula)

The degrees of MSc(Eng), MSc(CompSc) and MSc(ECom&IComp) are each a postgraduate degree awarded for the satisfactory completion of a prescribed curriculum in the Faculty of Engineering.

For the MSc(Eng) degree, the major part of the curriculum must include courses offered in one of the following fields: building services engineering, civil engineering, electrical and electronic engineering, energy engineering, industrial engineering and logistics management, innovative design and technology, mechanical engineering, and microelectronic science and technology.

The MSc(Eng), MSc(CompSc) and MSc(ECom&IComp) curricula are offered in part-time and full-time modes.

MSc 1 Admission requirements

To be eligible for admission to the curriculum leading to the degree of MSc(Eng) / MSc(CompSc) / MSc(ECom&IComp), a candidate shall:

(a) comply with the General Regulations;

(b) comply with the Regulations for Taught Postgraduate Curricula;

(c) hold
- (i) a Bachelor's degree of this University in a relevant field; or
- (ii) a relevant qualification of equivalent standard from this University or from another university or comparable institution accepted for this purpose; and
- (iii) in respect of the courses of study leading to the degree of Master of Science in Engineering in the fields of Innovative Design and Technology and Microelectronic Science and Technology, a Bachelor’s degree in Engineering or related Science discipline;
- (iv) in respect of the courses of study leading to the degree of Master of Science in civil engineering, a Bachelor’s degree in related disciplines, such as Environmental Engineering, Chemical Engineering, Mechanical Engineering, Environment-related Sciences, Computer Science, Mathematics or Statistics; and

(d) satisfy the examiners in a qualifying examination if required.

MSc 2 Qualifying Examination

(a) A qualifying examination may be set to test the candidate's academic ability or his/her ability to follow the curriculum prescribed. It shall consist of one or more written papers or their equivalent and may include a dissertation.

(b) A candidate who is required to satisfy the examiners in a qualifying examination shall not be permitted to register until he/she has satisfied the examiners in the examination.

MSc 3 Period of Study

The curriculum of the degree of MSc(Eng) / MSc(CompSc) / MSc(ECom&IComp) shall normally extend over one academic year of full-time study or two academic years of part-time study. Candidates shall not be permitted to extend their studies beyond the maximum period of registration of two academic years of full-time study or three academic years of part-time study, unless otherwise permitted or required by the Board of Faculty. For both full-time and part-time modes, the period of study shall include any assessment to be held during and/or at the end of each semester.

MSc 4 Curriculum Requirements

To complete the curriculum, a candidate shall, within the prescribed maximum period of registration stipulated in Regulation MSc3 above:

(a) satisfy the requirements prescribed in TPG6 of the Regulations for Taught Postgraduate Curricula;

(b) take not fewer than 72 credits of courses, in the manner specified in these regulations and syllabuses and pass all courses as specified in the syllabuses;

(c) follow courses of instruction and complete satisfactorily all prescribed practical / laboratory work; and

(d) satisfy the examiners in all forms of assessment as may be required in either

  (i) 72 credits of courses which must include a dissertation of 24 credits or a project of 12 credits as capstone experience; or

  (ii) at least 60 credits of courses successfully completed at this University (which must include a dissertation of 24 credits or a project of 12 credits) and not more than 12 credits of courses successfully completed at this or another university before admission to the MSc(Eng) / MSc(CompSc) / MSc(ECom&IComp) and approved by the Board of the Faculty.

MSc 5 Dissertation or project report

(a) A candidate who is permitted to select a dissertation or a project is required to submit the dissertation or the project report by a date specified by the Board of Examiners.

(b) All candidates shall submit a statement that the dissertation or the project report represents his/her own work undertaken after the registration as a candidate for the degree.

MSc 6 Selection of Courses

(a) A candidate shall select courses according to the guidelines stipulated in the syllabuses for the degree of MSc(Eng) / MSc(CompSc) / MSc(ECom&IComp).

(b) Selection of study patterns, as stipulated in the respective syllabus, shall be subject to the approval of the Head of the Department concerned.

(c) Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each academic year.

(d) Changes to the selection of courses may be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate.

(e) Subject to the approval of the Committee on Taught Postgraduate Curricula on the recommendation of the Head of the Department concerned, a candidate may in exceptional circumstances be permitted to select additional course(s).

(f) Requests for changes after the designated add/drop period of the semester shall be subject to the approval of the Committee on Taught Postgraduate Curricula. Withdrawal from courses beyond the designated add/drop period will be subject to the approval of the Committee on Taught Postgraduate Curricula.

