

B.Eng. (Environmental Engineering) Degree Requirements

- Cohort AY2012/2013 updated as of 28 December 2012

The following are the requirements for the degree:

- Students in the B.Eng. (Environmental Engineering) Programme are required to complete a minimum of 162 MCs with a CAP \geq 2.0 to graduate from the programme.
- 162 MCs will have to be earned by reading modules in accordance with Table A.
- The students are free to choose any combination of the offered modules from Table B to complete 16 MCs of the technical electives.
- A student must also satisfy other additional requirements that may be prescribed by the Faculty of Engineering or the University.
- **Students are required to read ES2331 Communicating Engineering towards the UEM /ULR-Breadth requirement.**

Table A: Summary of Modular Requirements and Credits

Modular Requirements	MCs
UNIVERSITY LEVEL REQUIREMENTS	20
General Education Modules (GEM) (at least one from Group B: Humanities and Social Sciences)	8
Singapore Studies (SS) Module	4
Breadth: Modules Outside Student's Faculty	8
PROGRAMME REQUIREMENTS	
Faculty Requirements:	10
ES1531/EG1413 Critical Thinking and Writing	4
HR2002 Human Capital in Organizations	3
EG2401 Engineering Professionalism	3
ES1102 English for Academic Purposes *	-
Major Requirements:	
Foundation Requirements	24
MA1505 Mathematics I	4
MA1506 Mathematics II	4
PC1431 Physics IE	4
MLE1101 Introductory Materials Science & Engineering	4
CE2409 Computer Applications	4
CM1502 General and Physical Chemistry for Engineers	4
Basic Engineering Modules:	16
EG1109 Statics and Mechanics of Materials	4
CE2134 Hydraulics	4
CE2183 Construction Project Management	4
CE2407 Engineering and Uncertainty Analysis	4
Engineering Process/Infrastructure Engineering (3 of the following courses):	12
CE2155 Structural Mechanics and Materials	4
CE2184 Infrastructure and the Environment	4
CM2142 Analytical Chemistry	4
CN2121 Chemical Engineering Thermodynamics	4
AR2723 Strategies for Sustainable Architecture	4
LSM1401 Fundamentals of Biochemistry	4
Environmental Engineering Core Modules:	28
ESE1001 Environmental Engineering Fundamentals	4
ESE2001 Environmental Processes	4
ESE2401 Water Science & Technology	4
ESE3101 Solid and Hazardous Waste Management	4
ESE3201 Air Quality Management	4
ESE3301 Environmental Microbiological Principles	4
ESE3401 Water & Wastewater Engineering 1	4
ESE Technical Electives Modules <i>-from the modules in Table B</i>	16

Modular Requirements	MCs
UNRESTRICTED ELECTIVE MODULES **	20
Projects Modules	
ESE4501 Design Project 4MCs	16
ESE4502 B.Eng Dissertation 12 MCs	
Total	162

* For students who have not passed or been exempted from the Qualifying English Test at the time of admissions to the Faculty

** Students are required to read ES2331 towards the UEM (or ULR-Breadth) requirement.

Table B: Technical Elective Modules ^Ω

1) Department of Civil and Environmental Engineering

- ESE4301 Wastewater Biotechnology
- ESE4401 Water & Wastewater Engineering 2
- ESE4402 Treatment Plant Hydraulics
- 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
- ESE5201 Combustion Pollution Control
- ESE5202 Air Pollution Control Technology
- ESE5203 Aerosol Science and Technology
- ESE5204 Toxic & Hazardous Waste Management
- ESE5205 Sludge and Solid Waste Management
- ESE5301 Environmental Biological Principles
- ESE5401 Water Quality Management
- ESE5402 Industrial Wastewater Control
- ESE5403 Water Reclamation & Reuse
- ESE5404 Biological Treatment Processes
- ESE5405 Water Treatment Processes
- ESE5406 Membrane Treatment Process and Modelling
- ESE5407 Membrane Technology for Water Management
- ESE5601 Environmental Risk Assessment
- ESE5602 Environmental Management Systems
- ESE5603 Pollution Minimisation and Prevention
- CE3132 Water Resources Engineering
- CE5307 Wave Hydrodynamics and Physical Oceanography
- CE5603 Engineering Economics & Project Evaluation

^Ω CEE reserves the right to decide on the modules to be offered in an academic year & any given semester. Please confirm with department beforehand.

