

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

Cohort AY2022/2023

Modular Requirements	Modular Credits (MCs)
Common Curriculum	
GEA1000 Quantitative Reasoning with Data ¹	4
CS1010 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 ³ or CFG2101 NUS Vacation Internship Programme ⁴ and EG3612 Vacation Industrial Attachment	10
Sub-total for Engineering Core	20
Engineering Programme Requirements	
CG1111 Engineering Principles and Practice I	4
CG2111A Engineering Principles and Practice II	4
CG2023 Signals and Systems	4
CG2027 Transistor-level Digital Circuits	2
CG2028 Computer Organization	2
CG2271 Real-time Operating Systems	4
CS1231 Discrete Structures	4
CS2040C Data Structures and Algorithms	4
CS2113 Software Engineering & Object-Oriented Programming	4
EE2026 Digital Design	4
EE4204 Computer Networks	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)	12
EG4301 DCP Dissertation or EG4301A Ideas to Start-up (over 2 consecutive semesters) ²	4

Innovation & Design Programme
NUS College of Design and Engineering

Other unrestricted electives	8
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 Students may read also fulfil the compulsory internship using any combination of the following for a minimum of 10 MCs (excess MCs are counted towards unrestricted electives):
 - CP3200 Internship (6 MCs)
 - CP3202 Internship II (6 MCs)
 - CP3880 Advanced Technology Research Programme (12 MCs)
- ⁴ 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
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 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 Second Major ^	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
CS1231 Discrete Structures	4	CG2023 Signals and Systems	4
CS2040C Data Structures and Algorithms	4	CS2113 Software Engineering & Object-Oriented Programming	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
Group A/B module for Second Major	4	EG2501 Liveable Cities	4
		EG3301R DCP Project	6
Sub-total	24	Sub-total	26

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	6	Innovation & Enterprise Elective 1	4
EG2401A Engineering Professionalism	2	CG2027 Transistor-level Digital Circuits	2
GE *	4	CG2028 Computer Organization	2
GE *	4	CG2271 Real-time Operating Systems	4
UE	4	CDE2000 Creating Narratives	4
		UE	4
Sub-total	20	Sub-total	20

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
EE4204 Computer Networks	4	Innovation & Enterprise Elective 2	4
Sub-total	10	Sub-total	10

^ 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 vacation internships **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 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 Second Major ^	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
CS1231 Discrete Structures	4	CG2023 Signals and Systems	4
CS2040C Data Structures and Algorithms	4	CS2113 Software Engineering & Object-Oriented Programming	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
Group A/B module for Second Major	4	EG2501 Liveable Cities	4
		EG3301R DCP Project	6
Sub-total	20	Sub-total	26

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	6	Innovation & Enterprise Elective 1	4
EG2401A Engineering Professionalism	2	CG2027 Transistor-level Digital Circuits	2
GE *	4	CG2028 Computer Organization	2
GE *	4	CG2271 Real-time Operating Systems	4
Specialisation module 1	4	CDE2000 Creating Narratives	4
		Specialisation module 2	4
Sub-total	20	Sub-total	20

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
EE4204 Computer Networks	4	Innovation & Enterprise Elective 2	4
Specialisation module 3	4	Specialisation module 5	4
Specialisation module 4	4		
Sub-total	18	Sub-total	14

^ 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
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 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 Second Major ^	4
Sub-total	20	Sub-total	24

Semester 3	MCs	Semester 4	MCs
CS1231 Discrete Structures	4	CG2023 Signals and Systems	4
CS2040C Data Structures and Algorithms	4	CS2113 Software Engineering & Object-Oriented Programming	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
Group A/B module for Second Major	4	EG2501 Liveable Cities	4
		EG3301R DCP Project	6
Sub-total	20	Sub-total	26

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project	6	EG3611A Industrial Attachment	10
EG2401A Engineering Professionalism	2		
CG2027 Transistor-level Digital Circuits	2		
CG2028 Computer Organization	2		
CG2271 Real-time Operating Systems	4		
GE *	4		
Sub-total	20	Sub-total	10

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
EE4204 Computer Networks	4	Innovation & Enterprise Elective 1	4
GE *	4	Innovation & Enterprise Elective 2	4
UE	4	CDE2000 Creating Narratives	4
UE	4		
Sub-total	22	Sub-total	18

^ 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 **plus a specialisation**)

Semester 1	MCs	Semester 2	MCs
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 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 Second Major ^	4
Sub-total	20	Sub-total	24

Semester 3	MCs	Semester 4	MCs
CS1231 Discrete Structures	4	CG2023 Signals and Systems	4
CS2040C Data Structures and Algorithms	4	CS2113 Software Engineering & Object-Oriented Programming	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
Group A/B module for Second Major	4	EG2501 Liveable Cities	4
GE	4	EG3301R DCP Project	6
Sub-total	24	Sub-total	26

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project	6	EG3611A Industrial Attachment	10
EG2401A Engineering Professionalism	2		
CG2027 Transistor-level Digital Circuits	2		
CG2028 Computer Organization	2		
CG2271 Real-time Operating Systems	4		
GE *	4		
Specialisation module 1	4		
Sub-total	24	Sub-total	10

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
Innovation & Enterprise Elective 1	4	Innovation & Enterprise Elective 2	4
EE4204 Computer Networks	4	Specialisation module 4	4
Specialisation module 2	4	Specialisation module 5	4
Specialisation module 3	4	CDE2000 Creating Narratives	4
Sub-total	22	Sub-total	22

^ 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 this module earlier.

