NUS Innovation & Design Programme
College of Design and Engineering

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

Cohort AY2025/2026

Course Requirements	Units
Common Curriculum	
GEA1000 Quantitative Reasoning with Data [1]	4
CS1010E Programming Methodology (or other variants)	4
CDE2501 Liveable Cities [2]	4
ES2631 Critique and Communication of Thinking and Design [2]	4
GE: Cultures and Connections [2]	4
GE: Communities and Engagement [2]	4
DTK1234 Design Thinking	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4
EG1311 Design and Make or EG1311BE Design and Make	4
PF1101A Project Management and Finance	4
Sub-total for Common Curriculum	**40**
Engineering Core	
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 [3] and EG3612 Vacation Industrial Attachment	10
Sub-total for Engineering Core	**20**
Engineering Programme Requirements	
CN1101A Chemical Engineering Principles and Practice I	4
CN2102 Chemical Engineering Principles and Practice II	4
CN2103 Material and Energy Balances	4
CN2104 Chemical Engineering Thermodynamics	4
CN2105 Reaction Engineering	4
CN2109 Fluid Mechanics	4
CN2110 Heat and Mass Transfer	4
CN2111 Fundamentals of Biomolecular Engineering	4
CN3104 Computer-Aided Chemical Process Simulation	4
CN3105 Machine Learning in Chemical Engineering	4
CN3106 Separation Processes	4
CN4101 Process Control and Safety	4
CN4102 Chemical Engineering Lab	4
CN4119 Final Year Design Project (over 2 consecutive semesters) [4]	8
Sub-total for Engineering Programme Requirements	**60**
Unrestricted Electives	
CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters) [5]	12
Electives for Minor [5]	8
Other unrestricted electives [4]	20
Sub-total for Unrestricted Electives	**40**
Total	**160**

(updated 4 July 2025)

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College of Design and Engineering

Notes:

[1] Students may read other approved courses for Data Literacy in lieu of GEA1000.

[2] Students may read equivalent courses in NUS College (NUSC), University Town College Programme (UTCP), and Ridge View Residential Programme (RVRC). CDE2501 fulfils GE: Singapore Studies while ES2631 fulfils GE: Critique and Expression.

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

[4] Students may take CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up in lieu of CN4119 and 4 units of unrestricted electives.

[5] Students should clear at least one elective course from List I prior to CDE3301.

(updated 4 July 2025)

NUS Innovation & Design Programme
College of Design and Engineering

Recommended semester schedule – JC-intake students or equivalent

(for students who opt for vacation internships)

Semester 1	Units	Semester 2	Units
CN1101A Chemical Engineering Principles and Practice I	4	CN2102 Chemical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	CN2103 Material and Energy Balances	4
DTK1234 Design Thinking	4	CS1010E Programming Methodology	4
MA1513 Linear Algebra with Differential Equations	2	EG1311 Design and Make or EG1311BE Design and Make	4
CE2407A Uncertainty Analysis for Engineers	2	MA1511 Engineering Calculus	2
PF1101A Project Management and Finance	4	MA1512 Differential Equations for Engineering	2
		Elective 1 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
CN2104 Chemical Engineering Thermodynamics	4	CN2105 Reaction Engineering	4
CN2109 Fluid Mechanics	4	CN2110 Heat and Mass Transfer	4
CDE2501 Liveable Cities	4	CN2111 Fundamentals of Biomolecular Engineering	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4	ES2631 Critique and Communication of Thinking and Design	4
Elective 2 for Minor	4	CDE3301 Ideas to Proof-of-Concept	6
Sub-total	**20**	**Sub-total**	**22**

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	GE	4
CN3104 Computer-Aided Chemical Process Simulation	4	GE	4
CN3105 Machine Learning in Chemical Engineering	4	UE	4
CN3106 Separation Processes	4	UE	4
EG2401A Engineering Professionalism	2	UE	4
Sub-total	**20**	**Sub-total**	**20**

Semester 7	Units	Semester 8	Units
CN4119 Final Year Design Project	4	CN4119 Final Year Design Project	4
CN4101 Process Control and Safety	4	CN4102 Chemical Engineering Lab	4
UE	4	UE	4
Sub-total	**12**	**Sub-total**	**12**

(updated 4 July 2025)

NUS Innovation & Design Programme
College of Design and Engineering

Recommended semester schedule – JC-intake students or equivalent

(for students who opt for industrial attachment)

Semester 1	Units	Semester 2	Units
CN1101A Chemical Engineering Principles and Practice I	4	CN2102 Chemical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	CN2103 Material and Energy Balances	4
DTK1234 Design Thinking	4	CS1010E Programming Methodology	4
MA1513 Linear Algebra with Differential Equations	2	EG1311 Design and Make or EG1311BE Design and Make	4
CE2407A Uncertainty Analysis for Engineers	2	MA1511 Engineering Calculus	2
PF1101A Project Management and Finance	4	MA1512 Differential Equations for Engineering	2
		Elective 1 for Minor	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	Units	Semester 4	Units
CN2104 Chemical Engineering Thermodynamics	4	CN2105 Reaction Engineering	4
CN2109 Fluid Mechanics	4	CN2110 Heat and Mass Transfer	4
CDE2501 Liveable Cities	4	CN2111 Fundamentals of Biomolecular Engineering	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4	ES2631 Critique and Communication of Thinking and Design	4
Elective 2 for Minor	4	CDE3301 Ideas to Proof-of-Concept	6
Sub-total	**20**	**Sub-total**	**22**

