

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

Cohort AY2026/2027

Course Requirements	Units
Common Curriculum	
GEA1000 Quantitative Reasoning with Data ¹	4
CS1010E Programming Methodology (or other variants) ²	4
CDE2501 Sustainable Systems for 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

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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 prior to CDE3301. Students in competition teams may enrol in CDE3301C Complex Systems Design: From Mission to Prototype in Semester 3 to Semester 4 (Year 2) or Semester 5 to Semester 6 (Year 3).

Sample study plan – 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 <u>or</u> 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 Sustainable Systems for Liveable Cities	4	CN2111 Fundamentals of Biomolecular Engineering	4
EE2211 Introduction to Machine Learning <u>or</u> 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

Sample study plan – 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 Sustainable Systems for 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

Sample study plan – 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
CN2103 Material and Energy Balances	4	CN2104 Chemical Engineering Thermodynamics	4
GEA1000 Quantitative Reasoning with Data	4	MA1512 Differential Equations for Engineering	2
DTK1234 Design Thinking	4	RVRC/UTCP course 2 (replaces GE)	4
MA1513 Linear Algebra with Differential Equations	2	Elective 1 for Minor	4
CE2407A Uncertainty Analysis for Engineers	2	CDE3301 Ideas to Proof-of-Concept	6
RVRC/UTCP course 1 (replaces GE)	4		
Sub-total	24	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 – can be used for SEP/NOC	Units
CN2105 Reaction Engineering	4	RVRC/UTCP course 4 (replaces ES2631)	4
CN2109 Fluid Mechanics	4	Elective 2 for Minor	4
CN2111 Fundamentals of Biomolecular Engineering	4	PF1101A Project Management and Finance	4
EE2211 Introduction to Machine Learning or EE2213 Introduction to Artificial Intelligence	4	UE	4
RVRC/UTCP course 3 (replaces CDE2501)	4	UE	4
CDE3301 Ideas to Proof-of-Concept	6	UE	2
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
CN2110 Heat and Mass Transfer	4	CN4101 Process Control and Safety	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
EG2401A Engineering Professionalism	2		
Sub-total	22	Sub-total	20

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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).

Sample study plan – 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 Sustainable Systems for Liveable Cities	4	CN2111 Fundamentals of Biomolecular Engineering	4
MA1513 Linear Algebra with Differential Equations *	2	CN3106 Separation Processes	4
CE2407A Uncertainty Analysis for Engineers *	2	ES2631 Critique and Communication of Thinking and Design	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
CN4101 Process Control and Safety	4	GE	4
EG2401A Engineering Professionalism	2		
Sub-total	18	Sub-total	16

* 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)