

**Bachelor of Engineering (Environmental Engineering)  
with Second Major in Innovation & Design**

**Cohorts AY2021/2022 and AY2022/2023**

<b>Modular Requirements</b>	<b>Modular Credits (MCs)</b>
<b>Common Curriculum</b>	
GEA1000 Quantitative Reasoning with Data	4
CS1010E Programming Methodology	4
ES2631 Critique and Communication of Thinking and Design <sup>1</sup>	4
GE: Cultures and Connections <sup>1</sup>	4
GE: Singapore Studies <sup>1</sup>	4
GE: Communities and Engagement <sup>1</sup>	4
CDE2000 Creating Narratives	4
DTK1234 Design Thinking	4
EE2211 Introduction to Machine Learning	4
EG1311 Design and Make	4
EG2501 Liveable Cities	4
IE2141 Systems Thinking and Dynamics	4
PF1101 Fundamentals of Project Management	4
EG4301 DCP Dissertation or EG4301A Ideas to Start-up (over 2 consecutive semesters) <sup>2</sup>	8
<b>Sub-total for Common Curriculum</b>	<b>60</b>
<b>Engineering Core</b>	
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 <sup>3</sup> and EG3612 Vacation Industrial Attachment	10
<b>Sub-total for Engineering Core</b>	<b>20</b>
<b>Engineering Programme Requirements</b>	
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
Technical electives	8
<b>Sub-total for Engineering Programme Requirements</b>	<b>40</b>
<b>Unrestricted Electives</b>	
Group A module for Second Major	4
Group B module for Second Major	4
Group C modules for Second Major (Innovation & Enterprise electives)	8
EG3301R DCP Project (over 2 consecutive semesters)	12
EG4301 DCP Dissertation or EG4301A Ideas to Start-up (over 2 consecutive semesters) <sup>2</sup>	4
Other unrestricted electives	8
<b>Sub-total for Unrestricted Electives</b>	<b>40</b>
<b>Total</b>	<b>160</b>

**Innovation & Design Programme**  
**NUS College of Design and Engineering**

Notes:

- <sup>1</sup> Students may read equivalent modules in USP/NUSC, UTCP, and RVRC.
- <sup>2</sup> The 12 MCs for EG4301/EG4301A are counted towards 8 MCs for the Integrated Project requirement in the Common Curriculum while 4 MCs are counted as unrestricted elective.
- <sup>3</sup> May be replaced by EG2605 Undergraduate Research Opportunities Programme.

**Recommended semester schedule – JC-intake students or equivalent**  
(for students who opt for vacation internships)

Semester 1	MCs	Semester 2	MCs
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 & 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
PF1101 Fundamentals of Project Management	4	Group A module for Second Major	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Summer vacation between Semesters 2 and 3	MCs
CFG2101 NUS Vacation Internship Programme	4
<b>Sub-total</b>	<b>4</b>

Semester 3	MCs	Semester 4	MCs
ESE2000 Chemistry for An Environmentally Sustainable Future	4	ESE3101 Resource Management and Circular Economy	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Microbiology in Natural and Built Environment	4
EE2211 Introduction to Machine Learning	4	ES2631 Critique and Communication of Thinking and Design	4
EG2501 Liveable Cities	4	IE2141 Systems Thinking & Dynamics	4
EG2401A Engineering Professionalism	2	EG3301R DCP Project	6
Group B module for Second Major	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Attachment	6
<b>Sub-total</b>	<b>6</b>

Semester 5	MCs	Semester 6 – can be used for SEP	MCs
EG3301R DCP Project	6	Innovation & Enterprise Elective 1	4
ESE3201 Air Quality in Changing Environment	4	GE *	4
ESE3401 Sustainable Urban Water Technology	4	GE *	4
GE *	4	UE	4
		UE	4
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>20</b>

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Technical Elective 1	4	Innovation & Enterprise Elective 2	4
CDE2000 Creating Narratives	4	Technical Elective 2	4
<b>Sub-total</b>	<b>14</b>	<b>Sub-total</b>	<b>14</b>

\* Students in UTCP and RVRC will need to overload in Semesters 2 to 4 in order to clear these modules earlier.

