B.Eng. (Civil Engineering) Degree Requirement
– matriculating August 2020

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

➢ Complete a **minimum of 160 Modular Credits (MCs)** with a **CAP ≥ 2.0**

➢ Pass the modules in accordance with **Table A**

➢ 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), ES1103 English for Academic Purposes (4 MCs)) and Modules under the Design-Your-Own-Module (DYOM) initiative.

➢ Satisfy all other requirements as prescribed by the Faculty or the University

B.Eng. (Civil Engineering) Degree Requirements for AY2020/2021	
University Requirements	**20**
General Education (GE) (5 Modules, each of 4MCs) ● **H**uman and Cultures (GEH) ● Quantitative **R**easoning (GER) ● **T**hinking and Expression (GET) ● **S**ingapore Studies (GES) ● Asking **Q**uestions (GEQ)	
Faculty Requirements	**6**
EG2401A Engineering Professionalism	2
ES2531 Critical Thinking and Writing	4
Common Core Requirements	**32**
CE1101A Civil Engineering Principles & Practice	4
CE2101 Principles & Practice in Infrastructure and Environment	4
MA1511 Engineering Calculus	2
MA1513 Linear Algebra with Differential Equations	2
CS1010E Programming Methodology	4
EG2211 Introduction to Machine Learning	4
EG1311 Design & Make (<mark>CE version</mark>)	4
MLE1010 Materials Engineering Principles and Practice	4
IE2141 Systems Thinking and Dynamics	4
CE Core Modules	**52**
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
CE Project & Internship Modules	**22**
CE4103 Design Project	4
CE4104 B.Eng. Dissertation	8
EG3611A Industrial Attachment	10
Unrestricted Elective Modules (UEM)	**28**
Total MC:	**160**

[1] **BEng students are required to read ES2531 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 ES2531.

[2] **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 which can be used to fulfil their UEMs.

[3] For BEng students who are from direct poly intake OR in the following special programmes: DDPs, CDPs, E-Scholar & CSP, industrial attachment is optional and **in-lieu of the 10 MCs of Industrial Attachment, students will have an additional 10 modular credits of "Free Electives"**. The "Free Electives" can be treated the same as unrestricted elective modules (UEM).

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

Technical Elective Modules [can be used to fulfil UEM requirements]

Geotechnical Engineering Modules (G)
CE5101 Seepage and Consolidation of Soils
CE5104 Underground Space
CE5105 Anal. & Num. Meth. in Foundation Engineering
CE5106 Ground Improvement
CE5107 Pile Foundations
CE5108 Earth Retaining Structures
CE5881 Topics in Geotechnical Engineering [†]

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 Modelling
CE5603 Engineering Economics and Project Evaluation
CE5804 Global Infrastructure Project Management
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[†]
CE5882 Topics in Transportation Engineering [†]
TP5025 Intelligent Transportation Systems
TP5028 Intermodal Transportation Operations

Hydraulic Modules (H)
CE4247 Treatment Plant Hydraulic
CE5307A Ocean Waves (2 MCs)
CE5307C Finite Amplitude Wave Theories & Their Applications (2 MCs)
CE5308 Coastal Processes & Sediment Transport
CE5312 River Mechanics
CE5315 Climate Science for Engineers
CE5316A Water Resources for Smart and Liveable Cities: Introduction (2 MCs)
CE5316B Water Resources Modelling for Urban Catchments (2 MCs)

CE5316C Eco-hydrology (2 MCs)
CE5883   Topics in Hydraulic & Water Resources [†]

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

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
CE5307A Ocean Waves (2 MCs)
CE5307B Hydrodynamic Loads on Offshore Structures (2 MCs)
OT5881   Topics in Offshore Engineering [†]
OT5882   Topics in Subsea Engineering [†]

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

[†] depending on the topics covered

Practicing Professional Pathway (PPP)

Sample Semester Schedule for A-Level & Equivalent CE students

Semester 1	MC	Semester 2	MC
MA1511 Engineering Calculus	2	CE2155 Structural Mechanics and Materials	4
CS1010E Programming Methodology	4	CE2102 Principles & Practice in Infra. & Environment	4
CE1101A Civil Engineering Principles & Practice	4	MLE1010 Materials Engrg Principles & Practice	4
EG1311 Design & Make (CE version)	4	GE 3 (GER1000)	4
GE 1	4	GE 4 (GEQ1000)	4
GE 2	4	MA1513 Linear Algebra with Differential Equations	2
Sub-total	22	Sub-total	22

Modules are on 100% e-Learning

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	4		
Sub-total	24	Sub-total	20

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	4		
CE2183 Construction Project Management	4		
ES2531 Critical Thinking and Writing	4		
Sub-total	20	Sub-total	12

Semester 7	MC	Semester 8	MC
CE4104 B.Eng. Dissertation	4	CE4104 B.Eng. Dissertation	4
CE4103 Design Project	4	UEM 4	4
UEM 1	4	UEM 5	4
UEM 2	4	UEM 6	4
UEM 3	4	UEM 7	4
Sub-total	20	Sub-total	20
TOTAL			160

Note:

The highlighted modules are pre-allocated to students

UEM can be read in any semester. They do not have to be taken in Sem 7 and 8.

