**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.

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**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.

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**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.

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**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.

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**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.

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**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.

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**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.

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**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.

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**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 |

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**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.*

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**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.

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**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.

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**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.

Subject to the University's approval

**MSC(ENG) IN INNOVATIVE DESIGN AND TECHNOLOGY**
(Applicable to students admitted to the curriculum in the academic year 2023-24 and thereafter)

Definition and Terminology

Discipline core 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.

Discipline elective 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.

Free elective course – any course offered by the Departments of the Faculty of Engineering for the fulfilment of the curriculum requirements of the degree of MSc(Eng) in Innovative Design and Technology that are not classified as discipline courses.

Capstone Experience – a 12-credit project, 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

Students are required to complete not fewer than 72 credits nor more than 84 credits.

| **Course Category** | **No. of Credits** |
|---|---|
| Discipline Core Courses | Not less than 30 |
| Discipline Elective Courses | Not less than 18 |
| Free Elective Courses | Not more than 12 |
| Capstone Experience | 12 |
| Total: | 72 |

Candidates shall select courses in accordance with the regulations of the degree. Candidates must complete a Project and 10 courses with the following requirements.

a) Candidates must complete at least 5 courses in List-A Discipline core courses with a total of ≥ 30 credits,
b) Candidates must complete at least 3 courses in List-B Discipline elective courses and any number of course in List-C Discipline elective courses with a total of ≥ 18 credits.
c) Candidates may select no more than 2 courses 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.

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The following is a list of discipline courses. The list 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.

**List-A Discipline core courses**

**IDAT7211. Innovation and R & D principle (6 credits)**

This course will focus on the innovative design principles and basic technology, including history of technology inventions and our living world, design fundaments, design process, creativity in design, solving design problem, design brief and specifications, understanding of design practices and technological principles in a variety of board inter-related design contexts, concept of IoT (Internet of Things). The specific course objectives are: (1) encourage students to find connections between innovation, technology, design and modern world; (2) to develop creative, analytical and critical thinking abilities in product design; to be able to apply the modelling tools in communication.

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**IDAT7212. Mechatronic systems engineering (6 credits)**

This course will focus on the integration of mechanical, electrical and software engineering for the growing demand for efficient high-tech solutions in an increasing automated world. It aims at training up the creative and elegant problem solving skills of the students who pursue new product launches, including fundamental methods for model-based design of mechatronic systems, multi-domain modelling, IoT (Internet of Things), simulation, robust control methods, performance analysis and evaluation of designs, diagnosis and maintenance of mechatronic systems. Students are required to develop creative behaviour with specific mechatronic products through the development of mini-projects.

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**IDAT7213. UAV design, navigation and control (6 credits)**

This course aims to explore the key techniques of a small scale unmanned aerial vehicle (UAV), including sensor calibration, navigation systems, and advanced control techniques.
The specific course objectives are as follows:

- To have an overall understanding of UAVs: system configurations and applications.
- To study the modelling, motion planning and nonlinear control techniques for small-scale UAVs, such as nonlinear dynamic inversion and optimal control.
- To understand the common navigation techniques in modern small-scale UAVs, such as GPS / IMU navigation, visual-inertial navigation, and light detection and ranging (lidar) navigation.
- To conduct experiments on state-of-the-art navigation and control techniques for actual UAVs.

Prerequisites: Good programming skills with MATLAB, C / C++, hands-on experiences

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**IDAT7214. Advanced technologies and materials for product development (6 credits)**

This course will focus on the advanced technologies and innovative materials which are popular in product development in modern design. It aims to equip students with knowledge and understanding of the advanced technology, e.g. VR, motion capture. It also covers the key properties of different innovative material in design and applications, including biomedical material, organic memory devices, flexible and stretchable energy harvesting devices, manufacturing and synthesis of materials.