**Recommended semester schedule – JC-intake students or equivalent**  
(for students who opt for vacation internships **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
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 & 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
PF1101 Fundamentals of Project Management	4	Group A module for Second Major	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Summer vacation between Semesters 2 and 3	MCs
CFG2101 NUS Vacation Internship Programme	4
<b>Sub-total</b>	<b>4</b>

Semester 3	MCs	Semester 4	MCs
ESE2000 Chemistry for An Environmentally Sustainable Future	4	ESE3101 Resource Management and Circular Economy	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Microbiology in Natural and Built Environment	4
EE2211 Introduction to Machine Learning	4	ES2631 Critique and Communication of Thinking and Design	4
EG2501 Liveable Cities	4	IE2141 Systems Thinking & Dynamics	4
EG2401A Engineering Professionalism	2	EG3301R DCP Project	6
Group B module for Second Major	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

Summer vacation between Semesters 4 and 5	MCs
EG3612 Vacation Internship Attachment	6
<b>Sub-total</b>	<b>6</b>

Semester 5	MCs	Semester 6 – can be used for SEP	MCs
EG3301R DCP Project	6	Innovation & Enterprise Elective 1	4
ESE3201 Air Quality in Changing Environment	4	GE *	4
ESE3401 Sustainable Urban Water Technology	4	GE *	4
GE *	4	Specialisation module 1	4
		Specialisation module 2	4
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>20</b>

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Specialisation module 3	4	Innovation & Enterprise Elective 2	4
Specialisation module 4	4	Specialisation module 5	4
CDE2000 Creating Narratives	4		
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>14</b>

**Recommended semester schedule – JC-intake students or equivalent**  
(for students who opt for industrial attachment)

Semester 1	MCs	Semester 2	MCs
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 & 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
PF1101 Fundamentals of Project Management	4	Group A module for Second Major	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 3	MCs	Semester 4	MCs
ESE2000 Chemistry for An Environmentally Sustainable Future	4	ESE3101 Resource Management and Circular Economy	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Microbiology in Natural and Built Environment	4
EE2211 Introduction to Machine Learning	4	ES2631 Critique and Communication of Thinking and Design	4
EG2501 Liveable Cities	4	IE2141 Systems Thinking & Dynamics	4
EG2401A Engineering Professionalism	2	EG3301R DCP Project	6
Group B module for Second Major	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project	6	EG3611A Industrial Attachment	10
ESE3201 Air Quality in Changing Environment	4		
ESE3401 Sustainable Urban Water Technology	4		
GE *	4		
GE *	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>10</b>

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 1	4	Innovation & Enterprise Elective 2	4
Technical Elective 1	4	Technical Elective 2	4
CDE2000 Creating Narratives	4	UE	4
GE *	4	UE	4
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

\* Students in UTCP and RVRC will need to overload in Semesters 2 to 4 in order to clear these modules earlier.

**Recommended semester schedule – JC-intake students or equivalent**  
(for students who opt for industrial attachment **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
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 & 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
PF1101 Fundamentals of Project Management	4	Group A module for Second Major	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 3	MCs	Semester 4	MCs
ESE2000 Chemistry for An Environmentally Sustainable Future	4	ESE3101 Resource Management and Circular Economy	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Microbiology in Natural and Built Environment	4
EE2211 Introduction to Machine Learning	4	ES2631 Critique and Communication of Thinking and Design	4
EG2501 Liveable Cities	4	IE2141 Systems Thinking & Dynamics	4
EG2401A Engineering Professionalism	2	EG3301R DCP Project	6
Group B module for Second Major	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project	6	EG3611A Industrial Attachment	10
ESE3201 Air Quality in Changing Environment	4	Specialisation module 1	4
ESE3401 Sustainable Urban Water Technology	4		
GE *	4		
GE *	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>14</b>

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 1	4	Innovation & Enterprise Elective 2	4
Specialisation module 2	4	Specialisation module 3	4
CDE2000 Creating Narratives	4	Specialisation module 4	4
GE *	4	Specialisation module 5	4
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

\* Students in UTCP and RVRC will need to overload in Semesters 2 to 4 in order to clear these modules earlier.

