

Bachelor of Engineering (Honours)

Available minors in Malaysia

Update version: 1 December 2023

Before commencing a minor, it is essential for you to review the prerequisite requirements for the units within the minor and proactively plan ahead to fulfil the requirements.

Artificial intelligence in engineering

This minor is **not** available to the chemical engineering, civil engineering, robotics and mechatronics engineering (artificial intelligence stream) and software engineering specialisations.

Students in the **electrical and computer systems engineering** or the **robotics and mechatronics engineering (automation stream)** specialisations complete the following

You must complete the four units (24 cp) below

- [TRC2001](#) Introduction to systems engineering
- [ECE4076](#) Computer vision
- [ECE4078](#) Intelligent robotics
- [ECE4179](#) Neural networks and deep learning

Artificial intelligence in engineering

This minor is **not** available to the chemical engineering, civil engineering, robotics and mechatronics engineering (artificial intelligence stream) and software engineering specialisations.

Students in the **mechanical engineering** specialisation complete the following

You must complete the four units (24 cp) below

- [ECE2071](#) Computer organisation and programming
- [ECE4076](#) Computer vision
- [ECE4078](#) Intelligent robotics
- [ECE4179](#) Neural networks and deep learning

Design and manufacturing

This minor is **not** available to the chemical engineering, civil engineering, electrical and computer systems engineering, robotics and mechatronics engineering (artificial intelligence stream) and software engineering specialisations.

Students in the **mechanical engineering** or **robotics and mechatronics engineering (automation stream)** specialisations complete the following

You must complete the four units (24 cp) below

- [MEC2811](#) Manufacturing processes
- [TRC2001](#) Introduction to systems engineering
- [MEC3800](#) Introduction to reliability engineering
- [MEC4801](#) Non-destructive testing and inspection

Sensory systems in Industry 4.0

This minor is **not** available to the civil engineering, electrical and computer systems engineering, robotics and mechatronics engineering (artificial intelligence stream) and software engineering specialisations.

Students in the **chemical engineering, mechanical engineering** or **robotics and mechatronics engineering (automation stream)** specialisations complete the following

You must complete the four units (24 cp) below

- [ECE2131](#) Electrical circuits
- [ECE2071](#) Computer organisation and programming
- [TRC3500](#) Sensors and artificial perception
- [ECE4078](#) Intelligent robotics

Bachelor of Engineering (Honours)

2024 Technical electives in Malaysia

Update version: 20 December 2023

● Offered × Not offered Offerings are subject to change		
Semester 1	Semester 2	October

First Year breadth study

¹ **Accreditation in Malaysia:** The Malaysian Ministry of Education requires you to complete [ENG2801](#) to meet general studies requirements. If you plan to specialise in Civil Engineering, the Engineering Accreditation Council Malaysia requires you to also complete [ENG1021](#) for accreditation.

² **Intending to specialise in chemical engineering:** Due to the prohibition with CHE2161, you are strongly advised against completing MEC2404 as a First Year elective. Choosing MEC2404 may lead to an insufficient foundation for the subsequent core unit CHE3167 in the chemical engineering specialisation. If you intend to specialise in chemical engineering, you are advised to choose CHE2161 as your First Year elective instead.

³ **NOTE:** If you complete a First Year technical elective that is also a core unit in your chosen specialisation or if you have completed a unit that is a prohibition to a core unit in your specialisation, you must replace the core with another unit chosen from your specialisation technical electives list or from one of the engineering minors. The replacement unit must be at the same level as the core unit or higher. Please seek advice from the Faculty of Engineering prior to enrolling in the replacement unit.

CHM1051 Chemistry 1 advanced	●	●	
ENG1021 Spatial communication in engineering ¹		●	
ENG1811 Engineering Industry 4.0 Design	●	●	
MAT1830 Discrete mathematics for computer science ³	●	●	
FIT1056 Introduction to software engineering for engineers	●	●	
PHS1002 Physics for engineering	●	●	
CHE2161 Mechanics of fluids ²		●	
ECE2072 Digital systems ³		●	
ENG2801 Leadership and innovation ¹		●	●
FIT2085 Introduction to computer science for engineers ³	●	●	
MEC2404 Mechanics of fluids ^{2,3}		●	
MEC2811 Manufacturing processes	●		
TRC2001 Introduction to systems engineering		●	

Chemical engineering

Electives must be completed at the unit level required to satisfy your course requirements. You may consider other engineering technical units chosen from the engineering minors, subject to meeting the unit prerequisite or co-requisite rules.