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**IDAT7215. Computer programming for product development and applications (6 credits)**

This course aims at equipping the students with practical skill in using computer programming to solve problems in product development. It focuses on the basic computer programming technique and how it can be applied in product development, e.g. software control, web applications and IoT (Internet of Things). It also covers the programming for Microsoft excel which is one of the most popular daily live

software. Programming in Excel can release its power in different areas, e.g. data mining and database integration.

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**IDAT7216. Function design, aesthetics design, manufacturing and intellectual property law (6 credits)**

This course aims at the fundamental principles of function design and aesthetics design. It presents how to achieve a balance between practical factors and psychological factors in design concerns. It also focuses on the aesthetic design as well as the knowledge in different manufacturing method which are essential to realise a design to product in the market. In addition to design and manufacturing, this course will also introduce intellectual property law to protect the right of the product inventor.

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**MECH6034. Computer aided product development (6 credits)**

This course will focus on main technologies related to computer-aided product development, including popular product development methodologies, computer-aided design, haptic shape modelling, reverse engineering, additive manufacturing and rapid tooling. The specific course objectives are: (1) To have a good understanding of popular product development methodologies, product development processes; (2) to understand major technologies that can be used to assist product development at different phases; (3) to be able to apply the computer-aided product development technologies to develop a simple product; and (4) to understand the constraints of manufacturing and cost in product development.

Topics include: product development methodologies; basic product manufacturing technologies; design for manufacturing; product costing and value engineering; solid modelling techniques; reverse engineering; additive manufacturing.

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**COMP7503. Multimedia technologies (6 credits)**

This course presents fundamental concepts and emerging technologies for multimedia computing. Students are expected to learn how to develop various kinds of media communication, presentation, and manipulation techniques. At the end of course, students should acquire proper skill set to utilise, integrate and synchronise different information and data from media sources for building specific multimedia applications. Topics include media data acquisition methods and techniques; nature of perceptually encoded information; processing and manipulation of media data; multimedia content organisation and analysis; trending technologies for future multimedia computing.

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**IMSE7128. Human factors engineering (6 credits)**

Ergonomics and systems design. Physical ergonomics, anthropometry, biomechanics. Human information processing, person-machine interface design, displays and controls. The visual environment and visual performance. Thermal environment and effects on performance, indices of comfort. Noise; noise measurement, effects of noise, control of noise. Vibration and acceleration; human tolerance.

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**COMP7506. Smart phone apps development (6 credits)**

Smart phones have become an essential part of our everyday lives. The number of smart phone users worldwide today surpasses six billion and is forecast to further grow by more than one billion in the next few years. Smart phones play an important role in mobile communication and applications.

Smart phones are powerful as they support a wide range of applications (called apps). Most of the time, smart phone users just download their favorite apps remotely from the app stores. There is a great potential for software developer to reach worldwide users.

This course aims at introducing the design and technical issues of smart phone apps. For example, smart phone screens are usually smaller than computer monitors while smart phones usually possess more hardware sensors than conventional computers. We have to pay special attention to these aspects in order to develop attractive and successful apps. Various modern smart phone apps development environments and programming techniques (such as Java for Android phones and Swift for iPhones) will also be introduced to facilitate students to develop their own apps.

Students should have basic programming knowledge.

Mutually exclusive with: COMP3330. Interactive mobile application design and programming

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**List-B Discipline elective courses (Technology)**

**MECH6010. Service behaviour of materials (6 credits)**

The aims of this course are: (1) to study the relevant physical basis for the understanding and prediction of the service behaviour, such as creep, fracture, fatigue and corrosion, of materials in industrial applications; and (2) to provide the knowledge to engineers the microstructure in such a way that the service behaviour of materials can be improved.

Topics include: creep regimes; creep mechanisms; creep resistant alloys; brittle fracture; ductile fracture; brittle-ductile transition; fracture mechanism maps; fatigue; Basquins and Coffin-Manson Laws; Goodman's relation; Palmgren-Miner rule; corrosion; electrochemical principles; forms of corrosion; corrosion control; case studies; service behaviour of engineering plastics; polymer-matrix composites.