MSc 7 Assessment

(a) The written examination for each course shall be held after the completion of the prescribed course of study for that course, and not later than January, May or August immediately following the completion of the course of study for that course unless otherwise specified in the syllabuses.

(b) A candidate, who is unable to complete the requirements within the prescribed maximum period of registration specified in Regulation MSc 3 because of illness or circumstances beyond his/her control, may apply for permission to extend his/her period of studies.

(c) A candidate who has failed to satisfy the examiners in any course(s) is required to make up for failed course(s) in the following manners:

  (i) undergoing re-assessment/re-examination in the failed course(s); or

  (ii) repeating the failed course(s) by undergoing instruction and satisfying the assessments; or

  (iii) taking another course in lieu and satisfying the assessment requirements.

(d) A candidate who has failed to satisfy the examiners in his/her dissertation or project report may be required to submit or resubmit a dissertation or a project report on the same subject within a period specified by the Board of Examiners.

(e) In accordance with G9(h) of the General Regulation and TPG8(d) of the Regulations for Taught Postgraduate Curricula, there shall be no appeal against the results of examinations and all other forms of assessment.

MSc 8 Grading system

Individual courses shall be graded according to the following grading system as determined by the Board of Examiners:

Standard	Grade	Grade Point
Excellent	A+	4.3
	A	4.0
	A-	3.7
Good	B+	3.3
	B	3.0
	B-	2.7
Satisfactory	C+	2.3
	C	2.0
	C-	1.7
Pass	D+	1.3
	D	1.0
Fail	F	0

MSc 9 Discontinuation of Studies

Unless otherwise permitted by the Board of the Faculty, a candidate will be recommended for discontinuation of their studies in accordance with General Regulation G12 if he/she has:

(a) failed to pass 12 credits in an academic year; or

(b) failed to satisfy the examiners at a second attempt in his/her dissertation or project report within the specified period; or

(c) failed to achieve a cumulative grade point average* (CGPA) of 1.0 or higher for two consecutive semesters with course enrolment; or

(d) exceeded the maximum period of registration specified in Regulation MSc3.

* *At the end of each semester, a cumulative grade point average (CGPA) for all courses, except cross-listed undergraduate courses and outside curriculum requirement optional courses as specified in the syllabuses, taken by a student (including failed courses) at the time of calculation is computed.*

MSc 10 Advanced Standing

Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum in accordance with TPG3 of the Regulations for Taught Postgraduate Curricula. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for Advanced Standing shall be determined by the Board of the Faculty, in accordance with the following principles:

(a) a candidate may be granted a total of not more than 20% of the total credits normally required under a curriculum for Advanced Standing unless otherwise approved by the Senate; and

(b) credits granted for advanced standing shall not be included in the calculation of the GPA but will be recorded on the transcript of the candidate.

MSc 11 Award of Degree

To be eligible for the award of the degree of MSc(Eng) / MSc(CompSc) / MSc(ECom&IComp), a candidate shall:

(a) comply with the General Regulations and the Regulations for Taught Postgraduate Curricula;

(b) complete the curriculum and satisfy the examiners in accordance with the regulations set out; and

(c) achieve a cumulative grade point average (CGPA) of 1.0 or higher.

MSc 12 Assessment results

On successful completion of the curriculum, candidates who have shown exceptional merit of achieving a cumulative grade point average (CGPA) of 3.6 or higher may be awarded a mark of distinction, and this mark shall be recorded on the candidates' degree diploma.

SYLLABUS FOR THE DEGREE OF MASTER OF SCIENCE IN ELECTRONIC COMMERCE AND INTERNET COMPUTING

(Applicable to students admitted to the curriculum in the academic year 2024-25 and thereafter)

Definition and Terminology

Discipline course – any course on a list of courses in the discipline of curriculum which a candidate must pass at least a certain number of credits as specified in the Regulations.

Fundamental course – any course in a subset of discipline courses which are considered fundamental or important in the curriculum which a candidate must pass at least 24 credits.

Elective course – any Taught Postgraduate level course offered by the Departments of the Faculty of Engineering for the fulfilment of the curriculum requirements of the degree of MSc in Electronic Commerce and Internet Computing that are not classified as discipline courses.

Capstone Experience – a 12-credit case study project or a 24-credit dissertation which is an integral part of the curriculum focusing on the integration and application of knowledge and skills that candidates have acquired throughout their studies.