* **Industry 4.0 units**

CHE2166 Introduction to process simulation		●	
CHE2167 Process material selection	●		
CHE2871 Biochemistry for engineers	●		
CHE2873 Introduction to chemical processes	●		
ECE2071 Computer organisation and programming *	●		
ECE2131 Electrical circuits *	●		
CHE3163 Sustainable processing 1	●		
CHE3171 Bioprocess technology		●	
CHE3172 Nanotechnology and materials 1		●	
CHE3873 Pilot plant project	●		
TRC3500 Sensors and artificial perception *	●		
CHE4171 Biochemical engineering		●	
CHE4172 Nanotechnology and materials 2		●	
CHE4173 Sustainable processing 2	●		
You may consider an engineering technical unit chosen from the engineering minors, subject to meeting the unit prerequisite and/or co-requisite rules.			

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Semester 1 Semester 2 October

Civil engineering

Electives must be completed at the unit level required to satisfy your course requirements. You may consider other engineering technical units chosen from the engineering minors, subject to meeting the unit prerequisite or co-requisite rules.

¹ **Accreditation in Malaysia:** If you plan to seek accreditation with Engineering Accreditation Council (EAC) Malaysia, you must complete ENG1021.

ENG1021	Spatial communication in engineering ¹		●	
CIV2283	Civil engineering construction	●		
CIV3283	Road engineering (Available elective to students who commenced Civil Engineering before 2020)		●	
MEC3459	Materials selection for engineers	×	●	
CIV4234	Advanced structural analysis	●		
CIV4235	Advanced structural design		●	
CIV4248	Ground hazards engineering	●		
CIV4261	Integrated urban water management	●		
CIV4268	Water resources management		●	
CIV4283	Transport planning		●	
CIV4284	Sustainable traffic systems	●		
You may consider an engineering technical unit chosen from the engineering minors, subject to meeting the unit prerequisite and/or co-requisite rules.				

Electrical and computer systems engineering

Electives must be completed at the unit level required to satisfy your course requirements. You may consider other engineering technical units chosen from the engineering minors, subject to meeting the unit prerequisite or co-requisite rules.

CORE ELECTIVES

The ECSE specialisation requires the completion of sixteen core units AND two core electives chosen from the ECSE technical electives list. **The core electives must be level 4 or 5 ECE-coded.**

¹ **Level 5 units:** You must obtain a weighted average mark (WAM) of 65 or above at the conclusion of level 3 and be in your final year to be eligible to enrol in the level 5 units.

TRC2001	Introduction to systems engineering		●	
ECE3093	Optimisation and numerical methods for engineers	×		
MEC3459	Materials selection for engineers	×	●	
TRC3500	Sensors and artificial perception	●		
ECE4032	Advanced control	●		
ECE4042	Communications theory	×	×	
ECE4043	Optical communications	×		
ECE4044	Telecommunications protocols	×		
ECE4045	Network performance		×	
ECE4053	Power system analysis		●	
ECE4063	Large scale digital design		×	
ECE4075	Real time embedded systems	●		
ECE4076	Computer vision	●		
ECE4078	Intelligent robotics		●	
ECE4122	Advanced electromagnetics		×	
ECE4146	Multimedia technologies		×	
ECE4179	Neural networks and deep learning	●		
ECE4808	Organic electronics and micro devices		●	
ECE4809	Solid state lighting		●	
ECE4810	Internet of things: Communication, data and security		●	
ECE5886	Smart grids ¹		×	
MEC5885	Energy efficiency and sustainability engineering ¹	●		
MEC5886	Sustainable energy technologies ¹		●	
You may consider an engineering technical unit chosen from the engineering minors, subject to meeting the unit prerequisite and/or co-requisite rules.				

Mechanical engineering

Electives must be completed at the unit level required to satisfy your course requirements. You may consider other engineering technical units chosen from the engineering minors, subject to meeting

ECE2131	Electrical circuits	●		
MEC2811	Manufacturing processes	●		
TRC2001	Introduction to systems engineering		●	
MEC3448	Engineering technologies		●	
MEC3458	Experimental project		×	
MEC3459	Materials selection for engineers ¹	×	●	
MEC3800	Introduction to reliability engineering	●		

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Semester 1 Semester 2 October

the unit prerequisite or co-requisite rules.

¹ **Accreditation in Malaysia:** If you plan to register as a Mechanical Engineer with the Board of Engineers Malaysia (BEM), you must complete MEC3459.

² **Level 5 units:** You must obtain a weighted average mark (WAM) of 65 or above at the conclusion of level 3 and be in your final year to be eligible to enrol in the level 5 units.

