

## **B.Eng. (Environmental Engineering) Degree Requirement** **- matriculating August 2019**

In order to graduate with the B.Eng. (Environmental) degree, students are required to:

- Complete a minimum of 160 MCs with a CAP  $\geq 2.0$
- Pass the modules in accordance with **Table A**.
- Pass Pathway technical elective modules.
- Students should not read more than 60 MCs of Level-1000 modules towards their degree requirements (excluding CFG1010 Roots and Wings – Personal and Interpersonal Effectiveness 1.0 (2 MCs) and ES1103 English for Academic Purposes (4 MCs)).
- Satisfy all other requirements as prescribed by the Faculty or the University.

### **B.Eng. (Environmental) Degree Requirements**

2019 EV Requirements	
<b>University Requirements</b>	<b>20</b>
<b>General Education (GE)</b> (5 Modules, each of 4MCs) <ul style="list-style-type: none"> <li>• <b>H</b>uman and Cultures (GEH)</li> <li>• Quantitative <b>R</b>easoning (GER)</li> <li>• <b>T</b>hinking and Expression (GET)</li> <li>• <b>S</b>ingapore Studies (GES)</li> <li>• Asking <b>Q</b>uestions (GEQ)</li> </ul>	
<b>Faculty Requirements</b>	<b>6</b>
EG2401A Engineering Professionalism	2
ES1531 Critical Thinking and Writing	4
<b>Foundational / Common Requirements</b>	<b>32</b>
MA1511 Engineering Calculus	2
MA1512 Differential Equations for Engineering	2
CE1101A Civil Engineering Principles & Practice	4
ESE2102 Principles & Practice in Infrastructure and Environment	4
* EG1311 Design and Make	4
* CS1010E Programming Methodology	4
* EE2211 Introduction to Machine Learning	4
* MLE1010 Materials Engineering Principles & Practice	4
* IE2141 Systems Thinking & Dynamics	4
<i>* New Common Core Module</i>	
<b>EV Core Modules</b>	<b>32</b>
CE2134 Hydraulics	4
ESE2000 Environmental Engineering Fundamentals	4
ESE2001 Environmental Challenges in the Anthropocene	4
ESE2401 Water Science & Technology	4
ESE3101 Solid and Hazardous Waste Management	4
ESE3201 Air Quality Management	4
ESE3301 Environmental Microbiological Principles	4
ESE3401 Sustainable Urban Water Technology	4
<b>EV Design Project &amp; Internship Modules</b>	<b>22</b>
ESE4501 Design Project	4
ESE4502R B.Eng. Dissertation	8
EG3611A Industrial Attachment	10
<b>EV Technical Electives</b>	<b>8</b>
<b>Pathway Requirements</b>	<b>8</b>
<b>Unrestricted Elective Modules</b>	<b>32</b>
<b>Total MC:</b>	<b>160</b>

<sup>1</sup> BEng students are required to read ES1531 Critical Thinking & Writing. Alternatively, students can read ES1501X Academic Expository Writing. USP/UTRP/RVRC students should refer to their respective programmes for USP/UTRP/RVRC modules to be read in place of ES1531.

<sup>2</sup> 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. ES1000 carries zero (0) MCs but students will have to pass in order to graduate while ES1103 carries 4 MCs to be used to fulfil the UEMs.

<sup>3</sup> For BEng students who are from direct poly intake and in the following special programmes: DDPs, CDPs, E-Scholar & CSP, industrial attachment is optional and the modular credits for the industrial attachment will become 'Free Electives' i.e., Unrestricted Electives (UE).

Please visit CEE website for more details <https://www.eng.nus.edu.sg/cee/undergraduate/beng-civil/curriculum/> for details.

## **Technical Elective Modules**

### Department of Civil and Environmental Engineering

ESE3011 Integrated Project for Environmental Sustainability  
ESE4301 Wastewater Biotechnology  
ESE4401 Water & Wastewater Engineering 2  
ESE4403 Membrane Tech in Env Applns  
ESE4404 Bioenergy  
ESE4405 Urban Water Engineering & Management  
ESE4406 Energy and the Environment  
ESE4407 Environmental Forensics  
ESE4408 Environmental Impact Assessment  
ESE4409 Environmental Applications of Adsorption  
ESE5880A Topics in Environmental Engineering: Chem. Lab Safety  
CE3132 Hydrology and Free Surface Flows  
CE5315 Climate Science for Engineers  
~~CE3102 Engineering of Socio-Technical System~~  
~~CE5307 Wave Hydrodynamics and Physical Oceanography~~  
~~CE5310 Hydroinformatics~~  
~~CE5312 River Mechanics~~  
~~CE5603 Engineering Economics & Project Evaluation~~  
~~CE5883A Topics in Hydraulic & Water Resources~~  
~~OT5401 Geoscience for Petroleum Exploration~~  
~~OT5402 Geophysical Imaging of the Earth Interior~~  
~~OT5403 Petrophysics and Downhole Measurements~~  
~~OT5404 Reservoir Characterization and Rock Physics~~  
~~OT5408 Unconventional and Renewable Energy Resources~~

\* CEE reserves the right to decide on the modules to be offered in any given semester.

