

**Bachelor of Engineering (Engineering Science)
with Minor in Innovation & Design**

Cohorts AY2021/2022 and AY2022/2023

Modular Requirements	Modular Credits (MCs)
Common Curriculum	
GEA1000 Quantitative Reasoning with Data	4
CS1010E Programming Methodology	4
ES2631 Critique and Communication of Thinking and Design ¹	4
GE: Cultures and Connections ¹	4
GE: Singapore Studies ¹	4
GE: Communities and Engagement ¹	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
ESP4901 Research Project (over 2 consecutive semesters) ²	8
Sub-total for Common Curriculum	60
Engineering Core	
MA1511 Engineering Calculus	2
MA1512 Differential Equations for Engineering	2
MA1508E Linear Algebra for Engineering	4
EG2401A Engineering Professionalism	2
EG3611A Industrial Attachment <u>or</u> CFG2101 NUS Vacation Internship Programme ³ <u>and</u> EG3612 Vacation Industrial Attachment	10
Sub-total for Engineering Core	20
Engineering Programme Requirements	
ESP1111 Engineering Principles in Action	4
ESP2111 Sensor System Electronics	4
ESP2106 Principles of Continua	4
ESP2107 Numerical Methods and Statistics	4
ESP2110 Design Project 2	4
ME2121 Engineering Thermodynamics and Heat Transfer	4
PC2130B Applied Quantum Physics	4
PC3235B Applied Solid State Physics	4
PC2020 Electromagnetics for Electrical Engineers <u>or</u> EE2023 Signals and Systems	4
EG3301R DCP Project (over 2 consecutive semesters) ⁴	4
Sub-total for Engineering Programme Requirements	40
Unrestricted Electives	
Group A module for Minor	4
Group B module for Minor	4
EG3301R DCP Project (over 2 consecutive semesters) ⁴	8
Other unrestricted electives ²	24
Sub-total for Unrestricted Electives	40
Total	160

Innovation & Design Programme
NUS College of Design and Engineering

Notes:

- ¹ Students may read equivalent modules in USP/NUSC, UTCP, and RVRC.
- ² Subject to approval from home department, students may take EG4301 DCP Dissertation or EG4301A Ideas to Start-up in lieu of ESP4901 and 4 MCs of unrestricted electives.
- ³ May be replaced by EG2605 Undergraduate Research Opportunities Programme.
- ⁴ The 12 MCs for EG3301R are counted towards 4 MCs for ESP3903 Major Design Project II while 8 MCs are counted as unrestricted elective.

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

Semester 1	MCs	Semester 2	MCs
ESP1111 Engineering Principles in Action	4	ESP2111 Sensor System Electronics	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
EG1311 Design & Make	4	DTK1234 Design Thinking	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineering	4
MA1512 Differential Equations for Engineering	2	PF1101 Fundamentals of Project Management	4
GE	4	Group A/B module for Minor ^	4
Sub-total	20	Sub-total	24

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

Semester 3	MCs	Semester 4	MCs
ESP2107 Numerical Methods and Statistics	4	ESP2110 Design Project 2	4
ME2121 Engineering Thermodynamics and Heat Transfer	4	PC3235B Applied Solid State Physics	4
ES2631 Critique and Communication of Thinking and Design	4	EE2211 Introduction to Machine Learning	4
IE2141 Systems Thinking & Dynamics	4	EG2501 Liveable Cities	4
Group A/B module for Minor	4	EG3301R DCP Project (replaces ESP3903)	6
Sub-total	20	Sub-total	22

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

Semester 5	MCs	Semester 6 – can be used for SEP	MCs
EG3301R DCP Project (replaces ESP3903)	6	PC2130B Applied Quantum Physics	4
ESP2106 Principles of Continua	4	PC2020 Electromagnetics for Electrical Engineers <u>or</u> EE2023 Signals and Systems	4
GE *	4	EG2401A Engineering Professionalism	2
GE *	4	CDE2000 Creating Narratives	4
		UE	4
Sub-total	18	Sub-total	18

Semester 7	MCs	Semester 8	MCs
ESP4901 Research Project	4	ESP4901 Research Project	4
UE	4	UE	4
UE	4	UE	4
UE	4		
Sub-total	16	Sub-total	12

^ Students can only take EG2310 or EG2301 in this semester. Those who wish to take EG2201A (in lieu of EG2310) and EG2311/EG2606B (in lieu of EG2301) may clear both modules concurrently in Semester 3.

* 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)

Semester 1	MCs	Semester 2	MCs
ESP1111 Engineering Principles in Action	4	ESP2111 Sensor System Electronics	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
EG1311 Design & Make	4	DTK1234 Design Thinking	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineering	4
MA1512 Differential Equations for Engineering	2	PF1101 Fundamentals of Project Management	4
GE	4	Group A/B module for Minor ^	4
Sub-total	20	Sub-total	24

Semester 3	MCs	Semester 4	MCs
ESP2107 Numerical Methods and Statistics	4	ESP2110 Design Project 2	4
ME2121 Engineering Thermodynamics and Heat Transfer	4	PC3235B Applied Solid State Physics	4
ES2631 Critique and Communication of Thinking and Design	4	EE2211 Introduction to Machine Learning	4
IE2141 Systems Thinking & Dynamics	4	EG2501 Liveable Cities	4
Group A/B module for Minor	4	EG3301R DCP Project (replaces ESP3903)	6
Sub-total	20	Sub-total	22

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces ESP3903)	6	EG3611A Industrial Attachment	10
ESP2106 Principles of Continua	4		
PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4		
EG2401A Engineering Professionalism	2		
GE *	4		
Sub-total	20	Sub-total	10

Semester 7	MCs	Semester 8	MCs
ESP4901 Research Project	4	ESP4901 Research Project	4
GE *	4	PC2130B Applied Quantum Physics	4
UE	4	CDE2000 Creating Narratives	4
UE	4	UE	4
UE	4	UE	4
UE	4		
Sub-total	24	Sub-total	20

^ Students can only take EG2310 or EG2301 in this semester. Those who wish to take EG2201A (in lieu of EG2310) and EG2311/EG2606B (in lieu of EG2301) may clear both modules concurrently in Semester 3.