Curriculum Structure

Candidates are required to complete 72 credits of courses as set out below, normally over one academic year of full-time study or two academic years of part-time study:

Course Category	**Enrolment Mode of 10 courses + Case study project**	**Enrolment Mode of 8 courses + Dissertation**
	No. of Credits	**No. of Credits**
Discipline Courses	Not less than 48 [Include at least 24 credits in Fundamental courses]	Not less than 36 [Include at least 24 credits in Fundamental courses]
Elective Courses	Not more than 12	Not more than 12
Capstone Experience	12	24
Total	72	72

Enrolment Mode

Candidates are required to successfully complete 72 credits to graduate. They can do that by studying in one of the following enrolment modes:

(a) 10 courses (each equivalent to 6 credits) + Case study project (equivalent to 12 credits)
OR
(b) 8 courses (each equivalent to 6 credits) + Dissertation (equivalent to 24 credits)

Course Selection

Candidates shall select courses in accordance with the regulations of the degree. In addition, the MSc(ECom&IComp) curriculum has the following guidelines on course selection.

i. Candidates have to complete at least 4 courses (at least 24 credits in total) from the following list of fundamental courses:

Course code	Title
ECOM6004	Legal aspects of IT and e-commerce
ECOM6008	Supply chain and e-logistics management
ECOM6013	E-commerce technologies
ECOM7127	Digital transformation: strategy and people
ICOM6012	Internet infrastructure technologies
ICOM6034	Website engineering
ICOM6045	Fundamentals of e-commerce security
ICOM7128	Knowledge graphs

ii. Candidates can select any courses in MSc(ECom&IComp) discipline, which are listed in the course descriptions section below. These can be a mixture of courses from ECOM and/or ICOM subject area(s) and some selected COMP and/or FITE courses.

iii. Candidates may also in exceptional circumstances select at most 2 taught postgraduate level courses (at most 12 credits in total) offered by the Departments in the Faculty of Engineering as electives. All course selection will be subject to approval by the Course Coordinators concerned.

MSc(ECom&IComp) Course descriptions

The following is a list of discipline courses offered by the Department of Computer Science for the MSc(ECom&IComp) curriculum.

It is the goal of the programme to have a comprehensive and dynamic curriculum in order to meet the challenges and opportunities of the fast developing Internet world. Therefore the courses, both in terms of range and syllabus, are updated and revised continuously and are subject to the approval of the University's Senate. The list of courses below is not final and some courses may not be offered every year.

All courses are assessed through examination and / or coursework assessment, the weightings of which are subject to approval by the Board of Examiners.

ECOM6004. Legal aspects of I.T. and e-commerce (6 credits)

This course provides an introduction to some of the main legal problems generated by recent developments in information technology and e-commerce, and their possible solutions. Topics to be covered are selected from, but not limited to, copyright, domain name disputes and other intellectual property issues on the Internet, contractual issues of on-line trading, public key infrastructure and electronic transactions, privacy and data protection.

Mutually exclusive with: COMP3311/CSIS0311 Legal aspects of computing and COMP7901 Legal protection of digital property

---

ECOM6008. Supply chain and e-logistics management (6 credits)

The course is designed to prepare you to apply business strategies, analytical methodologies and information technology in supply chain management. Traditionally industries have focussed on operation evaluation and performance improvement of mainly the manufacturing process; however, the deficiency of supply chain coordination results in severe downgrade of business competitiveness. With advent of information technology, computers not only improve manufacturing operation and management and also strategic decision-making as well. This course focuses on the systems approach to the planning, analysis, design, development, and evaluation of supply chain and e-logistics management.

ECOM6013. E-commerce technologies (6 credits)

This course provides an overview of technologies currently used in electronic commerce and an introduction to some technologies likely to play a major role in future. Topics include (but are not limited to) Internet & e-commerce infrastructure, e-commerce presence & development life cycle, web design & implementation, mobile technology, Internet & e-commerce security, electronic payment systems, blockchain & cryptocurrencies, AI & machine learning, smart city & IoT, e-commerce technology trends.

ECOM6014. E-marketing (6 credits)

This course considers how to create customer centric strategies for e-businesses. Marketing focuses on the interaction between the producer and the consumer. This focus remains unchanged in e-marketing, but our ability to foster this interaction with technology has been dramatically increased. The Internet provides new forms of communications like web sites, e-mail, social media, and mobile communications. However, these technologies do not necessarily replace traditional marketing

vehicles like mass media, direct mail, and telephone marketing, but instead augment them to improve the customer experience. The basic premise of this course is that these technologies can be used to fulfill the goal of a customer-centered marketing strategy.

