

**Bachelor of Engineering (Electrical Engineering)
with Second Major in Innovation & Design**

Cohort 2019/2020

Modular Requirements	Modular Credits (MCs)
University Level Requirements	
General education modules:	
• Quantitative Reasoning (GER1000)	4
• Thinking & Expression (GET)	4
• Human Cultures (GEH)	4
• Singapore Studies (GES)	4
• Asking Questions (GEQ1000)	4
Sub-total for University Level Requirements	20
Programme Requirements	
Faculty requirements:	
• ES2531 Critical Thinking & Writing ¹	4
• EG2401A Engineering Professionalism	2
• ES1xxxx English ²	-
Foundation requirements (common core):	
• EE1111A Electrical Engineering Principles & Practice I	4
• EE2111A Electrical Engineering Principles & Practice II	4
• MA1511 Engineering Calculus	2
• MA1512 Differential Equations for Engineering	2
• MA1508E Linear Algebra for Engineers	4
• CS1010E Programming Methodology	4
• EE2211 Introduction to Machine Learning	4
• EG1311 Design & Make	4
• IE2141 Systems Thinking & Dynamics	4
• MLE1010 Materials Engineering Principles & Practice	4
EEE core modules:	
• EE2012A Analytical Methods in Electrical & Computer Engineering	3
• EE2023 Signals & Systems	4
• EE2026 Digital Design	4
• EE2027 Electronic Circuits	4
• EE2028 Microcontroller Programming & Interfacing	4
• EE2028A C Programming	2
• EE2029 Introduction to Electrical Energy Systems	3
• EE2033 Integrated Systems Lab	4
• PC2020 Electromagnetics for Electrical Engineers	4
EEE outer core and technical electives ³ (minimum of one EE4xxx technical elective)	16
EEE design and project modules:	
• EG3301R DCP Project ³ (over 2 consecutive semesters) <i>(Double-counted for Second Major in Innovation & Design and replaces EE4002D Capstone Project)</i>	12
EG3612 Vacation Internship Programme (VIP) ^{3,4}	6
Sub-total for Programme Requirements	108

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Unrestricted Elective Modules (UEM)	
• Group A module for Second Major	4
• Group B module for Second Major	4
• Group C modules for Second Major – Innovation & Enterprise electives	8
• EG4301 DCP Dissertation <u>or</u> EG4301A Ideas to Start-up (over 2 consecutive semesters)	12
Other unrestricted electives	4
Sub-total for Unrestricted Elective Modules	32
Total	160

Notes:

- ¹ Students in USP, UTCP, and RVRC may read an equivalent module (e.g. UWC2101%, UTW1001%, ES1601, ES1501%) in lieu of ES2531.
- ² Students who have not passed or been exempted from the Qualifying English Test at the point of admission will have to read ES1000 and/or ES1103. ES1103 carries 4 MCs which may be counted as UEM.
- ³ Students in this Second Major are allowed to complete EG3612 (6 MCs) in lieu of EG3611A (10 MCs).

The 12 MCs for EG3301R are mapped by 8 MCs from EE4002D and 4 MCs from the replacement of EG3611A (10 MCs) with EG3612 (6 MCs).

Students may also opt to do EG3611A (10 MCs) in lieu of EG3612 (6 MCs) and 4 MCs of technical electives.
- ⁴ EG3612 (VIP) is optional for poly-intake students and those in the following special programmes: double degree programmes (DDP), concurrent degree programmes (CDP), Chemical Sciences Programme (CSP), and E-Scholars. The 6 MCs for EG3612 may be replaced by other modules.

Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent
(for students who opt for vacation internship)

Semester 1	MCs	Semester 2	MCs
EE1111A Electrical Engineering Principles & Practice I	4	EE2111A Electrical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineers	4
MA1512 Differential Equations for Engineering	2	MLE1010 Materials Engineering Principles & Practice	4
CS1010E Programming Methodology	4	EE2026 Digital Design	4
EG1311 Design & Make	4	EE2028A C Programming	2
GET	4	GER1000 Quantitative Reasoning	4
		Group A module for Second Major (UEM)	4
Sub-total	20	Sub-total	26

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
EE2012A Analytical Methods in Electrical & Computer Engineering	3	EE2023 Signals & Systems	4
EE2027 Electronic Circuits	4	EE2029 Introduction to Electrical Energy Systems	3
EE2028 Microcontroller Programming & Interfacing	4	PC2020 Electromagnetics for Electrical Engineers	4
ES2531 Critical Thinking & Writing	4	GEQ1000 Asking Questions	4
Group B module for Second Major (UEM)	4	EG3301R DCP Project (replaces EE4002D)	6
Sub-total	23	Sub-total	25

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Programme	6
Sub-total	6

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces EE4002D)	6	Innovation & Enterprise Elective 1 (UEM)	4
Outer Core Elective	4	EE2033 Integrated Systems Lab	4
GEH	4	Technical Elective 1	4
GES	4	Technical Elective 2	4
		Technical Elective 3	4
Sub-total	18	Sub-total	20

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
Innovation & Enterprise Elective 2 (UEM)	4	UEM	4
EG2401A Engineering Professionalism	2		
Sub-total	12	Sub-total	10

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent
(for students who opt for vacation internship **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
EE1111A Electrical Engineering Principles & Practice I	4	EE2111A Electrical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineers	4
MA1512 Differential Equations for Engineering	2	MLE1010 Materials Engineering Principles & Practice	4
CS1010E Programming Methodology	4	EE2026 Digital Design	4
EG1311 Design & Make	4	EE2028A C Programming	2
GET	4	GER1000 Quantitative Reasoning	4
		Group A module for Second Major (UEM)	4
Sub-total	20	Sub-total	26

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
EE2012A Analytical Methods in Electrical & Computer Engineering	3	EE2023 Signals & Systems	4
EE2027 Electronic Circuits	4	EE2029 Introduction to Electrical Energy Systems	3
EE2028 Microcontroller Programming & Interfacing	4	PC2020 Electromagnetics for Electrical Engineers	4
ES2531 Critical Thinking & Writing	4	GEQ1000 Asking Questions	4
Group B module for Second Major (UEM)	4	EG3301R DCP Project (replaces EE4002D)	6
Sub-total	23	Sub-total	25

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Programme	6
Sub-total	6

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces EE4002D)	6	Innovation & Enterprise Elective 1 (UEM)	4
Outer Core Elective	4	EE2033 Integrated Systems Lab	4
GEH	4	Specialisation module 1	4
GES	4	Specialisation module 2	4
		Specialisation module 3	4
Sub-total	18	Sub-total	20

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
Innovation & Enterprise Elective 2 (UEM)	4	Specialisation module 4	4
EG2401A Engineering Professionalism	2	Specialisation module 5	4
Sub-total	12	Sub-total	14

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

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Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent
(for students who opt for industrial attachment in lieu of vacation internship)

Semester 1	MCs	Semester 2	MCs
EE1111A Electrical Engineering Principles & Practice I	4	EE2111A Electrical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineers	4
MA1512 Differential Equations for Engineering	2	MLE1010 Materials Engineering Principles & Practice	4
CS1010E Programming Methodology	4	EE2026 Digital Design	4
EG1311 Design & Make	4	EE2028A C Programming	2
GET	4	GER1000 Quantitative Reasoning	4
		Group A module for Second Major (UEM)	4
Sub-total	20	Sub-total	26

