NUS Innovation & Design Programme
College of Design and Engineering

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

Cohort AY2024/2025

Course Requirements	Units
Common Curriculum	
GEA1000 Quantitative Reasoning with Data	4
CS1010E 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
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up (over 2 consecutive semesters) [4]	8
Sub-total for Common Curriculum	**60**
Engineering Core	
MA1505 Mathematics I	4
MA1512 Differential Equations for Engineering	2
MA1513 Linear Algebra with Differential Equations	2
EG2401A Engineering Professionalism	2
EG3611A Industrial Attachment or CFG2101 NUS Vacation Internship Programme [5] and EG3612 Vacation Industrial Attachment	10
Sub-total for Engineering Core	**20**
Engineering Programme Requirements	
ME1102 Engineering Principles and Practice I	4
ME2104 Engineering Principles and Practice II	4
ME2102 Engineering Innovation and Modelling	4
ME2112 Strength of Materials	4
ME2115/ME3115 Mechanics of Machines	4
ME2121 Engineering Thermodynamics and Heat Transfer	4
ME2134 Fluids Mechanics I	4
ME2142/ME3142 Feedback Control Systems	4
ME2162 Manufacturing Processes	4
Technical elective	4
Sub-total for Engineering Programme Requirements	**40**
Unrestricted Electives	
Group A course for Second Major	4
Group B course for Second Major	4
Group C courses for Second Major (Innovation & Enterprise electives)	8
CDE3301 Ideas to Proof-of-Concept (over 2 consecutive semesters)	12
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up (over 2 consecutive semesters) [4]	4
Other unrestricted electives	8
Sub-total for Unrestricted Electives	**40**
Total	**160**

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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] The 12 units for CDE4301/CDE4301A are counted towards 8 units for the Integrated Project requirement in the Common Curriculum while 4 units are counted as unrestricted elective.

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

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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
ME1102 Engineering Principles and Practice I	4	ME2104 Engineering Principles and Practice II	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
EG1311 Design and Make	4	DTK1234 Design Thinking	4
MA1505 Mathematics I	4	MA1512 Differential Equations for Engineering	2
GEC/GEN	4	MA1513 Linear Algebra with Differential Equations	2
		PF1101 Fundamentals of Project Management	4
		Group A/B course for Second Major	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
ME2102 Engineering Innovation and Modelling	4	ME2121 Engineering Thermodynamics and Heat Transfer	4
ME2112 Strength of Materials	4	CDE2501 Liveable Cities	4
ME2134 Fluids Mechanics I	4	EE2211 Introduction to Machine Learning	4
ES2631 Critique and Communication of Thinking and Design	4	Additional technical course 1	4
Group A/B course for Second Major	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	Innovation & Enterprise Elective 1	4
ME2162 Manufacturing Processes	4	ME2115/ME3115 Mechanics of Machines	4
Additional technical course 2	4	EG2401A Engineering Professionalism	2
GEC/GEN	4	UE	4
		UE	4
Sub-total	**18**	**Sub-total**	**18**

Semester 7	Units	Semester 8	Units
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6	CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6
Innovation & Enterprise Elective 2	4	Technical Elective	4
ME2142/ME3142 Feedback Control Systems	4	Additional technical course 3	4
Sub-total	**14**	**Sub-total**	**14**

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

Semester 1	Units	Semester 2	Units
ME1102 Engineering Principles and Practice I	4	ME2104 Engineering Principles and Practice II	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
EG1311 Design and Make	4	DTK1234 Design Thinking	4
MA1505 Mathematics I	4	MA1512 Differential Equations for Engineering	2
GEC/GEN	4	MA1513 Linear Algebra with Differential Equations	2
		PF1101 Fundamentals of Project Management	4
		Group A/B course for Second Major	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
ME2102 Engineering Innovation and Modelling	4	ME2121 Engineering Thermodynamics and Heat Transfer	4
ME2112 Strength of Materials	4	CDE2501 Liveable Cities	4
ME2134 Fluids Mechanics I	4	EE2211 Introduction to Machine Learning	4
ES2631 Critique and Communication of Thinking and Design	4	Additional technical course 1	4
Group A/B course for Second Major	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	Innovation & Enterprise Elective 1	4
ME2162 Manufacturing Processes	4	ME2115/ME3115 Mechanics of Machines	4
Additional technical course 2	4	EG2401A Engineering Professionalism	2
GEC/GEN	4	Specialisation course 1	4
		Specialisation course 2	4
Sub-total	**18**	**Sub-total**	**18**