The goal for this course is to develop a set of principles so that managers can effectively develop and implement e-marketing strategies. A core framework that we will use in this course is an interactive marketing strategy. Interactive marketing goes by many names, including customer relationship management (CRM). E-marketing allows companies to interact with consumers on an individual basis and create customized products and services using personalized knowledge about a consumer. As part of this course we develop a compatible set of quantitative techniques to implement interactive marketing strategies. Throughout the course we explore examples and cases to understand how e-marketing is evolving in practice.

ECOM6016. Electronic payment systems (6 credits)

The course covers banking systems, e-payment security, foreign exchange, Internet banking, mobile payments, credit and stored-value cards, Octopus, micropayments, peer-to-peer payments, cryptocurrencies, blockchain, large-scale B2B payments, faster (instant) payments, seamless shopping and the future of money. Particular attention is given to Hong Kong and Mainland China banking and payment systems.

ECOM6022. Topics in electronic commerce (6 credits)

This course covers advanced topics in areas in electronic commerce that are relevant at the time. Leaders in the field, expert practitioners and distinguished scholars in the field around the world will be invited to participate in this course.

ECOM6023. E-financial services (6 credits)

This course provides students with the fundamentals of financial services in the context of e-Commerce and mobile devices. Payment systems in general and various payment transaction systems in particular will be examined. Similarly, eFinance has brought new concepts into e-Brokerage, e-Insurance, e-Lending and other fields. The course covers technology, operations, customer experience as well as demonstrates how regulations and security aspects are impacted by developments like Bitcoin and Blockchain. Studies of established banks as well as new FinTech Players serve as examples and reinforcements for many of the concepts.

ECOM6029. E-business transformation (6 credits)

eCommerce has shortened business transaction cycles, expanded market reach, and allowed companies to build and manage customer relationship more effectively. Companies need to transform their business model periodically with an eye to improving their operational effectiveness, entrenching their strategic position, and ultimately sustaining their competitive advantage.

As change is inseparable from life, and thus strategic advantage by definition transient, transformation and innovation are inseparable from business survival. In order to thrive, businesses have to manage their processes effectively, revisit their value propositions periodically, and at times change their business model entirely. Innovation and transformational initiatives, however, are difficult to implement and prone to failure as companies must grapple with a whole host of strategic, organizational, psychological and increasingly global issues.

This course builds on the basic principles of cognitive science, business and economics to examine the role of change as a strategic necessity. It provides a roadmap for transforming companies into inter-networked enterprises where proprietary and shared infrastructures are used to link customers, suppliers, partners and employees to create superior economic value. You will learn how the Internet can provide firms with the necessary infrastructure needed to align their business strategy with IT strategy, streamline front-end and back-end processes, manage relationships and partnerships, and adapt to emerging global issues such as outsourcing and offshoring. In the process you will learn about the nature of change and business complexity and gain a better appreciation of the nature of organizational failure.

The course pays special attention to the adverse effects of cognitive biases in the transformation process by looking into the inner workings of the brain to understand, among other things, why we prefer the status quo and generally resist change, why we regularly act rationally irrational, why we cannot usually break away from our entrenched mental models to think creatively.

ECOM7121. Dynamic digital capabilities (6 credits)

This course covers the fundamental business and economic principles of dynamic digital capabilities as well as mobile platform innovation. Business in today's global and exponential world must adjust to the dramatic changes caused by emerging technologies such as AI, Blockchain, Cloud and Data as well as smart cities, ecosystems, on-demand platforms and crowdsourcing 2.0. We provide a systematic framework, cases and hands-on experience in analyzing industries, cities and regions being transformed by digitalization, disruption, demonetization and dematerialization. Managers, developers, engineers and graduate students are guided in the development of ABCD business models and dynamic digital capability-building. Cases include multinational corporations, entrepreneurial startups, emerging unicorns and nonprofits worldwide.

ECOM7122. Entrepreneurship development and ventures in Asia (6 credits)

This course provides an intense and mentored hands-on experiential learning opportunity where highly motivated entrepreneurial teams of students become co-founders of a high tech startup, competing in a competitive online Venture Startup Simulation Game. We cover and apply strategic thinking, industry analysis, competitive advantage, value chain analysis, Blue Ocean value innovation strategies and Digital plus AI-Data business models. This is a quick, fun, fast-learning and low-risk way to experience the nuts and bolts, the ups and downs and competitive dynamics of the launch and first year of a $3.5M VC funded venture startup. The second half of the course focuses on Applied AI ventures in Asia and how to develop a successful AI-data strategy and Demo Day "pitch".