**Recommended semester schedule – JC-intake students or equivalent**  
(for students in year-long NOC programmes)

Semester 1	MCs	Semester 2	MCs
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 & 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
PF1101 Fundamentals of Project Management	4	Group A module for Second Major	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 3	MCs	Semester 4	MCs
ESE2000 Chemistry for An Environmentally Sustainable Future	4	ESE3101 Resource Management and Circular Economy	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Microbiology in Natural and Built Environment	4
EE2211 Introduction to Machine Learning	4	ES2631 Critique and Communication of Thinking and Design	4
EG2501 Liveable Cities	4	IE2141 Systems Thinking & Dynamics	4
Group B module for Second Major	4	EG3301R DCP Project	6
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>22</b>

Semester 5	MCs	Semester 6 – NOC	MCs
EG3301R DCP Project	6	NOC	
ESE3201 Air Quality in Changing Environment	4		
ESE3401 Sustainable Urban Water Technology	4		
GE *	4		
GE *	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>20</b>

Semester 7 – NOC	MCs	Semester 8	MCs
NOC		Technical Elective 1	4
		Technical Elective 2	4
		CDE2000 Creating Narratives	4
		GE *	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>16</b>

\* Students in UTCP and RVRC will need to overload in Semesters 2 to 4 in order to clear these modules earlier.

A year-long NOC programme comprises the following modules:

- TR3201N Entrepreneurship Practicum (8 MCs) – replaces EG4301A (4 MCs out of 12 MCs) and UE (4 MCs)
- TR3202N Start-up Internship Programme (12 MCs) – replaces EG3611A (10 MCs) and EG2401A (2 MCs)
- TR3203N Start-up Case Study and Analysis (8 MCs) – replaces EG4301A (8 MCs out of 12 MCs)
- Entrepreneurship courses (up to 12 MCs) – replaces Innovation & Enterprise electives (up to 8 MCs) while the rest are counted as UE

**Recommended semester schedule – JC-intake students or equivalent**  
(for students in one-semester NOC programmes)

Semester 1	MCs	Semester 2	MCs
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 & 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
PF1101 Fundamentals of Project Management	4	Group A module for Second Major	4
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>20</b>

Semester 3	MCs	Semester 4	MCs
ESE2000 Chemistry for An Environmentally Sustainable Future	4	ESE3101 Resource Management and Circular Economy	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Microbiology in Natural and Built Environment	4
EE2211 Introduction to Machine Learning	4	ES2631 Critique and Communication of Thinking and Design	4
EG2501 Liveable Cities	4	IE2141 Systems Thinking & Dynamics	4
Group B module for Second Major	4	EG3301R DCP Project	6
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>22</b>

Semester 5	MCs	Semester 6 – NOC	MCs
EG3301R DCP Project	6	NOC	
ESE3201 Air Quality in Changing Environment	4		
ESE3401 Sustainable Urban Water Technology	4		
GE *	4		
GE *	4		
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>20</b>

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Technical Elective 1	4	Technical Elective 2	4
CDE2000 Creating Narratives	4	UE	4
GE *	4	UE	4
<b>Sub-total</b>	<b>18</b>	<b>Sub-total</b>	<b>18</b>

\* Students in UTCP and RVRC will need to overload in Semesters 2 to 4 in order to clear these modules earlier.

A one-semester NOC programme comprises the following modules:

- TR3202S Start-up Internship Programme (12 MCs) – replaces EG3611A (10 MCs) and EG2401A (2 MCs)
- TR3204 Entrepreneurship Practicum (4 MCs) – replaces Innovation & Enterprise Elective 1
- Entrepreneurship course (4 MCs) – replaces Innovation & Enterprise Elective 2



**Recommended semester schedule – JC-intake students or equivalent**  
(for students in Engineering Scholars Programme)

Semester 1	MCs	Semester 2	MCs
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	RC4 module 2 (replaces GE)	4
CE2407A Uncertainty Analysis for Engineers	2	EG3301R DCP Project	6
PF1101 Fundamentals of Project Management	4	Group A module for Second Major	4
RC4 module 1 (replaces GE)	4	UE (or IE2141 Systems Thinking & Dynamics if not in RC4)	4
<b>Sub-total</b>	<b>24</b>	<b>Sub-total</b>	<b>28</b>

