Innovation & Design Programme
NUS College of Design and Engineering

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

Cohort AY2021/2022

Modular Requirements	Modular Credits (MCs)
Common Curriculum	
GEA1000 Quantitative Reasoning	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
EG4301 DCP Dissertation or EG4301A Ideas to Start-up (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 or CFG2101 NUS Vacation Internship Programme [3] and 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 or 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 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) [4]	8
EG4301 DCP Dissertation or EG4301A Ideas to Start-up (over 2 consecutive semesters) [2]	4

(updated 3 September 2022)

Other unrestricted electives	12
Sub-total for Unrestricted Electives	**40**
Total	**160**

Notes:

[1] Students may read equivalent modules in USP/NUSC, UTCP, and RVRC.

[2] 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.

[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.

Innovation & Design Programme
NUS College of Design and Engineering

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		
Sub-total	**20**	**Sub-total**	**20**

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 module for Second Major	4	EG3301R DCP Project (replaces ESP3903)	6
Group B module for Second Major	4		
Sub-total	**24**	**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	Innovation & Enterprise Elective 1	4
ESP2106 Principles of Continua	4	PC2130B Applied Quantum Physics	4
GE *	4	PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4
GE *	4	CDE2000 Creating Narratives	4
		EG2401A Engineering Professionalism	2
Sub-total	**18**	**Sub-total**	**18**

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 2	4	UE	4
UE	4	UE	4
Sub-total	**14**	**Sub-total**	**14**

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

(updated 3 September 2022)

Innovation & Design Programme
NUS College of Design and Engineering

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

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		
Sub-total	**20**	**Sub-total**	**20**

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 module for Second Major	4	EG3301R DCP Project (replaces ESP3903)	6
Group B module for Second Major	4		
Sub-total	**24**	**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	Innovation & Enterprise Elective 1	4
ESP2106 Principles of Continua	4	PC2130B Applied Quantum Physics	4
GE *	4	PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4
GE *	4	CDE2000 Creating Narratives	4
		EG2401A Engineering Professionalism	2
Sub-total	**18**	**Sub-total**	**18**

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 2	4	Specialisation module 3	4
Specialisation module 1	4	Specialisation module 4	4
Specialisation module 2	4	Specialisation module 5	4
Sub-total	**18**	**Sub-total**	**18**

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

(updated 3 September 2022)

Innovation & Design Programme
NUS College of Design and Engineering

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		
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	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 module for Second Major	4	EG3301R DCP Project (replaces ESP3903)	6
Group B module for Second Major	4		
Sub-total	**24**	**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
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 1	4	PC2130B Applied Quantum Physics	4
Innovation & Enterprise Elective 2	4	CDE2000 Creating Narratives	4
GE *	4	UE	4
UE	4	UE	4
Sub-total	**22**	**Sub-total**	**22**

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

(updated 3 September 2022)

Innovation & Design Programme
NUS College of Design and Engineering

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

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		
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	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 module for Second Major	4	EG3301R DCP Project (replaces ESP3903)	6
Group B module for Second Major	4		
Sub-total	**24**	**Sub-total**	**22**

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project (replaces ESP3903)	6	EG3611A Industrial Attachment	10
ESP2106 Principles of Continua	4	Specialisation module 1	4
PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4		
EG2401A Engineering Professionalism	2		
GE *	4		
GE *	4		
Sub-total	**24**	**Sub-total**	**14**

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 1	4	PC2130B Applied Quantum Physics	4
Innovation & Enterprise Elective 2	4	CDE2000 Creating Narratives	4
Specialisation module 2	4	Specialisation module 4	4
Specialisation module 3	4	Specialisation module 5	4
Sub-total	**22**	**Sub-total**	**22**

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

(updated 3 September 2022)

Innovation & Design Programme
NUS College of Design and Engineering

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

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		
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	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 module for Second Major	4	EG3301R DCP Project (replaces ESP3903)	6
Group B module for Second Major	4		
Sub-total	**24**	**Sub-total**	**22**

