

## **B.Eng. (Civil 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>AY2019/2020 CE Requirements</b>	
<b>University Requirements</b>	<b>20</b>
<b>General Education (GE)</b> (5 Modules, each of 4MCs) <ul style="list-style-type: none"> <li>• <u>H</u>uman and Cultures (GEH)</li> <li>• <u>Q</u>uantitative <u>R</u>easoning (GER)</li> <li>• <u>T</u>hinking and Expression (GET)</li> <li>• <u>S</u>ingapore Studies (GES)</li> <li>• Asking <u>Q</u>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>
CE1101A Civil Engineering Principles & Practice	4
CE2101 Principles & Practice in Infrastructure and Environment	4
MA1505 Mathematics I	4
*CS1010E Programming Methodology	4
*EG2211 Introduction to Machine Learning	4
*EG1311 Design & Make <small>(CE version)</small>	4
*MLE1010 Materials Engineering Principles and Practice	4
*IE2141 Systems Thinking and Dynamics	4
<i>* New Common Core Module</i>	
<b>CE Core Modules</b>	<b>52</b>
CE2112 Soil Mechanics	4
CE2134 Hydraulics	4
CE2155 Structural Mechanics and Materials	4
CE2183 Construction Project Management	4
CE2407 Engineering and Uncertainty Analyses	4
ESE3001 Water Quality Engineering	4
CE3115 Geotechnical Engineering	4
CE3116 Foundation Engineering	4
CE3121 Transportation Engineering	4
CE3132 Water Resources Engineering	4
CE3155 Structural Analysis	4
CE3165 Structural Concrete Design	4
CE3166 Structural Steel Design and System	4
<b>CE Project &amp; Internship Modules</b>	<b>22</b>
CE4103 Design Project	4
CE4104 B.Eng. Dissertation	8
EG3611A Industrial Attachment	10
<b>Unrestricted Elective Modules</b>	<b>28</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.

*Information correct as Feb 2020*

## **Technical Elective Modules [can be used to fulfil UEM (or Free Elective) requirements]**

### Geotechnical Engineering Modules (G)

- CE5101 Seepage and Consolidation of Soils
- CE5104 Underground Space
- CE5105 Anal. & Num. Meth. in Foundation Eng. rg
- CE5106 Ground Improvement
- CE5107 Pile Foundations
- CE5108 Earth Retaining Structures
- CE5881 Topics in Geotechnical Engineering †

### Environmental Engineering Modules (E)

- ESE3101 Solid and Hazardous Waste Management
- ESE4401 Water & Wastewater Engineering 2
- ESE4405 Urban Water Engineering & Management
- ESE5205 Sludge & Solid Waste Management
- ESE5402 Industrial Water Control

### Structural Engineering Modules (S)

- CE4257 Linear Finite Element Analysis
- CE4258 Structural Stability and Dynamics
- CE5509 Advanced Structural Steel Design
- CE5510 Advanced Structural Concrete Design
- CE5513 Plastic Analysis of Structures
- CE5604 Advanced Concrete Technology
- CE5610 Assessment and Retrofit of Concrete Structures
- CE5611 Precast Concrete Technology
- ME5103 Plates and Shells
- CE5885 Topics in Structural Engineering †
- CE5886 Topics in Concrete Engineering †

### Infrastructure Systems Modules (C and T)

- CE4221 Design of Land Transport Infrastructure
- CE5204 Pavement Design and Rehabilitation
- CE5205 Transportation Planning
- CE5206 Urban Public Transportation Systems
- CE5208 Transport Infrastructure Asset Management

CE5209 Transportation Data Analytics and Modeling  
CE5603 Engineering Economics and Project Evaluation  
CE5804 Global Infrastructure Project Mgt  
CE5805 DfMA & Productivity Analytics in Construction  
CE5806 Advanced Project Management with Lean Construction  
CE5807 Integrated Digital Delivery (IDD)  
CE5808 Virtual Design and Construction with BIM Technologies  
CE5880 Topics in Project Management Engineering<sup>†</sup>  
CE5882 Topics in Transportation Engineering<sup>†</sup>  
TP5025 Intelligent Transportation Systems  
TP5028 Intermodal Transportation Operations

#### Hydraulic Modules (H)

CE4247 Treatment Plant Hydraulic  
CE5307A/C Ocean Waves/ Finite Amplitude Wave Theories & Their Applications  
CE5308 Coastal Processes & Sediment Transport  
CE5312 River Mechanics  
CE5313 Groundwater Hydrology  
CE5883 Topics in Hydraulic & Water Resources<sup>†</sup>

#### Offshore Modules (O)

OT5101 Exploration and Production of Petroleum  
OT5202 Analysis & Design of Offshore Structures  
OT5203 Design of Floating Structures  
OT5204 Moorings & Risers  
OT5205 Offshore Pipelines  
OT5206 Offshore Foundations  
OT5207 Arctic Engineering  
OT5401 Geoscience for Petroleum Exploration  
OT5402 Seismic Acquisition and Processing  
OT5403 Petrophysics and Downhole Measurements  
OT5404 Reservoir Characterization and Rock Physics  
OT5405 Enhanced Oil Recovery  
OT5406 Petroleum Production Engineering  
OT5407 Petroleum Geomechanics  
OT5408 Unconventional and Renewable Energy Resources  
OT5409 Drilling and Completion Engineering  
OT5881 Topics in Offshore Engineering<sup>†</sup>  
OT5882 Topics in Subsea Engineering<sup>†</sup>  
CE5307A/B Ocean Waves/ Hydrodynamic Loads on Offshore Structures

