

Degree Requirements of MSc (Chemical Engineering)
(for cohorts from Semester 2, AY2023/2024 and onwards)

The Master of Science (Chemical Engineering) Degree programme, or MSc (CHE), is hosted by the Department of Chemical and Biomolecular Engineering. In order to qualify for the MSc (CHE) Degree, a candidate must complete a programme of study consisting of at least 40 units. In addition, a student must obtain a minimum GPA of 3.0 (Grade B-) for the best courses equivalent to 40 units. A student may choose to graduate with one of the following:

- MSc (CHE) Degree with no specialisation
- MSc (CHE) Degree with Specialisation in Sustainable Development

Courses in Group 1 are in several specialised areas of chemical engineering while those in Group 2 consist of selected courses from other Master of Science programmes in the College of Design and Engineering.

Group 1

CN5010	Mathematical & Computing Methods for Chemical Engineers
CN5020	Advanced Reaction Engineering
CN5030	Advanced Chemical Engineering Thermodynamics
CN5040	Advanced Transport Phenomena
CN5050	Advanced Separation Processes
CN5111	Optimization of Chemical Processes ^{#+}
CN5111B	Process Optimization with Industrial Applications
CN5112	Introduction to Electrochemical Systems
CN5124	Fluid-Particle Systems [#]
CN5131	Colloids and Surfaces
CN5150	Principles of Polymer Science and Engineering
CN5160	Advanced Topics in Catalysis
CN5161	Polymer Processing Engineering
CN5162	Advanced Polymeric Materials
CN5172	Biochemical Engineering [#]
CN5173	Downstream Processing of Biochemical & Pharmaceutical Products [#]
CN5181	Computer Aided Chemical Engineering ⁺
CN5190	Hydrogen Energy and Technology ^{#^}
CN5191	Project Engineering ^{#^+}
CN5192	Future Fuel Options: Prospects and Technologies [^]
CN5193	Instrumental Methods of Analysis
CN5194	Carbon Capture Sequestration and Utilization ^{^+}
CN5195	Biomass and Energy [^]
CN5203	Circular Economy in the Chemical Industry [#]
CN5204	Green Chemical Process and Technology [#]
CN5205	Advanced Machine Learning for Chemical Engineers ⁺
CN5206	Advanced Fluid Mechanics with Artificial Intelligence ^{#^}
CN5207	Energy Transition Towards Net Zero ^{#^}
CN5208	Nuclear Reactor Engineering [#]
CN5215	Atomistic Modelling of Molecules and Materials ^{#+}
CN5216	Electronic Materials and Energy Technologies ^{#^+}
CN5219	Engineering Nanobiotechnology
CN5220	Colloids and Soft Matter Engineering
CN5222	Pharmaceuticals and Fine Chemicals [#]
CN5240	Principles and Applications of Battery Technologies [^] – coming in Sem 2, AY2026/2027
CN5246	Catalysis Science and Engineering ^{#^}
CN5247	Advanced Enzyme Technology – coming in Sem 2, AY2026/2027
CN5251	Membrane Science and Technology [#]

CN5252	Molecular and Computational Tools for Biotechnology
CN5277	Molecular Engineering of Advanced Drug Delivery Systems [#]
CN5301	Sustainability Strategies for Energy Systems ^{^+}
CN5304	Process Systems Analysis and Decision-Making ^{^+} – coming in Sem 2, AY2026/2027
CN5371	Special Topics in Biochemical Engineering and Bioseparations
CN5391	Selected Topics in Advanced Chemical Engineering – I
CN5392	Selected Topics in Advanced Chemical Engineering – II
CN5401	Contemporary Topics in Advanced Chemical Engineering (2 units)
CN5432	Fundamentals and Applications of Porous Materials
CN5555	Chemical Engineering Project ⁺ (8 units)
CN5566	Chemical Engineering Industrial Practice ⁺ (8 units)

Group 2

ESE5202	Air Pollution Control Technology
ESE5602	Environmental Management Systems
MT5912	Frugal Innovation
MT5913	TechLaunch – Experiential Entrepreneurship
MT5920	Enterprise Development - Experiential Innovation
SH5201	Process Hazard Analysis
SH5202	Quantified Risk Analysis
SH5204	Industrial Safety Engineering

The MSc (CHE) Degree graduation requirements are stipulated below:

MSc (CHE) Degree with no specialisation

A candidate must successfully complete a programme of study consisting of 10 courses or 40 units with at least 32 units from Group 1 list of courses. The remaining units may be from Group 1, Group 2 or any courses from the graduate levels in the same or other disciplines as approved by the Department.

MSc (CHE) Degree with Specialisation in Sustainable Development

A candidate must successfully complete a programme of study consisting of 10 courses or 40 units with at least 32 units from Group 1 list of courses. The remaining units may be from Group 1, Group 2 or any courses from the graduate levels in the same or other disciplines as approved by the Department. In addition, candidates are expected to complete a total of 20 units of specialised courses shown below.

CN5111	Optimization of Chemical Processes ^{#+}
CN5190	Hydrogen Energy and Technology ^{#^}
CN5192	Future Fuel Options: Prospects and Technologies [^]
CN5194	Carbon Capture Sequestration and Utilization ^{^+}
CN5195	Biomass and Energy [^]
CN5216	Electronic Materials and Energy Technologies ^{#^+}
CN5203	Circular Economy in the Chemical Industry [#]
CN5204	Green Chemical Process and Technology [#]
CN5207	Energy Transition Towards Net Zero ^{#^}
CN5301	Sustainability Strategies for Energy Systems ^{^+}
CN5555	Chemical Engineering Project ⁺ (8 units) – <i>must be in an area related to sustainability</i>

Note: All courses listed are worth 4 units each except for CN5401 Contemporary Topics in Advanced Chemical Engineering (2 units), CN5555 Chemical Engineering Project (8 units) and CN5566 Chemical Engineering Industrial Practice (8 units).

** Not all courses listed above are necessarily available in any one year, and new courses may be made available from time to time.*

[#] Courses that are also offered to BEng (Chem Eng) undergraduate students

[^] Courses that are also offered to MSc (Energy Systems) students

⁺ 100% Continuous Assessment; no final exam