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**MECH6046. Microsystems for energy, biomedical and consumer electronics applications (6 credits)**

Microelectromechanical systems (MEMS) and microfluidics have gradually found numerous applications in modern energy, mechanical engineering and biomedical engineering applications. This course aims to provide students with the necessary fundamental knowledge and experience in the working principles, design, materials, fabrication and packaging, and applications of MEMS and microfluidic systems. MEMS and microfluidic devices are emerging platforms for modern engineering applications in biomedicine, chemistry, material sciences and micro-machines. This is the course that will introduce graduate students and practicing engineers into the growing field of microsystem engineering. Practical examples will be given when delivering each major topic. Teaching of the course is also strengthened with case studies on carefully chosen topics. At the end of this course, students who fulfil the requirements of this course will be able to: (1) demonstrate ability to understand the fundamental principles behind MEMS and microfluidic; (2) differentiate different MEMS and microfluidic techniques and understand their importance in modern engineering; (3) apply concepts of micro-systems for industrial applications, particularly in energy, mechanical engineering and biomedical engineering.

Topics include: MEMS and microsystem products; microsensors; microactuators; microfluidic devices; multidisciplinary nature of microsystem design and manufacture; fluid mechanics in microscaled flows; materials for MEMS and microfluidic devices; fabrication techniques of MEMS and microfluidic devices; flow characterisation techniques; flow control with microfluidics; microfluidics for life sciences and chemistry.

Students who have taken and passed MECH6032. will not be allowed to take MECH6046.

**MECH6047. Finite element analysis in mechanics (6 credits)**

This course aims to: (1) introduce the basic concepts and procedures in finite element analysis; (2) introduce the methods of analysis using the finite element method for mechanics problems in engineering; and (3) provide hands-on experience on conducting various mechanics analyses by using a state-of-the-art finite element software.

Topics include: concepts and procedures in finite element analysis; elasticity analysis of truss, beam, plane and plate problems; thermo-mechanical analysis; modal analysis; direct integration methods for dynamic analysis; geometric and material nonlinear analyses; contact analysis; hands-on experience of finite element analysis.

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**MECH7010. Contemporary robotics (6 credits)**

This course aims to explore the major technologies related to modern robotic systems, including the components and working principle of robots, automatic and computer-aided control, kinematics and control of mobile robots including drones and driverless cars, soft robots, etc.

The specific course objectives are: (1) to have a comprehensive understanding of robotic systems in terms of their system configurations, working principles, historical evolutions, and applications; (2) to understand the mathematical foundations, designs, data processing, and real-time control of various sensing and actuation units which comprise a robotic system; (3) to study the robot kinematics modelling, sensing, estimation, and control; (4) to explore the challenges and trends in contemporary robotic research, and the future directions for application of robotic components.

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**IMSE7111. Intelligent optimization / Data-driven optimization (6 credits)**

Overview of data-driven optimization and intelligent analytics; Genetic algorithms; Simulated annealing algorithm; Tabu search algorithm; Particle swarm optimization; Ant colony optimization; Predatory search strategy; Computational techniques and Intelligent optimization strategies for dynamic systems; Data mining, decision analytics; Applications in multiple objective optimisation; Applications in constraint problems; Multiple level optimization; Case studies in supply chain, logistics, manufacturing and service applications.

(This course is re-titled to “Data-driven optimization” from the academic year of 2024-25.)

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**IMSE7139. Cyber-physical systems (6 credits)**

This course mainly consists of lectures and projects. The topics include introduction to cyber-physical systems (CPS), sensors and sensor networks, robotics and automation, communications for CPS, data analytics in CPS, digital twins, cloud computing for CPS, and system integrations. By completion of the projects, the topics will be discussed in the related lectures and hands-on experiments. The outcomes of each individual project will be integrated at the end to address CPS from system point of view as well in applications related settings.

