

MSE Master of Science Module Baskets (Cohort matriculated **in AY2020/2021 and AY2021/2022)**

Page 1 & 2: Module Lists

Page 3: Other Important Pointers

Page 4: Graduation Requirements (No Specialization)

Page 5 & 6: Graduation Requirements (Specialization in Materials Innopreneurship)

Specialization in Materials Innopreneurship is only applicable to those admitted from AY2021/2022 onwards.

There are also multiple modules which have been renamed but the Module Codes and content of the modules remain the same. Please pay attention to not take the same module again despite the change in name as it will affect the graduation check and potentially delay your graduation.

Core Modules (Requirements 8 MC)

*Waiver of core modules are allowed for students who have Bachelor's Degree in Materials Science & Engineering or related discipline with the approval of the Programme Director. Students who waiver the 2 MLE Core Modules will need to take 2 MLE Elective Group Modules in place to fulfil the MC required for graduation. Only MLE Electives are allowed to replace MLE Core. Other General/MIB Electives are **NOT** allowed.*

MLE Core Modules	MLE5001	Basics of Structures & Properties of Materials
	MLE5002	Materials Characterization

All 4 MC unless stated differently. ^

MLE Elective Group (Requirements at least 8 MC)

MLE Elective Group	MLE5101	Thermodynamics for Sustainability
	MLE5102	Mechanical Behaviours of Materials
	MLE5104	Physical Properties of Materials
	MLE5210	Modelling and Simulation of Materials
	MLE5211	Nanomaterials
	MLE5212	Energy Conversion & Storage
	MLE5213	Magnetic Materials
	MLE5214	Advances in Polymeric Materials
	MLE5215	Atomistic Modelling of Molecules and Materials
	MLE5216	Introduction to Microscopy for Material Research
	MLE5217	Foundations of Machine Learning for Materials Science
	MLE5228	Superconductivity and Superconducting Devices
	MLE6101	Thermodynamics and Kinetics of Materials
	MLE6103	Structures of Materials

All 4 MC unless stated differently. ^

General Elective Group

General Elective Group	MLE	MLE5003	Materials Science & Engineering Project (8 MC)
		MLE5218	Materials Discovery with AI
		MLE5219	Materials Informatics: The Role of Big Data
		MLE5220	Computation of Macroscopic Materials Behaviours
		MLE5221	Designing Materials for Renewable Fuels and Clean Water
		MLE5222	Nano and 2D Materials for Energy Applications
		MLE5223	Rational Materials Design for Sustainability
		MLE5224	Degradation of Materials

		MLE5225	Electrocatalytic Materials for Sustainability
		MLE5226	Problem Solving for Future Sustainability Challenges
	BN	BN5201	Advanced Biomaterials
	CE	CE5604	Advanced Concrete Technology
	CN	CN5161	Polymer Processing Engineering
		CN5162	Advanced Polymeric Materials
		CN5251	Membrane Science & Technology
	EE	EE5431	Fundamentals of Nanoelectronics
		EE5508	Semiconductor Fundamentals
	ME	ME5506	Corrosion of Materials
		ME5513	Deformation, Fracture and Fatigue of Materials
		ME5516	Emerging Energy Conversion and Storage Technologies
		ME5611	Sustainable Product Design & Manufacturing
		ME6504	Mechanical Failure Analysis: Learning from Examples
		ME6505	Engineering Materials in Medicine
		ME6508	Atomistic Simulations of Materials

All 4 MC unless stated differently. ^

Materials Innopreneurship Basket (MIB) Elective Group**

For students who are not specializing in Materials Innopreneurship, only a maximum of 12 MC can be taken from this MIB elective group.

MIB Elective Group	MLE	MLE4213	Innovation & Product Development for Material Engineers ++
		MLE5004	Innovation & Translation Research Project in MSE (8 MC) ++
	MT	MT5001	Intellectual Property Management & Innovation Strategy
		MT5002	Management of Industrial R&D
		MT5006	Value Creation Through Product Development
		MT5007	Management of Technological Innovation
		MT5010	Technology Forecasting, Intelligence & Foresighting
		MT5911	Venture Capital Funding for TechVenture
		MT5912	Frugal Innovation
		MT5913	TechLaunch – Experiential Entrepreneurship
		MT5920	Enterprise Development

All 4 MC unless stated differently. ^

Additional Modules only available for students specializing in Materials Innopreneurship*:**

Additional Mods only for Specialization	MT	MT5008	Internal and Collaborative Corporate Entrepreneurship
		MT5020	Managing the Human Elements of Technology Management
		MT5022	Digital Disruption and Technology Strategy
		MT5023	Technology-Based Entrepreneurial Strategy
		MT5024	Maximising Innovation Value through Patent Analytics

All 4 MC unless stated differently. ^

^ All modules are 4 MC unless stated differently, please double check the MC in the NUSMods website used for timetable planning. Not all modules will be available every semester or every academic year.

