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 module for the first two semester.*

*The department will help to pre-allocated 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)**

<table>
<thead>
<tr>
<th>Foundation Modules</th>
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</thead>
<tbody>
<tr>
<td>IE5001    Operations Planning and Control I</td>
</tr>
<tr>
<td>IE5002    Applied Engineering Statistics</td>
</tr>
<tr>
<td>IE5003    Cost Analysis and Engineering Economy</td>
</tr>
<tr>
<td>IE5004    Engineering Probability and Simulation</td>
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<table>
<thead>
<tr>
<th>Systems Engineering and Methodologies</th>
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</thead>
<tbody>
<tr>
<td>IE5105    Introduction to Supply Chain Systems</td>
</tr>
<tr>
<td>IE5107    Material Flow Systems</td>
</tr>
<tr>
<td>IE5108    Facility Layout and Location</td>
</tr>
<tr>
<td>IE5202    Applied Forecasting Methods</td>
</tr>
<tr>
<td>IE5203    Decision Analysis</td>
</tr>
<tr>
<td>IE5205    Healthcare Systems and Analytics</td>
</tr>
<tr>
<td>IE5206    Energy and Sustainability: A Systems Approach</td>
</tr>
<tr>
<td>IE5404    Large Scale Systems Engineering</td>
</tr>
<tr>
<td>IE5407    Flexibility In Engineering Systems Design</td>
</tr>
<tr>
<td>IE5504    Systems Modelling and Advanced Simulation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Quality and Reliability Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE5121    Quality Planning and Management</td>
</tr>
</tbody>
</table>
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.

Service Systems - 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
- At least five of the following elective modules for specialisation:

IE5122 Statistical Quality Control
IE5205 Healthcare System and Analytics
IE5213 Service Innovation and Management
IE5404 Large Scale Systems Engineering
IE5504 Systems Modelling and Advanced Simulation
IE5905 Independent Study in Service Systems
IE5906A Research Project in Service Systems I
IE5906B Research Project in Service Systems 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.