NUS Innovation & Design Programme
College of Design and Engineering

Bachelor of Engineering (Computer Engineering) with Minor in Innovation & Design

Cohort AY2024/2025

Course Requirements	Units
Common Curriculum	
GEA1000 Quantitative Reasoning with Data	4
CS1010 Programming Methodology	4
ES2631 Critique and Communication of Thinking and Design [1]	4
GEC: Cultures and Connections [1]	4
GEN: Communities and Engagement [1]	4
CDE2501 Liveable Cities [1, 2]	4
DTK1234 Design Thinking	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4
EG1311 Design and Make	4
PF1101 Fundamentals of Project Management or PF1101A Project Management and Finance	4
Additional technical courses for Engineering major [3]	12
CG4002 Computer Engineering Capstone Project [4]	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 [5] or CFG2101 NUS Vacation Internship Programme [6] 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 course for Minor	4
Group B course for Minor	4
CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters)	12
Other unrestricted electives [4]	20
Sub-total for Unrestricted Electives	**40**
Total	**160**

(updated 15 July 2025)

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Notes:

[1] Students may read equivalent courses in NUS College (NUSC), University Town College Programme (UTCP), and Ridge View Residential Programme (RVRC).

[2] Students who are not in NUSC, UTCP or RVRC but have read another GESS Singapore Studies course prior to CDE2501 must still complete CDE2501.

[3] Students who have already read CDE2000 Creating Narratives and/or IE2141 Systems Thinking and Dynamics must still complete the 12 units of additional technical courses from their Engineering major.

The latest list of additional technical course may be found on this website: https://cde.nus.edu.sg/undergraduate/curriculum-structure/

Poly-intake students and those in the Engineering Scholars Programme only need to complete 8 units of additional technical course. The remaining 4 units may be fulfilled by CDE2501 (if not in NUSC/UTCP/RVRC and using another course to fulfil Singapore Studies), CDE2000, IE2141, or a third additional technical course.

[4] Students may take CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up in lieu of CG4002 and 4 units of unrestricted electives.

[5] Students may read also fulfil the compulsory internship using any combination of the following for a minimum of 10 units (excess units are counted towards unrestricted electives):

- CP3200 Internship (6 units)
- CP3202 Internship II (6 units)
- CP3880 Advanced Technology Research Programme (12 units)

[6] May be replaced by CDE2605 Undergraduate Research Opportunities Programme or CDE2605R Undergraduate Research Experience (UREx).

(updated 15 July 2025)

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Recommended semester schedule – JC-intake students or equivalent

(for students who opt for vacation internships)

Semester 1	Units	Semester 2	Units
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 and 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
GEC/GEN	4	Group A/B course for Minor ^	4
Sub-total	**20**	**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	Units
CS1231 Discrete Structures	4	CDE2501 Liveable Cities	4
CS2040C Data Structures and Algorithms	4	CG2023 Signals and Systems	4
ES2631 Critique and Communication of Thinking and Design	4	CS2113 Software Engineering & Object-Oriented Programming	4
Additional technical course 1	4	EE2026 Digital Design	4
Group A/B course for Minor ^	4	EE2211 Introduction to Machine Learning	4
		CDE3301 Ideas to Proof-of-Concept	6
Sub-total	**20**	**Sub-total**	**26**

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
CDE3301 Ideas to Proof-of-Concept	6	CG2027 Transistor-level Digital Circuits	2
EG2401A Engineering Professionalism	2	CG2028 Computer Organization	2
Additional technical course 2	4	CG2271 Real-time Operating Systems	4
GEC/GEN	4	Additional technical course 3	4
UE	4	UE	4
		UE	4
Sub-total	**20**	**Sub-total**	**20**

Semester 7	Units	Semester 8	Units
CG4002 Computer Engineering Capstone Project	8	UE	4
EE4204 Computer Networks	4	UE	4
Sub-total	**12**	**Sub-total**	**8**

^ Students can only take CDE2310 or CDE2301 in Semester 2. Those who wish to take CDE2300 (in lieu of CDE2310) and CDE2311/CDE2605R/CDE2606B (in lieu of CDE2301) may clear both courses concurrently in Semester 3.

