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
- ME5301: Advanced Computational Fluid Dynamics
- ME5302: 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).

Updated on 04 Nov 2015