* 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 Engineering Scholars Programme)

Semester 1	MCs	Semester 2	MCs
ESP1111 Engineering Principles in Action	4	ESP2111 Sensor System Electronics	4
ESP2107 Numerical Methods and Statistics	4	GEA1000 Quantitative Reasoning with Data	4
MA1511 Engineering Calculus	2	DTK1234 Design Thinking	4
MA1512 Differential Equations for Engineering	2	PF1101 Fundamentals of Project Management	4
RC4 module 1 (replaces GE)	4	RC4 module 2 (replaces GE)	4
Group B module for Minor	4	EG3301R DCP Project (replaces ESP3903)	6
UE (or IE2141 Systems Thinking & Dynamics if not in RC4)	4		
Sub-total	24	Sub-total	26

Semester 3	MCs	Semester 4	MCs
ESP2106 Principles of Continua	4	EE2211 Introduction to Machine Learning	4
ME2121 Engineering Thermodynamics and Heat Transfer	4	EG2501 Liveable Cities	4
RC4 module 3 (replaces GE)	4	PC3235B Applied Solid State Physics	4
EG3301R DCP Project (replaces ESP3903)	6	PC2020 Electromagnetics for Electrical Engineers <u>or</u> EE2023 Signals and Systems	4
Group A module for Minor	4	CDE2000 Creating Narratives	4
UE	4	RC4 module 4 (replaces ES2631 Critique and Communication of Thinking and Design)	4
		UE	4
Sub-total	26	Sub-total	28

Semester 5 – NOC	MCs	Semester 6	MCs
NOC		ESP4901 Research Project	8
		PC2130B Applied Quantum Physics	4
		UE	4
		UE	4
Sub-total	20	Sub-total	24

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

- CS1010E Programming Methodology (4 MCs)
- MA1508E Linear Algebra for Engineering (4 MCs) – using MA2001 Linear Algebra
- 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) – counted as UE
- Entrepreneurship course (4 MCs) – counted as UE

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

Recommended semester schedule – poly-intake students
(for students who may want to upgrade to a Second Major)

Semester 1	MCs	Semester 2	MCs
ESP1111 Engineering Principles in Action	4	ESP2111 Sensor System Electronics	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineering	4
MA1512 Differential Equations for Engineering	2	PF1101 Fundamentals of Project Management	4
GE	4	EG3301R DCP Project (replaces ESP3903)	6
Group A/B module for Minor ^	4		
Sub-total	20	Sub-total	22

Semester 3	MCs	Semester 4	MCs
ESP2107 Numerical Methods and Statistics	4	ESP2110 Design Project 2	4
ME2121 Engineering Thermodynamics and Heat Transfer	4	PC2130B Applied Quantum Physics	4
ES2631 Critique and Communication of Thinking and Design	4	PC3235B Applied Solid State Physics	4
IE2141 Systems Thinking & Dynamics	4	PC2020 Electromagnetics for Electrical Engineers <i>or</i> EE2023 Signals and Systems	4
EG3301R DCP Project (replaces ESP3903)	6	EE2211 Introduction to Machine Learning	4
		EG2501 Liveable Cities	4
Sub-total	22	Sub-total	24

Semester 5	MCs	Semester 6	MCs
ESP4901 Research Project	4	ESP4901 Research Project	4
ESP2106 Principles of Continua	4	CDE2000 Creating Narratives	4
GE	4	EG2401A Engineering Professionalism	2
GE	4	UE	4
Group A/B module for Minor	4		
Sub-total	20	Sub-total	14

^ Students are recommended to take EG2201A in this semester. Those who wish to take EG2310 (in lieu of EG2201A) should take EG2301/EG2311/EG2606B in Semester 1 and EG2310 in Semester 2.

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

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

Recommended semester schedule – poly-intake students

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

Semester 1	MCs	Semester 2	MCs
ESP1111 Engineering Principles in Action	4	ESP2111 Sensor System Electronics	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
MA1511 Engineering Calculus	2	MA1508E Linear Algebra for Engineering	4
MA1512 Differential Equations for Engineering	2	PF1101 Fundamentals of Project Management	4
GE	4	Group A module for Minor	4
GE	4		
Sub-total	20	Sub-total	20

Semester 3	MCs	Semester 4	MCs
ESP2107 Numerical Methods and Statistics	4	ESP2110 Design Project 2	4
ME2121 Engineering Thermodynamics and Heat Transfer	4	PC2133 Applied Solid State Physics	4
ES2631 Critique and Communication of Thinking and Design	4	EE2211 Introduction to Machine Learning	4
IE2141 Systems Thinking & Dynamics	4	EG2501 Liveable Cities	4
Group B module for Minor	4	EG3301R DCP Project (replaces ESP3903)	6
Sub-total	20	Sub-total	22

Semester 5	MCs	Semester 6	MCs
ESP4901 Research Project	4	ESP4901 Research Project	4
ESP2106 Principles of Continua	4	PC2130B Applied Quantum Physics	4
PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4	CDE2000 Creating Narratives	4
GE	4	EG2401A Engineering Professionalism	2
EG3301R DCP Project (replaces ESP3903)	6	UE	4
Sub-total	22	Sub-total	18

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

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