

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

Cohorts AY2021/2022 and AY2022/2023

Modular Requirements	Modular Credits (MCs)
Common Curriculum	
GEA1000 Quantitative Reasoning with Data	4
CS1010E 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
MLE4101 B.Eng. Dissertation <u>or</u> MLE4102A Design Project (over 2 consecutive semesters) ²	8
Sub-total for Common Curriculum	60
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 <u>or</u> CFG2101 NUS Vacation Internship Programme ³ <u>and</u> EG3612 Vacation Industrial Attachment	10
Sub-total for Engineering Core	20
Engineering Programme Requirements	
MLE1001B Materials Science & Engineering Principles & Practice I	4
MLE2001A Materials Science & Engineering Principles & Practice II	4
MLE2102 Principles of Renewable Energy	4
MLE2103A Materials Kinetics and Processing	2
MLE2105 Electronic Materials of Materials	4
MLE3101A Materials Characterization	3
MLE3101 Materials Characterization Laboratory	3
MLE3103 Materials Design: Aerospace to Biomedical Applications	4
MLE3111A Materials Properties and Processing Laboratory	2
MLE3112 Machine Learning Approaches in Materials Laboratory	2
Technical electives	8
Sub-total for Engineering Programme Requirements	40
Unrestricted Electives	
Group A module for Minor	4
Group B module for Minor	4
EG3301R DCP Project (over 2 consecutive semesters)	12
Other unrestricted electives ²	20
Sub-total for Unrestricted Electives	40
Total	160

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Notes:

- ¹ Students may read equivalent modules in USP/NUSC, UTCP, and RVRC.
- ² Subject to approval from home department students may take EG4301 DCP Dissertation or EG4301A Ideas to Start-up in lieu of MLE4101/MLE4102A and 4 MCs of unrestricted electives.
- ³ 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
MLE1001B Materials Science & Engineering Principles & Practice I	4	MLE2001A Materials Science & Engineering Principles & Practice I	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking	4	EG1311 Design & Make	4
MA1513 Linear Algebra with Differential Equations	2	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	MA1512 Differential Equations for Engineering	2
PF1101 Fundamentals of Project Management	4	Group A module for Minor	4
Sub-total	20	Sub-total	20

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

Semester 3	MCs	Semester 4	MCs
MLE2102 Principles of Renewable Energy	4	MLE2105 Electronic Properties of Materials	4
EE2211 Introduction to Machine Learning	4	ES2631 Critique and Communication of Thinking and Design	4
EG2501 Liveable Cities	4	IE2141 Systems Thinking & Dynamics	4
EG2401A Engineering Professionalism	2	GE	4
GE	4	EG3301R DCP Project	6
Group B module for Minor	4		
Sub-total	22	Sub-total	22

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	Technical Elective 1	4
MLE2103A Materials Kinetics and Processing	2	Technical Elective 2	4
MLE3101A Materials Characterization	3	UE	4
MLE3101 Materials Characterization Laboratory	3	UE	4
GE	4	UE	4
Sub-total	18	Sub-total	20

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Semester 7	MCs	Semester 8	MCs
MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4	MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4
MLE3103 Materials Design: Aerospace to Biomedical Applications	4	UE	4
MLE3111A Materials Properties and Processing Laboratory	2	UE	4
MLE3112 Machine Learning Approaches in Materials Laboratory	2		
CDE2000 Creating Narratives	4		
Sub-total	16	Sub-total	12

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

Semester 1	MCs	Semester 2	MCs
MLE1001B Materials Science & Engineering Principles & Practice I	4	MLE2001A Materials Science & Engineering Principles & Practice I	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
DTK1234 Design Thinking	4	EG1311 Design & Make	4
MA1513 Linear Algebra with Differential Equations	2	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	MA1512 Differential Equations for Engineering	2
PF1101 Fundamentals of Project Management	4	Group A module for Minor	4
Sub-total	20	Sub-total	20

Semester 3	MCs	Semester 4	MCs
MLE2102 Principles of Renewable Energy	4	MLE2105 Electronic Properties of Materials	4
EE2211 Introduction to Machine Learning	4	ES2631 Critique and Communication of Thinking and Design	4
EG2501 Liveable Cities	4	IE2141 Systems Thinking & Dynamics	4
EG2401A Engineering Professionalism	2	GE	4
GE	4	EG3301R DCP Project	6
Group B module for Minor	4		
Sub-total	22	Sub-total	22

Semester 5	MCs	Semester 6	MCs
EG3301R DCP Project	6	EG3611A Industrial Attachment	10
MLE2103A Materials Kinetics and Processing	2		
MLE3101A Materials Characterization	3		
MLE3101 Materials Characterization Laboratory	3		
GE	4		
UE	4		
Sub-total	22	Sub-total	10

Semester 7	MCs	Semester 8	MCs
MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4	MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4
MLE3103 Materials Design: Aerospace to Biomedical Applications	4	Technical Elective 1	4
MLE3111A Materials Properties and Processing Laboratory	2	Technical Elective 2	4
MLE3112 Machine Learning Approaches in Materials Laboratory	2	UE	4
CDE2000 Creating Narratives	4	UE	4
UE	4	UE	4
Sub-total	20	Sub-total	24

Recommended semester schedule – JC-intake students or equivalent
(for students in Engineering Scholars Programme)