Semester 7	Units	Semester 8	Units
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6	CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6
Innovation & Enterprise Elective 2	4	Specialisation course 4	4
ME2142/ME3142 Feedback Control Systems	4	Specialisation course 5	4
Specialisation course 3	4	Additional technical course 3	4
Sub-total	**18**	**Sub-total**	**18**

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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
ME1102 Engineering Principles and Practice I	4	ME2104 Engineering Principles and Practice II	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
EG1311 Design and Make	4	DTK1234 Design Thinking	4
MA1505 Mathematics I	4	MA1512 Differential Equations for Engineering	2
GEC/GEN	4	MA1513 Linear Algebra with Differential Equations	2
		PF1101 Fundamentals of Project Management	4
		Group A/B course for Second Major	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	Units	Semester 4	Units
ME2102 Engineering Innovation and Modelling	4	ME2121 Engineering Thermodynamics and Heat Transfer	4
ME2112 Strength of Materials	4	CDE2501 Liveable Cities	4
ME2134 Fluids Mechanics I	4	EE2211 Introduction to Machine Learning	4
ES2631 Critique and Communication of Thinking and Design	4	Additional technical course 1	4
Group A/B course for Second Major	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
ME2115/ME3115 Mechanics of Machines	4		
ME2162 Manufacturing Processes	4		
EG2401A Engineering Professionalism	2		
Additional technical course 2	4		
Sub-total	**20**	**Sub-total**	**10**

Semester 7	Units	Semester 8	Units
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6	CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6
Innovation & Enterprise Elective 1	4	Innovation & Enterprise Elective 2	4
ME2142/ME3142 Feedback Control Systems	4	Technical Elective	4
GEC/GEN	4	Additional technical course 3	4
UE	4	UE	4
Sub-total	**22**	**Sub-total**	**22**

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

Semester 1	Units	Semester 2	Units
ME1102 Engineering Principles and Practice I	4	ME2104 Engineering Principles and Practice II	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
EG1311 Design and Make	4	DTK1234 Design Thinking	4
MA1505 Mathematics I	4	MA1512 Differential Equations for Engineering	2
GEC/GEN	4	MA1513 Linear Algebra with Differential Equations	2
		PF1101 Fundamentals of Project Management	4
		Group A/B course for Second Major	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	Units	Semester 4	Units
ME2102 Engineering Innovation and Modelling	4	ME2121 Engineering Thermodynamics and Heat Transfer	4
ME2112 Strength of Materials	4	CDE2501 Liveable Cities	4
ME2134 Fluids Mechanics I	4	EE2211 Introduction to Machine Learning	4
ES2631 Critique and Communication of Thinking and Design	4	Additional technical course 1	4
GEC/GEN	4	CDE3301 Ideas to Proof-of-Concept	6
Group A/B course for Second Major	4		
Sub-total	**24**	**Sub-total**	**22**

Semester 5	Units	Semester 6	Units
CDE3301 Ideas to Proof-of-Concept	6	EG3611A Industrial Attachment	10
Innovation & Enterprise Elective 1	4		
ME2115/ME3115 Mechanics of Machines	4		
ME2162 Manufacturing Processes	4		
EG2401A Engineering Professionalism	2		
Additional technical course 2	4		
Sub-total	**24**	**Sub-total**	**10**

Semester 7	Units	Semester 8	Units
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6	CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6
Innovation & Enterprise Elective 2	4	Specialisation course 3	4
ME2142/ME3142 Feedback Control Systems	4	Specialisation course 4	4
Specialisation course 1	4	Specialisation course 5	4
Specialisation course 2	4	Additional technical course 3	4
Sub-total	**22**	**Sub-total**	**22**

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NUS Innovation & Design Programme
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Recommended semester schedule – JC-intake students or equivalent

(for students in year-long NOC programmes)