#### CE Technical Modules

CE3101 Integrated Infrastructure Project  
CE3102 Socio-economic sustainable developments  
CE5701 Special Topics in Civil Engineering  
CE5702 CE Reliability Analysis and Design

<sup>†</sup> depending on the topics covered

# Practicing Professional Pathway (PPP)

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

Semester 1	MC	Semester 2	MC
MA1505 Mathematics I	4	CE2155 Structural Mechanics and Materials	4
CS1010E Programming Methodology	4	CE2102 Principles & Practice in Infra. & Envir.	4
CE1101A Civil Engineering Principles & Practice	4	MLE1010 Materials Engineering Principles & Practice	4
EG1311 Design & Make (CE version)	4	GE 2 (GER1000)	4
GE 1	4	GE 3	4
		GE 4	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>24</b>

Semester 3	MC	Semester 4	MC
CE2112 Soil Mechanics	4	CE3115 Geotechnical Engineering	4
CE2134 Hydraulics	4	CE3166 Structural Steel Design and System	4
CE2407 Engineering and Uncertainty Analyses	4	CE3132 Water Resources Engineering	4
CE3155 Structural Analysis	4	EE2211 Introduction to Machine Learning	4
IE2141 Systems Thinking and Dynamics	4	ESE3001 Water Quality Engineering	4
		GE 5 (GEQ1000)	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>24</b>

Semester 5	MC	Semester 6	MC
CE3116 Foundation Engineering	4	EG3611A Industrial Attachment	10
CE3121 Transportation Engineering	4	EG2401A Engineering Professionalism	2
CE3165 Structural Concrete Design			
CE2183 Construction Project Management	4		
UEM 4 ES1531 Critical Thinking and Writing	4		
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>12</b>

Semester 7	MC	Semester 8	MC
CE4104 B.Eng. Dissertation	4	CE4104 B.Eng. Dissertation	4
CE4103 Design Project	4	ES1531 Critical Thinking and Writing UEM 1 4	4
UEM 2 1	4	UEM 5	4
UEM 3-2	4	UEM 6	4
UEM 4-3	4	UEM 7	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>
<b>TOTAL</b>			<b>160</b>

Note: UEM can be read in any semester (e.g. Technical elective for Specialization or Track (if any) / Second Major/ Minor / UEM module)

Pre-allocate

# Innovation & Design Centric Programme (iDCP)

Recommended schedule to check with iDCP

## Accredited Poly Direct Entry CE 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
CE1101A	Civil Engineering Principles & Practice *	4
CE2102	Principles & Practice in Infrastructure and Environment *	4
MLE1010	Materials Engineering Principles and Practice. *	4
EG1311	Design and Make *	4
ES1531	Critical Thinking and Writing	4
<b>Total</b>		<b>40</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
- ∨ Faculty Requirements
- \* Programme Requirements

### Note:

- For students with Diploma related to Environmental and Water Technology from Singapore Polytechnic or Ngee Ann Polytechnic will be exempted from ESE3001 Water Quality Engineering (4 MCs) but will be required to take CE1101A Civil Engineering Principles & Practice (4 MCs).
- 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 if they are exempted from MA1301, before registering for MA1301.
- 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 CE students

- updated Feb 2020

Semester 3	MC	Semester 4	MC
MA1301 Introductory Mathematics <sup>1</sup>	4	CE2155 Structural Mechanics and Materials	4
CS1010E Programming Methodology	4	<del>EE2211 Introduction to Machine Learning</del> GE 1	4
CE2112 Soil Mechanics	4	CE3115 Geotechnical Engineering	4
CE2134 Hydraulics	4	MA1505 Mathematics I	4
CE2183 Construction Project Management (CE1101A, for Water Tech diploma)	4	GE 2 (GER1000)	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 5	MC	Semester 6	MC
CE2407 Engineering & Uncertainty Analyses	4	CE3166 Structural Steel Design and System	4
CE3121 Transportation Engineering	4	ESE3001 Water Quality Engineering (GE5, for Water Tech diploma)	4
CE3116 Foundation Engineering	4	CE3132 Water Resources Engineering	4
CE3155 Structural Analysis	4	<del>GE-3 EE2211 Introduction to Machine Learning</del>	4
CE3165 Structural Concrete Design	4	GE 4 3 (GEQ1000)	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

Optional or you can read modules

Semester 7	MC	Semester 8	MC
CE4104 B.Eng. Dissertation	4	CE4104 B.Eng. Dissertation	4
CE4103 Design Project	4	Free Elective	4
IE2141 Systems Thinking and Dynamics	4	UEM GE 5	4
EG2401A Engineering Professionalism	2	UEM	4
GE 5 4 (CE2183, for Water Tech diploma)	4		
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>16</b>
<b>TOTAL</b>			<b>120</b>

**Total 120 + 40 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.

**Pre-allocate**