MEC3821	Introduction to electric vehicle technology		●	
MEC3828	Biomedical engineering and healthcare system		×	
TRC3500	Sensors and artificial perception	●		
ECE4179	Neural networks and deep learning	●		
MEC4416	Momentum, energy and mass transport in engineering systems		×	
MEC4417	Refrigeration and air-conditioning		●	
MEC4418	Control systems	×		
MEC4444	Introduction to engineering acoustics		●	
MEC4801	Non-destructive testing and inspection	●		
MEC4802	Sustainable engineering and design with nanomaterials	×		
MEC4803	Sustainable combustion technologies	●		
MEC4804	Clean energy materials		●	
TRC4200	Engineering cyber-physical systems	●		
TRC4800	Robotics	●		
MEC5801	Industrial ecology ²		●	
MEC5885	Energy efficiency and sustainability engineering ²	●		
MEC5886	Sustainable energy technologies ²		●	
MEC5891	Design for additive manufacturing ²	●		
MEC5897	Lean manufacturing ²		●	
TRC5801	Operations and supply chain management ²	●		
You may consider an engineering technical unit chosen from the engineering minors, subject to meeting the unit prerequisite and/or co-requisite rules.				

Robotics and mechatronics engineering

Electives must be completed at the unit level required to satisfy your course requirements. You may consider other engineering technical units chosen from the engineering minors, subject to meeting the unit prerequisite or co-requisite rules.

¹ **Accreditation in Malaysia:** If you plan to seek accreditation with the Engineering Accreditation Council Malaysia (EAC), you must complete [(ECE3051 or MEC3416) and TRC4802].

² **Level 5 units:** You must obtain a weighted average mark (WAM) of 65 or above at the conclusion of level 3 and be in your final year to be eligible to enrol in the level 5 units.

ECE2111	Signals and systems		●	
ECE2191	Probability models in engineering		●	
TRC2001	Introduction to systems engineering		●	
ECE3051	Electrical energy systems ¹	●		
ECE3073	Computer systems	●		
ECE3141	Information and networks	●		
MEC3416	Machine design ¹		●	
MEC3448	Engineering technologies		●	
MEC3459	Materials selection for engineers	×	●	
MEC3821	Introduction to electric vehicle technology		●	
MEC3828	Biomedical engineering and healthcare system		×	
ECE4032	Advanced control	●		
ECE4044	Telecommunication protocols	×		
ECE4045	Network performance		×	
ECE4053	Power system analysis		●	
ECE4063	Large scale digital design		×	
ECE4076	Computer vision	●		
ECE4078	Intelligent robotics		●	
ECE4146	Multimedia technologies		×	
ECE4179	Neural networks and deep learning	●		
ECE4809	Solid state lighting		●	
ECE4810	Internet of Things: Communication, data and security		●	
MEC4416	Momentum, energy and mass transport in engineering systems		×	
MEC4417	Refrigeration and air-conditioning		●	
MEC4426	Computer-aided design		●	

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MEC4444	Introduction to engineering acoustics		●	
MEC4801	Non-destructive testing and inspection	●		
MEC4802	Sustainable engineering and design with nanomaterials	×		
TRC4200	Engineering cyber-physical systems	●		
TRC4802	Thermo-fluids and power systems ¹		●	
TRC4902	Mechatronics and manufacturing		●	
ECE5886	Smart grids ²		×	
MEC5885	Energy efficiency and sustainability engineering ²	●		
MEC5886	Sustainable energy technologies ²		●	
MEC5891	Design for additive manufacturing ²	●		
TRC5901	Advanced artificial intelligence ²		●	
<i>You may consider an engineering technical unit chosen from the engineering minors, subject to meeting the unit prerequisite and/or co-requisite rules.</i>				

Software engineering

Electives must be completed at the unit level required to satisfy your course requirements.

FIT3003	Business intelligence and data warehousing		●	
FIT3080	Artificial intelligence		●	
FIT3081	Image processing	●		
FIT3134	Entrepreneurship		● Summer semester A	
FIT3143	Parallel computing		●	
FIT3152	Data analytics	●		
FIT3155	Advanced data structures and algorithms	●	●	
FIT3175	Usability	●		
FIT3179	Data visualisation		●	
FIT3182	Big data management and processing	●		
FIT3183	Malicious AI and dark side security		●	
FIT4005	IT research methods	●	●	
FIT4009	Advanced topics in intelligent systems		●	
FIT5133	Enterprise architecture and management		×	
FIT5202	Data processing for big data	●		