

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

Cohort 2020/2021

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):	
• CE1101A Civil Engineering Principles & Practice	4
• ESE2102 Principles & Practice in Infrastructure & Environment	4
• MA1511 Engineering Calculus	2
• MA1512 Differential Equations for Engineering	2
• 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
EVE core modules:	
• CE2134 Hydraulics	4
• ESE2000 Environmental Engineering Fundamentals	4
• ESE2001 Environmental Challenges in the Anthropocene	4
• ESE2401 Water Science & Technology	4
• ESE3101 Solid & Hazardous Waste Management	4
• ESE3201 Air Quality Management	4
• ESE3301 Environmental Microbiological Principles	4
• ESE3401 Sustainable Urban Water Technology	4
EVE technical electives ³	20
EVE design and project modules:	
• EG3301R DCP Project ³ (over 2 consecutive semesters) <i>(Double-counted for Second Major in Innovation & Design and replaces ESE4501 Design Project)</i>	12
EG3612 Vacation Internship Programme (VIP) ^{3,5}	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	8
• EG4301 DCP Dissertation <u>or</u> EG4301A Ideas to Start-up ⁴ (over 2 consecutive semesters)	12
Other unrestricted electives	4
Sub-total for Unrestricted Elective Modules	32
Total	160

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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 4 MCs from ESE4501, 4 MCs from the replacement of EG3611A (10 MCs) with EG3612 (6 MCs), and 4 MCs from technical electives.

Students may also opt to do EG3611A (10 MCs) in lieu of EG3612 (6 MCs) and 4 MCs of technical electives.
- ⁴ Students in this Second Major are allowed to complete additional technical electives (8 MCs) in lieu of ESE4502R B.Eng. Dissertation (8 MCs) if they complete EG4301/EG4301A.
- ⁵ 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 2020/2021 – JC-intake students or equivalent
(for students who opt for vacation internship)

Semester 1	MCs	Semester 2	MCs
CE1101A Civil Engineering Principles & Practice	4	ESE2102 Principles & Practice in Infrastructure & Environment	4
MA1511 Engineering Calculus	2	CS1010E Programming Methodology	4
MA1512 Differential Equations for Engineering	2	EG1311 Design & Make	4
ESE2000 Environmental Engineering Fundamentals	4	ES2531 Critical Thinking & Writing	4
GER1000 Quantitative Reasoning	4	Group A module for Second Major (UEM)	4
GET	4		
Sub-total	20	Sub-total	20

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
MLE1010 Materials Engineering Principles & Practice	4	ESE2401 Water Science & Technology	4
CE2134 Hydraulics	4	ESE3101 Solid & Hazardous Waste Management	4
ESE2001 Environmental Challenges in the Anthropocene	4	GEQ1000 Asking Questions	4
Group B module for Second Major (UEM)	4	EG3301R DCP Project (replaces ESE4501)	6
Sub-total	20	Sub-total	22

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 ESE4501)	6	Innovation & Enterprise Elective 1 (UEM)	4
ESE3201 Air Quality Management	4	ESE3301 Environmental Microbiological Principles	4
ESE3401 Sustainable Urban Water Technology	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 5	4
Technical Elective 3	4	EG2401A Engineering Professionalism	2
Technical Elective 4	4	UEM	4
Sub-total	18	Sub-total	16

Recommended semester schedule for Cohort 2020/2021 – JC-intake students or equivalent
(for students who opt for vacation internship **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
CE1101A Civil Engineering Principles & Practice	4	ESE2102 Principles & Practice in Infrastructure & Environment	4
MA1511 Engineering Calculus	2	CS1010E Programming Methodology	4
MA1512 Differential Equations for Engineering	2	EG1311 Design & Make	4
ESE2000 Environmental Engineering Fundamentals	4	ES2531 Critical Thinking & Writing	4
GER1000 Quantitative Reasoning	4	Group A module for Second Major (UEM)	4
GET	4		
Sub-total	20	Sub-total	20

