

## Bachelor of Engineering (Industrial & Systems Engineering) Degree Requirements for Students Matriculated in AY2019/2020

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 modular requirements
- Satisfy all other requirements as prescribed by the Faculty of Engineering or the University

Modular Requirements	Practising Professional Pathway (PPP)			Research-Focused Pathway (RfP)
	Option 1	Option 2	Option 3	
<b>University Level Requirements</b> General Education	20 MCs	20 MCs	20 MCs	20 MCs
<b>Unrestricted Elective Modules (UEM)</b>	32 MCs	32 MCs	32 MCs	32 MCs
<b>Common Engineering Requirements</b> CS1010E, EE2211, EG1311, IE1111R, IE2111, IE2141, MA1505, MA1508E, MLE1010	36 MCs	36 MCs	36 MCs	36 MCs
<b>Faculty Requirements</b> ES2531, EG2401A	6 MCs	6 MCs	6 MCs	6 MCs
<b>ISE Major Requirements</b> IE2100, IE2110, IE3100R, IE3101, IE3110R, ST2334, IE4102 or IE4100R, EG3611A or EG3612, PC1431 or PC1432	42 MCs	46 MCs	46 MCs	46 MCs
<b>ISE Electives</b>	16 MCs	12 MCs	12 MCs	12 MCs
<b>Pathway Requirements</b>	8 MCs	8 MCs	8 MCs	8 MCs
<b>Minimum MCs required for graduation</b>	<b>160 MCs</b>	<b>160 MCs</b>	<b>160 MCs</b>	<b>160 MCs</b>

Notes:

[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] Students are required to read one General Education Modules (GE) from each of 5 pillars: Human and Cultures (H&C), Quantitative Reasoning (QR), Thinking and Expression (T&E), Singapore Studies (SS) and Asking Questions (AQ).

[3] Internship is optional for poly intake students and students in the following special programmes: DDPs, CDPs, GEP & CSP. The modular credits for the internship/industrial-attachment will become 'Free Electives' i.e., Unrestricted Electives (UE).

[4] Students are required to read one of the modules listed in the Basket of Science Modules.

### Basket of Science Modules

Module Code and Title	MCs
PC1431 Physics IE	4
PC1432 Physics IIE	4

[5] Students should not read more than 60MCs of level 1000 modules towards their degree requirements.

[6] Pathway Requirements:

### **Practising Professional Pathway (PPP)**

- PPP students can select one of the following options to meet the degree requirements:
  - Option 1: IE4102 and EG3612 (10 MCs) + ISE Electives (16 MCs)
  - Option 2: IE4100R and EG3612 (14 MCs) + ISE Electives (12 MCs)
  - Option 3: IE4102 and EG3611A (14 MCs) + ISE Electives (12 MCs)
- PPP students must read IE4240 and IE4211 to meet the pathway requirements (8 MCs). Both modules cannot be double counted towards the ISE Electives requirements.

**Research-Focused Pathway (RfP)**

- RfP students will have to take UROP (Undergraduate Research Opportunities Programme) to meet RfP requirements. (UEM)
- RfP students will have to work on research based FYP.
- RfP students will have to carry out internship in Research Institutions or R&D Labs.
- RfP students will have to take two 5000 level (or 6000 level) modules from the Basket of Modules for RfP Requirements.

**Basket of Modules for RfP Requirements**

Module Code and Title	MCs
IE5108 Facility Layout and Location	4
IE5202 Applied Forecasting Methods	4
IE5203 Decision Analysis	4
IE5205 Healthcare Systems and Analytics	4
IE5213 Service Innovation and Management	4
IE6001 Foundations of Optimization	4
IE6002 Advanced Engineering Statistics	4

**ISE Elective Modules for Students Matriculated in AY2019/2020 to AY2020/2021**

Module Code and Title	MCs
IE3105 Fundamentals of Systems Engineering and Architecture	4
IE3120 Manufacturing Logistics	4
IE3250 Human Factors Engineering	4
IE4210 Operations Research II	4
IE4213 Learning from Data	4
IE4214 Revenue Management and Pricing Analytics	4
IE4215 Machine Learning for Industrial Engineering	4
IE4211 Modelling and Analytics	4
IE4220 Supply Chain Modeling	4
IE4221 Transportation Demand Modelling and Economics	4
IE4229 Selected Topics in Logistics	4
IE4239 Selected Topics in Quality Engineering	4
IE4240 Project Management	4
IE4242 Cost Analysis and Management	4
IE4243 Decision Modeling and Risk Analysis	4
IE4248 Energy and Green Economy	4
IE4249 Selected Topics in Engineering Management	4
IE4259 Selected Topics in Systems Engineering	4
IE4299 Selected Topics in Industrial Engineering	4
IE5107 Material flow Systems*	4
IE5108 Facility Layout and Location*	4
IE5121 Quality Planning and Management*	4
IE5202 Applied Forecasting Methods*	4
IE5203 Decision Analysis*	4
IE5206 Energy and Sustainability: A Systems Approach*	4
IE5213 Service Innovation and Management*	4
IE5221 Transportation Modeling and Economics*	4
IE5231 Statistical Methods for Process Design and Control*	4
IE5301 Human Factors in Engineering & Design*	4
IE5600 Applied Programming for Industrial Systems*	4
MT4002 Technology Management Strategy	4
MT5002 Management of Industrial R & D*	4

\* Level 5000 modules only offered to ISE students with Stage 4 standing.