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**IMSE7034. Operational research (6 credits)**

The philosophy and methodology of Operational Research: problem analysis, model building, and implementation of solutions. Mathematical programming and its applications in logistics and supplies: vehicle scheduling, transportation and transhipments problems. Replacement models for capital

equipment and preventive replacement for components of low capital value. Risk analysis for capital expenditure proposals. Queuing theory and event simulation with applications in serial and parallel supply chains.

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**COMP7103. Data mining (6 credits)**

Data mining is the automatic discovery of statistically interesting and potentially useful patterns from large amounts of data. The goal of the course is to study the main methods used today for data mining and on-line analytical processing. Topics include data mining architecture; data preprocessing; mining association rules; classification; clustering; on-line analytical processing (OLAP); data mining systems and languages; advanced data mining (web, spatial, and temporal data).

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**DASC7606. Deep learning (6 credits)**

Machine learning is a fast-growing field in computer science and deep learning is the cutting-edge technology that enables machines to learn from large-scale and complex datasets. Ethical implications of deep learning and its applications will be covered and the course will focus on how deep neural networks are applied to solve a wide range of problems in areas such as natural language processing, and image processing. Other applications such as financial predictions, game playing and robotics may also be covered. Topics covered include linear and logistic regression, artificial neural networks and how to train them, recurrent neural networks, convolutional neural networks, generative models, deep reinforcement learning, and unsupervised feature learning.

Prerequisites: Knowledge of algorithms, calculus, linear algebra, and programming would be an advantage.

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**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 programmes, 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.

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

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**COMP7408. Distributed ledger and blockchain technology (6 credits)**

In this course, students will learn the key technical elements behind the blockchain (or in general, the distributed ledger) technology and some advanced features, such as smart contracts, of the technology. Variations, such as permissioned versus permissionless and private blockchains, and the available blockchain platforms will be discussed.

Students will also learn the following issues: the security, efficiency, and the scalability of the technology. Cyber-currency (e.g. Bitcoin) and other typical application examples in areas such as finance will also be introduced.

Prerequisites: COMP7906. Introduction to cyber security or ICOM6045. Fundamentals of e-commerce security and experience in programming is required.

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**COMP7906. Introduction to cyber security (6 credits)**

The aim of the course is to introduce different methods of protecting information and data in the cyber world, including the privacy issue. Topics include introduction to security; cyber attacks and threats; cryptographic algorithms and applications; network security and infrastructure.

Mutually exclusive with: ICOM6045. Fundamentals of e-commerce security

Remarks: students with basic knowledge in Mathematics for CS, applied statistics and Python will be preferred.

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**ELEC6604. Neural networks, fuzzy systems and genetic algorithms (6 credits)**

This course provides a general introduction to neural networks, fuzzy systems and genetic algorithms. The fundamental concepts and techniques of these three areas will be given. The course will also provide examples on the application of neural networks, fuzzy systems and genetic algorithms to a variety of engineering problems. This course will cover three important topics in the field of Applied Artificial Intelligence. By the end of this course, student should possess a firm grounding in the concepts and techniques of neural network, fuzzy system and genetic algorithm. The student should be able to apply the acquired knowledge to the development of intelligent systems or to the exploration of research problems.

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**ELEC6098. Electronic and mobile commerce (6 credits)**

This course aims at introducing both technical, commercial and managerial knowledge on electronic commerce and mobile. The course will start with an introduction to the Business-to-Consumer (B2C) Model; Business-to-Business (B2B) model, followed by an overview of different enabling technologies for electronic commerce and mobile commerce such as the location base technology, RFID, GPS, mobile network, electronic payment, server-side and channel security, Near Field Communication, QR Code, augmented reality and other latest technologies deploying in the industry. By the end of the course, the research trend and the way forward of the industry will be discussed.