2) Dept of Chemical and Biomolecular Engineering

- SH5002 Fundamentals in Industrial Safety
- SH5004 Fundamentals in Industrial Hygiene
- SH5101 Industrial Toxicology
- SH5402 Advanced SHE Management

3) Dept of School of Design and Environment

- LX5103 Environmental Law

Table C: Recommended Semester schedule for EVE Students

Modules	MCs	Modules	MCs
Semester 1		Semester 2	
MA1505 Mathematics I	4	MA1506 Mathematics II	4
PC1431 Physics IE ^	4	MLE1101 Introductory Materials Science & Engineering	4
ESE1001 Environmental Engineering Fundamentals	4	EG1109 Statics and Mechanics of Materials	4
CE2409 Computer Applications in Civil Engineering	4	CM1502 General and Physical Chemistry for Engineers	4
ES1000* Basic English Course	-	ES1102* English for Academic Purposes	-
A Singapore Studies Module	4	General Education Module/ Breadth 1	4
Sub-total	20	Sub-total	20

^ PC1431 Physics IE must be graded.

* Students who have not passed or even been exempted from the Qualifying English Test at the time of admissions to the Faculty, will have to read ES1000 and/or ES1102. This will be decided by CELC.

Modules	MCs	Modules	MCs
Semester 3		Semester 4	
CE2155* Structural Mechanics and Materials	4	CM2142* Analytical Chemistry	4
CE2184* Infrastructure and the Environment	4	LSM1401* Fundamentals of Biochemistry	4
CN2121* Chemical Engineering Thermodynamics	4	AR2723* Strategies for Sustainable Architecture	4
LSM1401* Fundamentals of Biochemistry	4	CE2183 Construction Project Management	4
CM2142* Analytical Chemistry	4	ESE2401 Water Science & Technology	4
CE2134 Hydraulics	4	2 x General Education or Breadth Modules	8
CE2407 Engineering and Uncertainty Analysis	4	EG1413** Critical Thinking and Writing	4
ESE2001 Environmental Processes	4		
Sub-total	20	Sub-total	24

* Students are required to read 3 out of the 6 modules listed. LSM1401 and CM2142 are offered in both Semesters. Module choices are subjected to timetable availability and fulfillment of co/pre-requisites, if any.

** Students who are required to read ES1102 have to pass the module before reading EG1413. Students are allowed to read EG1413 in any semester as long as they have passed or been exempted from ES1102.

Modules	MCs	Modules	MCs
Semester 5		Semester 6	
ESE3101 Solid and Hazardous Waste Mgmt	4	Technical Elective Module 1	4
ESE3201 Air Quality Management	4	Technical Elective Module 2	4
ESE3301 Environmental Microbiological Principles	4	General Education Module/ Breadth	4
ESE3401 Water & Wastewater Engineering 1	4	Unrestricted Elective Module 2	4
ES2331 Communicating Engineering (UEM 1)	4	Unrestricted Elective Modules 3	4
Sub-total	20	Sub-total	20

Note: ES2331 must be read on a **graded basis** either as **Breadth** (module type code U9) OR as **Unrestricted Elective** (module type code 27). ES1531 is a pre-requisite of ES2331, (hence you can choose to read ES2331 in any semester after you have passed ES1531).