Semester 1	Units	Semester 2	Units
ME1102 Engineering Principles and Practice I	4	ME2104 Engineering Principles and Practice II	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
EG1311 Design and Make	4	DTK1234 Design Thinking	4
MA1505 Mathematics I	4	MA1512 Differential Equations for Engineering	2
GEC/GEN	4	MA1513 Linear Algebra with Differential Equations	2
		PF1101 Fundamentals of Project Management	4
		Group A/B course for Second Major	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	Units	Semester 4	Units
ME2102 Engineering Innovation and Modelling	4	ME2121 Engineering Thermodynamics and Heat Transfer	4
ME2112 Strength of Materials	4	CDE2501 Liveable Cities	4
ME2134 Fluids Mechanics I	4	EE2211 Introduction to Machine Learning	4
ES2631 Critique and Communication of Thinking and Design	4	Additional technical course 1	4
Group A/B course for Second Major	4	CDE3301 Ideas to Proof-of-Concept	6
Sub-total	**20**	**Sub-total**	**22**

Semester 5	Units	Semester 6 – NOC	Units
CDE3301 Ideas to Proof-of-Concept	6	NOC	
ME2115/ME3115 Mechanics of Machines	4		
ME2162 Manufacturing Processes	4		
GEC/GEN	4		
Sub-total	**18**	**Sub-total**	**20**

Semester 7 – NOC	Units	Semester 8	Units
NOC		ME2142/ME3142 Feedback Control Systems	4
		Technical Elective	4
		Additional technical course 2	4
		Additional technical course 3	4
Sub-total	**20**	**Sub-total**	**16**

A year-long NOC programme comprises the following courses (up to 40 units):

- ETP3206L Innovation & Enterprise Internship (16 units) – replaces EG3611A (10 units), EG2401A (2 units), and UE (4 units)
- ETP3202L Innovation & Enterprise Case Study & Analysis (8 units) – replaces CDE4301A (8 units out of 12 units)
- ETP3203L Innovation & Enterprise Internship Practicum (8 units) – replaces CDE4301A (4 units out of 12 units) and UE (4 units)
- Entrepreneurship courses (up to 8 units) – replaces Innovation & Enterprise electives (up to 8 units – students will need to complete additional Innovation & Enterprise Electives in NUS if they are unable to complete 8 units of entrepreneurship courses during NOC)

(updated 16 July 2025)

NUS Innovation & Design Programme
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Recommended semester schedule – JC-intake students or equivalent

(for students in one-semester NOC programmes)

Semester 1	Units	Semester 2	Units
ME1102 Engineering Principles and Practice I	4	ME2104 Engineering Principles and Practice II	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
EG1311 Design and Make	4	DTK1234 Design Thinking	4
MA1505 Mathematics I	4	MA1512 Differential Equations for Engineering	2
GEC/GEN	4	MA1513 Linear Algebra with Differential Equations	2
		PF1101 Fundamentals of Project Management	4
		Group A/B course for Second Major	4
Sub-total	**20**	**Sub-total**	**24**

Semester 3	Units	Semester 4	Units
ME2102 Engineering Innovation and Modelling	4	ME2121 Engineering Thermodynamics and Heat Transfer	4
ME2112 Strength of Materials	4	CDE2501 Liveable Cities	4
ME2134 Fluids Mechanics I	4	EE2211 Introduction to Machine Learning	4
ES2631 Critique and Communication of Thinking and Design	4	Additional technical course 1	4
Group A/B course for Second Major	4	CDE3301 Ideas to Proof-of-Concept	6
Sub-total	**20**	**Sub-total**	**22**

Semester 5	Units	Semester 6 – NOC	Units
CDE3301 Ideas to Proof-of-Concept	6	NOC	
ME2115/ME3115 Mechanics of Machines	4		
ME2162 Manufacturing Processes	4		
GEC/GEN	4		
Sub-total	**18**	**Sub-total**	**20**

Semester 7	Units	Semester 8	Units
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6	CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6
ME2142/ME3142 Feedback Control Systems	4	Technical Elective	4
Additional technical course 2	4	Additional technical course 3	4
UE	4	UE	4
Sub-total	**18**	**Sub-total**	**18**

