

MSC(ENG) IN INDUSTRIAL ENGINEERING AND LOGISTICS MANAGEMENT

The curriculum extends over not less than two and not more than three calendar years of study. It provides advanced education and training in the philosophy, methods and techniques of Industrial Engineering and Industrial/Logistics Management which are appropriate to industrial and service organizations in both the private and the public sectors.

Candidates are permitted to select modules in accordance with Regulations E5 and E6. Candidates must either select (a) 12 modules; or (b) 8 modules and a dissertation. In either case, he/she can select no more than three modules offered by other programmes in the Faculty of Engineering as electives. All selection will be subjected to approval by the Course Coordinator.

The following is a list of discipline modules offered by the Department of Industrial and Manufacturing Systems Engineering. The list below is not final and some modules may not be offered every year.

IELM6001. Concurrent engineering

Product development process analysis and reengineering: performance measurement, organisation and management issues and extended enterprises. Formal methods and techniques, "Design for X", arc conjoint analysis. Product management, product variety, and engineering changes. Collaborative product commerce: information/task sharing, customer/supplier involvement and e-commerce/e-business applications. Case studies in logistics, service and manufacturing industries.

IELM6002. Operations management

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.

IELM6004. Industrial project management *

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.

IELM6027. Organisation theory and behavioural science

Managing and managers; evolution of management theory. Planning- decision making; strategic management; strategy implementation. Organising- organisational design and structure; power and the distribution of authority; managing organisational change and innovation. Leading- motivation; leadership; teams and teamwork; communication and negotiation. Controlling- principles of effective control; operations control.

IELM6028. Enterprise logistics and facilities design *

Enterprise logistics: materials handling systems, storage and warehousing operations, competitive manufacturing, modelling and analysis of enterprise logistics systems; location analysis; methodologies for facilities planning: systematic layout planning approaches (SLP); manufacturing strategies; layout planning algorithms.

IELM6030. Ergonomics

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.

IELM6034. Operational research techniques

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 transshipments 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.

IELM6037. Costing and finance

Cost terms and purposes, allocation and absorption of overheads, cost volume analysis, product costing, activity-based costing, budgetary control and standard costing, variance analysis, cost for decision making. Capital investment appraisal including discount cash flow, net present value and internal rate of return, risk analysis. Interpretation of financial statements, ratio analysis, fund flow statement, sources of funds, management of working capital.

IELM6042. Quality management *

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.

IELM6043. Information technology management

Planning and management approaches in IT: IT strategies; alignment planning; IT evaluation and outsourcing; managing information resources; building information systems; project implementation. Contemporary IT topics: e-commerce; IS security; impacts of IT on organizations, individuals, and society; business process re-engineering. IT applications: supply chain management; enterprise resource planning; customer relationship management; and knowledge management.

IELM6044. Supply chain management *

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.

IELM6045. Global operations and logistics *

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.

IELM6046. Supply management *

Purchasing in the supply chain, strategic purchasing, implementation and evaluation of strategy; purchasing organisation in a corporation, impact of e-procurement; out-sourcing, supplier selection, partnership with suppliers; pricing agreement, price analysis; global sourcing.

IELM6047. Digital enterprises

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; Application case studies in enterprise business processes: (product development, order taking and processing, online contract negotiation and bidding, rapid quotation and cost estimation, etc.)

IELM6048. Terminal and warehousing operations *

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.

IELM6049. Advanced manufacturing systems

Manufacturing strategies, process choice; types of advanced manufacturing systems: FMS, reconfigurable manufacturing systems, holonic manufacturing system; elements of advanced manufacturing systems: production, handling, storage, sensing and control; modelling and analysis of manufacturing systems, discrete-event simulation, queuing networks, effects of variability on system performance; manufacturing cells; modelling and design of advanced manufacturing systems; control architectures; agent-based planning and scheduling.

IELM6050. Industrial applications of radio frequency identification technologies *

Introduction to radio frequency identification (RFID); features and characteristics of readers and tags, typical frequencies, materials and orientations, middleware, standards for electronic product coding, and physical markup language. Design, development and implementation of RFID solutions; business process analysis, technology and vendor selection, deployment of readers and tags, infrastructure architecture, integration with enterprise application systems, and cost-benefits and constraints. RFID case studies and applications in object identification and tracking, asset management, warehouse management, supply chain integration, and manufacturing automation.

IELM6051. Fundamentals of law for logistics

The module 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.

IELM6052. Operational risk management practices

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.

IELM6025. Dissertation (4 modules)

Student individuals or groups 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.

* Approved for reimbursement from the Continuing Education Fund (CEF).
