FIRST & SECOND SEMESTERS : Common for all branches

THIRD SEMESTER

MA201T: Mathematics III 3-1-0-0-3
Probability distributions, Random variables, mean and variance of probability
distributions, Chebyshev’s theorem, joint distributions, Sampling distributions and
inference concerning means, sampling distribution of the variance, tests of hypothesis,
Inference concerning variance, test for goodness of fit, regression analysis, analysis of
variance, completely randomized designs.
Text Book:
   Prentice Hall Ltd., 1995

EE216T: Electrical Measurements and Machines 3-0-0-0-3
Measurement of power, Basics of rotating machinery, principle of operation, e.m.f and
torque equation, d.c. Machines, principles of operation, generators and motors,
Transformers, Alternators, synchronous machines, single phase and special machines.
Working of AC and DC Servomotors and Principles of Position, Velocity and Force
servo control Systems- Applications in CNC Machine Tool drives and Robots.
Text Book:
   Delhi, 1997.

ME211T: Mechanics of Fluids 3-1-0-0-3
Characteristics and properties of fluids; Fluid static’s and kinematics; Energy equations
for different types of fluid flow; Flow measuring devices; concepts of basic potential
flows; Flow past immersed bodies; Boundary layer equations and its solutions
Text Books:
1. White, F.M., Fluid mechanics, McGraw Hill

References:
1. Finnemore & Franzinl, Fluid mechanics with engineering applications, Mc Graw
   Hill.

ME212T: Elements of Solid Mechanics 3-1-0-0-3
General concepts of stress and strain - stress and strain tensors; Bending stresses in beams
- axial shear and bending moments by integration and singularity functions; Torsion in
circular elastic and inelastic bars; Different methods of assessment of deflection of beams; transformation of stress and strains, compound stresses; Theory of columns.

Text Books:

References:

PM213T: Materials Science and Metallurgy

Text Book:

References:
3. Shackelford J.F., Material Science for Engineers

ME213D: Machine Drawing

Orthographic projections of machine elements; Welded joints, Screwed fasteners, Pipe joints, couplings, Pulleys, Gears, Journal and roller bearings; Assembly drawings of Engine parts, Parts of lathe, Valves, Jigs and fixtures; Concepts of limits, fits and tolerances; Working drawings of simple machine elements; Introduction to CAD.

Text Books:

References:

EE215L: Electrical Measurements and Machines Lab

List of experiments:
1. a) Linear and Non-linear Characteristics - Determination of V-I characteristics of a linear resistor and an incandescent lamp.
b) Methods of measuring high and low resistance-Voltmeter/Ammeter method.


3. a) Measurement of Energy using single-phase energy meter and verification by power/time measurements.
   b) Measurement of power in 3 phase circuits using two-wattmeter method.

4. Determination of the efficiency and regulation of single-phase transformer by direct loading.

5. Determination of efficiency and regulation at various loads conditions of a single-phase transformer by open circuit and short circuit tests.

6. a) Study of Starters for 3 phase Induction motors
   b) Determination of performance characteristics of Squirrel Cage induction motor by conducting load test.


8. Determination of Open circuit characteristic and load characteristics of a dc shunt generator.


12. Testing of Single phase motor

CE294L: Strength of Materials Laboratory 0-0-0-3-1
Study of extensometer and strain gauges, Simple tension test, double shear test, Rockwell, Brinnel and Vickers hardness tests, Izod and Charpy impact tests, Strength of open coiled and closed coil springs, bending, torsion, compression and fatigue tests.
FOURTH SEMESTER

MA202T: Mathematics IV 3-1-0-0-3

Text Book:

References:

ME251T: Thermodynamics 3-1-0-0-3
Introduction to thermodynamic systems; P,V,T relationships of pure substances; Zeroth law of thermodynamics and temperature measurements; First law of thermodynamics - concepts of heat and work; Second law of thermodynamics - concept of entropy, calculation of entropy changes, availability, thermodynamic property relationship, mixture of gases.

References:
5. Y.V.C. Rao, An Introduction to Thermodynamics, Prentice Hall.

ME252T: Mechanics of Machinery 3-1-0-0-3
Introduction to kinematics and mechanisms - displacement and velocity analysis - acceleration analysis; Concepts of path-curvature theory; Design of cams; Design of gears, gear trains; Kinematic synthesis; Graphical synthesis for motion, function generator; Techniques for analytical synthesis.

