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.

Subject to the University's approval

MSC(ENG) IN INDUSTRIAL ENGINEERING AND LOGISTICS MANAGEMENT
(Applicable to students admitted to the curriculum in the academic year 2024-25 and thereafter)

Definition and Terminology

Discipline course – any course offered by the curriculum of the MSc(Eng) in Industrial Engineering and Logistics Management (IELM).

Fundamental courses – a specific number of discipline courses in the curriculum that a student must pass.

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 Industrial Engineering and Logistics Management that are not classified as discipline courses.

Capstone Experience – a dissertation or a project which is a compulsory and integral part of the curriculum.

Curriculum Structure

Candidates are required to complete 72 credits of courses, as set out below.

Course Category	**Enrolment Mode**	
	8 Courses + Dissertation	**10 Courses + Project**
Discipline Courses (including at least 2 Fundamental Courses)	Not less than 36 credits	Not less than 48 credits
Elective Courses	Not more than 12 credits	
Capstone	Dissertation (24 credits)	Project (12 credits)
Total	72 credits	

Candidates are permitted to select courses in accordance with Regulations MSc4, MSc5 and MSc6. The curriculum provides two enrolment modes for candidates to choose from either (i) 8 courses plus a dissertation, or (ii) 10 courses plus a project. In choosing the enrolment mode (i), candidates must complete a 24-credit dissertation and at least 6 discipline courses (including at least 2 fundamental courses); for enrolment mode (ii), candidates must complete a 12-credit project and at least 8 discipline courses (including at least 2 fundamental courses). Candidates choosing any enrolment mode can take no more than 2 elective courses out of Taught Postgraduate level courses offered by other curricula in the Faculty of Engineering. All selection will be subjected to approval by the Course Coordinator.

The curriculum is offered in both part-time and full-time modes. For the part-time mode of study, the curriculum shall extend over not less than two and not more than three academic years of study. For the full-time mode of study, the curriculum shall extend over not less than one and not more than two academic years of study.

The curriculum provides advanced education and training in the philosophy, methods and techniques of Industrial Engineering, Logistics and Supply Chain Management and Systems Engineering, which are essential for industrial and service organizations in both the private and the public sectors.

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

It should be noted that not all of the courses listed below are offered every year:

List of Discipline Courses

Fundamental Courses (Students are required to choose at least 2 out of 3):
IMSE7015 Engineering economics and finance
IMSE7020 Supply chain management
IMSE7034 Operational research

Capstone Courses (Students are required to choose either one):
IMSE7098 Project (12 credits)
IMSE7099 Dissertation (24 credits)

Other Discipline Courses:
IMSE7111 Data-driven optimization
IMSE7119 Digital enterprises and e-commerce
IMSE7128 Human factors engineering
IMSE7137 Virtual reality for systems engineering
IMSE7138 Healthcare systems engineering
IMSE7139 Cyber-physical systems
IMSE7140 Machine learning and applications
IMSE7141 Digital twin and applications
IMSE7142 Computational methods for industrial engineering
IMSE7143 The internet of things
IMSE7150 Frontiers in industrial engineering and logistics management A
IMSE7151 Frontiers in industrial engineering and logistics management B
IMSE7152 Frontiers in industrial engineering and logistics management C
IMSE7153 Frontiers in industrial engineering and logistics management D
IMSE7154 Intelligent technologies for industrial engineering A
IMSE7155 Intelligent technologies for industrial engineering B
IMSE7156 Intelligent technologies for industrial engineering C
IMSE7157 Intelligent technologies for industrial engineering D

IMSE7212 Physical internet
IMSE7221 Warehousing and city logistics
IMSE7222 Global logistics and transportation systems
IMSE7251 Fundamentals of law for logistics

IMSE7310 Financial engineering
IMSE7315 Supply chain and logistics finance
IMSE7337 Operational risk management
IMSE7339 Financial technologies
IMSE7340 Asset and portfolio management