Semester 5	Units	Semester 6	Units
CDE3301 Ideas to Proof-of-Concept	6	EG3611A Industrial Attachment	10
CN3104 Computer-Aided Chemical Process Simulation	4		
CN3105 Machine Learning in Chemical Engineering	4		
CN3106 Separation Processes	4		
EG2401A Engineering Professionalism	2		
Sub-total	**20**	**Sub-total**	**10**

Semester 7	Units	Semester 8	Units
CN4119 Final Year Design Project	4	CN4119 Final Year Design Project	4
CN4101 Process Control and Safety	4	CN4102 Chemical Engineering Lab	4
GE	4	UE	4
GE	4	UE	4
UE	4	UE	4
UE	4		
Sub-total	**24**	**Sub-total**	**20**

(updated 4 July 2025)

NUS Innovation & Design Programme
College of Design and Engineering

Recommended semester schedule – JC-intake students or equivalent

(for students in Engineering Scholars Programme)

Semester 1	Units	Semester 2	Units
CN1101A Chemical Engineering Principles and Practice I	4	CN2102 Chemical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	CN2103 Material and Energy Balances	4
DTK1234 Design Thinking	4	MA1512 Differential Equations for Engineering	2
MA1513 Linear Algebra with Differential Equations	2	UE	4
CE2407A Uncertainty Analysis for Engineers	2	RVRC/UTCP course 2 (replaces GE)	4
PF1101A Project Management and Finance	4	Elective 1 forMinor	4
RVRC/UTCP course 1 (replaces GE)	4	CDE3301 Ideas to Proof-of-Concept	6
Sub-total	**24**	**Sub-total**	**28**

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

Semester 3	Units	Semester 4 – can be used for SEP	Units
CN2104 Chemical Engineering Thermodynamics	4	CN2105 Reaction Engineering	4
CN2109 Fluid Mechanics	4	CN2110 Heat and Mass Transfer	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4	CN2111 Fundamentals of Biomolecular Engineering	4
RVRC/UTCP course 3 (replaces CDE2501)	4	RVRC/UTCP course 4 (replaces ES2631)	4
Elective 2 for Minor)	4	EG2401A Engineering Professionalism	2
CDE3301 Ideas to Proof-of-Concept	6	UE	4
Sub-total	**26**	**Sub-total**	**22**

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

Semester 5	Units	Semester 6	Units
CN4119 Final Year Design Project	4	CN4119 Final Year Design Project	4
CN3104 Computer-Aided Chemical Process Simulation	4	CN4102 Chemical Engineering Lab	4
CN3105 Machine Learning in Chemical Engineering	4	UE	4
CN3106 Separation Processes	4	UE	4
CN4101 Process Control and Safety	4	UE	2
Sub-total	**20**	**Sub-total**	**18**

(updated 4 July 2025)

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College of Design and Engineering

Students are highly encouraged to complete the following courses before Semester 1 through advanced placement credits:

- CS1010E 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)

CFG2101 may be replaced by CDE2605 Undergraduate Research Opportunities Programme or CDE2605R Undergraduate Research Experience (UREx).

(updated 4 July 2025)

NUS Innovation & Design Programme
College of Design and Engineering

Recommended semester schedule – poly-intake students

Semester 1	Units	Semester 2	Units
CN1101A Chemical Engineering Principles and Practice I	4	CN2102 Chemical Engineering Principles and Practice II	4
GEA1000 Quantitative Reasoning with Data	4	CN2103 Material and Energy Balances	4
PF1101A Project Management and Finance	4	CS1010E Programming Methodology	4
MA1301 Introductory Mathematics * (UE)	4	MA1511 Engineering Calculus	2
Elective 1 for Minor	4	MA1512 Differential Equations for Engineering	2
		CDE3301 Ideas to Proof-of-Concept	6
Sub-total	**20**	**Sub-total**	**22**

Semester 3	Units	Semester 4	Units
CN2104 Chemical Engineering Thermodynamics	4	CN2105 Reaction Engineering	4
CN2109 Fluid Mechanics	4	CN2110 Heat and Mass Transfer	4
CDE2501 Liveable Cities	4	CN2111 Fundamentals of Biomolecular Engineering	4
MA1513 Linear Algebra with Differential Equations *	2	ES2631 Critique and Communication of Thinking and Design	4
CE2407A Uncertainty Analysis for Engineers *	2	GE	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4	Elective 2 for Minor	4
CDE3301 Ideas to Proof-of-Concept	6		
Sub-total	**26**	**Sub-total**	**24**

Semester 5	Units	Semester 6	Units
CN4119 Final Year Design Project	4	CN4119 Final Year Design Project	4
CN3104 Computer-Aided Chemical Process Simulation	4	CN4102 Chemical Engineering Lab	4
CN3105 Machine Learning in Chemical Engineering	4	GE	4
CN3106 Separation Processes	4	EG2401A Engineering Professionalism	2
CN4101 Process Control and Safety	4		
Sub-total	**20**	**Sub-total**	**14**

* Students who are exempted from MA1301 can take MA1513 and CE2407A in Semester 1.

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

- DTK1234 Design Thinking (4 units)
- EG1311B Design and Make (4 units)
- EG3611P Industrial Attachment (10 units)
- Unrestricted electives (20 units)

(updated 4 July 2025)