Text Books:

References:

**ME253T: Advanced Mechanics of Solids**

3-1-0-0-3

Concepts of stress and strain at a point; Equations of elasticity, boundary conditions, special problems in bending; Problems of plane stress, strain and axy-symmetrics; rotating discs; Introduction to energy technique; 3-D approach to torsion in non-circular sections; Torsion in thin walled open and closed sections; Introduction to theory of plasticity- stress, strain relationships.

**Text Books:**


**References:**

5. Johnson, W. & Muller, P. B., Engineering Plasticity.

**PM254T: Manufacturing Science**

3-1-0-0-3

Foundry - pattern, mould and core making; melting practice; solidification of pure metals and alloys; Casting processes - different types; Riser and gating designs; Casting defects and their inspection; Yield criteria of metals; Isotropic and kinematic hardening; Metal forming operations and their analysis - classification of metal joining - different welding techniques; Welding metallurgy, testing of welded joints; Brazing and soldering.

**Text Books:**

1. Amithabha Ghosh & Asok kumar mallik, Manufacturing Science, Affiliated East West Press Ltd.

**References:**

7. Metals Hand Book- Vol 5., Welding Institute of Metals. USA.

**PM255T: Metrology and Instrumentation**

3-1-0-0-3

Basis concepts of measurement experiment planning, calibration, models of measurement systems; Statistical concepts in measurements; Uncertainty analysis; Data acquisition
systems; Interferometers, Different types of transducers; Optical instruments, limits and fits, surface finish measurements, screw threads and gear measurements, co-ordinate measuring machines; Techniques of temperature measurements, pressure measurements, strain measurements, force and torque measurements.

**Text Books:**

1. Figliola Richard, S. & Beasley Donald E., Theory & Design for Mechanical Measurements, 3rd edn., John Wiley & Sons Inc,

**References:**

2. Thomas, G. Bechwith, Lewis Buck, N & Roy, D. Marangoni., Mechanical Measurements, NAROSA.

**ME256L: Fluid Mechanics and Fluid Machinery Lab** 0-0-0-3-1


**PM257L: Production Engineering Lab I** 0-0-0-3-1

Classifications of machine tools and machining processes - Specification of machine tool, power source, Centre lathe - general features, parts and functions - Machining on Centre lathe- Cutting tools - Materials, types; Grinding, Cutting variables - Selection of speeds, feeds and depth of cut - Use of cutting fluids - Methods of holding work - Lathe operations - straight, taper and eccentric turning, thread cutting, drilling, boring, profile turning, knurling - Tolerance and surface finish.
FIFTH SEMESTER

ME301T: Principles of Management 3-1-0-0-3

Text Books:

References:

ME311T: Heat & Mass Transfer 3-1-0-0-3

Text Book:

References:
1. Incropera, F. P. and De Witt D. P., Fundamental of Heat and Mass Transfer, John Wiley

ZZ301Z: Environmental Studies 3-0-0-0-3

PM313T: Machining Science & Machine Tools 3-1-0-0-3
Mechanics of machining, orthogonal and oblique cutting, tool wear and tool life, machinability, economics of machining, tool geometry and nomenclature, grinding wheels, basic concepts of machine tools, kinematics, machine tool drives, machine tool dynamics, gear manufacture, hydraulic control of machine tools, testing of machine tools, unconventional machining processes and mechanics, design of jigs and fixtures.

References:
6. HMT, Production Technology – Tata Mcgraw Hill.
15. Donaldson, Lecain & Goold; Tool design, Tata McGraw Hill.

PM357L: Metrology & Instrumentation Lab 0-0-0-3-1
Study and use of various measuring instruments and gauges, Measurement System Analysis, Measurement of thread parameters, Tools angles, Gear parameters, etc. Calibration experiments with pressure gauge, load cell, thermocouple, stroboscope, LVDT, etc. and uncertainty analysis. Limits and fits, Surface finish measurements, Evaluation of straightness and other form measurements, Measurements with Coordinate Measuring Machines.