Mutually exclusive with: ELEC6078, ELEC6086

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**MEDD8860 Emerging technologies in STEM education (6 credits)**

This course explores a broad range of current and emerging tools, practices and themes in STEM education. Also, the course will review current and future research trends in emerging tools, practices and themes in STEM Education. The course begins by exploring the historical development of crossdisciplinary integration in STEM education, in order to equip students with an overall picture on the types and trends of digital technology used for delivering STEM education in the past, present and future classrooms.

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**MEDD8914 Implementing STEM/STEAM-rich making: opportunities and challenges (6 credits)**

This course aims to develop students' knowledge of constructionism and maker culture to enhance their understanding of the theory and practice behind STEM/STEAM-Rich Making. Students will explore different approaches (e.g. assembly form of making, tinkering) in practical STEM/STEAM-Rich Making through hands-on activities. This course also critically examines the opportunities and challenges for implementing STEM/STEAM-Rich Making through SWOT analysis and funding proposal writing, as well as develops students' leadership in promoting and implementing STEM/STEAM education. School visits will be arranged, if possible.

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**TDLL6024 Teaching and learning with IT (6 credits)**

This course provides a comprehensive introduction to the use of information technology for teaching and learning. Topics range from traditional applications e.g., computer-based tutorials to more contemporary applications such as the use of learning objects, cognitive tools and collaborative technologies. The course highlights theories of learning underpinning technology integration and the educational contexts within which these are intended to be used.

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**TDLL6333 Mobile and ubiquitous technology in education (6 credits)**

This course provides a hands-on oriented and in-depth exploration of smart-phone/mobile devices in general, together with essential concepts and the impact of ubiquitous technologies for education and training. The potential for this technology in the next-generation learning systems to impact socio-technological and educational developments will be investigated through real-life examples. In addition to the theoretical and conceptual issues, students will develop practical knowledge in the design and development of simple educational applications for delivery via mobile technologies (e.g., iPhone, iPads and iPods). Particular attention will be given to object-oriented programming and integration with cloud computing.

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**TDLL7341 Game-based learning environments (6 credits)**

This course aims to introduce the main idea behind Digital Game-Based Learning (DGBL). It will investigate the pedagogical aspects of using games for learning, including commercial games in education settings and games that are created specifically for educational purpose. This course will review current techniques and trends in educational games. Issues related to design, enhancement implementation and evaluation of DGBL will also be examined.

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**TDLL7349 Data science and learning analytics (6 credits)**

This course provides a broad overview of the key concepts, skills, technologies and applications in data science, with an emphasis on learning analytics and educational data mining. Learners will explore principles, methods and application cases in data pre-processing and storage, inferential and predictive analytics, supervised and unsupervised machine learning, association rule mining, text analytics, network analysis, data visualisation, as well as data ethics and privacy. Example cases will be discussed to illustrate how learning analytics needs to be connected to the targeted learning outcomes and pedagogical design considerations. Students will conduct labs, tutorials and group project to gain hands-on experience on using industry-standard data mining and/or learning analytics packages to solve practical data-driven problems. It is strongly recommended that students have basic knowledge of

statistics (equivalent to undergraduate level of introductory course on statistics) and are comfortable of using new IT tools.

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**CIVL6054. Engineering for transport systems (6 credits)**

Engineering appreciation of the transport systems; transport infrastructure development; choice of transportation systems; fixed track systems; application of technology in transport.

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**CIVL6061. Special topic in environmental engineering A (6 credits)**

This course provides an opportunity for students to study in-depth an area of environmental engineering of interest to students and staff alike. The topic will be announced in the beginning of the semester when the course is offered.

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**CIVL6062. Special topic in environmental engineering B (6 credits)**

This course provides an opportunity for students to study in-depth an area of environmental engineering of interest to students and staff alike. The topic will be announced in the beginning of the semester when the course is offered.