Semester 5	MCs	Semester 6 – NOC	MCs
EG3301R DCP Project (replaces ESP3903)	6	NOC	
ESP2106 Principles of Continua	4		
PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4		
GE *	4		
Sub-total	**18**	**Sub-total**	**20**

Semester 7 – NOC	MCs	Semester 8	MCs
NOC		PC2130B Applied Quantum Physics	4
		CDE2000 Creating Narratives	4
		GE *	4
		UE	4
Sub-total	**20**	**Sub-total**	**16**

* 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

(updated 3 September 2022)

Innovation & Design Programme
NUS College of Design and Engineering

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

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		
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	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 module for Second Major	4	EG3301R DCP Project (replaces ESP3903)	6
Group B module for Second Major	4		
Sub-total	**24**	**Sub-total**	**22**

Semester 5	MCs	Semester 6 – NOC	MCs
EG3301R DCP Project (replaces ESP3903)	6	NOC	
ESP2106 Principles of Continua	4		
PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4		
GE *	4		
Sub-total	**18**	**Sub-total**	**20**

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
GE *	4	PC2130B Applied Quantum Physics	4
UE	4	CDE2000 Creating Narratives	4
UE	4	UE	4
Sub-total	**18**	**Sub-total**	**18**

* 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

(updated 3 September 2022)

Innovation & Design Programme
NUS College of Design and Engineering

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 Second Major	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 – NOC	MCs
ESP2106 Principles of Continua	4	NOC	
ME2121 Engineering Thermodynamics and Heat Transfer	4		
RC4 module 3 (replaces GE)	4		
EG3301R DCP Project (replaces ESP3903)	6		
Group A module for Second Major	4		
UE	4		
Sub-total	**26**	**Sub-total**	**20**

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
RC4 module 4 (replaces ES2631 Critique and Communication of Thinking and Design)	4	ESP2110 Design Project 2	4
EE2211 Introduction to Machine Learning	4	PC3235B Applied Solid State Physics	4
EG2501 Liveable Cities	4	PC2130B Applied Quantum Physics	4
PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4	CDE2000 Creating Narratives	4
UE	4	UE	4
Sub-total	**26**	**Sub-total**	**26**

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) – 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.

(updated 3 September 2022)

Innovation & Design Programme
NUS College of Design and Engineering

Recommended semester schedule – poly-intake students
(for students who are not required to take MA1301)

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 module for Second Major	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 or EE2023 Signals and Systems	4
EG3301R DCP Project (replaces ESP3903)	6	EE2211 Introduction to Machine Learning	4
Group B module for Second Major	4	EG2501 Liveable Cities	4
Sub-total	**26**	**Sub-total**	**24**

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 1	4	Innovation & Enterprise Elective 2	4
ESP2106 Principles of Continua	4	CDE2000 Creating Narratives	4
GE	4	EG2401A Engineering Professionalism	2
		GE	4
Sub-total	**18**	**Sub-total**	**20**

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)

(updated 3 September 2022)

Innovation & Design Programme
NUS College of Design and Engineering

Recommended semester schedule – poly-intake students
(for students who are required to take MA1301)

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
MA1301 Introductory Mathematics (UEM)	4	MA1508E Linear Algebra for Engineering	4
GE	4	PF1101 Fundamentals of Project Management	4
Group A module for Second Major	4	EG3301R DCP Project (replaces ESP3903)	6
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
MA1511 Engineering Calculus	2	PC3235B Applied Solid State Physics	4
MA1512 Differential Equations for Engineering	2	PC2020 Electromagnetics for Electrical Engineers or EE2023 Signals and Systems	4
ES2631 Critique and Communication of Thinking and Design	4	EE2211 Introduction to Machine Learning	4
EG3301R DCP Project (replaces ESP3903)	6	EG2501 Liveable Cities	4
Group B module for Second Major	4		
Sub-total	**26**	**Sub-total**	**24**

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 1	4	Innovation & Enterprise Elective 2	4
IE2141 Systems Thinking & Dynamics	4	CDE2000 Creating Narratives	4
ESP2106 Principles of Continua	4	EG2401A Engineering Professionalism	2
GE	4	GE	4
Sub-total	**22**	**Sub-total**	**20**

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)

(updated 3 September 2022)