IMSE7505 Intelligent transportation and autonomous driving
IMSE7506 Advanced machine learning methods

IMSE7902 Project management
IMSE7909 Quality management
IMSE7936 Operations planning and control

Elective Courses

Please consult courses offered for other MSc curricula in the Faculty of Engineering.
Calendar entries of discipline courses offered by the curriculum of MSc(Eng) in IELM

IMSE7015. Engineering economics and finance (6 credits)

Engineering economics fundamentals: cost concepts, money-time relationships, comparing alternatives, depreciation and income taxes, cost estimation, price changes and exchange rates, replacement analysis, effects of uncertainties; financial statements, ratio analysis, financial performance, financial planning and growth; capital budgeting: investment criteria, project analysis and evaluation, project cash flow; cost of capital, long-term financial policy, financial leverage and capital structure policy.

IMSE7020. Supply chain management (6 credits)

Supply chain characterisation; operation objectives; distribution channels; channel design considerations; logistics network design. Inventory management; risk pooling; distribution strategies. Strategic alliances; international issues in supply chain management; coordinating product and supply chain design; customer value. Information technology; decision support systems; the value of information in supply chains. Case studies and contemporary topics on supply chain management; the beer game.

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.

IMSE7098. Project (12 credits)

A group of students will work on a supervised project that relates to major research and/or industrial projects and initiatives that supervisors have recently carried out. Groups are expected to generate project deliverables of a variety of forms including patents, software copyrights, research papers, proof-of-the-concept solutions and products, consultancy reports / whitepapers, etc. This course will provide students with a range of opportunities to engage in academic research, industrial innovation and entrepreneurship development.

IMSE7099. Dissertation (24 credits)

Student individuals will undertake a supervised project which will be assessed. The dissertation module must relate to the subject matter and be agreed by the Department of Industrial and Manufacturing Systems Engineering. The Dissertation can be related to research projects within the department or industry-related projects.

IMSE7111. 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 optimization; Applications in constraint problems; Multiple level optimization; Case studies in supply chain, logistics, manufacturing and service applications.

IMSE7119. Digital enterprises and e-commerce (6 credits)

Overview and development of e-business; e-business technologies and solutions: appraisal and selection, implementation and adoption; Enterprise information and knowledge portals, virtual enterprises; Roles of e-business in enterprise development and integration; corporate social accountability and responsibility standards; digital technologies for product design and development; cryptographic algorithms for corporate data and IP protection; mobile technology and electronic payment, smart cards, RFID and NFC.

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.

IMSE7137. Virtual reality for systems engineering (6 credits)

Fundamental concept of virtual reality, augmented and mixed reality; human perception and virtual reality; system components of modern virtual reality systems; applications of virtual reality technology in engineering systems design and analysis, immersive and interactive virtual environments; innovation and consciousness with virtual reality system development and deployment, ethical issues and social impacts of adopting virtual reality in system development. Designing and building virtual systems with immersive virtual reality systems including CAVE-like environment and VR headsets.

IMSE7138. Healthcare systems engineering (6 credits)

Introduction to healthcare delivery systems; healthcare technology-human integration; human factors in healthcare; crew resource management; quality of care; economic analysis in healthcare; healthcare logistics; healthcare system test and evaluation; analysis and design for patient safety.

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 the individual projects will be integrated at the end to address CPS from system point of view as well in applications related settings.

IMSE7140. Machine learning and applications (6 credits)

Overall view of machine learning methods. Supervised learning, unsupervised learning, reinforcement learning. Support-vector machines, linear regression, decision trees, k-nearest neighbor algorithm, neural networks. Active learning, classification and regression. Model training, testing, selection, and validation. Performance evaluation. Industrial applications in forecasting, ranking, recommendation systems, information extraction, object recognition in computer vision, and pattern recognition.

IMSE7141. Digital twin and applications (6 credits)

This course teaches fundamental technologies of digital twin. Overall view of basic concepts related to digital twin. How to build blocks of digital twin. The setup of sensor systems and digital twin infrastructures. The integration, testing, monitoring and maintenance of digital twin. Data collection, processing, storage, transmission, and synchronization. Simulation and decision-making support in industrial engineering and logistics management.