PM358L: Production Engg. Lab II 0-0-0-3-1
Exercises:
Shaping and slotting Exercises -Flat and bevel surfaces, grooves, Slots, guide ways, key ways etc.
Exercises in horizontal and -surface, slot, key way and gear milling-Vertical milling machine
Turning Exercises-Limits and Fits
Grinding Exercises
Non – traditional Machining
NC/CNC Machining.
References:
1. HMT, Production Technology, Tata McGraw Hill.
2. ASTME, Tool Engineer’s Gandbook.
Electives

ME321T: Design for Manufacturability 3-1-0-0-3

Text Book:

References:

ME322T: Unconventional Energy Systems 3-1-0-0-3

References:

ME323T: Fluid Machinery 3-1-0-0-3

References
ME324T: Introduction to Finite Element Methods 3-1-0-0-3

Text Books:

References:

ME326T: Marketing Concepts 3-1-0-0-3

Text Books:

References:

ME 327T: Management Information Systems 3-1-0-0-3

References:
SIXTH SEMESTER

ME312T: Dynamics of Machinery  3-1-0-0-3
Kinematics and Kinetics of rigid body – Euler equations of motion – Euler angles
gyroscope - Introduction to Lagrangian dynamics – work and energy principle of virtual
work – D’Alembert’s principle – generalised coordinates – Lagrange’s equation of
motion – Introduction to calculus of variations – Hamilton’s principle – force analysis –
balancing – introduction to vibration.

Text Books:

References:
McGraw Hill.
Hill.

ME352T: Gas Dynamics  3-1-0-0-3
Basic equations of fluid flow, Use of integral and differential formulation, Derivation of
Navier Stokes equations, Equations for compressible, one-dimensional duct flows, one
dimensional isentropic flows, Flow with normal and oblique shocks, Fanno flows,
Rayleigh flows, generalized one dimensional flow, analysis of diffusers.

References:
2. Shapiro., A.H., Dynamics & Thermodynamics of Compressible fluid flow,
Ronald Press.

ME353T: Thermal Engineering I  3-1-0-0-3
Gaspower cycles including Miller & Stirling cycles, part throttle & super changed cycles-
Engine systems including MPFI and stratified charge engines-Thermo chemistry &
alternate fuels-Normal & Abnormal combustion in IC Engines - Octane & Cetane
Numbers-Engine Performance-Engine emissions & control - catalytic converter & EGR-
Gas turbine cycles including jet-propulsion cycles - combustion chambers -centrifugal &
axial flow compressors.

Text Books:
1. Yunus A. Cengel & Michael A. Boles, Thermodynamics – an engineering
2. Willard W. Pulkrabek, Engineering Fundamentals of Internal combustion Engines
(University of Wisconsin) Prentice Hall of India Pvt.Ltd., New Delhi
London.
4. L. Mathur & R. P. Sharma, Internal combustion Engines, Dhanpat Rai
Publications (P) Ltd., Madras.
**ME361T: Fundamentals of Control System Engineering**


**Text Book:**


**References**


**ME362T: CAD/CAM**

Introduction to computer graphics, 2D and 3D transformations, CAD/CAM hardware and software, CAD/CAM data exchange and integration, CNC machine tools, constructional features, drives and controls, CNC manual part programming and computer assisted programming, computer integrated manufacturing systems, computer aided inspection, group technology, flexible manufacturing systems, industrial robotics and machine vision, rapid prototyping, design for manufacturability, process planning and concurrent engineering, lean production and agile manufacturing.

**References**


ME381L: Thermal Engineering Laboratory  
Constant Speed Characteristics of Petrol and Diesel engines- Determination of Friction Power at any given speed and load by William’s Line, Morse Test, Retardation Test and Motoring Test.-Variable Speed Characteristics of Petrol and Diesel engines- Heat Balance in constant speed and variable speed conditions- Determination of Valve-timing Diagrams of high speed and low speed engines- Determination of the Higher and Lower Calorific Values of solid, liquid and gaseous fuels- Determination of Flash Point, Fire Point, Viscosity & Pour Point of different lubricants- Constant Speed characteristics of blowers and compressors (reciprocating and rotary ).

ME398P: Mini Project/ Industrial Training  
Students may undertake short research projects under the direction of members of the faculty, normally 3 hrs/week. A written, detailed report describing the project and results is required. Students are expected to undertake fabrication work of new experimental set up/devices or develop software packages for the various laboratories in the department.

Students may opt to undertake with help from the Department of Training and Placement, Internship in the field of Mechanical Engineering by undergoing in-plant training of at least one-month duration in reputed industries/research centers in the country. The industrial training is expected to be undertaken during the semester recess. The student writes a final report on this training and makes an oral presentation before an evaluation committee.