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
MLE1010 Materials Engineering Principles & Practice	4	ESE2401 Water Science & Technology	4
CE2134 Hydraulics	4	ESE3101 Solid & Hazardous Waste Management	4
ESE2001 Environmental Challenges in the Anthropocene	4	GEQ1000 Asking Questions	4
Group B module for Second Major (UEM)	4	EG3301R DCP Project (replaces ESE4501)	6
Sub-total	20	Sub-total	22

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 ESE4501)	6	Innovation & Enterprise Elective 1 (UEM)	4
ESE3201 Air Quality Management	4	ESE3301 Environmental Microbiological Principles	4
ESE3401 Sustainable Urban Water Technology	4	Specialisation module 1	4
GEH	4	Specialisation module 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	Specialisation module 5	4
Specialisation module 3	4	EG2401A Engineering Professionalism	2
Specialisation module 4	4	UEM	4
Sub-total	18	Sub-total	16

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Recommended semester schedule for Cohort 2020/2021 – JC-intake students or equivalent
(for students who opt for industrial attachment in lieu of vacation internship)

Semester 1	MCs	Semester 2	MCs
CE1101A Civil Engineering Principles & Practice	4	ESE2102 Principles & Practice in Infrastructure & Environment	4
MA1511 Engineering Calculus	2	CS1010E Programming Methodology	4
MA1512 Differential Equations for Engineering	2	EG1311 Design & Make	4
ESE2000 Environmental Engineering Fundamentals	4	ES2531 Critical Thinking & Writing	4
GER1000 Quantitative Reasoning	4	Group A module for Second Major (UEM)	4
GET	4		
Sub-total	20	Sub-total	20

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
MLE1010 Materials Engineering Principles & Practice	4	ESE2401 Water Science & Technology	4
CE2134 Hydraulics	4	ESE3101 Solid & Hazardous Waste Management	4
ESE2001 Environmental Challenges in the Anthropocene	4	GEQ1000 Asking Questions	4
GEH	4	EG3301R DCP Project (replaces ESE4501)	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 ESE4501)	6	EG3611A Industrial Attachment	10
Innovation & Enterprise Elective 1 (UEM)	4		
ESE3201 Air Quality Management	4		
ESE3401 Sustainable Urban Water Technology	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 2 (UEM)	4	ESE3301 Environmental Microbiological Principles	4
Technical Elective 1	4	Technical Elective 4	4
Technical Elective 2	4	EG2401A Engineering Professionalism	2
Technical Elective 3	4	UEM	4
Sub-total	22	Sub-total	20

Recommended semester schedule for Cohort 2020/2021 – JC-intake students or equivalent
(for students who opt for industrial attachment **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
CE1101A Civil Engineering Principles & Practice	4	ESE2102 Principles & Practice in Infrastructure & Environment	4
MA1511 Engineering Calculus	2	CS1010E Programming Methodology	4
MA1512 Differential Equations for Engineering	2	EG1311 Design & Make	4
ESE2000 Environmental Engineering Fundamentals	4	ES2531 Critical Thinking & Writing	4
GER1000 Quantitative Reasoning	4	Group A module for Second Major (UEM)	4
GET	4		
Sub-total	20	Sub-total	20

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
MLE1010 Materials Engineering Principles & Practice	4	ESE2401 Water Science & Technology	4
CE2134 Hydraulics	4	ESE3101 Solid & Hazardous Waste Management	4
ESE2001 Environmental Challenges in the Anthropocene	4	GEQ1000 Asking Questions	4
GEH	4	EG3301R DCP Project (replaces ESE4501)	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 ESE4501)	6	EG3611A Industrial Attachment	10
Innovation & Enterprise Elective 1 (UEM)	4		
ESE3201 Air Quality Management	4		
ESE3401 Sustainable Urban Water Technology	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 2 (UEM)	4	ESE3301 Environmental Microbiological Principles	4
Specialisation module 1	4	Specialisation module 4	4
Specialisation module 2	4	Specialisation module 5	4
Specialisation module 3	4	EG2401A Engineering Professionalism	2
Sub-total	22	Sub-total	20