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**CIVL7005. Sustainable construction technology: principles and practices (6 credits)**

This course provides in-depth knowledge of technology in the context of sustainable construction, with the syllabus covering concepts of sustainable construction; systems theories; technological innovation theories; types of technology and their applications; technology selection and management strategy.

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**CIVL7006. Optimization techniques for transportation applications (6 credits)**

Linear programming, nonlinear programming, network optimization, and integer optimization methods for solving transportation problems.

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**CIVL7016. Land transport and the environment (6 credits)**

Land transport systems; Rail and road construction; Rail noise emissions and abatement; Air, noise and water pollution of roads; Road related air and noise emission measurements, estimation and abatement approaches.

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**URBA6001. Foundations in spatial data analysis (6 credits)**

Spatial data has become indispensable for building a smart city, particularly in city planning, design and management. This involves new means of capturing spatial data by different types of sensors, advanced application of Artificial Intelligence (AI) and rapid development of spatial analytics in the area of Geographic Information System (GIS) and Building Information Modelling (BIM). The main objective of this course is to equip students from relevant disciplines (e.g. land use planning, surveying, architecture, landscape architecture, engineering, environmental science and social sciences) with foundational knowledge and techniques on spatial data analysis.

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**URBA6002. Urban big data analytics (6 credits)**

This course further develops students' knowledge and skills in handling, analysing and modelling urban data, especially big data. Students will learn conceptual frameworks for analysing and modelling urban issues, methodologies and software tools for processing and modelling urban data; as well as applying urban models and analytics to empirical cases. The aim of this course is to equip students with advanced urban modelling and analytics to explain current urban conditions and predict future urban changes beyond the smart era.

Prerequisite: URBA6011. Programming and foundations in urban data analysis

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**URBA6009. Artificial intelligence for future cities (6 credits)**

This course provides an introduction to programing, computational thinking, and artificial intelligence (AI), which have become essential skills in the fields of smart cities and urban science. Students are expected to reflect how software, data, smart technologies and AI are becoming integral to future smart cities; learn key concepts, algorithms, and data structures; acquire skills and experiences in computer programing; and understand how programing can be applied to solve urban problems.

Prerequisite: URBA6011. Programming and foundations in urban data analysis

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**RECO7605. Information management (6 credits)**

This course focuses on the tasks associated with informative and supply chain management and their associated fundamental knowledge and information management theories. Information, human, monetary and resource flows; manufacturing and construction supply chain management; efficiency and responsiveness; integration through IT or common information management tools and techniques; interorganisational, cultural and contractual issues; supply chain integrity.

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**IDAT7217. Advanced topics in innovative design and technology A (6 credits)**

This course will introduce selected advanced innovation design and technology and apply them to problems in relevant areas. The topic will be announced in the beginning of the semester when the course is offered.

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**IDAT7218. Advanced topics in innovative design and technology B (6 credits)**

This course will introduce selected advanced innovation design and technology and apply them to problems in relevant areas. The topic will be announced in the beginning of the semester when the course is offered.

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**IDAT7219. Smart building technology (6 credits)**

This course aims at the fundamental principles of applying IoT technology that use hardware, software, and connectivity to manage HVAC, lighting, security, etc. It focuses on the interlinked elements which form a collects and analyses building operation data in real time and improved building upkeep and maintenance.

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**IDAT7220. STEM education (6 credits)**

STEM (Science, Technology, Engineering, and Math) in an educational context refers to the concept of teaching content in these areas not in siloed separate classes, but in an integrated, project-based manner, emphasizing student agency and self-directed learning. This course aims to educate teacher-candidates in best practices for implementing this, through a combination of readings, videos, instructional design, and a series of mini-projects that model curriculum integration practices.