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

Semester 1	MCs	Semester 2	MCs
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 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 Second Major ^	4
Sub-total	20	Sub-total	24

Semester 3	MCs	Semester 4	MCs
CS1231 Discrete Structures	4	CG2023 Signals and Systems	4
CS2040C Data Structures and Algorithms	4	CS2113 Software Engineering & Object-Oriented Programming	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
Group A/B module for Second Major	4	EG2501 Liveable Cities	4
		EG3301R DCP Project	6
Sub-total	29	Sub-total	26

Semester 5	MCs	Semester 6 – NOC	MCs
EG3301R DCP Project	6	NOC	
CG2027 Transistor-level Digital Circuits	2		
CG2028 Computer Organization	2		
CG2271 Real-time Operating Systems	4		
GE *	4		
Sub-total	18	Sub-total	20

Semester 7 – NOC	MCs	Semester 8	MCs
NOC		EE4204 Computer Networks	4
		CDE2000 Creating Narratives	4
		GE *	4
Sub-total	20	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.

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
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 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 Second Major ^	4
Sub-total	20	Sub-total	24

Semester 3	MCs	Semester 4	MCs
CS1231 Discrete Structures	4	CG2023 Signals and Systems	4
CS2040C Data Structures and Algorithms	4	CS2113 Software Engineering & Object-Oriented Programming	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
Group A/B module for Second Major	4	EG2501 Liveable Cities	4
		EG3301R DCP Project	6
Sub-total	20	Sub-total	26

Semester 5	MCs	Semester 6 – NOC	MCs
EG3301R DCP Project	6	NOC	
CG2027 Transistor-level Digital Circuits	2		
CG2028 Computer Organization	2		
CG2271 Real-time Operating Systems	4		
GE *	4		
Sub-total	18	Sub-total	20

Semester 7	MCs	Semester 8	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
EE4204 Computer Networks	4	CDE2000 Creating Narratives	4
GE *	4	UE	4
UE	4		
Sub-total	18	Sub-total	14

^ 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.

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
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1231 Discrete Structures	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	6
UE	4		
Sub-total	24	Sub-total	26

Semester 3	MCs	Semester 4 – NOC	MCs
CG2027 Transistor-level Digital Circuits	2	NOC	
CG2028 Computer Organization	2		
CS2040C Data Structures and Algorithms	4		
EE2026 Digital Design	4		
RC4 module 3 (replaces GE)	4		
EG3301R DCP Project	6		
Group A module for Second Major	4		
Sub-total	26	Sub-total	20

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
CS2113 Software Engineering & Object-Oriented Programming	4	CG2023 Signals and Systems	4
CG2271 Real-time Operating Systems	4	EE2211 Introduction to Machine Learning	4
EE4204 Computer Networks	4	EG2501 Liveable Cities	4
RC4 module 4 (replaces ES2631 Critique and Communication of Thinking and Design)	4	CDE2000 Creating Narratives	4
UE (or IE2141 Systems Thinking & Dynamics if not in RC4)	4	UE	4
Sub-total	26	Sub-total	26

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

- CS1010 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.

Recommended semester schedule – poly-intake students

(for students who are not required to take MA1301)

Semester 1	MCs	Semester 2	MCs
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 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/B module for Second Major	4
Group A/B module for Second Major ^	4	EG3301R DCP Project	6
Sub-total	20	Sub-total	26

Semester 3	MCs	Semester 4	MCs
CS1231 Discrete Structures	4	CG2023 Signals and Systems	4
CS2040C Data Structures and Algorithms	4	CS2113 Software Engineering & Object-Oriented Programming	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
EG3301R DCP Project	6	EG2501 Liveable Cities	4
		GE	4
Sub-total	22	Sub-total	24

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
CG2027 Transistor-level Digital Circuits	2	Innovation & Enterprise Elective 1	4
CG2028 Computer Organization	2	Innovation & Enterprise Elective 2	4
CG2271 Real-time Operating Systems	4	CDE2000 Creating Narratives	4
EE4204 Computer Networks	4	GE *	4
EG2401A Engineering Professionalism	2		
Sub-total	20	Sub-total	22

^ 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.

* 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:

- 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 required to take MA1301)

Semester 1	MCs	Semester 2	MCs
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
MA1301 Introductory Mathematics (UEM)	4	MA1511 Engineering Calculus	2
GE	4	MA1512 Differential Equations for Engineering	2
Group A/B module for Second Major ^	4	PF1101 Fundamentals of Project Management	4
		Group A/B module for Second Major	4
		EG3301R DCP Project	6
Sub-total	20	Sub-total	26

Semester 3	MCs	Semester 4	MCs
CS1231 Discrete Structures	4	CG2023 Signals and Systems	4
CS2040C Data Structures and Algorithms	4	CS2113 Software Engineering & Object-Oriented Programming	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
IE2141 Systems Thinking & Dynamics	4	EE2211 Introduction to Machine Learning	4
MA1508E Linear Algebra for Engineering	4	EG2501 Liveable Cities	4
EG3301R DCP Project	6	GE	4
Sub-total	26	Sub-total	24

Semester 5	MCs	Semester 6	MCs
EG4301 DCP Dissertation	6	EG4301 DCP Dissertation	6
CG2027 Transistor-level Digital Circuits	2	Innovation & Enterprise Elective 1	4
CG2028 Computer Organization	2	Innovation & Enterprise Elective 2	4
CG2271 Real-time Operating Systems	4	CDE2000 Creating Narratives	4
EE4204 Computer Networks	4	GE *	4
EG2401A Engineering Professionalism	2		
Sub-total	20	Sub-total	22

^ 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.

* 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:

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