

SYLLABUS FOR THE DEGREE OF MASTER OF SCIENCE IN ELECTRONIC COMMERCE AND INTERNET COMPUTING (MSc[ECom&IComp])

[Applicable to students admitted to the curriculum in the academic year 2017-18 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)

Subject Area

The curriculum tries to provide an integration of technology with businesses, and consists of courses falling into two major and related subject areas: electronic commerce (ECOM) courses and Internet computing (ICOM) courses. Students are encouraged to take courses in both areas, provided they have the necessary pre-requisite knowledge for the particular course. Extensive counselling will be provided to assist students to choose their courses.

Course Selection

Candidates shall select courses in accordance with the regulations of the degree. In addition, the MSc(ES&IC) 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
ECOM6029	E-business transformation
ICOM6012	Internet infrastructure technologies
ICOM6034	Website engineering
ICOM6045	Fundamentals of e-commerce security
ICOM6046	Semantic data architecture

- ii. Candidates can select any courses in MSc(ES&IC) discipline, which are listed in the course descriptions section below. They can be any mixture of courses from ECOM and/or ICOM subject area(s).
 - iii. Candidates may also in exceptional circumstances select at most 2 courses (at most 12 credits in total) offered by other taught postgraduate curricula in the Faculty of Engineering as electives. All course selection will be subject to approval by the Course Coordinators concerned.
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MSc(ES&IComp) Course descriptions

The following is a list of discipline courses offered by the Department of Computer Science for the MSc(ES&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 include 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.

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 those technologies currently used in electronic commerce and an introduction to some likely to play a major role in the future. Topics include (but are not limited to) networking systems, social networking and media, computer and network security, payment systems, data mining and "big data", the Internet of Things, mobile systems and digital media technologies.

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, wireless payments, stored-value cards, micropayments, peer-to-peer payments, electronic and virtual currencies such as Bitcoin, large-scale B2B payments and the future of money. Particular attention is given to Hong Kong and Mainland China banking and payment systems.

ECOM6020. Customer relationship management: business strategies and techniques (6 credits)

The objectives of this course are to understand CRM concepts; CRM business strategies; typical business applications for CRM; and the process to implement CRM projects.

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)

The Internet has shortened business transaction cycles, expanded market reach, and allowed companies to build and manage customer relationship more effectively. Today almost every company is trying to find out how best to deploy the Internet throughout its value chain to improve operational effectiveness, entrench strategic position, and ultimately create sustainable competitive advantage. Transformational initiatives, however, are difficult to implement and prone to failure as companies must grapple with a whole host of strategic, organizational, technical and increasingly global issues.

This course builds on the basic principles of business and economics to examine the role of the Internet 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.

ECOM6033. Geospatial information and technology for location-based services (6 credits)

Location-based services (LBS) are the collection of data and technology that drive popular applications such as in-car navigation, mapping of nearby points of interest on cell phones, automatic notification of weather hazards as they impact travel along a highway route, location-based advertising, geosocial networking, and tracking of inventory in warehouses. These applications leverage the user's or object's physical location to locate and access additional relevant information. LBS is enabled by the nexus of the Internet, wireless and geospatial technology realms. While geospatial technology is perhaps the least understood of these, geospatial content and services comprise the majority of the value component in LBS. To help students explore the full value of LBS, this course examines how to identify, obtain and manage the location-based information that users need and the geospatial technology and content behind LBS called Geographic Information Systems (GIS).

ECOM6037. Developing business models for digital media (6 credits)

The course introduces digital media cases and platforms that are used as a foundation for student work to design business models for media concepts. The course specifically explores business models focused on social media and content apps for handheld devices. This means not only smart phones, but also notebooks and tablets such as the i-Pad as well as devices and controllers used for electronic games. Special attention will be paid to developments in Hong Kong and Mainland China.