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**IDAT7221. Data analytics and artificial intelligence for design engineering and business (6 credits)**

This course will focus on advanced technology and product management, including AI, machine learning, value engineering and product costing, product analysis, and project management. It will provide the students with a comprehensive overview and the fundamental concepts of project management, and an understanding of how project management can be used as a strategic tool to deliver business performance for organizations. Students will also learn the key components of project management, and practical methodologies in managing projects of different natures. Apart from these, students will be able to apply the newest technology on innovative design and basic data analytics concepts to analyse, interpret, understand, and draw conclusions from quantitative data.

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**List-C Discipline elective courses (Design Practice: Management)**

**MECH7012. Principles of engineering management (6 credits)**

The focus of this course is on the basic principles, methods, and functions of engineering management. An overview of systems engineering is provided, with coverage on the design and management of an enterprise as an integrated system. The course objectives are: (1) acquire the essential principles of engineering management and understand how to apply these principles in daily practice in industry; and (2) understand and apply methods for managing the operations of engineering companies in the global business environment.

Topics include: systems engineering; core concepts and tools for the management of operations: operations planning and control functions, ERP systems; contemporary topics and approaches in engineering management: supply chain, green management, ethics, corporate social responsibility and compliance, risk and crisis management.

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**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.

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**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

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**ELEC6092. Green project management (6 credits)**

This course aims at introducing Green Project Management. By giving a brief account on the environmental issues, the course will begin by explaining the scope and value of green projects. It will illustrate the importance of clarity of mission and goals of green projects; and how these could be done by means of audit and feasibility study. It will also describe how green project planning and control can be implemented with proper system tools. The basic theory regarding contract management: project strategy, contract documents, tendering procedure and contingency shall be introduced. It will also give examples of site implementation: partnership collaboration; project quality assurance; safety management; environmental issues and risk management. The course shall be concluded by detailing project quality assurance; safety management.

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**ELEC6601. Industrial marketing (6 credits)**

This course covers the following topics: Business to business marketing; value chain; character of industrial marketing; marketing opportunities; marketing strategies; channel relationships; sales and sales management; marketing communications; customer programmes; business ethics; and crisis management.

By means of problem-based learning, case studies, guest induction, team interaction and lectures, a student shall improve feeling of industrial marketing models; along with understanding of underlying practices and business concepts. The student shall acquire skill and proficiency through the projects and presentations. He shall be able to apply concepts, and where possible, be able to develop innovative models for potential applications.

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**ELEC6603. Success in industrial entrepreneurship (6 credits)**

This course covers the following topics: Framework for entrepreneurship; identifying resources, capabilities, environments, opportunities and strategies; business plan; financing the new venture; risk balancing and staged financing; creating an organisation.

By means of problem-based learning, case studies, guest induction, team interaction and lectures, a student shall improve feeling of entrepreneurship and new opportunities; along with understanding of successful models and business concepts. The student shall acquire skill and proficiency through the projects and presentations. He shall be able to apply concepts and to elaborate successful opportunities and extend them to potential applications.

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**Capstone requirement**

**IDAT7101. Capstone Project (12 credits)**

For the Capstone Project, it is a project-based work aims to provide students with capstone experience to work on a real-world problem and carry out a substantial project which requires integration of the knowledge they have learnt in the curriculum. Students will work in solo or small groups under the guidance of their supervisor(s) from any department of the Engineering Faculty or other relevant faculties. Students are required to attend workshops, seminars and submit a substantial written report as well.

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Course approved for reimbursement from the Continuing Education Fund (CEF) (applicable to Hong Kong residents only)

**MECH6034. Computer-aided product development (CAPD) (6 credits)**

**MECH7012. Principles of engineering management (6 credits)**

**COMP7408. Distributed ledger and blockchain technology (6 credits)**

**COMP7503. Multimedia technologies (6 credits)**

**COMP7506. Smart phone apps development (6 credits)**

**COMP7802. Introduction to financial computing (6 credits)**

**COMP7906. Introduction to cyber security (6 credits)**