Bachelor of Engineering (Industrial & Systems 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):	
• IE1111R Industrial & Systems Engineering Principles & Practice I	4
• IE2111 Industrial & Systems Engineering Principles & Practice II	4
• MA1505 Mathematics I	4
• 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
ISE core modules:	
• IE2100 Probability Models with Applications	4
• IE2110 Operations Research I	4
• IE3101 Statistics for Engineering Applications	4
• IE3110R Simulation	4
• IE4211 Modelling & Analytics	4
• IE4240 Project Management	4
• ST2334 Probability & Statistics	4
• PC1431 Physics IE <u>or</u> PC1432 Physics IIE	4
ISE technical electives [3]	16
ISE design and project modules:	
• EG3301R DCP Project (over 2 consecutive semesters) *(Double-counted for Second Major in Innovation & Design and replaces IE3100R Systems Design Project & IE4102 Independent Study Module)*	12
EG3612 Vacation Internship Programme (VIP) [3, 4]	6
Sub-total for Programme Requirements	**108**
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	12
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**

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<u>Notes:</u>

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 may 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.

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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
IE1111R Industrial & Systems Engineering Principles & Practice I	4	IE2111 Industrial & Systems Engineering Principles & Practice I	4
MA1505 Mathematics I	4	MA1508E Linear Algebra for Engineers	4
CS1010E Programming Methodology	4	MLE1010 Materials Engineering Principles & Practice	4
PC1431 Physics IE or PC1432 Physic IIE	4	ST2334 Probability & Statistics	4
GET	4	GER1000 Quantitative Reasoning	4
		Group A module for Second Major (UEM)	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	MCs	Semester 4	MCs
EG1311 Design & Make	4	IE2141 Systems Thinking & Dynamics	4
EE2211 Introduction to Machine Learning	4	IE2100 Probability Models with Applications	4
IE2110 Operations Research I	4	IE3101 Statistics for Engineering Applications	4
GEQ1000 Asking Questions	4	EG2401A Engineering Professionalism	2
ES2531 Critical Thinking & Writing	4	EG3301R DCP Project (replaces IE3100R and IE4102)	6
Group B module for Second Major (UEM)	4		
Sub-total	**24**	**Sub-total**	**20**

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 IE3100R and IE4102)	6	Innovation & Enterprise Elective 1 (UEM)	4
IE3110R Simulation	4	IE4211 Modelling & Analytics	4
IE4240 Project Management	4	Technical Elective 1	4
GEH	4	Technical Elective 2	4
		GES	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	Technical Elective 4	4
Technical Elective 3	4	UEM	4
Sub-total	**14**	**Sub-total**	**14**

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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
IE1111R Industrial & Systems Engineering Principles & Practice I	4	IE2111 Industrial & Systems Engineering Principles & Practice I	4
MA1505 Mathematics I	4	MA1508E Linear Algebra for Engineers	4
CS1010E Programming Methodology	4	MLE1010 Materials Engineering Principles & Practice	4
PC1431 Physics IE or PC1432 Physic IIE	4	ST2334 Probability & Statistics	4
GET	4	GER1000 Quantitative Reasoning	4
		Group A module for Second Major (UEM)	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	MCs	Semester 4	MCs
EG1311 Design & Make	4	IE2141 Systems Thinking & Dynamics	4
EE2211 Introduction to Machine Learning	4	IE2100 Probability Models with Applications	4
IE2110 Operations Research I	4	IE3101 Statistics for Engineering Applications	4
GEQ1000 Asking Questions	4	EG2401A Engineering Professionalism	2
ES2531 Critical Thinking & Writing	4	EG3301R DCP Project (replaces IE3100R and IE4102)	6
Group B module for Second Major (UEM)	4		
Sub-total	**24**	**Sub-total**	**20**

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces IE3100R and IE4102)	6	EG3611A Industrial Attachment	10
IE3110R Simulation	4		
IE4240 Project Management	4		
GEH	4		
GES	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 1 (UEM)	4	IE4211 Modelling & Analytics	4
Innovation & Enterprise Elective 2 (UEM)	4	Technical Elective 3	4
Technical Elective 1	4	UEM	4
Technical Elective 2	4		
Sub-total	**22**	**Sub-total**	**18**

