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

Two Electives Modules  
Any two modules from the following:  
CS2113T  Software Engineering  
IE2130  Quality Engineering I  
IE3101  Statistics for Engineering Applications  
IE3110R  Simulation  
IE4240  Project Management (or equivalent)  
IE4243  Decision Modeling and Risk Analysis  

Two Systems Modules  
Any two modules from the following:  
Industrial Systems  
IE3120  Manufacturing Logistics  
IE4220  Supply Chain Modeling  
IE4221  Transport Demand Modeling and Economics  
IE4244  Energy: Security, Competitiveness and Sustainability  
Infrastructure Systems  
CE3101  Integrated Infrastructure Project
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
CN4238 Chemical and Biochemical Process Modelling 4
CN4245R Data Based Process Characterization 4

**Biomedical Systems**

BN3101 Biomedical Engineering Design 4
BN4203 Rehabilitation Engineering 4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit</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>
</tr>
<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@nus.edu.sg.