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
EE2012A Analytical Methods in Electrical & Computer Engineering	3	EE2023 Signals & Systems	4
EE2027 Electronic Circuits	4	EE2029 Introduction to Electrical Energy Systems	3
EE2028 Microcontroller Programming & Interfacing	4	PC2020 Electromagnetics for Electrical Engineers	4
ES2531 Critical Thinking & Writing	4	GEQ1000 Asking Questions	4
Group B module for Second Major (UEM)	4	EG3301R DCP Project (replaces EE4002D)	6
Sub-total	23	Sub-total	25

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces EE4002D)	6	EG3611A Industrial Attachment	10
Innovation & Enterprise Elective 1 (UEM)	4		
EE2033 Integrated Systems Lab	4		
GEH	4		
Sub-total	18	Sub-total	10

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
Innovation & Enterprise Elective 2 (UEM)	4	Technical Elective 1	4
GES	4	Technical Elective 2	4
Outer Core Elective	4	UEM	4
EG2401A Engineering Professionalism	2		
Sub-total	20	Sub-total	18

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent
(for students who opt for industrial attachment **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
EE1111A Electrical Engineering Principles & Practice I	4	EE2111A Electrical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineers	4
MA1512 Differential Equations for Engineering	2	MLE1010 Materials Engineering Principles & Practice	4
CS1010E Programming Methodology	4	EE2026 Digital Design	4
EG1311 Design & Make	4	EE2028A C Programming	2
GET	4	GER1000 Quantitative Reasoning	4
		Group A module for Second Major (UEM)	4
Sub-total	20	Sub-total	26

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
EE2012A Analytical Methods in Electrical & Computer Engineering	3	EE2023 Signals & Systems	4
EE2027 Electronic Circuits	4	EE2029 Introduction to Electrical Energy Systems	3
EE2028 Microcontroller Programming & Interfacing	4	PC2020 Electromagnetics for Electrical Engineers	4
ES2531 Critical Thinking & Writing	4	GEQ1000 Asking Questions	4
Group B module for Second Major (UEM)	4	EG3301R DCP Project (replaces EE4002D)	6
Sub-total	23	Sub-total	25

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces EE4002D)	6	EG3611A Industrial Attachment	10
Innovation & Enterprise Elective 1 (UEM)	4		
EE2033 Integrated Systems Lab	4		
Outer Core Elective	4		
GEH	4		
Sub-total	22	Sub-total	10

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
Innovation & Enterprise Elective 2 (UEM)	4	Specialisation module 2	4
GES	4	Specialisation module 3	4
Specialisation module 1	4	Specialisation module 4	4
EG2401A Engineering Professionalism	2	Specialisation module 5	4
Sub-total	20	Sub-total	22

Note:

The Group A module for Second Major may be completed in the summer vacation between Semesters 2 and 3 or a subsequent semester if students do not wish to overload in Semester 2.

Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent
(for students in year-long NOC programmes)

Semester 1	MCs	Semester 2	MCs
EE1111A Electrical Engineering Principles & Practice I	4	EE2111A Electrical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineers	4
MA1512 Differential Equations for Engineering	2	MLE1010 Materials Engineering Principles & Practice	4
CS1010E Programming Methodology	4	EE2026 Digital Design	4
EG1311 Design & Make	4	EE2028A C Programming	2
GET	4	GER1000 Quantitative Reasoning	4
		Group A module for Second Major (UEM)	4
Sub-total	20	Sub-total	26

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
EE2012A Analytical Methods in Electrical & Computer Engineering	3	EE2023 Signals & Systems	4
EE2027 Electronic Circuits	4	EE2029 Introduction to Electrical Energy Systems	3
EE2028 Microcontroller Programming & Interfacing	4	PC2020 Electromagnetics for Electrical Engineers	4
ES2531 Critical Thinking & Writing	4	GEQ1000 Asking Questions	4
Group B module for Second Major (UEM)	4	EG3301R DCP Project (replaces EE4002D)	6
Sub-total	23	Sub-total	25

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces EE4002D)	6	NOC	
EE2033 Integrated Systems Lab	4		
GEH	4		
GES	4		
Sub-total	18	Sub-total	