Recommended semester schedule for Cohort 2020/2021 – JC-intake students or equivalent
(for students in year-long NOC programmes)

Semester 1	MCs	Semester 2	MCs
CE1101A Civil Engineering Principles & Practice	4	ESE2102 Principles & Practice in Infrastructure & Environment	4
MA1511 Engineering Calculus	2	CS1010E Programming Methodology	4
MA1512 Differential Equations for Engineering	2	EG1311 Design & Make	4
ESE2000 Environmental Engineering Fundamentals	4	ES2531 Critical Thinking & Writing	4
GER1000 Quantitative Reasoning	4	Group A module for Second Major (UEM)	4
GET	4		
Sub-total	20	Sub-total	20

Semester 3	MCs	Semester 4	MCs
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
MLE1010 Materials Engineering Principles & Practice	4	ESE2401 Water Science & Technology	4
CE2134 Hydraulics	4	ESE3101 Solid & Hazardous Waste Management	4
ESE2001 Environmental Challenges in the Anthropocene	4	GEQ1000 Asking Questions	4
GEH	4	EG3301R DCP Project (replaces ESE4501)	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 ESE4501)	6	NOC	
ESE3201 Air Quality Management	4		
ESE3401 Sustainable Urban Water Technology	4		
Technical Elective 1	4		
GES	4		
Sub-total	22	Sub-total	

Semester 7	MCs	Semester 8	MCs
NOC		ESE3301 Environmental Microbiological Principles	4
		Technical Elective 2	4
		Technical Elective 3	4
		Technical Elective 4	4
Sub-total		Sub-total	16

Mapping of year-long NOC programmes:

NOC modules	/DP / Engineering modules
TR3201 Entrepreneurship Practicum (8 MCs)	EG2401A Engineering Professionalism (2 MCs) + TE (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 2020/2021 – poly-intake students

Semester 1	MCs	Semester 2	MCs
MA1301 Introductory Mathematics (in lieu of EG3612)	4	EG3301R DCP Project (replaces ESE4501)	6
CE1101A Civil Engineering Principles & Practice	4	MA1511 Engineering Calculus	2
MLE1010 Materials Engineering Principles & Practice	4	MA1512 Differential Equations for Engineering	2
CS1010E Programming Methodology	4	CE2134 Hydraulics	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE2401 Water Science & Technology	4
		GER1000 Quantitative Reasoning	4
Sub-total	20	Sub-total	22

Semester 3	MCs	Semester 4	MCs
EG3301R DCP Project (replaces ESE4501)	6	EE2211 Introduction to Machine Learning	4
IE2141 Systems Thinking & Dynamics	4	ESE3101 Solid & Hazardous Waste Management	4
ESE3201 Air Quality Management	4	ESE3301 Environmental Microbiological Principles	4
ESE3401 Sustainable Urban Water Technology	4	GET	4
Group B module for Second Major (UEM)	4	Group A module for Second Major (UEM)	4
Sub-total	22	Sub-total	20

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation (UEM)	6	EG4301 DCP Dissertation (UEM)	6
Technical Elective 1	4	Innovation & Enterprise Elective 1 (UEM)	4
GEQ1000 Asking Questions	4	Technical Elective 2	4
GEH	4	Technical Elective 3	4
GES		EG2401A Engineering Professionalism	2
Sub-total	18	Sub-total	20

Semester 7	MCs
Innovation & Enterprise Elective 2 (UEM)	4
Technical Elective 4	4
Technical Elective 5	4
UEM (in lieu of EG3612)	2
Sub-total	14

Notes:

- Poly-intake students may receive the following exemptions depending on their Diploma qualification:
 - ESE2000 Environmental Engineering Fundamentals (4 MCs)
 - ESE2102 Principles & Practice in Infrastructure & Environment (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/or other modules.