Agile methods like effectuation and the business model development canvas are applied to identify, develop, and argue the case for launching an innovative digital media product. The aim of the course is therefore to ensure that students have the necessary competencies to select and further develop an appropriate business model for a digital media innovation of their choice should they want to join the media industry.

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. It provides a systematic framework, cases and hands-on experience. It is designed to guide managers, developers, engineers and graduate students in the development of transformative digital and smartphone business models and capability-building. Cases include multinational corporations, entrepreneurial startups, emerging unicorns, nonprofit and government worldwide.

Mutually exclusive with: ECOM6030 Web 2.0 strategy and innovation

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

This course provides an intense and mentored hands-on experiential learning opportunity where highly motivated entrepreneurial teams of students can be guided in Lean Startup techniques and learn interactively while helping analyze, expand and pivot already-award-winning early stage ventures.

We will focus on FinTech Ventures and Ecosystems in Asia, a high priority area for the Hong Kong government and China, where the online transaction volume of online giants like AliPay and WeChat already eclipses traditional banks and financial institutions.

Mutually exclusive with: ECOM6036 Entrepreneurship development

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

Hong Kong, like a number of cities in China and overseas, is considering the transformational development into a smart city. The concept of a smart city is based on the application of ICT in various aspects of the city to connect and integrate the systems and services of the city for better synergy and efficient use of resources. 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), Big Data analytics, Internet of Things (IoT) etc., that are indispensable to the development and effective management of the key components of smart cities. 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 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.

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 computing applications and services are changing the way enterprises interact with their customers and employees. The explosion in smartphone ownership and a slew of other smart devices (e.g. activity bracelets, smart thermostats, Bluetooth beacons) along with the deployment of 4G (and soon 5G) networks is leading to a slew of new mobile and Internet of Things (IoT) applications and services. They range from mobile commerce services to wireless enterprise apps and mobile social networking apps, all the way to more futuristic IoT scenarios.

Mutually exclusive with: ECOM6024 Mobile and pervasive commerce

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.

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).

ICOM6041. An introduction to cloud computing (6 credits)

This course offers an overview of current cloud technologies, and discusses some issues in the design and implementation of cloud systems, and the impact cloud computing on business.

Topics include Cloud Service models (SaaS, PaaS, and IaaS), virtualization techniques (Xen, KVM, VMWare, Linux Container), cluster and data center networking, software-defined network (SDN) and OpenFlow, Big Data processing frameworks (Hadoop and Spark), Map/Reduce and Spark programming paradigm for large-scale data analysis. Motivating examples from major cloud computing players such as Google, Amazon, and Microsoft will be discussed.

ICOM6042. Designing apps for smart mobile phones (6 credits)

Smart phones have dominated the technology market in recent years, led by the major brands of iPhones, Android and Windows phones. These increasingly powerful phones are supported by a whole range of applications (abbreviated to “Apps”) developed and uploaded for commercial or free distribution by professional as well as aspiring programmers that a whole new worldwide market has sprung up. More and more of these apps have been specially designed and developed for corporations that they are now beginning to play an important role in e-business operations.

This course introduces the design principles of these apps, their development, testing, and marketing as well as the technology platforms and programming languages for use on small screens. Hands-on practice is provided for students to gain confidence and some expertise, so that they can be on their way to exploit this new emerging career opportunity.

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 in 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 marketing and electronic commerce. 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. 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.

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.

ICOM6046. Semantic data architecture (6 credits)

This course covers the technical and strategic approaches for semantic data architectures that enable knowledge systems to gain a greater understanding and insights for enterprise data services. The course will develop critical skills to understand and apply semantic data architecture methodologies, conceptual and logical frameworks, and best practices covering structured data, semantic modelling, metadata, linked open data, and ontologies. The course will also develop skills in analysing semantic data standards for shared interoperability and to support data architecture technology strategies and governance principles.

Mutually exclusive with: ICOM6043 Information architecture

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.

Mutually exclusive with: ECOM6032 E-discovery and digital forensics

ICOM7000. 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.

ICOM7001. Case study project (12 credits)

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