Semester 7	MCs	Semester 8	MCs
NOC		Outer Core Elective	4
		Technical Elective 1	4
		Technical Elective 2	4
Sub-total		Sub-total	12

Mapping of year-long NOC programmes:

NOC modules	iDP / Engineering modules
TR3201 Entrepreneurship Practicum (8 MCs)	EG2401A Engineering Professionalism (2 MCs) + TE breadth (4 MCs)
TR3202 Start-up Internship Programme (12 MCs)	EG3612 Vacation Internship Programme (6 MCs) + EG4301 DCP Dissertation (4 MCs out of 12 MCs)
TR3203N Start-up Case Study & Analysis (8 MCs)	EG4301 DCP Dissertation (8 MCs out of 12 MCs)
Entrepreneurship courses (up to 12 MCs)	Innovation & Enterprise electives (8 MCs – UEM)

Recommended semester schedule for Cohort 2019/2020 – poly-intake students

(for students who intend to complete in 6 semesters and are exempted from Group A module for Second Major)

Semester 3	MCs	Semester 4	MCs
MA1301 Introductory Mathematics (in lieu of EG3612)	4	EG3301R DCP Project (replaces EE4002D)	6
PC1222 Fundamentals of Physics II (in lieu of EG3612)	4	MA1511 Engineering Calculus	2
CS1010E Programming Methodology	4	MA1512 Differential Equations for Engineering	2
EE2026 Digital Design	4	MLE1010 Materials Engineering Principles & Practice	4
EE2028A C Programming	2	EE2027 Electronic Circuits	4
Group B module for Second Major (UEM)	4	EE2028 Microcontroller Programming & Interfacing	4
		GER1000 Quantitative Reasoning	4
Sub-total	22	Sub-total	26

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces EE4002D)	6	Innovation & Enterprise Elective 1 (UEM)	4
MA1508E Linear Algebra for Engineers	4	IE2141 Systems Thinking & Dynamics	4
EE2211 Introduction to Machine Learning	4	EE2012A Analytical Methods in Electrical & Computer Engineering	3
EE2023 Signals & Systems	4	EE2033 Integrated Systems Lab	4
EE2029 Introduction to Electrical Energy Systems	3	GEQ1000 Asking Questions	4
PC2020 Electromagnetics for Electrical Engineers	4	GET	4
Sub-total	25	Sub-total	23

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
Innovation & Enterprise Elective 2 (UEM)	4	Technical Elective 1	4
Outer Core Elective	4	Technical Elective 2	4
GEH	4	Technical Elective 3	4
GES	4		
EG2401A Engineering Professionalism	2		
Sub-total	24	Sub-total	18

Notes:

- Poly-intake students may receive the following exemptions depending on their Diploma qualification:
 - EE1111A Electrical Engineering Principles & Practice I (4 MCs)
 - EE2111A Electrical Engineering Principles & Practice II (4 MCs)
 - EG1311 Design & Make (4 MCs)
 - ES2531 Critical Thinking & Writing (4 MCs)
 - Unrestricted elective modules (20 MCs)
- Poly-intake students may be exempted from Group A module for Second Major (4 MCs) and/or one Innovation & Enterprise elective (4 MCs) depending on their Diploma qualification. These would be included as part of the 20 MCs of exemptions for unrestricted elective modules.

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3. EG3612 (VIP) is not compulsory for poly-intake students. The 6 MCs for VIP may be fulfilled by MA1301 (4 MCs) and PC1222 (4 MCs) and/or other technical elective modules.