** For students with no specialization, only maximum of 12 MC can be taken from this Materials Innopreneurship Basket (MIB) Elective Group.

Other Important Pointers:

- Students are not allowed to take both MLE5003 and MLE5004 together as both are project modules which requires high time commitment and heavy in workload.
- Part-time students are not allowed to take MLE5003 or MLE5004 due to high time commitment and heavy workload.
- For part-time students who wish to specialise in Materials Innopreneurship, please email department administrator to check on arrangement for MLE5004.
- MLE4213 and MLE5004 are only open to specialization student.

Modules in Blue Fonts are newly-added into our curriculum.

- MLE5101 and MLE6101 are **preclusions** to each other. You can only take either 1.
 - If you have taken and completed MLE6101 before, please do not select MLE5101.
 - MLE6101 is no longer available to MSc candidates from AY 2022/2023 onwards.
- MLE5224 and ME5506 are **preclusions** to each other. You can only take either 1.
- MLE5228 and PC5218 are **preclusions** to each other. You can only take either 1.
- MLE5218 and MLE5219 require the **pre-requisite** of MLE5217.
- MLE5221 and MLE5225 require the **pre-requisite** of MLE5101. For those who have taken MLE6101 before, pre-requisite will be waived.
- MLE5223 requires the **pre-requisite** of MLE5001.
- Candidates are allowed to take the modules together with their pre-requisites in the same semester.
- Please make sure to check all the modules for any prerequisites/preclusions before selecting/requesting the modules during ModReg.

Curriculum Requirements (No Specialization):

Requirements	Pass 40 MC of MSE and MSE recognized modules as per breakdown below:	Remarks
1. Pass 8 MC of Core Modules	8	MLE Core: MLE5001 & MLE5002
2. Pass 8 MC from MLE Elective Group	8	Refer to MLE Elective Group.
3. Pass 16 MC from MLE, General & MIB Elective Group	16	Refer to MLE Elective Group, General Elective Group and MIB Elective Group. Max 12 MC allowed for MIB Group.
4. Pass 8 MC from the MLE, General Elective Group OR NCE Modules OR Credit Transfer	8	Refer to MLE Elective Group, General Elective Group. OR NCE Modules: Level 5000/6000 Modules from other Engineering departments, subjected to availability and approval. From AY 2022/2023, Modules from Science are no longer considered NCE and will not be approved. Modules taken from Science before AY 2022/2023 will still be considered as NCE and included in your MC where applicable. NUSRI Students who credit transfer their modules will use up NCE MC quota. Can transfer a maximum of 2 modules (8 MC) .
Total MC	40	Required MC for Graduation: Pass 40 MC Minimum CAP for Graduation: 3.00

Curriculum Requirements (**With Specialization**):

Note: Specialization is only applicable to those admitted from AY2021/2022 onwards.

†† To qualify for Specialization in Materials Innopreneurship:

- Students must pass 20 MC of specialization-related modules.
- Students must take 2 compulsory modules: *MLE4213 Innovation & Product Development for Material Engineers (4 MC) AND MLE5004 Innovation & Translation Research Project in MSE (8 MC) which will add up to 12 MC. Only by pre-allocation.*
- The remaining 8 MC can be chosen from MIB Elective Group** or the additional modules available only available for selection by students specializing in Materials Innopreneurship***.

*** If student does not meet requirements to complete specialization at the end, the modules taken here will be counted towards MIB Elective.

Requirements	Pass 40 MCs of MSE and MSE recognized modules as per breakdown below:	Remarks
1. Pass 8 MC of Core Modules	8	MLE Core: MLE5001 & MLE5002
2. Pass 8 MC from MLE Elective Group	8	Refer to MLE Elective Group.
3. Pass 20 MC for Specialization (Specialization-related Modules)	20	MLE5004 (Compulsory) (8 MC) MLE4213 (Compulsory) (4 MC) MLE5004 and MLE4213 are only by pre-allocation, students who are approved to take this specialization and declared for this specialization need to email Mr Javier Ang (angzwj@nus.edu.sg) for these 2 modules. Remaining 8 MC of modules from MIB Elective Group, Additional Modules Available for Students Specialization.
4. Pass 4 MC from the MLE, General Elective Group OR NCE Module OR Credit Transfer	4	Refer to MLE Elective Group, General Elective Group. OR NCE Modules: Level 5000/6000 Modules from other Engineering departments, subjected to availability and approval. From AY 2022/2023, Modules from Science are no longer considered NCE and will not be

		<p>approved. Modules taken from Science before AY 2022/2023 will still be considered as NCE and included in your MC where applicable.</p> <p>NUSRI Students who credit transfer their modules will use up NCE MC quota. Can transfer only 1 module to complete this 4 MC requirement.</p>
Total MC	40	<p>Required MC for Graduation: Pass 40 MC</p> <p>Minimum CAP for Graduation: 3.00</p>