

**Bachelor of Engineering (Environmental and Sustainability Engineering)
with Minor in Innovation & Design**

Cohort AY2025/2026

Course Requirements	Units
Common Curriculum	
GEA1000 Quantitative Reasoning with Data ¹	4
CS1010E Programming Methodology (or other variants) ²	4
CDE2501 Sustainable Systems for Liveable Cities ²	4
ES2631 Critique and Communication of Thinking and Design ²	4
GE: Cultures and Connections ²	4
GE: Communities and Engagement ²	4
DTK1234 Design Thinking	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4
EG1311 Design and Make or EG1311BE Design and Make	4
PF1101A Project Management and Finance	4
Sub-total for Common Curriculum	40
Engineering Core	
MA1511 Engineering Calculus	2
MA1512 Differential Equations for Engineering	2
MA1513 Linear Algebra with Differential Equations	2
CE2407A Uncertainty Analysis for Engineers	2
EG2401A Engineering Professionalism	2
EG3611A Industrial Attachment or CFG2101 NUS Vacation Internship Programme ³ and EG3612 Vacation Industrial Attachment	10
Sub-total for Engineering Core	20
Engineering Programme Requirements	
CE2134 Fluid Mechanics	4
ESE2101 Environmental Science and Engineering Principles and Practice	4
ESE2102 Principles and Practice in Environmental Monitoring	4
ESE2000 Chemistry for an Environmentally Sustainable Future	4
ESE2001 Environmental Challenges in the Anthropocene	4
ESE3101 Resource Management and Circular Economy	4
ESE3201 Air Quality in Changing Environment	4
ESE3301 Microbiology in Natural and Built Environment	4
ESE3401 Sustainable Urban Water Technology	4
ESE4408 Environmental Impact Assessment	4
ESE4501 Design Project	4
Technical electives	8
ESE4502R B. Eng. Dissertation (over 2 consecutive semesters) ⁴	8
Sub-total for Engineering Programme Requirements	60
Unrestricted Electives	
CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters) ⁵	12
Electives for Minor ⁵	8
Other unrestricted electives ⁴	20
Sub-total for Unrestricted Electives	40
Total	160

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Notes:

- ¹ Students may read other approved courses for Data Literacy in lieu of GEA1000.
- ² Students may read equivalent courses in NUS College (NUSC), University Town College Programme (UTCP), and Ridge View Residential Programme (RVRC). CDE2501 fulfils GE: Singapore Studies while ES2631 fulfils GE: Critique and Expression.
- ³ May be replaced by CDE2605 Undergraduate Research Opportunities Programme or CDE2605R Undergraduate Research Experience (UREx).
- ⁴ Students may take CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up in lieu of ESE4502R and 4 units of unrestricted electives.
- ⁵ Students should clear at least one elective course prior to CDE3301. Students in competition teams may enrol in CDE3301C Complex Systems Design: From Mission to Prototype in Semester 3 to Semester 4 (Year 2) or Semester 5 to Semester 6 (Year 3).

Sample study plan – JC-intake students or equivalent
(for students who opt for vacation internships)

Semester 1	Units	Semester 2	Units
ESE2101 Environmental Science and Engineering Principles and Practice	4	ESE2102 Principles and Practice in Environmental Monitoring	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking	4	EG1311 Design and Make <u>or</u> EG1311BE Design and Make	4
MA1513 Linear Algebra with Differential Equations	2	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	MA1512 Differential Equations for Engineering	2
PF1101A Project Management and Finance	4	Elective 1 for Minor	4
Sub-total	20	Sub-total	20

Summer vacation between Semesters 2 and 3	Units
CFG2101 NUS Vacation Internship Programme	4
Sub-total	4

Semester 3	Units	Semester 4	Units
CE2134 Fluid Mechanics	4	ESE3101 Resource Management and Circular Economy	4
ESE2000 Chemistry for an Environmentally Sustainable Future	4	ESE3301 Microbiology in Natural and Built Environment	4
ESE2001 Environmental Challenges in the Anthropocene	4	ES2631 Critique and Communication of Thinking and Design	4
EE2211 Introduction to Machine Learning <u>or</u> EE2213 Introduction to Artificial Intelligence	4	GE	4
EG2401A Engineering Professionalism	2	CDE3301 Ideas to Proof-of-Concept	6
Elective 2 for Minor	4		
Sub-total	22	Sub-total	22

Summer vacation between Semesters 4 and 5	Units
EG3612 Vacation Internship Attachment	6
Sub-total	6

Semester 5	Units	Semester 6 – can be used for SEP	Units
ESE3201 Air Quality in Changing Environment	4	Technical Elective 1	4
ESE3401 Sustainable Urban Water Technology	4	GE	4
CDE2501 Sustainable Systems for Liveable Cities	4	UE	4
CDE3301 Ideas to Proof-of-Concept	6	UE	4
		UE	4
Sub-total	18	Sub-total	20