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Recommended semester schedule for Cohort 2019/2020 – poly-intake students

(for students who intend to complete in 7 semesters and are exempted from Group A module for Second Major)

Semester 3	MCs	Semester 4	MCs
MA1301 Introductory Mathematics (in lieu of EG3612)	4	EG3301R DCP Project (replaces EE4002D)	6
PC1222 Fundamentals of Physics II (in lieu of EG3612)	4	MA1511 Engineering Calculus	2
CS1010E Programming Methodology	4	MA1512 Differential Equations for Engineering	2
EE2026 Digital Design	4	MLE1010 Materials Engineering Principles & Practice	4
EE2028A C Programming	2	EE2027 Electronic Circuits	4
Group B module for Second Major (UEM)	4	GER1000 Quantitative Reasoning	4
Sub-total	22	Sub-total	22

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces EE4002D)	6	IE2141 Systems Thinking & Dynamics	4
MA1508E Linear Algebra for Engineers	4	EE2012A Analytical Methods in Electrical & Computer Engineering	3
EE2211 Introduction to Machine Learning	4	EE2033 Integrated Systems Lab	4
EE2023 Signals & Systems	4	EE2028 Microcontroller Programming & Interfacing	4
EE2029 Introduction to Electrical Energy Systems	3	GEQ1000 Asking Questions	4
		GET	4
Sub-total	21	Sub-total	23

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
PC2020 Electromagnetics for Electrical Engineers	4	Innovation & Enterprise Elective 1 (UEM)	4
GEH	4	Outer Core Elective	4
GES	4	Technical Elective 1	4
Sub-total	18	Sub-total	18

Semester 9	MCs
Innovation & Enterprise Elective 2 (UEM)	4
Technical Elective 2	4
Technical Elective 3	4
EG2401A Engineering Professionalism	2
Sub-total	14

Recommended semester schedule for Cohort 2019/2020 – JC-intake students or equivalent
(for students in E-Scholars programme)

Semester 1	MCs	Semester 2	MCs
EE1111A Electrical Engineering Principles & Practice I	4	EE2111A Electrical Engineering Principles & Practice II	4
MA1511 Engineering Calculus	2	EE2023 Signals & Systems	4
MA1512 Differential Equations for Engineering	2	EE2026 Digital Design	4
MLE1010 Materials Engineering Principles & Practice	4	PC2020 Electromagnetics for Electrical Engineers	4
EE2028A C Programming	2	RC4 module 2	4
GER1000 Quantitative Reasoning	4	EG3301R DCP Project (replaces EE4002D)	6
RC4 module 1 (replaces ES2531 Critical Thinking & Writing)	4	Group A module for Second Major (UEM)	4
Group B module for Second Major (UEM)	4		
Sub-total	26	Sub-total	30

Semester 3	MCs	Semester 4 – NOC	MCs
EE2012A Analytical Methods in Electrical & Computer Engineering	3	TR3202 Start-up Internship Programme	12
EE2027 Electronic Circuits	4	Entrepreneurship courses	8
EE2028 Microcontroller Programming & Interfacing	4		
RC4 module 3	4		
RC4 module 4	4		
EG2101 Pathways to Engineering Leadership (replaces EG2401A Engineering Professionalism)	2		
EG3301R DCP Project (replaces EE4002D)	6		
Sub-total	27	Sub-total	20

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
UEM (in lieu of EG2141)	4	Outer Core Elective	4
EE2211 Introduction to Machine Learning	4	Technical Elective 1	4
EE2033 Integrated Systems Lab	4	Technical Elective 2	4
EE2029 Introduction to Electrical Energy Systems	3	Technical Elective 3	4
RC4 module 5	4		
Sub-total	25	Sub-total	22

Notes:

- Students must complete the following modules before Semester 1 through advanced placement credits:
 - CS1010E Programming Methodology (4 MCs)
 - MA1508E Linear Algebra for Engineers (4 MCs) – using MA1101R Linear Algebra
 - EG1311 Design & Make (4 MCs)
- TR3202 and the NOC entrepreneurship courses are mapped to EG3612 Vacation Internship Programme (6 MCS), 8 MCs of Innovation & Enterprise electives (i.e. Group C modules), and 6 MCs of UEM.