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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
IE1111R Industrial & Systems Engineering Principles & Practice I	4	IE2111 Industrial & Systems Engineering Principles & Practice I	4
MA1505 Mathematics I	4	MA1508E Linear Algebra for Engineers	4
CS1010E Programming Methodology	4	MLE1010 Materials Engineering Principles & Practice	4
PC1431 Physics IE or PC1432 Physic IIE	4	ST2334 Probability & Statistics	4
GET	4	GER1000 Quantitative Reasoning	4
		Group A module for Second Major (UEM)	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	MCs	Semester 4	MCs
EG1311 Design & Make	4	IE2141 Systems Thinking & Dynamics	4
EE2211 Introduction to Machine Learning	4	IE2100 Probability Models with Applications	4
IE2110 Operations Research I	4	IE3101 Statistics for Engineering Applications	4
GEQ1000 Asking Questions	4	GEH	4
ES2531 Critical Thinking & Writing	4	EG3301R DCP Project (replaces IE3100R and IE4102)	6
Group B module for Second Major (UEM)	4		
Sub-total	**24**	**Sub-total**	**22**

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces IE3100R and IE4102)	6		
IE3110R Simulation	4	NOC	
IE4240 Project Management	4		
GES	4		
Sub-total	**18**	**Sub-total**	

Semester 7	MCs	Semester 8	MCs
		IE4211 Modelling & Analytics	4
NOC		Technical Elective 1	4
		Technical Elective 2	4
		Technical Elective 3	4
Sub-total		**Sub-total**	**16**

Mapping of year-long NOC programmes:

NOC modules	*i*DP / Engineering modules
TR3201 Entrepreneurship Practicum (8 MCs)	EG2401A Engineering Professionalism (2 MCs) + IE4249 (4 MCs – TE)
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)

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Innovation & Design Programme
Faculty of Engineering

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

Semester 3	MCs	Semester 4	MCs
MA1301 Introductory Mathematics (UEM in lieu of EG3612)	4	EG3301R DCP Project (replaces IE3100R and IE4102)	6
CS1010E Programming Methodology	4	IE2111 Industrial & Systems Engineering Principles & Practice I	4
PC1431 Physics IE or PC1432 Physic IIE	4	MA1505 Mathematics I	4
GET	4	MLE1010 Materials Engineering Principles & Practice	4
Group B module for Second Major (UEM)	4	ST2334 Probability & Statistics	4
		GER1000 Quantitative Reasoning	4
Sub-total	**20**	**Sub-total**	**26**

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces IE3100R and IE4102)	6	IE2141 Systems Thinking & Dynamics	4
MA1508E Linear Algebra for Engineers	4	IE2100 Probability Models with Applications	4
EG1311 Design & Make	4	IE3101 Statistics for Engineering Applications	4
EE2211 Introduction to Machine Learning	4	EG2401A Engineering Professionalism	2
IE2110 Operations Research I	4	GES	4
GEQ1000 Asking Questions	4	Group A module for Second Major (UEM)	4
Sub-total	**26**	**Sub-total**	**22**

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
Innovation & Enterprise Elective 1 (UEM)	4	Innovation & Enterprise Elective 2 (UEM)	4
IE3110R Simulation	4	IE4211 Modelling & Analytics	4
IE4240 Project Management	4	Technical Elective 1	4
GEH	4		
Sub-total	**22**	**Sub-total**	**18**

Semester 9	MCs
Technical Elective 2	4
Technical Elective 3	4
Technical Elective 4	4
UEM (in lieu of EG3612)	2
Sub-total	**14**

Notes:

1. Poly-intake students may receive the following exemptions depending on their Diploma qualification:
   - IE1111R Industrial & Systems Engineering Principles & Practice I (4 MCs)
   - ES2531 Critical Thinking & Writing (4 MCs)
   - Unrestricted elective modules (20 MCs)

2. 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.

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

(updated 7 June 2021)