

## 4.2.7.2 Degree Requirements

The general requirements include at least 40 MCs, of which at least 30 MCs must be at graduate level within the subject or in related disciplines and the remaining credits may be from other levels in the same or other disciplines subject to the approval of the department.

**To graduate with the MSc (Ind & Sys Eng) degree, a student must complete a minimum of 40 MCs in coursework with a minimum CAP of 3.00 for the best modules equivalent of 40 MCs (inclusive of foundation/core modules, where required).**

These must include the four ISE graduate foundation modules **IE5001, IE5002, IE5003 and IE5004** (16 MCs), and at least 16 MCs of ISE graduate elective modules.

Subject to the department's approval, up to 8 MCs may be from outside the department.

*New students are required to take CORE compulsory modules for the first two semester.*

*The department will help to pre-allocate the CORE module for new students.*

The graduate modules currently offered in the programme are listed in Table 4.2.7.2a. All modules are of 4 MCs. Some modules are offered in selected years only. See Modules Listings under Industrial and Systems Engineering at the Faculty of Engineering [website](#) for details.

### **Table 4.2.7.2a: Modules in Master of Science (Industrial & Systems Engineering)**

#### Foundation Modules

- IE5001 Operations Planning and Control I
- IE5002 Applied Engineering Statistics
- IE5003 Cost Analysis and Engineering Economy
- IE5004 Engineering Probability and Simulation

#### Systems Engineering and Methodologies

- IE5105 Introduction to Supply Chain Systems
- IE5107 Material Flow Systems
- IE5108 Facility Layout and Location
- IE5202 Applied Forecasting Methods
- IE5203 Decision Analysis
- IE5205 Healthcare Systems and Analytics
- IE5206 Energy and Sustainability: A Systems Approach
- IE5404 Large Scale Systems Engineering
- IE5407 Flexibility In Engineering Systems Design
- IE5504 Systems Modelling and Advanced Simulation

#### Quality and Reliability Engineering

- IE5121 Quality Planning and Management
- IE5122 Statistical Quality Control

IE5123 Reliability Engineering

#### Engineering Management

IE5208 Systems Approach to Project Management

IE5211 New Product Management

IE5213 Service Innovation and Management

#### Human Engineering

IE5301 Human Factors in Engineering and Design

IE5307 Topics in Human Factors Engineering

#### Advanced Modules

IE6001 Foundations Of Optimization

IE6002 Advanced Engineering Statistics

IE6004 Advanced Engineering Probability

IE6005 Stochastic Models and Optimization

IE6099 ISE Research Methodology

IE6107 Advanced Material Flow Systems

IE6108 Advanced Facility Layout and Location

IE6123 Advanced Reliability Engineering

IE6125 Advanced Software Quality Engineering

IE6126 Advanced Industrial Data Modelling and Analysis

IE6127 Six Sigma Methodologies

IE6199 Advanced Topics in Quality Engineering

IE6203 Advanced Decision Analysis

IE6211 Advanced New Product Management

IE6299 Advanced Topics in Engineering Management

IE6302 Advanced Ergonomics and Workplace Design

IE6399 Advanced Topics in Human Factors Engineering

IE6401 Advanced Topics in Industrial Logistics

IE6499 Advanced Topics in Systems Engineering

IE6503 Advanced Operations Research

IE6504 Advanced Systems Modelling and Simulation

IE6506 Advanced Computer Based Decision Systems

IE6511 Surrogate and Metaheuristic Global Optimization

### **Areas of Specialisation**

Students may opt for one of the following optional areas of specialisation. Not all modules will necessarily be offered in one academic year:

## **Operations Research - *from January 2016 and onwards***

To be considered for the award of this specialisation, a student must complete a minimum of 40 MCs with a graduating CAP = 3.50 as follows:

- The four ISE graduate foundation modules: IE5001, IE5002, IE5003 and IE5004
- At least five of the following elective modules for specialisation:

IE5105 Modelling for Supply Chain Systems  
IE5107 Material Flow Systems  
IE5108 Facility Layout and Location  
IE5123 Reliability Engineering  
IE5203 Decision Analysis  
IE5504 Systems Modelling and Advanced Simulation  
IE5907 Independent Study in Operations Research  
IE5908A Research Project in Operations Research I  
IE5908B Research Project in Operations Research II

- The remaining MCs in elective modules within or outside the Department subject to general degree requirements and Department's approval.
- A candidate may offer projects in lieu of graduate modules regardless whether he has selected the area of specialisation. If a candidate opts for a project, he/she has to propose a suitable project and find an appropriate supervisor. The Department does not have a list of projects. The candidate's experience and expertise in his/her workplace should help to identify a suitable project.
- Not more than 2 modules can be taken by a student for the project and independent study modules.

## **Project Management - *from August 2015 and onwards***

To be considered for the award of this specialisation, a student must complete a minimum of 40 MCs with a graduating CAP = 3.50 as follows:

- The four ISE graduate foundation modules: IE5001, IE5002, IE5003 and IE5004
- The compulsory module : IE5208 **or** IE5214.
- At least four of the following elective modules for specialisation:

IE5121 Quality Planning and Management  
IE5202 Applied Forecasting Methods  
IE5211 New Product Management **or** MT5006 Strategic and New Product Management  
IE5212 Management of Technological Innovation **or** MT5007 Management of Technological Innovation  
IE5301 Human Factors in Engineering and Design  
IE5404 Large Scale Systems Engineering  
IE5407 Flexibility in Engineering Systems Design  
IE5903 Independent Study in Project Management  
IE5904A Research Project in Project Management I  
IE5904B Research Project in Project Management II

- The remaining MCs in elective modules within or outside the Department subject to general degree requirements and Department's approval.
- A candidate may offer projects in lieu of graduate modules regardless whether he has selected the area of specialisation. If a candidate opts for a project, he/she has to propose a suitable project and find an appropriate supervisor. The Department does not have a list of projects. The candidate's experience and expertise in his/her workplace should help to identify a suitable project.
- Not more than 2 modules can be taken by a student for the project and independent study modules.