### Dept of Chemical and Biomolecular Engineering

~~SH5002 Fundamentals in Industrial Safety~~  
~~SH5110 Chemical Hazard Evaluation~~  
~~SH5101 Industrial Toxicology~~  
~~SH5402 Advanced SHE Management~~

## **Professional Pathway Modules/ Research Pathway Modules**

Denote by the highlighted colour

# Practicing Professional Pathway (PPP)

## Sample Semester Schedule for A-Level & Equivalent EVE students

Semester 1	MC	Semester 2	MC
ESE2000 Env. Engr. Fundamentals	4	CS1010E Programming Methodology	4
CE1101A Civil Engineering Principles & Practice	4	ESE2102 Principles & Practice in Infrastructure and Environment	4
MA1511 Engineering Calculus	2	EG1311 Design and Make	4
MA1512 Differential Equations for Engineering	2	GEH/GES	4
GER1000	4	GES/GEH	4
GET	4		
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 3	MC	Semester 4	MC
IE2141 System Thinking and Dynamics	4	ESE2401 Water Science & Technology	4
MLE1010 Materials Engineering Principles and Practice	4	ESE3101 Solid and Hazardous Waste Mgmt	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Environmental Microbiological Principles	4
CE2134 Hydraulics	4	EE2211 Introduction to Machine Learning	4
ES1531 Critical Thinking and Writing	4	GEQ	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 5	MC	Semester 6	MC
ESE3201 Air Quality Management	4	EG3611A Industrial Attachment	10
ESE3401 Sustainable Urban Water Technology	4		
UEM 1	4		
UEM 2	4		
UEM 3	4		
UEM 4	4		
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>10</b>
Special Semester			
UEM 5 *	4		
UEM 6 *	4		
<b>Sub-total</b>	<b>8</b>		

\* Can either take them in Special Term or in normal semester on top of the 20/18 MCs

Semester 7	MC	Semester 8	MC
ESE4502R B.Eng. Dissertation	4	ESE4502R B.Eng. Dissertation	4
ESE4501 Design Project	4	Professional Development Module <sup>3</sup>	4
Professional Development Module <sup>3</sup>	4	UEM 8	4
UEM 7	4	Technical Elective 2	4
Technical Elective 1	4	EG2401A Engineering Professionalism	2
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>18</b>
<b>TOTAL</b>			<b>160</b>

<sup>1</sup>Students are strongly encouraged to complete all the five GE modules latest by the end of Year 2.

<sup>2</sup>UEM can be read in any semester and can be any module out of your major requirements.

<sup>3</sup>PPP students will have to take 8 MCs of professional development electives to satisfy pathway requirements.

Updated March 2020

Pre-allocate

## Research-Focused Pathway (RfP)

### Sample Semester Schedule for A-Level & Equivalent EVE students

Semester 1	MC	Semester 2	MC
ESE2000 Env. Engr. Fundamentals	4	CS1010E Programming Methodology	4
CE1101A Civil Engineering Principles & Practice	4	ESE2102 Principles & Practice in Infrastructure and Environment	4
MA1511 Engineering Calculus	2	EG1311 Design and Make	4
MA1512 Differential Equations for Engineering	2	GEH/GES	4
GER1000	4	GES/GEH	4
GET	4		
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 3	MC	Semester 4	MC
IE2141 System Thinking and Dynamics	4	ESE2401 Water Science & Technology	4
MLE1010 Materials Engineering Principles and Practice	4	ESE3101 Solid and Hazardous Waste Mgmt	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Environmental Microbiological Principles	4
CE2134 Hydraulics	4	EE2211 Introduction to Machine Learning	4
ES1531 Critical Thinking and Writing	4	GEQ	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 5	MC	Semester 6	MC
ESE3201 Air Quality Management	4	EG3611A Industrial Attachment	10
ESE3401 Sustainable Urban Water Technology	4		
UEM 1	4		
UEM 2	4		
UEM 3	4		
UEM 4	4		
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>10</b>
<b>Special Semester</b>			
UEM 5 *	4		
UEM 6 *	4		
<b>Sub-total</b>	<b>8</b>		

\* Can either take them in Special Term or in normal semester on top of the 20/18 MCs

Semester 7	MC	Semester 8	MC
ESE4502R B.Eng. Dissertation	4	ESE4502R B.Eng. Dissertation	4
ESE4501 Design Project	4	Research Development Module <sup>3</sup>	4
Research Development Module <sup>3</sup>	4	UEM 8	4
UEM 7	4	Technical Elective 2	4
Technical Elective 1	4	EG2401A Engineering Professionalism	2
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>18</b>
<b>TOTAL</b>			<b>160</b>

<sup>1</sup>Students are strongly encouraged to complete all the five GE modules latest by the end of Year 2.

