3.5.5.1 Second Major in Systems Engineering Programme

The Department of Industrial Systems Engineering & Management (ISEM) offers the Major in Systems Engineering (Sys Eng Major), a Second Major as part of NUS Special Undergraduate Programmes, for students from all other faculties and schools.

The programme is offered from August 2008. Students may be admitted to the programme based on the following criteria:

- Students can apply on admission or after they have completed their first year of study;
- Must apply no later than the 5th semester of their study;
- Must have a CAP score of at least 3.5

Applications should be submitted to the ISEM Department. Selection for admission will be on a competitive basis and subjected to the approval from ISEM Department as well as availability of quota.

To fulfil the requirements of the Second Major in Systems Engineering, students are required to complete 48 MCs.

Students may use up to a maximum of 16 MCs of their Second Major in Systems Engineering modules to double count towards other programmes.

Once admitted to the Second Major in Systems Engineering programme, students do not need to maintain any minimum academic performance threshold in order to remain in the programme. They are strongly encouraged to plan their modules well in order to be able to complete the programme requirements.

Students who complete the 24 MCs of core modules* will be awarded a Minor in Systems Engineering if they do not wish to complete all the requirements for the Second Major in Systems Engineering.

### Module Requirements for 2nd Major in Systems Engineering  AY2017/2018 Intake Onwards

<table>
<thead>
<tr>
<th>Modules</th>
<th>MCs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seven Core Modules</strong></td>
<td>32</td>
</tr>
<tr>
<td>ST2334 Probability and Statistics*</td>
<td>4</td>
</tr>
<tr>
<td>IE1113 Introduction to Systems Analytics*</td>
<td>4</td>
</tr>
<tr>
<td>IE1114 Introduction to Systems Thinking and Dynamics*</td>
<td>4</td>
</tr>
</tbody>
</table>
IE2110  Operations Research I* 4
IE2150  Human Factors Engineering* 4
IE3105  Fundamentals of Systems Engineering and Architecture* 4
IE3102  System Engineering Project 8

**Two Electives Modules** 8

Any two modules from the following:

CS2113T  Software Engineering 4
IE2130  Quality Engineering I 4
IE3101  Statistics for Engineering Applications 4
IE3110R  Simulation 4
IE4240  Project Management (or equivalent) 4
IE4243  Decision Modeling and Risk Analysis 4

**Two Systems Modules** 8

Any two modules from the following:

**Industrial Systems**

IE3120  Manufacturing Logistics 4
IE4220  Supply Chain Modeling 4
IE4221  Transport Demand Modeling and Economics 4
IE4244  Energy: Security, Competitiveness and Sustainability 4

**Infrastructure Systems**

CE3101  Integrated Infrastructure Project 4
CE3102  Engineering of Socio-Technical Systems 4
CE3121  Transportation Engineering 4
CE3132 Water Resources Engineering 4
CE4221 Design of Land Transport Infrastructures 4
CE4282 Building Information Modeling for Project 4
ESE3101 Solid and Hazardous Waste Management 4

Computer Systems
CS2102 Database Systems 4
CS4244 Knowledge Based Systems 4
CS4246 AI Planning and Decision Making 4

Electrical/Electronic Systems
EE3331C Feedback Control Systems 4
EE3505C Electrical Energy Systems 4
EE4214 Real Time Embedded Systems 4
EE4305 Introduction to Fuzzy/Neural Systems 4
EE4307 Control Systems Design and Simulation 4
EE4308 Advances in Intelligent Systems and Robotics 4
EE4501 Power Systems Management and Protection 4
EE4511 Sustainable Energy Systems 4

Mechanical Systems
ME4246 Modern Control Systems 4
ME4263 Fundamentals of Product Development 4
ME4266 Energy and Thermal Systems 4

Chemical Systems
CN4122 Process Synthesis and Simulation 4
CN4201R Petroleum Refining 4
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN4238</td>
<td>Chemical and Biochemical Process Modelling</td>
<td>4</td>
</tr>
<tr>
<td>CN4245R</td>
<td>Data Based Process Characterization</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Biomedical Systems</strong></td>
<td></td>
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<tr>
<td>BN3101</td>
<td>Biomedical Engineering Design</td>
<td>4</td>
</tr>
<tr>
<td>BN4203</td>
<td>Rehabilitation Engineering</td>
<td>4</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td>48</td>
</tr>
</tbody>
</table>

For queries on the Second Major in Systems Engineering, please email us at isebox1@nullnus.edu.sg.