

3.2.8.2 Degree Requirements

Students in the Bachelor of Engineering (Industrial & Systems Engineering) programme are required to fulfil the following requirements to graduate from the programme:

- Complete a minimum of 160 MCs with a CAP \geq 2.0;
- Pass the modules in accordance with Table 3.2.8a and 3.2.8b for Practicing Professional and Research-focused Pathways, respectively;
- Satisfy all other requirements as prescribed by the Faculty of Engineering or the University.

Students are advised to refer to the Industrial Systems Engineering and Management Department website for latest information on BEng (ISE) curriculum.

Table 3.2.8a: Summary of Modular Requirements and Credits for Practicing Professional Pathway (PPP)

Modular Requirements	MCs	MCs	MCs
	Option 1	Option 2	Option 3
University Level Requirements	20	20	20
General Education Modules (GE) (5 Modules, each of 4MCs) <ul style="list-style-type: none"> • Human and Cultures (H&C) • Quantitative Reasoning (QR) • Thinking and Expression (T&E) • Singapore Studies (SS) • Asking Questions (AQ) 	20	20	20
Unrestricted Electives	32	32	32
Common Engineering Requirements	36	36	36
CS1010E Programming Methodology	4	4	4
EE2211 Introduction to Machine Learning	4	4	4
EG1311 Design and Make	4	4	4
IE1111R Industrial & Systems Engineering Principles & Practice I	4	4	4
IE2111 Industrial & Systems Engineering Principles & Practice II	4	4	4
IE2141 Systems Thinking and Dynamics	4	4	4

MA1505 Mathematics I	4	4	4
MA1508E Linear Algebra	4	4	4
MLE1010 Materials Engineering Principles & Practice	4	4	4
Faculty Requirements	6	6	6
ES1531 Critical Thinking and Writing	4	4	4
EG2401A Engineering Professionalism	2	2	2
ES1xxx English ¹			
ISE Foundation Requirements	8	8	8
Basket of Science Modules (PC1431 or PC1432)	4	4	4
ST2334 Probability and Statistics	4	4	4
ISE Major Requirements	50	50	50
IE2100 Probability Models with Applications	4	4	4
IE2110 Operations Research I	4	4	4
IE3100R Systems Design Project	8	8	8
IE3101 Statistics for Engineering Applications	4	4	4
IE3110R Simulation	4	4	4
IE4100R BEng Dissertation	-	8	-
IE4102 Independent Study Module	4	-	4
EG3611A Industrial Attachment Programme ²	-	-	10
EG3612 Vacation Internship Programme ²	6	6	-
ISE Electives (see Table 3.2.8d)	16	12	12
Pathway Requirements (PPP)	8	8	8
IE4211 Modelling and Analytics	4	4	4
IE4240 Project Management	4	4	4

Total	160	160	160
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¹ Students who have not passed or been exempted from the Qualifying English Test at the time of admissions to the Faculty will have to read ES1000 and/or ES1103. This will be decided by CELC.

² For BEng students who are from direct poly intake and in the following special programmes: DDPs, CDPs, GEP & CSP, internship/industrial-attachment is optional and the modular credits for the internship/industrial-attachment will become 'Free Electives' i.e., Unrestricted Electives (UE).

Practicing Professional Pathway

- PPP students can select one of the following options to meet the degree requirements:

Option 1: IE4102 and EG3612 (10MCs) + ISE Electives (16MCs)

Option 2: IE4100R and EG3612 (14MCs) + ISE Electives (12MCs)

Option 3: IE4102 and EG3611A (14MCs) + ISE Electives (12MCs)

- PPP students will have to read IE4211 and IE4240 of professional development modules to meet the pathway requirements (8MCs).