<sup>2</sup>UEM can be read in any semester and can be any module out of your major requirements.

<sup>3</sup>RfP students will have to take 8 MCs of research development electives to satisfy pathway requirements.

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# Innovation & Design Centric Programme (iDCP)

Recommended schedule will be updated soon

## Accredited Poly Direct Entry EVE Students as of AY2019/2020

EXEMPTED MODULES		MCs
	Unrestricted Elective Module 1 ▪	4
	Unrestricted Elective Module 2 ▪	4
	Unrestricted Elective Module 3 ▪	4
	Unrestricted Elective Module 4 ▪	4
	Unrestricted Elective Module 5 ▪	4
ESE2000	Environmental Engineering Fundamentals *	4
ESE2102	Principles & Practice in Infrastructure and Environment *	4
EG1311	Design and Make *	4
ES1531	Critical Thinking and Writing ˇ	4
<b>Total</b>		<b>36</b>

Polytechnic diploma holders may be granted advanced placement credits (APC) in relevant modules for up to a maximum of 40 MCs (Modular Credits).

- University Level Requirements
- ˇ Faculty Requirements
- \* Programme Requirements (*depending on the Diploma*)

### Note:

- Table above shows the maximum APCs given by the University and the Faculty/Department. APCs given to each Accredited Diplomas, can vary.
- Polytechnic graduates admitted into BEng programmes with the 6-month (10 MC) Industrial Attachment requirement, may take the 3-month internship (6MC via EG3602) and/or 'Free Elective' modules in lieu of the 10 MC for the Industrial Attachment.
- Polytechnic graduates have to read MA1301 except those who have successfully completed all modules/courses in special Math programmes (such as the "Certificate in Engineering Mathematics", "Diploma Plus Programme in Advanced Engineering Mathematics" & etc) offered by their respective Polytechnics. Students can send their certificates to FoE Undergraduate Office for exempted from MA1301, before registering for MA1511/MA1512.
- Students should not read more than 60 MCs of Level-1000 modules towards their degree requirements (minimum of 160 MCs for graduation), excluding CFG1010 Roots and Wings – Personal and Interpersonal Effectiveness 1.0 (2 MCs), ES1103 English for Academic Purposes (4 MCs), Modules under the Design-Your-Own-Module (DYOM) initiative. For Polytechnic graduates, 12 MCs of the exempted UE modules will not count towards the 60 MCs limit on level-1000 modules.

## Sample Semester Schedule for Accredited Direct Poly Entry EVE students

Semester 3	MC	Semester 4	MC
CE1101A Civil Engineering Principles & Practice	4	CE2134 Hydraulics UEM1	4
MA1301 Introductory Mathematics (fulfil UEM 1)	4	GET	4
GER1000 ESE2001 Environmental Challenges in the Anthropocene	4	ESE2401 Water Science & Technology	4
CS1010E Programming Methodology	4	ESE2001 Environmental Challenges in the Anthropocene GER1000	4
MLE1010 Materials Engineering Principles and Practice	4	MA1511 Engineering Calculus	2
		MA1512 Differential Equations for Engineering	2
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 5	MC	Semester 6	MC
ESE3201 Air Quality Management	4	ESE3101 Solid and Hazardous Waste Mgmt	4
ESE3401 Sustainable Urban Water Technology	4	ESE3301 Environmental Microbiological Principles	4
UEM4 CE2134 Hydraulics	4	EE2211 Introduction to Machine Learning	4
IE2141 System Thinking and Dynamics	4	Professional Development Module1	4
GES/GEH	4	GEH/GES	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

### SPECIAL TERM (SUMMER HOLIDAYS)

Vacation Internship (VIP) {fulfill Free Elective <sup>2</sup> }	6
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Semester 7	MC	Semester 8	MC
ESE4502R B.Eng. Dissertation	4	ESE4502R B.Eng. Dissertation	4
ESE4501 Design Project	4	Professional Development Module2	4
GEQ	4	UEM2	4
Technical Elective1	4	EG2401A Engineering Professionalism	2
Free Elective Module	4	Technical Elective2	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>18</b>
<b>TOTAL</b>			<b>124</b>

*Total 124 + 36 APCs = 160 MCs*

<sup>1</sup>MA1301 can be counted towards UEM. Students with the relevant Diploma Plus Certificate or Advanced Modules in Mathematics from Singapore Polytechnic or Ngee Ann Polytechnic could be waived from the requirement of taking MA1301.

<sup>2</sup>Direct poly entry students are not required to take EG3611A Industrial Attachment. In-lieu of the Industrial Attachment, students have 10MCs of Free Electives. The free electives can be read in any semester and can be any modules out of your major requirements.

<sup>3</sup>UEM and Free Electives can be read in any semester and can be any modules out of your major requirements. GE too can be read in any semester, except GEQ.

*Updated March 2020*

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