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Semester 7	Units	Semester 8	Units
ESE4502R B. Eng. Dissertation	4	ESE4502R B. Eng. Dissertation	4
ESE4501 Design Project	4	ESE4408 Environmental Impact Assessment	4
Technical Elective 2	4	UE	4
UE	4		
Sub-total	16	Sub-total	12

Sample study plan – JC-intake students or equivalent
(for students who opt for industrial attachment)

Semester 1	Units	Semester 2	Units
ESE2101 Environmental Science and Engineering Principles and Practice	4	ESE2102 Principles and Practice in Environmental Monitoring	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking	4	EG1311 Design and Make or EG1311BE Design and Make	4
MA1513 Linear Algebra with Differential Equations	2	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	MA1512 Differential Equations for Engineering	2
PF1101A Project Management and Finance	4	Elective 1 for Minor	4
Sub-total	20	Sub-total	20

Semester 3	Units	Semester 4	Units
CE2134 Fluid Mechanics	4	ESE3101 Resource Management and Circular Economy	4
ESE2000 Chemistry for an Environmentally Sustainable Future	4	ESE3301 Microbiology in Natural and Built Environment	4
ESE2001 Environmental Challenges in the Anthropocene	4	ES2631 Critique and Communication of Thinking and Design	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4	GE	4
EG2401A Engineering Professionalism	2	CDE3301 Ideas to Proof-of-Concept	6
Elective 2 for Minor	4		
Sub-total	22	Sub-total	22

Semester 5	Units	Semester 6	Units
ESE3201 Air Quality in Changing Environment	4	EG3611A Industrial Attachment	10
ESE3401 Sustainable Urban Water Technology	4		
CDE2501 Sustainable Systems for Liveable Cities	4		
GE	4		
CDE3301 Ideas to Proof-of-Concept	6		
Sub-total	22	Sub-total	20

Semester 7	Units	Semester 8	Units
ESE4502R B. Eng. Dissertation	4	ESE4502R B. Eng. Dissertation	4
ESE4501 Design Project	4	ESE4408 Environmental Impact Assessment	4
Technical Elective 1	4	Technical Elective 2	4
UE	4	UE	4
UE	4	UE	4
UE	4		
Sub-total	24	Sub-total	20

Sample study plan – JC-intake students or equivalent
(for students in Engineering Scholars Programme)

Semester 1	Units	Semester 2	Units
ESE2101 Environmental Science and Engineering Principles and Practice	4	ESE2102 Principles and Practice in Environmental Monitoring	4
GEA1000 Quantitative Reasoning with Data	4	ESE3101 Resource Management and Circular Economy	4
DTK1234 Design Thinking	4	MA1512 Differential Equations for Engineering	2
MA1513 Linear Algebra with Differential Equations	2	RVRC/UTCP course 2 (replaces GE)	4
CE2407A Uncertainty Analysis for Engineers	2	Elective 1 for Minor	4
PF1101A Project Management and Finance	4	CDE3301 Ideas to Proof-of-Concept	6
RVRC/UTCP course 1 (replaces GE)	4		
Sub-total	24	Sub-total	24

Summer vacation between Semesters 2 and 3	Units
CFG2101 NUS Vacation Internship Programme	4
Sub-total	4

Semester 3	Units	Semester 4 – can be used for SEP/NOC	Units
CE2134 Fluid Mechanics	4	ESE3301 Microbiology in Natural and Built Environment	4
ESE2000 Chemistry for an Environmentally Sustainable Future	4	EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4
ESE2001 Environmental Challenges in the Anthropocene	4	RVRC/UTCP course 4 (replaces ES2631)	4
EG2401A Engineering Professionalism	2	UE	4
RVRC/UTCP course 3 (replaces CDE2501)	4	UE	4
Elective 2 for Minor	4	UE	2
CDE3301 Ideas to Proof-of-Concept	6		
Sub-total	28	Sub-total	22

Summer vacation between Semesters 4 and 5	Units
EG3612 Vacation Internship Attachment	6
Sub-total	6

Semester 5	Units	Semester 6	Units
ESE4502R B. Eng. Dissertation	4	ESE4502R B. Eng. Dissertation	4
ESE3201 Air Quality in Changing Environment	4	ESE4408 Environmental Impact Assessment	4
ESE3401 Sustainable Urban Water Technology	4	Technical Elective 2	4
ESE4501 Design Project	4	UE	4
Technical Elective 1	4	UE	4
Sub-total	20	Sub-total	20

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Students are highly encouraged to complete the following courses before Semester 1 through advanced placement credits:

- CS1010E Programming Methodology (4 units)
- EG1311 Design and Make (4 units)
- MA1505 Mathematics I (4 units) – replaces MA1511 Engineering Calculus (2 units) and counted as UE (2 units)

CFG2101 may be replaced by CDE2605 Undergraduate Research Opportunities Programme or CDE2605R Undergraduate Research Experience (UREx).