ECOM7123. Building smart cities: an information system approach (6 credits)

Hong Kong, like a number of cities in China and overseas, is following global trend to develop and transform herself into a smart city. The concept of a smart city is based on the application of ICT in various domains of the city to connect and integrate the systems and services of the city for better synergy and efficient use of resources. The vast amount of real-time data generated by smart sensors can be integrated with the modern information and communication technologies, useful information and insights can then be derived by analytic techniques to optimize and automate city management. Productivity can be boosted and sustainability can be ensured based on the effective collection, delivery and manipulation of the information in smart cities by innovative applications. The ultimate goal of smart city development is to improve people's quality of life and support the development of innovation and business enterprises.

This course presents an overview and the core concepts and techniques of building smart cities by utilizing the technologies like Geographic Information Systems (GIS), Location Intelligence, Open

Data, Common Spatial Data Infrastructure (CSDI), Big Data analytics, Internet of Things (IoT) , Artificial Intelligence (AI) etc., that are indispensable to the development and effective management of the key components of smart cities. Key components of smart cities in the Smart City Wheel and various development stages will be discussed in details and current and potential technologies facilitating smart city development will be introduced. Students will not only learn the concepts but also real applications being developed or used in smart cities. A series of guest lectures will be arranged for our students to understand more about the actual implementations of smart city projects in various industries in Hong Kong.

ECOM7124. Mobile and IoT computing services and applications (6 credits)

With nearly 5 billion mobile phone users worldwide, including well over 2 billion smartphone users, new mobile and IoT technologies are driving the development of a slew of new products and services. This course introduces students to the technologies, applications, services and business models associated with the mobile Internet and the Internet of Things ("IoT"). This includes looking at underlying technologies as well as important usability, security, privacy and business considerations, and learning to appreciate and analyze the challenges and tradeoffs they entail. The course also provides an overview of future trends and ongoing research in this new and fast growing area.

ECOM7126. Machine learning for business and e-commerce (6 credits)

This course provides the necessary fundamental concepts, theory and tools in Machine Learning (ML) to enable students to understand how Artificial Intelligence (AI) and ML can be applied in typical business applications in general, and for E-Commerce in particular. As AI is a broad field of study, the course will focus on ML including an introduction to the fundamentals of ML, supervised and unsupervised learning, ML workflow, dataset preparation, handling and analysis, selection and training of ML models: regression, classification and clustering models; Support Victor Machines (SVM), decision trees, ensemble learning and random forests; introduction to Artificial Neural Networks (ANN), Large Language Model (LLM) and other neural network models. The course will use ML projects and applications to demonstrate how ML can be used to solve real business problems.

ECOM7127. Digital transformation: strategy and people (6 credits)

Change is constant and inseparable from life.

Survival in today's volatile, uncertain, complex, chaotic and accelerating (VUCCA) world calls for continual adaptations to change. In response, companies increasingly rely on digital transformation to redesign their business processes, revisit their value propositions and recalibrate their business models. But transformation initiatives are difficult to implement and prone to failure as they entail a host of technological, organizational and human issues.

Digital transformation success revolves around the degree to which a company can tightly align its strategy, systems, processes and people with its business model. More importantly, success hinges on how a company's workforce adapts to change, thinks outside the box to see fleeting opportunities, and leverages emerging technologies to design, innovate and market high-margin products and services.

Building on two interlaced strands of inquiry this course relies on the principles of cognitive science, organizational behavior and strategy to examine the role of change as a strategic imperative. It explores the nature of change, complexity, chaos and failure to highlight the importance of adaptation and transformation.

First, we examine the central role of human cognition in digital transformation. We show that in spite of the importance of technology, the success of digital transformation is largely dependent on human

factors. By studying the inner workings of the brain, we demonstrate that resistance to change and inability to adapt are manifestation of cognitive biases that adversely engulf our thinking and behavior. We highlight the pernicious effects of digital devices on our ability to focus without being distracted. We also underline the role of mindfulness in transforming mind, unleashing cognitive potentials, fostering creativity and thus enhancing quality of our lives.

