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.

In line with the NUS Centralised Online Registration System (CORS), students admitted into the Second Major in Systems Engineering programme will have to bid for their modules during CORS registration.

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>
</tbody>
</table>
IE1113 Introduction to Systems Analytics* 4
IE1114 Introduction to Systems Thinking and Dynamics* 4
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**
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN4122</td>
<td>Process Synthesis and Simulation</td>
<td>4</td>
</tr>
<tr>
<td>CN4201R</td>
<td>Petroleum Refining</td>
<td>4</td>
</tr>
<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>
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</table>

**Biomedical Systems**

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BN3101</td>
<td>Biomedical Engineering Design</td>
<td>4</td>
</tr>
<tr>
<td>BN4203</td>
<td>Rehabilitation Engineering</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total** 48

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