Electives

ME371T: Fluid Power Control  

References:
8. Khaimovitch., Hydraulic & pneumatic control of machine tools

**PM374T: Quality Engineering and Management**

3-1-0-0-3

(Prerequisite: Basic Probability and Statistics)


**Text Book:**


**References:**


**PM375T: Work System Design**

3-1-0-0-3

Definition and scope of work design and measurement-Work Design and Methods Study - Principles of motion economy; Work Measurement, Establishment and maintenance of time standards, Allowances and Performance rating; Precision time measurement, Pre-determined fundamental motion time standards, Work sampling; Work Study in Office.
Ergonomics: Nature of man-machine systems and characteristics; Information input and processing – sources and pathways of stimuli - Human information processing; Visual displays – Quantitative and qualitative displays, General guidelines in design of visual displays; Auditory and tactu al displays; Speech communication; Bases of human motor activity, Human control of systems, Compatibility, Influence of display factors and control factors on system control.

**Text Books:**


**References:**


**PM376T: Technology Management**


**Text Book:**


**References:**


**ME377T: Theory of Metal Forming**


**References:**

SEVENTH SEMESTER

PM351T: Operations Research 3-1-0-0-3

Text Books:

References:

ME401D: Machine Design 4-0-0-0-4
Steps in design process; selection of materials; design for static , impact and fatigue loading; threaded fasteners; design of welded joints, springs, clutches & brakes and belt & chain drives; design of shafts and keys; design of spur, helical, bevel and worm gears; lubrication and bearing design; selection of rolling contact bearings.

Text Book:

References:
1. Siegel, Maleev & Hartman., Mechanical Design of Machines – International Book Company

Data Handbooks (allowed for reference during examinations also):

ME441L: Heat Transfer Laboratory 0-0-0-3-1
Introduction to fundamentals of heat transfer – condensation and boiling, heat exchangers and experimental techniques in thermal sciences.

References:
PM442L: CAD/CAM Lab


References:

ME444P: Project

Students are required to enroll in this course to complete the degree requirements. The project work commenced in VII Semester shall be continued in VIII Semester, normally 3 hours/week. At the end of seventh semester, a mid term evaluation will be conducted by a project evaluation committee.

Electives

ME421T: Mechanical Behaviour & Testing of Materials

Text Book:

References:

ME422T: Computational Methods in Fluid Flow and Heat Transfer  3-1-0-0-3

References:

ME423T: Automobile Engineering  3-1-0-0-3

References:
3. William Crouse, Automotive engines.
4. A. W. Judge, Motor manual (four volumes).
5. William Crouse, Automotive fuel, lubricating & cooling systems.
7. William Crouse, Automotive electrical equipments.

ME424T: Industrial Tribology  3-1-0-0-3
Navier-Stroke’s equation; Reynolds equations; Idealized hydrodynamic bearings; finite bearings; Hydrodynamic instability; Externally pressurized and gas lubricated bearings;
surface topography; theories of friction; Wear of materials; Measurement of friction and wear.

References:
1. B.C. Majumdar, Introduction to Tribology, A.H. Wheeler, Bangalore.
5. K. L. Johnson, Contact Mechanics, Cambridge University Press.

PM425T: Supply Chain Management 3-1-0-0-3
Evolution of Supply Chain Management (SCM) from logistics management - Decision phases in a supply chain - Achieving strategic fit - Supply chain drivers and obstacles - Information technology and SCM - Enterprise resource planning systems and SCM - Role of purchasing in SCM - Sources of supply - Outsourcing and Make or Buy decisions - General procurement procedures - Managing inventories in a supply chain - Inventory models with constraints - Managing uncertainty in a supply chain using safety inventory - Determining appropriate level of safety inventory - Transportation in a supply chain - Design options for a transportation network - Routing and scheduling in transportation - Facility decisions - Models for facility location and capacity allocation.

Text Books:

References:

PM426T: Cost Analysis & Control 3-1-0-0-3

Text Book:

References:

ME427T: Aerodynamics 3-1-0-0-3
Potential theory, conformal transformation, Blassius theorem, Kutta theorem, Joukowski transformation, Aerofoil, thin aerofoil theory, finite wing theory.

References:

ME429T: Heating Ventilation & Air Conditioning 3-1-0-0-3

References:
1. Stoecker, Refrigeration & Air conditioning.
2. Dossat, Refrigeration & Air conditioning.
5. Noman Harris, Modern Air conditioning Practice.

ME430T: Computer Graphics 3-1-0-0-3
Aim: Give an introduction and overall idea about computer graphics- Procedural elements of computer graphics- overview of graphics devices, Line and circle drawing algorithms, hidden line removal algorithms, etc. - Mathematical elements of Computer Graphics – Viewing - transformations, Mathematical modeling of curves and surfaces.

Text Books:

References:
PM432T: Organisation Behavior

Text Book:

References:

PM433T: Consumer Behavior
Consumer – diversity in market place – market segmentation – ethics in marketing – consumer as individuals – consumer as decision makers – consumers in the social and cultural settings.