Table 3.2.8b: Summary of Modular Requirements and Credits for Research-focused Pathway (RfP)

Modular Requirements	MCs
University Level Requirements	20
General Education Modules (GE) (5 Modules, each of 4MCs) <ul style="list-style-type: none"> • Human and Culture (H&C) • Quantitative Reasoning (QR) • Thinking and Expression (T&E) • Singapore Studies (SS) • Asking Questions (AQ) 	20
Unrestricted Electives	32

Common Engineering Requirements	36
CS1010E Programming Methodology	4
EE2211 Introduction to Machine Learning	4
EG1311 Design and Make	4
IE1111R Industrial & Systems Engineering Principles & Practice I	4
IE2111 Industrial & Systems Engineering Principles & Practice II	4
IE2141 Systems Thinking and Dynamics	4
MA1505 Mathematics I	4
MA1508E Linear Algebra	4
MLE1010 Materials Engineering Principles & Practice	4
Faculty Requirements	6
ES1531 Critical Thinking and Writing	4
EG2401A Engineering Professionalism	2
ES1xxx English ¹	
ISE Foundation Requirements	8
Basket of Science Modules (PC1431 or PC1432)	4
ST2334 Probability and Statistics	4
ISE Major Requirements	50
IE2100 Probability Models with Applications	4
IE2110 Operations Research I	4
IE3100R Systems Design Project	8
IE3101 Statistics for Engineering Applications	4
IE3110R Simulation	4
IE4100R BEng Dissertation	8

EG3612 Vacation Internship Programme ²	6
ISE Electives (see Table 3.2.8d)	12
Pathway Requirements (RfP)	8
IE5xxx/IE6xxx (see Table 3.2.8c)	4
IE5xxx/IE6xxx (see Table 3.2.8c)	4
Total	160

¹ Students who have not passed or been exempted from the Qualifying English Test at the time of admission to the Faculty will have to read ES1000 and/or ES1103. This will be decided by CELC.

² For BEng students who are from direct poly intake and in the following special programmes: DDPs, CDPs, GEP & CSP, internship/industrial-attachment is optional and the modular credits for the internship/industrial-attachment will become 'Free Electives' i.e., Unrestricted Electives (UE).

Research-focused Pathway

- RfP student will have to carry out internship in Research Institutions or R&D Labs.
- RfP students will have to work on research based FYP.
- RfP students will have to read any two 5000 level (or 6000 level) modules from the Basket of Modules for Research-focused Pathway Requirements (see Table 3.2.8c).
- RfP students will have to take UROP (Undergraduate Research Opportunities Programme - 4MCs).

Table 3.2.8c: Basket of Modules for Research-focused Pathway Requirements

Modules
IE5108 Facility Layout and Location
IE5202 Applied Forecasting Methods
IE5203 Decision Analysis
IE5205 Healthcare Systems and Analytics
IE5213 Service Innovation and Management
IE5407 Flexibility in Engineering Systems Design

IE6001 Foundations of Optimization
IE6002 Advanced Engineering Statistics
IE6005 Stochastic Models and Optimization

Table 3.2.8d: List of ISE Electives

ISE TECHNICAL ELECTIVES
IE3105 Fundamentals of Systems Engineering and Architecture
IE3120 Manufacturing Logistics
IE3250 Human Factors Engineering
IE4210 Operations Research II
IE4211 Modelling and Analytics
IE4220 Supply Chain Modelling
IE4221 Transportation Demand Modelling and Economics
IE4229 Selected Topics in Logistics
IE4230 Quality Engineering II
IE4239 Selected Topics in Quality Engineering
IE4240 Project Management
IE4241 Work, Technology and Organization
IE4242 Cost Analysis and Management
IE4243 Decision Modeling and Risk Analysis
IE4244 Energy: Security, Competitiveness and Sustainability
IE4249 Selected Topics in Engineering Management
IE4250 System Dynamics Modelling
IE4251 Process Analysis and Redesign

ISE TECHNICAL ELECTIVES

IE4259 Selected Topics in Systems Engineering

IE4299 Selected Topics in Industrial Engineering

IE5108 Facility Layout and Location

IE5121 Quality Planning and Management

IE5203 Decision Analysis

IE5213 Service Innovation and Management

IE5301 Human Factors in Engineering and Design

IE5307 Topics in Human Factor Engineering

MT4002 Technology Management Strategy

MT5002 Management of Industrial R&D

Note: Level 5000 modules only offered to ISE students with Stage 4 standing.