M.Sc.(Eng.) in Building Services Engineering

(courses offered in 2002-2003)

First Semester

MEBS6000 Utility Services

Cold and hot water supply: water distribution systems, patterns of usage, estimation of requirements, simultaneous demand, storage capacity, pumping arrangements, calorifiers and water heaters; steam systems: low and high pressure systems, boilers and heat exchangers, steam supply piping and condensate return, insulation, steam trapping; drainage systems and sewage disposal: stormwater and sanitary drainage systems, rainfall intensity, simultaneous sanitary discharge, sizing of drains and sewers, methods of sewage disposal, primary and secondary treatments; lifts, escalators and conveyors: calculation of lift requirements, electrical/mechanical details of installation, operation and maintenance, safety aspects; L.V. electrical installation; communication systems; security and alarm systems.

MEBS6010 Indoor Pollution

Concept of occupant exposure: thermal, visual, acoustic and air quality stressors; stress, strain, susceptibility and adaption; types and physiological effects of indoor contaminants: gases and vapours, inert particulars, biological particulates, and radionuclides; psychophysiological factors; sources and location of pollutants: micro-, mini-, meso- and macro-environments; measurement methods for indoor pollutants; methods of pollution control: design of passive and active systems, operation and maintenance; legislation and public policy issues; energy and cost implications of indoor pollution control.

MEBS6009 Fire Services Design

Characteristics and behaviour of fire; fire hazards of materials and buildings; fire hazards of building services and processes; fire detectiona nd alarm systems; water-based fire extinguishing systems; automatic sprinkler systems, hydrant and hosereel systems, drencher systems; gas-based fire extinguishing systems: BTM, BCF, and CO_2 systems; special fire extinguishing systems; portable fire extinguishers; means of fire escape; smoke control; staircase pressurization; smoke vents; emergency power; statutory regulations governing fire services installations: F.O.C. rules, N.F.P.A. codes and local Codes of Practice; installation and commissioning; maintenance requirements.

M.Sc.(Eng.) in Building Services Engineering

Second Semester

MEBS6005 Building Automation Systems

Principles of building automation systems: system configurations; central processor and outstations; distributed processing and intelligence; integrated control; control modes, direct digital controls; adaptive control; tuning; types of input and output points; security and energy management. Microprocessor fundamentals: architecture of microprocessor systems; computerized logic control; memories; special supporting devices; hardware and software development; system development. Transducers, sensors and actuators: signal conditioning, processing and transmission. Current developments; selection criteria; cost, reliability and system maintenance.

MEBS6009 Fire Services Design

Characteristics and behaviour of fire; fire hazards of materials and buildings; fire hazards of building services and processes; fire detectiona nd alarm systems; water-based fire extinguishing systems; automatic sprinkler systems, hydrant and hosereel systems, drencher systems; gas-based fire extinguishing systems: BTM, BCF, and CO_2 systems; special fire extinguishing systems; portable fire extinguishers; means of fire escape; smoke control; staircase pressurization; smoke vents; emergency power; statutory regulations governing fire services installations: F.O.C. rules, N.F.P.A. codes and local Codes of Practice; installation and commissioning; maintenance requirements.

MEBS6011 Maintenance and Management of Building Facilities

Areas of facilities management; security of facilities; maintenance philosophy; optimum control and operation; fault detection and analysis; energy management; safety and environmental protection. Management techniques in maintenance: decision making techniques; spares inventory control; types of maintenance techniques; resource management; computerized maintenance; measures of maintenance effectiveness; design of management instruments. Plant availability and maintainability; reliability of parallel and series configurations.

M.Sc.(Eng.) in Mechanical Engineering

(courses offered in 2002-2003)

First Semester

MECH6022 Offshore Engineering Design

Offshore structural configurations; environmental conditions, design criteria and code requirements; deterministic and stochastic design approaches; design of offshore structures; numerical methods for marine applications.

MECH6024 Applied Mathematics for Engineers

Two topics selected from (1) computational techniques in engineering, (2) variational methods in mechanics, and (3) statistical methods in engineering.

MECH6026 Computational Thermal Fluid Dynamics

Fundamental concepts and equations of thermal fluid dynamics; solution of linear equation systems; numerical solutions of partial differential equations.

MECH6028 Processing and Service Behaviour of Engineering Plastics

Extrusion; injection moulding; blow moulding; solid phase forming; recycling; rapid prototyping. Viscoelastic behaviour of plastics; design methods for plastics based on deformation data; dynamic behaviour and hysteresis losses; fatigue; UV degradation; flame retardance; introduction to polymer-matrix composites.

CIMA6001 Geometric Modelling and Computer Graphics

2D, 3D geometric modeling principles: information representation and manipulation, mathematical bases, graphics rendering techniques; elements of computer graphics; graphics packages and standards; data exchange standards.

M.Sc.(Eng.) in Mechanical Engineering

Second Semester

MECH6009 Solar Energy Application

Radiant heat transfer, sun-earth trigonometry, beam and diffuse radiation, collector types, solar heating and cooling, system design, tracking, direct conversion.

MECH6013 Computational and Experimental Stress Analysis

Fundamental concepts of numerical solutions, direct and energy formulation of finite element models, solution techniques, material and geometric nonlinearities. Strain Gauge method, photoelasticity, Moire and interferometric methods.

MECH6018 Micrometeorology and Atmospheric Diffusion

Atmospheric dynamics; boundary layer, turbulence; gradient, statistical and Lagrangian similarity diffusion theory; plume rise; bluff body aerodynamics and wind-tunnel modeling.

MECH6025 Marine Propulsion Plant

Machinery systems; design criteria; prime mover efficiency; energy saving methods. Propulsion; fixed and controllable pitch propellers; design procedures; matching of hull, propeller, diesel engine and turbocharger. Marine shafting design; alignment; vibration; thrust and tail shaft bearings.

CIMA6004 Computer-aided Manufacturing

Numerical control principles and applications; computer aided process planning; industrial robots; flexible manufacturing systems; computer aided production management; computer aided process control and quality control; application of AI in manufacturing; CAD/CAM evaluation and implementation; computer integrated manufacturing (CIM).