IMSE7142. Computational methods for industrial engineering (6 credits)

This course teaches fundamental computational methods and the applications to engineering problems in the context of industrial engineering. Analytical models, algorithms, and simulation methods will be discussed. Variability and uncertainty in engineering problems. Foundations of probability, sampling distributions, confidence intervals. Interpolation and regression. Numerical solution of linear and non-linear equations, numerical differentiation and integration, boundary value problems, initial value problems and partial differential equations. Monte Carlo method.

IMSE7143. The internet of things (6 credits)

Theory and fundamentals of internet of things (IoT). Methods to create abstractions, formalisms and semantics at IoT layer. Artificial intelligence of things, machine learning for IoT, edge computing. IoT challenges in security, reliability and privacy. Device software development, IoT in cloud-to-thing-continuum. IoT software development, test beds and quality assurance. Sensors and actuators, remote operations and control. IoT applications in manufacturing, construction, healthcare, logistics and supply chain management.

IMSE7150. Frontiers in industrial engineering and logistics management A (6 credits)

This course is part of the series “Frontiers in industrial engineering and logistics management”. The aim of this series is to provide students with a deeper understanding of the advanced topics under the five areas of focus of this programme, namely, fundamentals of industrial engineering, advanced engineering technology, logistics and supply chain management, financial engineering, and leadership development. This course focuses on the fundamental theories and advanced engineering technologies in industrial engineering. Through this course, students are expected to have a holistic view of the fundamental theories and technologies in industrial engineering. This course mainly consists of lectures and projects.

IMSE7151. Frontiers in industrial engineering and logistics management B (6 credits)

This course is part of the series “Frontiers in industrial engineering and logistics management”. The aim of

this series is to provide students with a deeper understanding of the advanced topics under the five areas of focus of this programme, namely, fundamentals of industrial engineering, advanced engineering technology, logistics and supply chain management, financial engineering, and leadership development. This course focuses on the advanced theories and data analytics methods in logistics and supply chain management. Case studies and industrial applications in the logistics and supply chain management field will be discussed. This course mainly consists of lectures and projects.

IMSE7152. Frontiers in industrial engineering and logistics management C (6 credits)

This course is part of the series "Frontiers in industrial engineering and logistics management". The aim of this series is to provide students with a deeper understanding of the advanced topics under the five areas of focus of this programme, namely, fundamentals of industrial engineering, advanced engineering technology, logistics and supply chain management, financial engineering, and leadership development. This course focuses on the emerging engineering technologies and applications in the industry. Through this course, students are expected to have a holistic view of the technology development in industrial engineering. This course mainly consists of lectures and projects.

IMSE7153. Frontiers in industrial engineering and logistics management D (6 credits)

This course is part of the series "Frontiers in industrial engineering and logistics management". The aim of this series is to provide students with a deeper understanding of the advanced topics under the five areas of focus of this programme, namely, fundamentals of industrial engineering, advanced engineering technology, logistics and supply chain management, financial engineering, and leadership development. This course focuses on the engineering practices and leadership training in industrial engineering. Case studies of various industrial applications will be discussed. This course mainly consists of lectures and projects.

IMSE7154. Intelligent technologies for industrial engineering A (6 credits)

This course is part of the series "Intelligent technologies for industrial engineering". This series of courses are designed to introduce students to critical technologies with applications in intelligent engineering systems. The course will cover essential topics about the intelligent technologies with an emphasis on their augmentation in data engineering and analytics. Students will learn the fundamental theories and knowledge related to the technologies, and how to leverage such technologies to enhance various aspects of industrial engineering. This course mainly consists of lectures and projects.