(updated 15 July 2025)

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Recommended semester schedule – JC-intake students or equivalent

(for students who opt for industrial attachment)

Semester 1	Units	Semester 2	Units
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 and 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
GEC/GEN	4	Group A/B course for Minor ^	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	Units	Semester 4	Units
CS1231 Discrete Structures	4	CDE2501 Liveable Cities	4
CS2040C Data Structures and Algorithms	4	CG2023 Signals and Systems	4
ES2631 Critique and Communication of Thinking and Design	4	CS2113 Software Engineering & Object-Oriented Programming	4
Additional technical course 1	4	EE2026 Digital Design	4
Group A/B course for Minor ^	4	EE2211 Introduction to Machine Learning	4
		CDE3301 Ideas to Proof-of-Concept	6
Sub-total	**20**	**Sub-total**	**26**

Semester 5	Units	Semester 6	Units
CDE3301 Ideas to Proof-of-Concept	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		
GEC/GEN	4		
Sub-total	**20**	**Sub-total**	**10**

Semester 7	Units	Semester 8	Units
CG4002 Computer Engineering Capstone Project	8	Additional technical course 3	4
EE4204 Computer Networks	4	UE	4
Additional technical course 2	4	UE	4
UE	4	UE	4
		UE	4
Sub-total	**20**	**Sub-total**	**20**

^ Students can only take CDE2310 or CDE2301 in Semester 2. Those who wish to take CDE2300 (in lieu of CDE2310) and CDE2311/CDE2605R/CDE2606B (in lieu of CDE2301) may clear both courses concurrently in Semester 3.

(updated 15 July 2025)

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Recommended semester schedule – JC-intake students or equivalent

(for students in Engineering Scholars Programme)

Semester 1	Units	Semester 2	Units
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1231 Discrete Structures	4	GEA1000 Quantitative Reasoning with Data	4
MA1512 Differential Equations for Engineering	2	DTK1234 Design Thinking	4
PF1101 Fundamentals of Project Management	4	CS2040C Data Structures and Algorithms	4
UTCP course 1 (replaces GE)	4	UTCP course 2 (replaces GE)	4
Group B course for Minor	4	CDE3301 Ideas to Proof-of-Concept	6
UE	4		
Sub-total	**26**	**Sub-total**	**26**

Semester 3	Units	Semester 4 – NOC	Units
CG2027 Transistor-level Digital Circuits	2		
CG2028 Computer Organization	2		
CS2113 Software Engineering & Object-Oriented Programming	4		
EE2026 Digital Design	4	NOC	
EE2211 Introduction to Machine Learning	4		
UTCP course 3 (replaces CDE2501)	4		
CDE3301 Ideas to Proof-of-Concept	6		
Sub-total	**26**	**Sub-total**	**22**

Semester 5	Units	Semester 6	Units
CG2023 Signals and Systems	4	CG4002 Computer Engineering Capstone Project	8
CG2271 Real-time Operating Systems	4	Additional technical course 2	4
EE4204 Computer Networks	4	Additional technical course 3	4
Additional technical course 1	4	UE	4
UTCP course 4 (replaces ES2631 Critique and Communication of Thinking and Design)	4		
Group A course for Minor	4		
Sub-total	**24**	**Sub-total**	**20**

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

- CS1010 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)
- MA2001 Linear Algebra (4 units) – replaces MA1508E Linear Algebra for Engineering (4 units)

A one-semester NOC programme comprises the following courses (up to 20 units):

- ETP3201S Innovation & Enterprise Internship (12 units) – replaces EG3611A (10 units) and EG2401A (2 units)
- ETP3204S Innovation & Enterprise Internship Practicum (4 units) – counted as UE (4 units)
- Entrepreneurship course (4 units) – counted as UE (4 units)

(updated 15 July 2025)

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Recommended semester schedule – poly-intake students