Semester 1	MCs	Semester 2	MCs
MLE1001B Materials Science & Engineering Principles & Practice I	4	MLE2001A Materials Science & Engineering Principles & Practice I	4
GEA1000 Quantitative Reasoning with Data	4	MLE2105 Electronic Properties of Materials	4
DTK1234 Design Thinking	4	MA1512 Differential Equations for Engineering	2
MA1513 Linear Algebra with Differential Equations	2	RC4 module 2 (replaces GE)	4
CE2407A Uncertainty Analysis for Engineers	2	EG3301R DCP Project	6
PF1101 Fundamentals of Project Management	4	Group A module for Minor	4
RC4 module 1 (replaces GE)	4	UE (or IE2141 Systems Thinking & Dynamics if not in RC4)	4
Sub-total	24	Sub-total	28

Semester 3	MCs	Semester 4 – NOC	MCs
MLE2102 Principles of Renewable Energy	4	NOC	
EE2211 Introduction to Machine Learning	4		
EG2501 Liveable Cities	4		
RC4 module 3 (replaces GE)	4		
EG3301R DCP Project	6		
Group B module for Minor	4		
Sub-total	26	Sub-total	20

Semester 5	MCs	Semester 6	MCs
MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4	MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4
RC4 module 4 (replaces ES2631 Critique and Communication of Thinking and Design)	4	Technical Elective 1	4
MLE2103A Materials Kinetics and Processing	2	Technical Elective 2	4
MLE3101A Materials Characterization	3	CDE2000 Creating Narratives	4
MLE3101 Materials Characterization Laboratory	3	UE	4
MLE3103 Materials Design: Aerospace to Biomedical Applications	4	UE	4
MLE3111A Materials Properties and Processing Laboratory	2	UE	2
MLE3112 Machine Learning Approaches in Materials Laboratory	2		
Sub-total	24	Sub-total	26

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

- CS1010E Programming Methodology (4 MCs)
- MA1511 Engineering Calculus (2 MCs) – using MA1505 Mathematics I (remaining 2 MCs counted as UE)
- 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) – counted as UE
- Entrepreneurship course (4 MCs) – counted as UE

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 may want to upgrade to a Second Major)

Semester 1	MCs	Semester 2	MCs
MLE1001B Materials Science & Engineering Principles & Practice I	4	MLE2001A Materials Science & Engineering Principles & Practice I	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
MA1513 Linear Algebra with Differential Equations	2	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	MA1512 Differential Equations for Engineering	2
PF1101 Fundamentals of Project Management	4	EG3301R DCP Project	6
Group A module for Minor	4	Group B module for Minor	4
Sub-total	20	Sub-total	22

Semester 3	MCs	Semester 4	MCs
MLE2102 Principles of Renewable Energy	4	MLE2105 Electronic Properties of Materials	4
MLE2103A Materials Kinetics and Processing	2	ES2631 Critique and Communication of Thinking and Design	4
MLE3101A Materials Characterization	3	IE2141 Systems Thinking & Dynamics	4
MLE3101 Materials Characterization Laboratory	3	GE	4
EE2211 Introduction to Machine Learning	4	GE	4
EG2401A Engineering Professionalism	2		
EG3301R DCP Project	6		
Sub-total	24	Sub-total	20

Semester 5	MCs	Semester 6	MCs
MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4	MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4
EG2501 Liveable Cities	4	Technical Elective 1	4
MLE3103 Materials Design: Aerospace to Biomedical Applications	4	Technical Elective 2	4
MLE3111A Materials Properties and Processing Laboratory	2	GE	4
MLE3112 Machine Learning Approaches in Materials Laboratory	2		
CDE2000 Creating Narratives	4		
Sub-total	20	Sub-total	16

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

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

Recommended semester schedule – poly-intake students

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

Semester 1	MCs	Semester 2	MCs
MLE1001B Materials Science & Engineering Principles & Practice I	4	MLE2001A Materials Science & Engineering Principles & Practice I	4
GEA1000 Quantitative Reasoning with Data	4	CS1010E Programming Methodology	4
MA1513 Linear Algebra with Differential Equations	2	MA1511 Engineering Calculus	2
CE2407A Uncertainty Analysis for Engineers	2	MA1512 Differential Equations for Engineering	2
PF1101 Fundamentals of Project Management	4	GE	4
GE	4	Group A module for Minor	4
Sub-total	20	Sub-total	20

Semester 3	MCs	Semester 4	MCs
MLE2102 Principles of Renewable Energy	4	MLE2105 Electronic Properties of Materials	4
MLE2103A Materials Kinetics and Processing	2	ES2631 Critique and Communication of Thinking and Design	4
MLE3101A Materials Characterization	3	IE2141 Systems Thinking & Dynamics	4
MLE3101 Materials Characterization Laboratory	3	GE	4
EE2211 Introduction to Machine Learning	4	EG3301R DCP Project	6
EG2401A Engineering Professionalism	2		
Group B module for Minor	4		
Sub-total	22	Sub-total	22

Semester 5	MCs	Semester 6	MCs
MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4	MLE4101 B.Eng. Dissertation or MLE4102A Design Project	4
EG2501 Liveable Cities	4	Technical Elective 1	4
MLE3103 Materials Design: Aerospace to Biomedical Applications	4	Technical Elective 2	4
MLE3111A Materials Properties and Processing Laboratory	2	CDE2000 Creating Narratives	4
MLE3112 Machine Learning Approaches in Materials Laboratory	2		
EG3301R DCP Project	6		
Sub-total	22	Sub-total	16

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

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