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) – replaces Innovation & Enterprise Elective 1 (4 units)
- Entrepreneurship course (4 units) – replaces Innovation & Enterprise Elective 2 (4 units)

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Recommended semester schedule – JC-intake students or equivalent

(for students in Engineering Scholars Programme)

Semester 1	Units	Semester 2	Units
ME1102 Engineering Principles and Practice I	4	ME2104 Engineering Principles and Practice II	4
ME2102 Engineering Innovation and Modelling	4	ME2134 Fluids Mechanics I	4
MA1512 Differential Equations for Engineering	2	GEA1000 Quantitative Reasoning with Data	4
MA1513 Linear Algebra with Differential Equations	2	DTK1234 Design Thinking	4
UTCP course 1 (replaces GE)	4	UTCP course 2 (replaces GE)	4
Group B course for Second Major	4	CDE3301 Ideas to Proof-of-Concept	6
UE	4		
Sub-total	**24**	**Sub-total**	**26**

Semester 3	Units	Semester 4 – NOC	Units
ME2112 Strength of Materials	4	NOC	
ME2121 Engineering Thermodynamics and Heat Transfer	4		
ME2162 Manufacturing Processes	4		
UTCP course 3 (replaces CDE2501)	4		
CDE3301 Ideas to Proof-of-Concept	6		
Group A course for Second Major	4		
Sub-total	**26**	**Sub-total**	**20**

Semester 5	Units	Semester 6	Units
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6	CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6
ME2115/ME3115 Mechanics of Machines	4	Additional technical course 2	4
ME2142/ME3142 Feedback Control Systems	4	Additional technical course 3	4
Technical Elective	4	EE2211 Introduction to Machine Learning	4
Additional technical course 1	4	PF1101A Project Management and Finance	4
UTCP course 4 (replaces ES2631 Critique and Communication of Thinking and Design)	4	UE	4
Sub-total	**26**	**Sub-total**	**26**

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)

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) – replaces Innovation & Enterprise Elective 1 (4 units)
- Entrepreneurship course (4 units) – replaces Innovation & Enterprise Elective 2 (4 units)

Recommended semester schedule – poly-intake students

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Semester 1	Units	Semester 2	Units
ME1102 Engineering Principles and Practice I	4	ME2104 Engineering Principles and Practice II	4
ME2102 Engineering Innovation and Modelling	4	ME2112 Strength of Materials	4
CS1010E Programming Methodology	4	GEA1000 Quantitative Reasoning with Data	4
MA1301 Introductory Mathematics * (UE)	4	MA1512 Differential Equations for Engineering	2
Group A/B course for Second Major	4	MA1513 Linear Algebra with Differential Equations	2
		CDE3301 Ideas to Proof-of-Concept	6
		Group A/B course for Second Major	4
Sub-total	**20**	**Sub-total**	**26**

Semester 3	Units	Semester 4	Units
MA1505 Mathematics I *	4	CDE2501 Liveable Cities	4
ME2115/ME3115 Mechanics of Machines	4	EE2211 Introduction to Machine Learning	4
ME2121 Engineering Thermodynamics and Heat Transfer	4	ME2134 Fluids Mechanics I	4
ME2162 Manufacturing Processes	4	EG2401A Engineering Professionalism	2
ES2631 Critique and Communication of Thinking and Design	4	PF1101A Project Management and Finance	4
CDE3301 Ideas to Proof-of-Concept	6	Additional technical course 1	4
Sub-total	**26**	**Sub-total**	**22**

Semester 5	Units	Semester 6	Units
CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6	CDE4301 Innovation & Design Capstone or CDE4301A Ideas to Start-up	6
Innovation & Enterprise Elective 1	4	Innovation & Enterprise Elective 2	4
ME2142/ME3142 Feedback Control Systems	4	Technical Elective	4
GEC/GEN	4	Additional technical course 2	4
GEC/GEN	4	Additional technical course 3	4
Sub-total	**22**	**Sub-total**	**22**

* Students who are exempted from MA1301 can take MA1505 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)
- EG3611P Industrial Attachment (10 units)
- Unrestricted electives (20 units)

(updated 16 July 2025)