Semester 3	MCs	Semester 4 – NOC	MCs
ESE2000 Chemistry for An Environmentally Sustainable Future	4	NOC	
ESE2001 Environmental Challenges in the Anthropocene	4		
EE2211 Introduction to Machine Learning	4		
EG2501 Liveable Cities	4		
RC4 module 3 (replaces GE)	4		
EG3301R DCP Project	6		
<b>Sub-total</b>	<b>26</b>	<b>Sub-total</b>	<b>20</b>

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Group B module for Second Major	4	ESE3301 Microbiology in Natural and Built Environment	4
RC4 module 4 (ES2631 Critique and Communication of Thinking and Design)	4	Technical Elective 1	4
ESE3201 Air Quality in Changing Environment	4	Technical Elective 2	4
ESE3401 Sustainable Urban Water Technology	4	UE	4
CDE2000 Creating Narratives	4	UE	2
<b>Sub-total</b>	<b>26</b>	<b>Sub-total</b>	<b>24</b>

**Innovation & Design Programme**  
**NUS College of Design and Engineering**

Students must complete the following modules before Semester 1 through advanced placement credits:

- CS1010E Programming Methodology (4 MCs)
- MA1511 Engineering Calculus (2 MCs) – using MA1505 Mathematics I (remaining 2 MCs counted as UE)
- EG1311 Design & Make (4 MCs)

A one-semester NOC programme comprises the following modules:

- TR3202S Start-up Internship Programme (12 MCs) – replaces EG3611A (10 MCs) and EG2401A (2 MCs)
- TR3204 Entrepreneurship Practicum (4 MCs) – replaces Innovation & Enterprise Elective 1
- Entrepreneurship course (4 MCs) – replaces Innovation & Enterprise Elective 2

Students who are not going on NOC must read EG2101 Pathways to Engineering Leadership in lieu of EG2401A.

**Recommended semester schedule – poly-intake students**

Semester 1	MCs	Semester 2	MCs
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
PF1101 Fundamentals of Project Management	4	MA1511 Engineering Calculus	2
MA1301 Introductory Mathematics (UEM)	4	MA1512 Differential Equations for Engineering	2
Group A module for Second Major	4	Group B module for Second Major	4
		EG3301R DCP Project	6
<b>Sub-total</b>	<b>20</b>	<b>Sub-total</b>	<b>22</b>

Semester 3	MCs	Semester 4	MCs
ESE2000 Chemistry for An Environmentally Sustainable Future	4	ESE3101 Resource Management and Circular Economy	4
ESE2001 Environmental Challenges in the Anthropocene	4	ESE3301 Microbiology in Natural and Built Environment	4
MA1513 Linear Algebra with Differential Equations	2	ES2631 Critique and Communication of Thinking and Design	4
CE2407A Uncertainty Analysis for Engineers	2	IE2141 Systems Thinking & Dynamics	4
EE2211 Introduction to Machine Learning	4	GE	4
EG2501 Liveable Cities	4	GE	4
EG2401A Engineering Professionalism	2		
EG3301R DCP Project	6		
<b>Sub-total</b>	<b>28</b>	<b>Sub-total</b>	<b>24</b>

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 1	4	Innovation & Enterprise Elective 2	4
ESE3201 Air Quality in Changing Environment	4	Technical Elective 1	4
ESE3401 Sustainable Urban Water Technology	4	Technical Elective 2	4
CDE2000 Creating Narratives	4	GE *	4
<b>Sub-total</b>	<b>22</b>	<b>Sub-total</b>	<b>22</b>

\* Students in UTCP and RVRC will need to overload in Semesters 2 to 4 in order to clear this module earlier.

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

- EG1311 Design & Make (4 MCs)
- DTK1234 Design Thinking (4 MCs)
- EG3611A Industrial Attachment (10 MCs)
- Unrestricted elective modules (20 MCs)