IMSE7155. Intelligent technologies for industrial engineering B (6 credits)

This course is part of the series "Intelligent technologies for industrial engineering". This series of courses are designed to introduce students to critical technologies with applications in intelligent engineering systems. The course will cover essential topics about the intelligent technologies with an emphasis on their integration into complex industrial systems. Students will learn the fundamental theories and knowledge related to the technologies; and gain hands-on experience in implementing these technologies to improve efficiency, productivity and performance of the industrial systems. This course mainly consists of lectures and projects.

IMSE7156. Intelligent technologies for industrial engineering C (6 credits)

This course is part of the series “Intelligent technologies for industrial engineering”. This series of courses are designed to introduce students to critical technologies with applications in intelligent engineering systems. The course will cover essential topics about the intelligent technologies with an emphasis on their capabilities to enhance decision-making in industrial operations. Students will learn the fundamental theories and knowledge related to the technologies, and also the skills to design and implement intelligent technologies tailored to address complex engineering challenges. This course mainly consists of lectures and projects.

IMSE7157. Intelligent technologies for industrial engineering D (6 credits)

This course is part of the series “Intelligent technologies for industrial engineering”. This series of courses are designed to introduce students to critical technologies with applications in intelligent engineering systems. The course will cover essential topics about the intelligent technologies with an emphasis on suitable, sustainable and socially responsible applications in engineering systems. Students will learn the fundamental theories and knowledge related to the technologies. Students will be engaged in thoughtful discussions on the intelligent technologies and the applications in various engineering settings. This course mainly consists of lectures and projects.

IMSE7212. Physical internet (6 credits)

Logistics network history and topology, organisation and performance, logistics networks sustainability, asset utilization. Interconnection principles; Digital Internet, Physical Internet, Internet of Things. Physical Internet components: containerisation diversity, modularity, handling and sorting. Logistics information capture, publication, EPCglobal standards. Flow routing and assets management in open-loop supply networks. Collaborative logistics business models, small scale cooperative game with transferable utility, Shapley value and core solution, big scale collaboration models, mechanism design, combinatorial optimisation. Case studies, web search, serious game.

IMSE7221. Warehousing and city logistics (6 credits)

Materials handling systems, automated storage and distribution systems, hardware and software, routing. Case studies from cargo terminals. Warehouse management systems, missions, functions, receiving and shipping operations planning, dock design, storage space, layout and location planning, order picking. Cost and performance analysis in logistics and warehouse management. Material handling principles, system design, selection of handling equipment, unit load design. Automation of warehouse and material handling systems, costing and audits. Applications of modelling and simulation for warehouse design and optimisation. Logistics security, logistics park and third party logistics service providers.

IMSE7222. Global logistics and transportation systems (6 credits)

Global operations and logistics strategies, strategic changes required by globalization, the strategic framework for global operations, the role of logistics in global operations and marketing strategies; global operations and logistics planning, supplier network development, physical distribution, global logistics network design, global supply chain management, risk management in global operations; management of global operations and logistics, operations analysis of global supply chains, information management for global logistics, performance measurement and evaluation in global logistics.

IMSE7251. Fundamentals of law for logistics (6 credits)

The course focuses on five areas of law essential to industrial and logistics managers: contracts, agency, shipping law, negligence and dispute resolution; overview of sources of law and legal structure of businesses; elements of a binding contract; duties of an agent, including common carriers, employees and professionals; claims arising in international shipment of goods, arbitration, mediation or litigation and venue for dispute resolution.

IMSE7310. Financial engineering (6 credits)

Basics of financial markets; cash flow analysis; capital asset pricing model (CAPM); portfolio optimisation; arbitrage and fundamental theorem of asset pricing; types of derivatives including forward, futures and options for various underlying assets; returns, value-at-risk (VaR), utility functions; pricing and hedging of derivative securities; numerical studies.

IMSE7315. Supply chain and logistics finance (6 credits)

Basics of financial markets; sources and channels for supply chain and logistics finance; financing conditions. Financial derivatives for managing risks; risk measures; theories and methods of financial hedging. Supply chain risks arising from global manufacturing, trading and logistics activities: uncertain price, demand and exchange rates; financing of logistics businesses and risks; development of risk hedging models: price models, demand models, optimal hedging policies.

