

SECOND MAJOR IN SYSTEMS ENGINEERING
Revised Course Requirements for Students admitted in
AY2019/2020 and AY2020/2021

To be awarded a degree with Second Major in Systems Engineering, students must pass **at least 40 MCs** of the following courses, which include:

CORE COURSES (24 Units)

Pass 5 core courses, which include:

IE2111 Industrial & Systems Engrg Principles & Practice II
IE2110 Operations Research I
IE2141 Systems Thinking and Dynamics
IE3105 Fundamentals in Systems Engineering & Architecture
IE3102 System Engineering Project (8 Units) ^{see Note 1}

ELECTIVES COURSES (8 Units)

Pass at least 8 Units from the following:

CS2113T Software Engineering & Object-Oriented Programming
IE3101 Statistics for Engineering Applications
IE3110R Simulation
IE3250 Human Factors Engineering
IE4240 Project Management (or equivalent)
IE4243 Decision Modeling & Risk Analysis
IE5231 Statistical Methods for Process Design & Control

SYSTEMS COURSES (8 Units)

Pass at least 8 Units from the following:

Industrial Systems

IE3120 Manufacturing Logistics
IE4220 Supply Chain Modeling
IE4221 Transport Demand Modeling & Economics

Infrastructure Systems

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

Computer Systems

CS2102 Database Systems
CS4244 Knowledge Representation and Reasoning
CS4246 AI Planning and Decision Making

Electrical/ Electronic Systems

EE3331C Feedback Control Systems
EE3506C/EE2029 Introduction to Electrical Energy Systems (4 Units/3 Units)
EE4305 Fuzzy/Neural Systems for Intelligent Robotics
EE4307 Control Systems Design & Simulation
EE4308 Autonomous Robot Systems
EE4501 Power System Management & Protection
EE4511 Renewable Generation and Smart Grid

Mechanical Systems

ME4226 Energy & Thermal Systems
ME4246 Modern Control Systems
ME4263 Fundamentals of Product Development

Chemical Systems

CN4122 Process Synthesis & Simulation (3 Units)
CN4201R Petroleum Refining
CN4238R Chemical & Biochemical Process Modelling

Biomedical Systems

BN3101 Biomedical Engineering Design (6 Units)
BN4203 Robotics in Rehabilitation

Note 1

IE3102 is a year-long course. The project work spans over a period of two semesters. Eligible students should contact ISEM Department at ug_isem@nus.edu.sg to indicate their intention to take the course before term starts.

- For project starting in Semester 1, please contact the Department by May.
- For project starting in Semester 2, please contact the Department by October.

Note 2

Students who complete the 5 core courses 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.

Course requirements for Minor in Systems Engineering

Pass the following 5 courses:

IE2110 Operations Research I
IE2111 Industrial & Systems Engineering Principles & Practice II
IE2141 Systems Thinking and Dynamics
IE3105 Fundamentals in Systems Engineering & Architecture
IE3102A Systems Engineering Project