In tandem with the first objective we show that competitive advantage is by definition temporary because people and companies are subject to continual disruption. We provide a roadmap for transforming companies into agile enterprises where customers, suppliers, partners and employees are linked together to create superior economic value. In the process we explore how best to avoid the pitfalls of digital transformation.

ECOM7000. Dissertation (24 credits)

The dissertation project is to provide an opportunity for the student to dive in depth into either a business case and/or a technology development in the e-commerce and Internet computing, and apply their body of knowledge learned in the programme to implement the business plan and/or the relevant technology to demonstrate its feasibility in a real or simulated business environment. This would involve substantive research into the chosen business plan and/or technology, implement and evaluate the proposed business plan or technology. Finally consolidate the findings and conclusion in the dissertation, and demonstrate the project result.

ECOM7001. Case study project (12 credits)

The case study project is to provide an opportunity for the student to dive in depth into either a business case or a technology development in the e-commerce and Internet computing, and apply their body of knowledge learned in the programme to understand and critically analysis the particular case. This would involve substantive research into the “Subject”, collect appropriate data by suitable means, research into reports and publicly available information, and consolidate their findings and conclusion in a case study report.

ICOM6012. Internet infrastructure technologies (6 credits)

This course takes a systematic approach to study the various components which form the infrastructure of the Internet. It provides a comprehensive coverage of existing and emerging Internet technologies and applications. Topics include: access and backbone network technologies; IP addressing and routing architectures; standard transport and application protocols; operating principles and internals of network entities. We will focus not only on how the Internet works but also its design rationale and engineering tradeoffs.

ICOM6027. E-crimes: digital crime scenes and legal sanctions (6 credits)

This course helps participants to grapple with crimes in the electronic age from both technical and legal points of view. It addresses three important aspects of the subject, namely, technologies adopted in e-crimes, legal sanctions and management of e-crimes scenes. Topics covered include: trends in e-crimes; different types of e-crimes, tools and technologies for committing e-crimes; laws relating to e-crimes and criminal sanctions; digital forensics, post-incident and live-forensic crime scene management, chain of evidence, collecting and collating digital evidence.

Mutually exclusive with: COMP3311/CSIS0311 Legal aspects of computing

---

ICOM6029. Topics in Internet computing (6 credits)

This course covers advanced topics in areas in Internet computing that are relevant at the time. Leaders in the field, expert practitioners and distinguished scholars in the field around the world will be invited to participate in this course.

ICOM6034. Website engineering (6 credits)

This course will introduce the standards, the software technologies and some good practices for implementing websites and web applications. It aims at covering an "end-to-end" picture of content delivery and presentation on the web, that is, from the "server-sides" where data is stored, adapted or integrated, to the "client-sides" with various demands and capabilities. It will suit students who wish to have a technical understanding on the subject or a career in website engineering, as it will introduce the techniques for building maintainable, extensible, interactive and mission-critical websites and web applications, using state-of-the-art standards and open-source tools.

The topics covered will be organized into four parts: (1) Website development basics (enabling standards and technologies, responsive web design, basic web security); (2) Design and implementation of web applications (rich Internet applications, client-side frameworks, MVC design patterns and libraries, content management systems); (3) Interoperability of web applications and services (web API protocols, mashups, cloud services for web development); and (4) Optimizations (traffic analysis, search engine and performance optimization techniques).

ICOM6044. Data science for business (6 credits)

The emerging discipline of data science combines statistical methods with computer science to solve problems in applied areas. In this case we focus on how data science can be used to solve business problems especially those enabled by electronic commerce. By its very nature e-commerce is able to generate large amounts of data and data mining methods are quite helpful for managers in turning this data into knowledge which in turn can be used to make better decisions. These data sets and their accompanying quantitative methods have the potential to dramatically change decision making in many areas of business. For example, ideas like interactive marketing, customer relationship management, and database marketing are pushing companies to utilize the information they collect about their customers in order to make better marketing decisions.

This course focuses on how data science methods can be applied to solve managerial problems in business. Our emphasis is developing a core set of principles that embody data science: empirical reasoning, exploratory and visual analysis, and predictive modeling. We use these core principles to understand many methods used in data mining and machine learning. Our strategy in this course is to survey several popular techniques and understand how they map into these core principles. These techniques are illustrated with case studies that involve decisions about targeting, product recommendation, customer retention and financial lending. The class takes a learning-by-doing approach to analyze data and make decisions from these analyses. However, the emphasis is not on the software for implementing these techniques but on understanding the inputs and outputs of these techniques and how they are used to solve business problems, and effectively communicate them to managers.