Sample study plan – poly-intake students

(for students who may want to upgrade to a Second Major)

Semester 1	Units	Semester 2	Units
ESE2101 Environmental Science and Engineering Principles and Practice	4	ESE2102 Principles and Practice in Environmental Monitoring	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking <u>or</u> PF1101A Project Management and Finance ^	4	MA1511 Engineering Calculus	2
MA1301 Introductory Mathematics * (UE)	4	MA1512 Differential Equations for Engineering	2
Elective 1 for Minor	4	CDE3301 Ideas to Proof-of-Concept	6
		Elective 2 for Minor	4
Sub-total	20	Sub-total	22

Semester 3	Units	Semester 4	Units
CE2134 Fluid Mechanics	4	ESE3101 Resource Management and Circular Economy	4
ESE2000 Chemistry for an Environmentally Sustainable Future	4	ESE3301 Microbiology in Natural and Built Environment	4
ESE2001 Environmental Challenges in the Anthropocene	4	EE2211 Introduction to Machine Learning <u>or</u> EE2213 Introduction to Artificial Intelligence	4
MA1513 Linear Algebra with Differential Equations *	2	ES2631 Critique and Communication of Thinking and Design	4
CE2407A Uncertainty Analysis for Engineers *	2	GE	4
EG2401A Engineering Professionalism	2		
CDE3301 Ideas to Proof-of-Concept	6		
Sub-total	24	Sub-total	20

Semester 5	Units	Semester 6	Units
ESE4502R B. Eng. Dissertation	4	ESE4502R B. Eng. Dissertation	4
ESE3201 Air Quality in Changing Environment	4	ESE4408 Environmental Impact Assessment	4
ESE3401 Sustainable Urban Water Technology	4	Technical Elective 1	4
ESE4501 Design Project	4	Technical Elective 2	4
CDE2501 Sustainable Systems for Liveable Cities	4	GE	4
Sub-total	20	Sub-total	20

* Students who are exempted from MA1301 can take MA1513 and CE2407A in Semester 1.

Poly-intake students with accredited diplomas will receive the following exemptions:

- DTK1234 Design Thinking (4 units) or PF1101A Project Management and Finance (4 units)
- EG1311BE Design and Make (4 units) – can be taken in any semester if not exempted
- EG3611P Industrial Attachment (10 units)
- Unrestricted electives (20 units)

Sample study plan – poly-intake students

(for students who are not planning to upgrade to a Second Major)

Semester 1	Units	Semester 2	Units
ESE2101 Environmental Science and Engineering Principles and Practice	4	ESE2102 Principles and Practice in Environmental Monitoring	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking <u>or</u> PF1101A Project Management and Finance ^	4	MA1511 Engineering Calculus	2
MA1301 Introductory Mathematics * (UE)	4	MA1512 Differential Equations for Engineering	2
GE	4	GE	4
		Elective 1 for Minor	4
Sub-total	20	Sub-total	20

Semester 3	Units	Semester 4	Units
CE2134 Fluid Mechanics	4	ESE3101 Resource Management and Circular Economy	4
ESE2000 Chemistry for an Environmentally Sustainable Future	4	ESE3301 Microbiology in Natural and Built Environment	4
ESE2001 Environmental Challenges in the Anthropocene	4	EE2211 Introduction to Machine Learning <u>or</u> EE2213 Introduction to Artificial Intelligence	4
MA1513 Linear Algebra with Differential Equations *	2	ES2631 Critique and Communication of Thinking and Design	4
CE2407A Uncertainty Analysis for Engineers *	2	CDE3301 Ideas to Proof-of-Concept	6
EG2401A Engineering Professionalism	2		
Elective 2 for Minor	4		
Sub-total	22	Sub-total	22

Semester 5	Units	Semester 6	Units
ESE4502R B. Eng. Dissertation	4	ESE4502R B. Eng. Dissertation	4
ESE3201 Air Quality in Changing Environment	4	ESE4408 Environmental Impact Assessment	4
ESE3401 Sustainable Urban Water Technology	4	Technical Elective 1	4
ESE4501 Design Project	4	Technical Elective 2	4
CDE3301 Ideas to Proof-of-Concept	6	CDE2501 Sustainable Systems for Liveable Cities	4
Sub-total	22	Sub-total	20

* Students who are exempted from MA1301 can take MA1513 and CE2407A in Semester 1.

Poly-intake students with accredited diplomas will receive the following exemptions:

- DTK1234 Design Thinking (4 units) or PF1101A Project Management and Finance (4 units)
- EG1311BE Design and Make (4 units) – can be taken in any semester if not exempted
- EG3611P Industrial Attachment (10 units)
- Unrestricted electives (20 units)