UEM can be used to take modules to fulfil Specialization / Second Major / Minor requirements or any modules as long as the total number of MCs for level-1000 at graduation does not exceed 60.

Innovation & Design Centric Programme (iDCP)

Recommended schedule to check with iDCP

Accredited Poly Direct Entry CE Students as of AY2020/2021

Exemptions for Accredited Poly Direct Entry
Polytechnic diploma holders may be granted advanced placement credits (APC) in relevant modules for up to a maximum of 40 MCs as shown in the table below. Students from Ngee Ann Poly's Diploma in Sustainable Urban Design & Engineering must refer to Note 5.

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
ES2531	Critical Thinking and Writing	4
	Total	40

Note:
1. 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).

2. Polytechnic graduates will have **10 MCs of 'Free Elective' modules in lieu of the 10 MCs Industrial Attachment**. Students <u>may</u> want to consider using 6 MCs to take the 3-month internship (EG3602).

3. **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 before registration of modules to check if they are exempted from MA1301.

4. 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, 20 MCs of the exempted UE modules will not count towards the 60 MCs limit on level-1000 modules.

5. Polytechnic graduates from Ngee Ann poly with a diploma in Sustainable Urban Design & Engineering will be exempted 20 MCs of Unrestricted Elective Module and ES2531 Critical Thinking Writing. The exemption from CE1101A, CE2102, MLE1010 and EG1311 will be determined after the department receives your transcript.

Sample Semester Schedule for Accredited Direct Poly Entry CE students
(for students who **MUST** take Maths Bridging Module MA1301)

Semester 3	MC	Semester 4	MC
MA1301 Introductory Mathematics[1] (fulfil UEM)	4	CE2155 Structural Mechanics and Materials	4
CS1010E Programming Methodology	4	CE3115 Geotechnical Engineering	4
CE2112 Soil Mechanics	4	MA1511 Engineering Calculus	2
CE2134 Hydraulics	4	MA1513 Linear Algebra with Differential Eqns	2
CE2183 Construction Project Management (CE1101A for Water Tech diploma)	4	GER1000[4] GE 1	4
		GEQ1000[4] GE 2	4
Sub-total	**20**	**Sub-total**	**20**

Modules are on 100% e-Learning

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	EE2211 Introduction to Machine Learning	4
CE3165 Structural Concrete Design	4	GE 3[4]	4
Sub-total	**20**	**Sub-total**	**20**

SPECIAL TERM (SUMMER HOLIDAYS)	
OPTIONAL Vacation Internship (VIP) {*Students can choose to take VIP to fulfil 6 MCs of Free Elective[2]*}	6

Semester 7	MC	Semester 8	MC
CE4104 B.Eng. Dissertation	4	CE4104 B.Eng. Dissertation	4
CE4103 Design Project	4	Free Elective[2,3]	4
IE2141 Systems Thinking and Dynamics	4	GE 5[4]	4
EG2401A Engineering Professionalism	2	UEM[3]	4
GE 4[4] (CE2183, for Water Tech diploma)	4		
Sub-total	**18**	**Sub-total**	**16**
TOTAL			**120**

Total 120 + 40 APCs = 160 MCs

The highlighted modules are pre-allocated to students.

[1]**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.

[2]Direct poly entry students are not required to take EG3611A Industrial Attachment. In-lieu of the Industrial Attachment, students have **10MCs of "Free Electives"**.

[3]**UEM and Free Electives can be read in any semester** and can be any modules within or outside of your major requirements. It can also be used to fulfil the requirements of minor/specialization.

[4]**GE too can be read in any semester**, except GER and GEQ which are pre-allocated in Sem 2.

Sample Semester Schedule for Accredited Direct Poly Entry CE students

(for students who are **WAIVED** the Maths Bridging Module MA1301)

Semester 3	MC	Semester 4	MC
MA1511 Engineering Calculus	2	CE2155 Structural Mechanics and Materials	4
CS1010E Programming Methodology	4	CE3115 Geotechnical Engineering	4
CE2112 Soil Mechanics	4	MA1513 Linear Algebra with Differential Eqns	2
CE2134 Hydraulics	4	GER1000[4] GE 1	4
CE2183 Construction Project Management (CE1101A for Water Tech diploma)	4	GEQ1000[4] GE 2	4
GE 4[4]	4	GE 3[4]	4
Sub-total	22	Sub-total	22

Modules are on 100% e-Learning

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	EE2211 Introduction to Machine Learning	4
CE3165 Structural Concrete Design	4		
Sub-total	20	Sub-total	16

SPECIAL TERM (SUMMER HOLIDAYS)	
OPTIONAL Vacation Internship (VIP) {*Students can choose to take VIP to fulfil 6 MCs of Free Elective[2]*}	6

Semester 7	MC	Semester 8	MC
CE4104 B.Eng. Dissertation	4	CE4104 B.Eng. Dissertation	4
CE4103 Design Project	4	Free Elective[2,3]	4
IE2141 Systems Thinking and Dynamics	4	GE 5[4]	4
EG2401A Engineering Professionalism	2	UEM[3]	4
UEM (CE2183, for Water Tech diploma)	4		
Sub-total	18	Sub-total	16
TOTAL			120

Total 120 + 40 APCs = 160 MCs

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