ICOM6045. Fundamentals of e-commerce security (6 credits)

This course provides an in-depth understanding of basic security problems and relevant e-commerce solutions, while helping students implement today’s most advanced security technologies, such as designing secure Web, e-commerce, and mobile commerce applications, securing corporate internal network, and providing secure employee/user authentication.

Key topics include: Security mechanisms, key management and certificates, payment security services, communication network and network access layer security, Internet layer security and transport layer security, application layer security, hypertext transfer protocol, web server security, web client security, mobile code security, mobile agent security, mobile commerce security.

Mutually exclusive with: COMP7906 Introduction to cyber security

---

ICOM7125. Digital forensics (6 credits)

This course serves as an introduction to students about current concepts and methodologies in conducting digital forensics investigation. It gives an overview of post-mortem digital forensics analysis, network forensics analysis, mobile forensics analysis as well as live forensics analysis and provides students with hands-on experience of identifying, acquiring, preserving, analysing and presenting digital evidence.

ICOM7128. Knowledge graphs (6 credits)

Knowledge graphs - a powerful method for organising and managing complex information - offers a wide range of advanced benefits and capabilities for organisations to manage their data platforms.

Knowledge graphs empower businesses to unlock the full potential of their data including improved data integration, enhanced analytics, contextual understanding, efficient data governance, agile knowledge management, collaboration, artificial intelligence, and visualisation. By leveraging the power and technological advantages of knowledge graphs, enterprises can drive innovation, gain a competitive edge, and revolutionise the way businesses operate in the digital age.

This course provides comprehensive coverage and understanding of the principles, techniques, and tools used to build and leverage knowledge graph platforms. The course covers topics including knowledge graph modelling, representation and reasoning, vocabulary management, querying, large language models, and visualisation. Emphasis is placed on practical real-world applications and hands-on exercises to reinforce theoretical concepts.

COMP7311. Legal issues in artificial intelligence and data science (6 credits)

This course introduces students to the growing legal, ethical and policy issues associated with artificial intelligence, data science and the related issues security and assurance. In particular, the relationship of AI and data science to personal autonomy, information assurance and privacy are analyzed and legislative responses studied. Class participation, research, writing, and oral/electronic presentations are integral components of the course.

The course contributes to the following goals: written communication and life-long learning. It includes coverage of the following goals: problem analysis, problem solving and teamwork.

COMP7404. Computational intelligence and machine learning (6 credits)

This course will teach a broad set of principles and tools that will provide the mathematical, algorithmic and philosophical framework for tackling problems using Artificial Intelligence (AI) and Machine Learning (ML). AI and ML are highly interdisciplinary fields with impact in different applications, such as, biology, robotics, language, economics, and computer science. AI is the science and engineering of making intelligent machines, especially intelligent computer programs, while ML refers to the changes in systems that perform tasks associated with AI. Ethical issues in advanced AI and how to prevent learning algorithms from acquiring morally undesirable biases will be covered.

Topics may include a subset of the following: problem solving by search, heuristic (informed) search, constraint satisfaction, games, knowledge-based agents, supervised learning (e.g., regression and support vector machine), unsupervised learning (e.g., clustering), dimension reduction learning theory, reinforcement learning, transfer learning, and adaptive control and ethical challenges of AI and ML.

Pre-requisites: Nil, but knowledge of data structures and algorithms, probability, linear algebra, and programming would be an advantage.

COMP7412. Banking in Web 3.0 – Metaverse, DeFi, NFTs and beyond (6 credits)

The course introduces students to new concepts of Banking with Web3.0 Technologies. Firstly, it will review the evolution from traditional banking towards decentralized finance and token economies. It will then assess the opportunities for new customer experiences with virtual reality and in the Metaverse as well as examine the opportunities and risks of NFTs (non-fungible tokens). The course will thoroughly examine the different types of Digital Assets, Digital Currencies and special forms like Central Bank Digital Currencies (e-CNY, e-HKD). A critical factor in the evolution towards Web3-Finance are the required regulations, a proper risk management and compliance of products and processes. The course will elaborate on these with the help of case studies and contemporary scenarios at the time of the lecture.

COMP7802. Introduction to financial computing (6 credits)

This course introduces the students to different aspects of financial computing in the investment banking area. The topics include yield curve construction in practice, financial modelling and modern risk management practice, etc. Financial engineering is an area of growing demand. The course is a combination of financial product knowledge, financial mathematics and computational techniques. This course will be suitable for students who want to pursue a career in this fast growing area.