IMSE7337. Operational risk management (6 credits)

Basics of risk management, risk and return, lifecycle of risk management, operational risk management (ORM) components; risk management framework: standards, management environment, management processes; operational risk assessment: assessment, identification, scale of assessment; risk reporting: risk indicators, risk map. Risk management strategies: risk avoidance, mitigation, transfer and acceptance; applications: supply chain management, product development, environment, health and safety risks; crisis management.

IMSE7339. Financial technologies (6 credits)

Applications of the state-of-the-art technologies that drive the rapid growth and disruptive innovations in the financial services sector: big data analytics and predictive modelling, mobility, payments and transactions, infrastructure and operational technologies for financial investments, P2P lending and crowdfunding, and cybersecurity. Understanding on how the financial technology innovations are disrupting traditional established business models and reshaping the way financial services are structured, provisioned and consumed.

IMSE7340. Asset and portfolio management (6 credits)

Statistics of asset and portfolio management: univariate statistics, multivariate statistics, modelling the market; portfolio selection theories: mean-variance analysis, asset pricing theory; factor model: arbitrage pricing theory, factor model estimation, principal component analysis; asset price dynamics; portfolio management strategies: tracking error, information ratio, passive and active strategies; portfolio monitor and adjustment; rebalancing; basic machine learning algorithms.

IMSE7505. Intelligent transportation and autonomous driving (6 credits)

This course will introduce students to the field of autonomous mobile robotics. Topics will focus on definition and applications of mobile robots; mobile robot components and architecture; kinematics and dynamics of mobile robots; sensors for mobile robots; planning and navigation for mobile robot; simultaneous localization and mapping; mobile manipulators; applications. The assignments of this course will involve building and testing autonomous mobile robots using simulation software and physical robots.

IMSE7506. Advanced machine learning methods (6 credits)

This course provides a detailed examination of various advanced topics in machine learning for industrial engineering, including five main directions: generative models, inference algorithms, predictive models, discovery models, and action-related models. It will cover not only the popular models, such as diffusion models, generative adversarial networks (GANs), and reinforcement learning models, but also significant classical algorithms in depth, such as Kalman filter, Markov Chain Monte Carlo (MCMC), Principal Component Analysis (PCA), and Independent Component Analysis (ICA). As the sequel to the course IMSE 7140 Machine Learning for Industrial Engineering, this course requires skills in Python programming, an understanding of core machine learning concepts, and knowledge of calculus, linear algebra, probability, and statistics—at an elementary level. IMSE 7140 covers the first two prerequisites, so completing IMSE 7140 is recommended but not required for enrolling in this course.

IMSE7902. Project management (6 credits)

Fundamental of project management; PMBOK's project management framework; Project initiating, planning, executing, monitoring and controlling, and closing; Project integration management; Project scope management; CPM/PERT techniques for project time management, resource allocation and cost management; Earned value analysis for project tracking; Application of techniques such as EMV, decision tree analysis, and Monte Carlo simulation in project risk management, human resource management, communication, procurement and quality management for industrial projects; Project change control and management; Project team-building; Case studies in logistics and manufacturing industries.

IMSE7909. Quality management (6 credits)

The principals of Total Quality Management and BS 7850. Basic tools of quality management, the Japanese approaches to quality management, 5S and Kaizen. Deming's approach to quality management. International quality assurance management system -- the ISO 9000 series, quality documentation, quality audit. Zero defects and Six Sigma. The American Malcolm Baldrige quality award. Quality Function Deployment. The Taguchi Methods.

IMSE7936. Operations planning and control (6 credits)

Elements of operations strategies; quantitative forecasting models; strategic decisions; planning products, processes, technologies, and facilities; selection and management of production technology; capacity planning and facility location; production planning systems; aggregate planning; master production scheduling; inventory systems; material requirement planning; shop floor planning and control; Just-In-Time manufacturing.