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

Semester 1	Units	Semester 2	Units
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 Programming Methodology	4	CS2040C Data Structures and Algorithms	4
MA1301 Introductory Mathematics * (UE)	4	GEA1000 Quantitative Reasoning with Data	4
PC1201 Fundamentals of Physics (UE)	4	MA1508E Linear Algebra for Engineering	4
Group A/B course for Minor	4	CDE3301 Ideas to Proof-of-Concept	6
		Group A/B course for Minor	4
Sub-total	**20**	**Sub-total**	**26**

Semester 3	Units	Semester 4	Units
MA1511 Engineering Calculus *	2	CG2023 Signals and Systems	4
MA1512 Differential Equations for Engineering *	2	CG2271 Real-time Operating Systems	4
CG2027 Transistor-level Digital Circuits	2	CDE2501 Liveable Cities	4
CG2028 Computer Organization	2	EE2211 Introduction to Machine Learning	4
CS2113 Software Engineering & Object-Oriented Programming	4	PF1101A Project Management and Finance	4
ES2631 Critique and Communication of Thinking and Design	4	EE2026 Digital Design	4
Additional technical course 1	4		
CDE3301 Ideas to Proof-of-Concept	6		
Sub-total	**26**	**Sub-total**	**24**

Semester 5	Units	Semester 6	Units
CS1231 Discrete Structures	4	CG4002 Computer Engineering Capstone Project	8
EE4204 Computer Networks	4	Additional technical course 2	4
EG2401A Engineering Professionalism	2	Additional technical course 3	4
GEC/GEN	4		
GEC/GEN	4		
Sub-total	**18**	**Sub-total**	**16**

* Students who are exempted from MA1301 can take MA1511 and MA1512 in Semester 1.

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

- DTK1234 Design Thinking (4 units)
- EG1311 Design and Make (4 units)
- EG3611A Industrial Attachment (10 units)
- Unrestricted electives (20 units)

(updated 15 July 2025)

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Recommended semester schedule – poly-intake students

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

Semester 1	Units	Semester 2	Units
CG1111 Engineering Principles and Practice I	4	CG2111A Engineering Principles and Practice II	4
CS1010 Programming Methodology	4	CS2040C Data Structures and Algorithms	4
MA1301 Introductory Mathematics * (UE)	4	GEA1000 Quantitative Reasoning with Data	4
PC1201 Fundamentals of Physics (UE)	4	MA1508E Linear Algebra for Engineering	4
GEC/GEN	4	EE2026 Digital Design	4
		Group A/B course for Minor	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	Units	Semester 4	Units
MA1511 Engineering Calculus *	2	CG2023 Signals and Systems	4
MA1512 Differential Equations for Engineering *	2	CG2271 Real-time Operating Systems	4
CG2027 Transistor-level Digital Circuits	2	CDE2501 Liveable Cities	4
CG2028 Computer Organization	2	EE2211 Introduction to Machine Learning	4
CS2113 Software Engineering & Object-Oriented Programming	4	PF1101A Project Management and Finance	4
ES2631 Critique and Communication of Thinking and Design	4	CDE3301 Ideas to Proof-of-Concept	6
Additional technical course 1	4		
Group A/B course for Minor	4		
Sub-total	**24**	**Sub-total**	**26**

Semester 5	Units	Semester 6	Units
CS1231 Discrete Structures	4	CG4002 Computer Engineering Capstone Project	8
EE4204 Computer Networks	4	Additional technical course 2	4
EG2401A Engineering Professionalism	2	Additional technical course 3	4
GEC/GEN	4		
CDE3301 Ideas to Proof-of-Concept	6		
Sub-total	**20**	**Sub-total**	**16**

* Students who are exempted from MA1301 can take MA1511 and MA1512 in Semester 1.

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

- DTK1234 Design Thinking (4 units)
- EG1311 Design & Make (4 units)
- EG3611A Industrial Attachment (10 units)
- Unrestricted electives (20 units)

(updated 15 July 2025)