Prerequisites: This course does not require any prior knowledge in the area of finance. Basic calculus and numeric computational techniques are useful. Knowledge in Excel spreadsheet operations is required to complete the assignments and final project.

COMP7901. Legal protection of digital property (6 credits)

This course introduces computer professionals to the various legal means of protecting digital property including computer software, algorithms, and any work or innovation in digital form. Focus is on the main issues in protecting digital property arising from developments in information technology, and their legal solutions. Topics covered include, but are not limited to, the following: 1) copyright protection of software and websites, 2) patent protection of software and algorithms, 3) protection of personal data.

Mutually exclusive with: COMP3311/CSIS0311 Legal aspects of computing and ECOM6004 Legal aspects of IT and e-commerce

---

FITE7407. Securities transaction banking (6 credits)

The course introduces the business and technology scenarios in the field of Transaction Banking for financial markets. It balances the economic and financial considerations for products and markets with the organizational and technological requirements to successfully implement a banking function in this scenario. It is a crossover between studies of economics, finance and information technology, and features the concepts from basics of the underlying financial products to the latest technology of tokenization of assets on a Blockchain.

FITE7409. Blockchain and cryptocurrency (6 credits)

This course is for students who are not computer science majors. In this course, students will learn the rationales behind the design of blockchain and cryptocurrency, the key technical / cryptographic elements that build up the blockchain technology, classifications of different types of blockchains, the comparisons of different blockchain platforms, what applications fit the best for the blockchain technology, and example applications in a wide range of disciplines. This course will also introduce some popular cryptocurrencies, e.g. Bitcoin, discuss in details about bitcoin transactions, briefly introduce what a cryptocurrency exchange is, and the evil sides of cryptocurrencies (e.g. being the ransoms of ransomware and money laundry).

FITE7410. Financial fraud analytics (6 credits)

This course aims at introducing various analytics techniques to fight against financial fraud. These analytics techniques include, descriptive analytics, predictive analytics, and social network learning. Various data set will also be introduced, including labeled or unlabeled data sets, and social network data set. Students learn the fraud patterns through applying the analytics techniques in financial frauds, such as, insurance fraud, credit card fraud, etc.

Key topics include: Handling of raw data sets for fraud detection; Applications of descriptive analytics, predictive analytics and social network analytics to construct fraud detection models; Financial Fraud Analytics challenges and issues when applied in business context.

Required to have basic knowledge about statistics concepts.

FITE7411. RegTech in finance (6 credits)

The course studies the use of regulatory technology, or RegTech, in the context of regulatory monitoring, reporting and compliance. It demonstrates that the true potential of RegTech lies in its ability to effect a profound transition from a Know Your Customer (KYC) to a Know Your Data (KYD) approach, which relies on efficient processes for the collection, formatting and analysis of reported data. The course covers the RegTech landscape and global challenges, the use of innovative technologies and disruption, RegTech investment, application for authorized institutions and industry adoption, illustrated with initiatives and examples in the Hong Kong context. It also discusses social impact and regulation, and the future development of RegTech.

FITE7413. Smart banking and innovative finance (6 credits)

This course provides an in-depth exploration of blockchain technology and distributed ledger technology (DLT) and their applications in the context of Smart Banking and Innovative Finance. Students will gain a comprehensive understanding of the underlying principles, functionalities, and potential benefits and challenges of the emerging Financial Technology (FinTech) 3.0.

The course will cover the emerging trend in Smart Banking and Innovative Finance with various disruptive business-IT (DLT and BlockChain) models in the evolving FinTech ecosystem such as decentralized finance (DeFi), central bank digital currencies (CBDC) and Hong Kong SAR Government's w-CBDC and rCBDC projects, eHKD/eCNY use cases, Open Banking and API (Application Programming Interface) ecosystem, Virtual Banks and Stored Valued Facility (SVF), Banking as a Service (BaaS), Banking as a Platform (BaaP), Faster Payment System (FPS) and cross-border payment/forex applications, smart contracts, tokenization and tokenomics, WealthTech, InsurTech, Self-Sovereign Identity (SSI), Zero Knowledge Proof (ZKP), and the related regulatory considerations.

Through lectures, case studies, in-class discussions, group presentations and reflective exercises, students will develop practical skills in designing, implementing, and managing blockchain and DLT solutions for Smart Banking and Innovative Finance.
