

MASTER OF SCIENCE (MECHANICAL ENGINEERING)

The programme is intended to provide students with an advanced knowledge and understanding of the 'state-of-the-art' in one or more of the many areas of mechanical engineering. Its unique balance of rigorous fundamentals and engaging real-world applications in the M.Sc. (Mechanical Engineering) programme train the students to be analytical thinkers who will successfully integrate and synthesize the theory and new knowledge. The combination of expertise in research and in engineering consultancy in the Mechanical Engineering Department helps to give this M.Sc. (Mechanical Engineering) course its unique features. The success of this M.Sc. (Mechanical Engineering) course can be measured by the large proportion of its graduates who find appropriate and challenging posts in industry at home and abroad.

A candidate may read for a M.Sc. in Mechanical Engineering with or without a major or area of specialization.

The Specializations currently available are as follows:

1. Computation & Modelling
2. Manufacturing Technology & Automation

To graduate, a student needs to accumulate a total of no less than 40 Modular Credits (MCs) and obtain a minimum Cumulative Average Point (CAP) of 3.0 (equivalent to the Grade of B-) for the best modules equivalent of 40 MCs (inclusive of foundation/core modules, where required). Each graduate module of 39 lecture hours is usually assigned 4 MCs. Hence, in general, a student needs to complete 10 modules chosen from the list of modules. (A maximum of 2 approved external modules are usually allowed.)

The M.Sc. (Mechanical Engineering) curriculum and specializations are currently being reviewed for Semester I, AY2016/2017. The listing below is only indicative of the current program. The updated details will be available at the time of registration.

The following graduate modules are offered by the Department of Mechanical Engineering:

GRADUATE MODULES ([Module Descriptions](#))

Applied Mechanics

ME5101	Applied Stress Analysis
ME5103	Plates and Shells
ME5105	Shock and Vibration Control
ME5106	Engineering Acoustics
ME5161	Optical Techniques in Experimental Stress Analysis
ME6101	Research Topics in Applied Mechanics
ME6102	Topics in Applied Mechanics
ME6103	Optical Measurement and Quality Inspection
ME6105	Continuum Mechanics
ME6107	Plasticity and Inelastic Deformation

Energy & Bio-thermal Systems

ME5201	Thermal Systems Design
ME5202	Industrial Transfer Processes
ME5204	Air Conditioning and Building Automation
ME5205	Energy Engineering
ME5207	Solar Energy Systems
ME6201	Research Topics in Thermodynamics and Heat Transfer
ME6202	Topics in Thermodynamics and Heat Transfer
ME6203	Mass Transport
ME6204	Convective Heat Transfer

Fluid Mechanics

ME5301	Flow Systems Analysis
ME5302	Computational Fluid Mechanics
ME5303	Industrial Aerodynamics
ME5361	Advanced Computational Fluid Dynamics
ME5362	Advanced Fluid Transients Computation and Modelling
ME6301	Research Topics in Fluid Dynamics
ME6302	Topics in Fluid Dynamics
ME6303	Advanced Fluid Dynamics
ME6304	Turbulence in Fluid Flows

Control & Mechatronics

ME5401/EE5101R	Linear Systems
ME5402/EE5106R	Advanced Robotics
ME5403/EE5103R	Computer Control Systems
ME5404/EE5904R	Neural Networks
ME5405	Machine Vision
ME6401	Topics in Mechatronics 1
ME6402	Topics in Mechatronics 2

Materials

ME5506	Corrosion of Materials
ME5513	Fracture and Fatigue of Materials
ME5516	Emerging Energy Conversion and Storage Technologies
ME6501	Research Topics in Materials Science
ME6502	Topics in Materials Science
ME6503	Theory of Transformations in Metals
ME6504	Defects and Dislocations in Solids
ME6505	Engineering Materials in Medicine

Manufacturing

ME5609	Rapid Response Manufacturing
ME5610	Product Development
ME5611	Sustainable Product Design & Manufacturing
ME5613	Optimal Design of Multi-Functional Structures
ME6601	Research Topics in Manufacturing
ME6602	Topics in Manufacturing
ME6604	Modelling of Machining Processes
ME6605	Abrasive and Non-Conventional Processes
ME6606	Computer Aided Product Development

Others

ME5701	Mathematics for Engineering Research
ME5708	Pressure Surges in Liquid & Gas Flow Systems
ME6701	Topics in Mechanical Engineering Research 1

For advanced courses in Mechanical Engineering on Topics of current research interest, lectures will be given by both specialists and department staff.

(Not all modules listed above are necessary available in any one year.)

SPECIALISATION IN COMPUTATION & MODELLING

In general, a student needs to complete 10 modules with **at least five (5)** selected from the core list.

Core Modules

ME5302	Computational Fluid Mechanics
ME5361	Advanced Computational Fluid Dynamics
ME5362	Advanced Fluid Transients Computation and Modelling
ME5404/EE5904R	Neural Networks
ME5701	Mathematics for Engineering Research
ME6301	Research Topics in Fluid Dynamics
ME6302	Topics in Fluid Dynamics
ME6303	Advanced Fluid Dynamics
ME6304	Turbulence in Fluid Flows

(Not all modules listed above are necessary available in any one year.)

SPECIALISATION IN MANUFACTURING TECHNOLOGY & AUTOMATION

In general, a student needs to complete 10 modules with **at least five (5)** selected from the core list.

Core Modules

ME5402/EE5106R	Advanced Robotics
ME5403/EE5103R	Computer Control Systems
ME5405	Machine Vision
ME5609	Rapid Response Manufacturing
ME5610	Product Development
ME5611	Sustainable Product Design & Manufacturing
ME5613	Optimal Design of Multi-Functional Structures
ME6602	Topics in Manufacturing
ME6604	Modelling of Machining Processes
ME6605	Abrasive and Non-Conventional Processes
ME6606	Computer Aided Product Development

(Not all modules listed above are necessary available in any one year.)

SPECIALISATION IN OFFSHORE OIL AND GAS TECHNOLOGY

This specialization will be offered in Semester 1 of AY 2011/ 2012 by Department of Civil & Environment Engineering, under M.Sc. (Offshore Technology).