WELCOME TO 500 LEVEL FIRST SEMESTER

Engineering Economics - MEE-501 || 2 UNITS

- Economics of business settings
- Costing of production systems
- Objectives of cost analysis and control.
- Sources of finance, money and credit for projects.
- Investment Appraisals.
- Resources Allocation.
- Interest rates.
- Interest formulas and problems.
- Annual costs.
- Present worth, rate of return.
- Cost reducing.
- Depreciation accounting.
- Valuation of assets.
- Financial management; accounting methods, financial statement, elements of costing.
- Budget and budgeting control.
- Dwelling with multiple alternatives and uncertainties, planning and Decision making procedures.
- Macroeconomics, Economic growth, National Income. Economic of technological change.

Tool Design - MEE 503 || 3 UNITS

- Tool geometry, properties and materials.
- The tool cutting process, general problems of tool design – cutting and mounting elements.
- Design of single point lathe tools including form tools, cutting tools for planning and shaping.

- The design of drills; core drilling, counter-bores, counter sinks, spot faces and reamers.
- Design of milling; milling cutters. Design of gear cutting tools operating by the form cutting principle and the generating principle.
- Design of internal and external surface broaches, special cutting tools such as combination tools and tools for automated production.
- Design of abrasive tools.
- Design of press tools.
- Design of jigs and fixtures: for turning, milling, drilling and grinding.
- Fixture design for NC machines.
- Flexible fixture design.
- Applications of computer in tools design.

Turbo-Machinery MEE-505 || 3 UNITS

- Classification of fluid machines.
- Theory of rotodynamic machines, one dimensional theorem, isolated and cascade considerations, departure from Euler's theory and losses.
- Compressible flow through rotodynamic machines.
- Performance of rotodynamic machines.
- Performance characteristics, losses and efficiencies.
- Dimensionless coefficients and similarity laws, scale effects, centrifugal pumps and fans, axial-flow pumps and fans, water turbines, the Pelton wheel.
- Francis turbine, axial-flow turbines, the fluid coupling, the torque converter.
- Positive displacement machines, reciprocating pumps, rotary gear, vane and piston pumps, hydraulic motors.
- Pipe machine system: Pump and the pipe system, parallel and series pump operation,cavitations in pumps and turbines, pump selections.

Computer Aided Design/Manufacturing - MEE-509 || 2 UNITS

- NC programming and machining with interactive CAD/CAM systems.
- Curve and surface geometry for tool-path generation.
- Tool-path generation methodologies.
- Geometric modelling techniques for simulation and verification of manufacturing processes.
- Introduction to Computer-Aided process planning Commercial packages such as Product Lifecycle Management System, etc

Metrology - MEE-519 || 3 UNITS

- General principles of instrumentation and measurements.
- Precision and accuracy.
- Measurement of length-light rays, block gauges, comparison with known lengths, graduated scales, rotation of screwed shaft, angular measurement-combination angle gauges, sine bars, auto-collimator angle deckor, precision level.
- Determination of straightness of surfaces.
- Measurement of form. Optical measurement of screw threads major/minor diameters, simple effective diameter, thread pitch, thread form, virtual effective diameter, measurement of gears, the involutes form, gear tooth element, rolling gear test, checking gear tooth profile, gear tooth thickness, gear pitch measurement of surface finish.
- Co-ordinate measuring machines.
- Computer Aided inspection.
- Application of laser in metrology.

Internal Combustion Engines and Transmission - MEE-524 || 3 UNITS

- Hydrocarbon fuels; structure, properties and test methods.
- Alternative fuels for automobile engines.
- Combustions stoichiometry; effect of dissociation, residual fraction etc. Fuel – air cycle analysis using combustion charts.

- Piston engine combustion phenomena; pre-ignition, detonation and knocking.
- Exhaust gas emissions; characteristics, effects, methods of measurement and reduction. Exhaust emission regulations.
- Fluid mechanics of internal combustion engines: fuel systems, intake and exhaust systems.
- Carburetor and fuel injection systems.
- Electronic and computer fuel injection systems.
- Turbocharging and turbochargers.
- Engine components and complete engine design.
- Engine testing.
- Manual gear box: Gear ratio pattern, synchromesh mechanism, overdrive and fifth gear.
- Automatic transmission principles and design: fluid flywheel, torque converter. epicyclic gearbox and clutches.
- Propeller shaft and differential assembly.

SEMINAR - MEE-507 || 1 UNIT

MEE 591 MECHANICAL ENGINEERING PROJECT I 3 UNITS

Original individual student project related to **a prescribed Mechanical Engineering problem** involving ***literature review, identification, deflection and formulation of the problem, theoretical investigation, modeling simulation analysis and design.*** 15th (T); 180h (P); C

MEE 592 MECHANICAL ENGINEERING PROJECT II 3 UNITS

Second phase of ***research investigations involving the fabrication of the designed model, debugging, calibration, testing data collection and analysis, and presentation of a comprehensive written report of the investigations.*** 15th (T); 180h (P); C; PR: MEE 591.