Modules	MCs	Modules	MCs
Semester 7		Semester 8	
ESE4501 Design Project	4	ESE4502 B.Eng Dissertation (Cont'd)	8
ESE4502 B.Eng. Dissertation	4	HR2002 Human Capital in Organizations	3
Technical Elective Module 3	4	EG2401 Engineering Professionalism	3
Technical Elective Module 4	4	Unrestricted Elective Module 5	4
Unrestricted Elective Module 4	4		
Sub-total	20	Sub-total	18

Table D: Recommended Semester Schedule for B.Eng. (Env Eng) students with an accredited Polytechnic Diploma (Cohort AY2012/2013)

Semester 3			Semester 4		
Modules		MCs	Modules		MCs
MA1301	Introductory Mathematics (<i>UEM 4</i>) <i>if no exemption is given</i>	4	MA1505	Mathematics I	4
PC1431	Physics IE **	4	ESE2401	Water Science and Technology	4
ESE2001	Environmental Processes	4	CM1502	General and Physical Chemistry for Engineers **	4
CE2409	Computer Applications in Civil Engineering	4	EG1109	Statics and Mechanics of Materials	4
ESE1001	Environmental Engineering Fundamentals	4	ES2331	Communication Engineering (<i>UEM 5</i>)	4
Sub-total		20	Sub-total		20

**** PC1431 or CM1502 will be exempted for those who have passed the APC Test for either one of the modules.**

Note: Students who have not passed or even been exempted from the Qualifying English Test at the time of admissions to the Faculty, will have to read ES100 and/or ES1102. This will be decided by CELC.
ES2331 must be read on a **graded basis** either as **Breadth** (U9) OR as **Unrestricted Elective** (27).

Semester 4			Semester 6		
Modules		MCs	Modules		MCs
MA1506	Mathematics II	4	CM2142*	Analytical Chemistry (Pre-Req: CM1101)	4
CE2184*	Infrastructure and the Environment	4	LSM1401*	Fundamentals of Biochemistry	4
LSM1401*	Fundamentals of Biochemistry	4	AR2723*	Strategies for Sustainable Architecture	4
CN2121*	Chemical Engineering Thermodynamics (Pre-Req: CN1111 and CM1502)	4	CE2155*	Structural Mechanics and Materials	4
CM2142*	Analytical Chemistry (Pre-Req: CM1101 waived if pass CM1502)	4	CE2183	Construction Project Management	4
CE2134	Hydraulics	4		Technical Elective Module 1	4
ESE3401	Water and Wastewater Engineering 1	4		Technical Elective Module 2	4
	Breadth Module	4		1 GEM Module	4
				Singapore Studies	4
Sub-total		20	Sub-total		24

* Students are required to read 3 out of 6 modules listed. LSM 1401 and CM 2142 are offered in both semesters. Module choices are subjected to timetable availability and fulfilment of co/pre-requisites, if any.

Semester 7			Semester 8		
Modules		MCs	Modules		MCs
ESE3101	Solid & Hazardous Waste Management	4	ESE4502	BEng Dissertation (<i>continuation</i>)	8
ESE3201	Air Quality Management	4	EG2401	Engineering Professionalism	3
ESE3301	Environmental Microbiological Principles	4	CM2142*	Analytical Chemistry (Pre-Req: CM1101)	4
ESE4501	Design Project	4	LSM1401*	Fundamentals of Biochemistry	4
ESE4502	BEng Dissertation	4	AR2723*	Strategies for Sustainable Architecture	4
CE2407	Engineering and Uncertainty Analysis	4	CE2155*	Structural Mechanics and Materials	4
				Technical Elective Module 3	4
				Technical Elective Module 4	4
Sub-total		24	Sub-total		23

Note:-

The above schedule can be revised in the event of timetabling constraints.

All poly entry students are considered for the following exemptions (Maximum 40 MCs):

Module	MCs	Remarks
GEM Module	4	Please note that these exemptions are NOT guaranteed, but are subject to assessment of polytechnic diploma results.
Breadth Module	4	
EG1413 Critical Thinking and Writing	4	
HR2002 Understanding Human Relations in the New Economy	3	
MLE1101 Introductory Materials Science and Engineering	4	
Unrestricted Elective Modules	12	
PC1431 Physics IE	4	Students can opt to sit for APC tests to gain exemptions from either CM1502. Exemption for this module will ONLY be granted by passing of APC test.
CM1502 General and Physical Chemistry for Engineers	4	

Limit on Level-1000 Modules

Students should not read more than 60 MCs of Level-1000 modules towards their degree requirements (minimum of 160 MCs for graduation). For Polytechnic graduates, 12 MCs of the exempted UE modules will not count towards the 60 MCs limit on level-1000 modules.