Text Book:

References:
EIGHTH SEMESTER

ME451T: Thermal Engineering–II 3-1-0-0-3
Properties of steam and steam–air mixtures – steam tables, mollier chart and psychrometric chart– solution of problems with the above charts including those on evaporative cooling and wet cooling towers- Vapour & Combined Power Cycles and Co-generation- Steam generators – Combustion equipments including Fluidized-bed Combustion chambers-Steam nozzles, turbines and condensers, Power Plant Economics and environmental aspects of thermal power systems.

References:
1. Yunus A. Cengel & Michael A. Boles, Thermodynamics an engineering approach.
4. Rajput, Thermal Engineering.

ME352T: Operations Management 3-1-0-0-3

Text Books:

SH341T: Industrial Economics 3-1-0-0-3

Some concepts - standard forms of Market structure - The concept of workable competition. The conceptual frame work of the study of Industrial Economics. Market strategies and innovation. The process of innovation, concepts and Relationships, Measurement of innovation activities - The Theory of technological innovation.

ME 22
Diffusion of New Technology.

References:
2. W. Stewart, Industrial Economics: An applied approach (Macmillan)
5. Sharad S. Martha, Regulation and development: India's experience.
7. P.J. Devons et.al., An introduction to Industrial Economics. (Allen and Wlwin.)

ME443S: Seminar 0-0-0-3-1
Each student shall prepare a technical paper and make a 20 – 30 minute oral presentation on a current research topic relevant to mechanical engineering to the rest of the class, after scrutiny and approval of the faculty- in charge of seminar. The oral presentation and a final technical report (in the format of an ASME journal paper of not less than 12 pages) are evaluated by faculty members in charge of seminar. Appropriate weights may be given for communications skills (both verbal and written) as well as for capacity to impress the audience and ability to handle question & answer (Q&A) sessions.

ME461P: Project 0-0-0-6-5
Students are required to enroll in this course to complete the degree requirements. The project work commenced in VII Semester shall be continued in VIII Semester, normally 3 hours/week. At the end of the semester, a thesis written in an acceptable style describing an original research project, and a successful oral defense of the thesis topic before a project evaluation committee are required.

Electives
ME471T: Powder Metallurgy 3-1-0-0-3
Powder Metallurgy Process, Secondary operations, Powder production techniques; Powder properties and their characteristics, Particle size distribution, Types of distribution function, sieve analysis, Microscopy, Sedimentation analysis; Specific surface and other technological properties; Powder conditioning; compaction, Pressing equipments and tooling; Powder Injection Moulding, extrusion and rolling, Hot compaction, Hot Iso-static Pressing (HIP), equipments, tooling and applications; Explosive compaction; slip casting; sintering, single component, Sintering diagrams and sintering anomalies, Multi-component sintering-solid phase and liquid phase, infiltration and reaction sintering; Sintering atmospheres and equipments; Production routes in practice; Products of PM.

Text Book:
References:

ME472T: Refrigeration & Air – Conditioning Systems 3-1-0-0-3

Text Books:
2. Norman Harris, Modern Air Conditioning Practice, McGraw Hill.

References:
1. Dossat, Refrigeration & Air conditioning
3. Arora, Refrigeration & Air Conditioning, Tata McGraw Hill

PM474T: Manufacturing Planning and Control 3-1-0-0-3

Text Books:

References:

PM475T: Accounting & Finance for Engineers 3-1-0-0-3
Text Books:

References:

ME478T: Introduction to Robotics

Manipulator Kinematics: Introduction to robotics, classification of robots, workspace analysis, Convention for affixing frames to links-DH Representation, Derivation of Direct kinematic equations for various types of robots.

Inverse Manipulator Kinematics: Solvability, algebraic vs. geometric, Pipers solution when three axes intersect, Examples of inverse manipulator kinematics, repeatability and accuracy.

Jacobiens: Velocities and static forces: Linear and rotational velocity of rigid bodies, velocity propagation from link to link, jacobiens, singularities, static forces in manipulators, jacobiens in force domain, Cartesian transformation of velocities and static forces.

Trajectory Generation: General consideration in path description and generation, joint space schemes, collision free path planning, Robot programming.

Sensing and vision - range sensors, proximity sensors, touch sensors, force and torque sensors - Low level and high-level vision. Robot intelligence and task planning.

References:

PM479T: Discrete Event System Simulation


Text Book:

References:
ME481T: Human Resource Management


References: