COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	ADVANCED MATHEMATICS	MA-102	Min "D"	Min "D"	5.0

ADVANCED MATHEMATICS

UNIT – I :

Vector space, linearly dependent and independent vectors. Linear transformation. Hermite polynomial properties of fourier transformation, DPT,WFT, Heavsites unit function.

UNIT – II :

Solution of Partial Differential Equation (PDE) by separation of variable method, one dimensional heat wave equation. numerical solution of PDE (Laplace, Posisson's, Parabolic) using finite difference methods.

UNIT – III :

Probability , compound and probability, discrete random variable. Binomial Normal and Poisson's distribution, Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.

UNIT – IV :

Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Application of Eigen value problems in Markov Process, Markov chain. Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M1: Infinity/FC FS),1:N/Infinity/FC FS), / M/S : Infinity / Infinity/ FCFS)

UNIT – V : FEM:

Variational functional,Euler Lagrange's equation, Variational forms, Ritzmethod, Galerkin's method, descretization, finite element method for one dimensional problems.

References:

1. Higher Engineering Mathematics by B.V.Ramana,Tata Mc Hill.
2. Advance Engineering Mathematics by Ervin Kreszig,Wiley Easten Edd.
3. Applied Numerical Methods with MATLAB Steven C Chapra TMH
4. Introductory Methods of Numerical Analysis by S.S.Shastry,
5. Introduction of Numerical Analysis by Forberg
6. Numerical Solution of Differential Equation by M.K.Jain
7. Numerical Mathematical Analysis by James B.Scraborogh
8. Fourier Transforms by J.N.Sheddon
9. Advance Mathematics for Engr and Sc,Spiegel,Schaum Series,TMH

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	THEORY OF ELASTICITY AND PLASTICITY	ME-107	Min "D"	Min "D"	5.0

THEORY OF ELASTICITY AND PLASTICITY

UNIT – I : UNSYMMETRICAL BENDING :

Product of inertia, transfer equation, transformation of coordinate axis. Principal moment of inertia. Bending stresses due to unsymmetrical bending of beams of symmetrical and unsymmetrical sections. Location of neutral axis, deflection of beams subjected to unsymmetrical bending.

UNIT – II : SHEAR CENTRE :

Location of shear centre for the symmetrical sections such as channel round and I sections. Shear centre for unsymmetrical sections such as unequal angle, Z, and channel sections.

UNIT – III : CURVED BEAMS :

Bending stresses in beams having initial curvature. Location of neutral axis in beams having rectangular, Circular, triangular, trapezoidal, I and T section. Variations of bending moment, normal and shear forces in curved beams. Crane hooks and chain links. Thin rings.

UNIT – IV : ELEMENTS OF THEORY OF ELASTICITY :

Stress components, strain components, equilibrium equations, Generalised Hooke's Law, compatibility equations, and stress function equations in Cartesian and Polar Coordinate. Plane stress and plane strain problems : Saint Venant's principle, use of polynomials. Applications to various cases such as pure bending of narrow beams, bending of prismatic bars, thick cylinders, rotating discs, rotating discs of variable thickness, rotating cylinders, stress concentration due to a small hole in strained plate.

UNIT – V : ELEMENTS OF THEORY OF PLASTICITY :

Basic laws of plastic flow, criterion of yield under complex stress. The Von-Mises yield coulomb criterion. The Tresca and yield criteria. Rule for plastic flow, condition of plane strain, basic equations for plane strain plasticity. Mohr's circle and physical plane.

References :

1. Mechanics of Material by K.Kumar and Ghai
2. Strgngth of Material by Sandu Singh

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	MATERIAL SCIENCE	ME-108	Min "D"	Min "D"	5.0

MATERIAL SCIENCE

UNIT – I : CRYSTAL STRUCTURE OF METALS:

General review of crystal structure of metals, Molecular structure, crystallographic notation of atomic planes, imperfections in crystals, surface imperfections.

UNIT – II : ELECTRON THEORY OF METALS:

Electron and Bonding, Bonds in crystals and their effect on the properties of Metals. Electron structure of atoms, Conductors and Insulators and Semi-conductors.

UNIT – III : DEFORMATION OF METALS:

Dislocation and slip phenomenon, work-hardening and re-crystallization. Elastic deformation of metals, atomic basis of elastic behavior- Plastic deformation of Metals, grain boundary, strain hardening, strain aging, strain rate.

UNIT – IV : ANELASTICITY :

Thermoelastic effect, relaxation time, measurement of damping capacity, creep phenomenon. Hot and cold working of metals Theories of fracture. Fatigue limit and its significance. Theory of radiation. Heat treatment of metals

UNIT – V : CERAMICS AND GLASS :

Composition, crystal structure, effect of structure on properties, fabrication of ceramic bodies, reinforced structure.

UNIT – VI : POLYMERS :

Types, response to change in temperature. Elasticity.

References :

1. The structure and properties of metals-Vol.I,II,III,IV.Wolf Series.
2. Elements of materials science by Van Vlack.
3. Physical Metallurgy Principles by Reed Hill
4. Engineering Material Science by Cidiric W.Richards.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	FLUID FILM LUBRICATION	ME-109	Min "D"	Min "D"	5.0

FLUID FILM LUBRICATION

UNIT – I : INTRODUCTION :

Classification of Bearings, Basic theory of hydrodynamic lubrication, Derivation of generalized Reynolds equations from continuity and momentum equation.

UNIT – II : HYDRODYNAMIC JOURNAL BEARING :

Solution of bearing. Reynold equation for (i) Infinite slider bearing, (ii) Rayliegh step journal bearing, (iii) Infinitely long full journal bearing. Boundary conditions – Full Sommerfeld conditions, Half Sommerfeld conditions, Reynolds condition, static performance characteristics of journal bearings-Friction forces, Load carrying capacity, Attitude angle, Eccentricity, Sommerfeld number, oil flow, thermal Equilibrium Extent of fluid film and pressure distribution, Kingsbury analogy.

UNIT – III : HYDROSTATIC JOURNAL BEARINGS :

Introduction, Theoretical Analysis, Boundary conditions, Static performance characteristics Load, friction coefficient parameter, oil-flow, temperature parameter.

UNIT – IV : NON-CIRCULAR JOURNAL BEARINGS :

Introduction, geometry of different types of non-circular bearings, boundary conditions, behavior of non circular bearings.

UNIT – V : GAS BEARINGS :

Introduction, difference between gas and oil bearings, static characteristics of gas bearings, Equations governing the behavior of gas bearings.

UNIT – VI : NUMERICAL METHODS FOR SOLUTION OF FLUID FILM EQUATIONS FOR BEARINGS (INTRODUCTION ONLY) :

Collection method, least square method, orthogonality Method, Galerkein's method, Ritz method, finite element method, finite difference method.

UNIT – VII : ROLLING ELEMENT BEARINGS :

Characteristics and application of rolling element bearings, classification of bearings, Life prediction, friction lubrication, bearing temperature, high speed consideration.

References :

1. Machine Design by Black
2. Tribology

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	COMPUTER AIDED DESIGN AND DRAFTING	ME-110	Min "D"	Min "D"	5.0

COMPUTER AIDED DESIGN AND DRAFTING

UNIT- I

Fundamentals of CAD, Automation and CAD, Product Cycle and CAD, Introduction of Computer Hardwares, Design of Work station, Graphics terminal Operator input and output devices, CPU and secondary Storage. Introduction to computer software and their applications.

UNIT- II

Curve Fitting:-Regression Analysis: - Introduction, Linear Regression, Polynomials regression, Fitting exponential and trigonometric function (accompanied by their Computer Programs in C^{++} **Interpolation:** Newton's divided difference interpolation, Polynomials, Lagranges interpolation, Spline.

UINIT- III

Introduction of Optimization and its Applications :- Statement of an optimization problem, Classification of optimization problems, Single Variable Optimisation, Multivariable optimization with no constraints, Multivariable optimization with inequality constraints One dimensonal minimization method Elimination methods (Unrestricted Search), Exhaustive search (Fibonacci method)

UINIT- IV

Computer Graphics : Algorithm For Generation Of Simple Drawing Elements Such as Line, Circle, etc. Computer Aided Drafting:(Auto CAD)-Creating Drawing: Various Drawing Commands: Line Plane, Ellipse, Circle, Arc, Hatch, Text, Dimensions, Limits, Scale, Grid, Layers, Fill, Snap, Trace. Editing Drawing: Various Editing Commands: Move, Erase Copy Zoom Pan, View, Chamfer, Fillet, Break, Explode Extend, Trim, Help, Rotate, Mirror,Other Utilities: Block, Array, Save, Quit, Plot . Advance Features Of Auto CAD: UCS, 3D object, DXF,DXB.

References :

1. CAD/CAM by Groovers and Zimmer.
2. Optimization and its applications by S.S.Rao.
3. Mastering Auto CAD by Raker
4. Numericals analysis by Shanta Kumar
5. Computer Graphics by D.Hearn and N.P. Baker

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	COMPUTER AIDED DESIGN AND DRAFTING LAB	ME-111L	Min "D"	Min "D"	5.0

The exercises in this component shall be designed to demonstrate the basic principles outlined in different units of the theory paper. After completing the exercises the student should have developed a good grasp of the practical utilities of the theory content.

List of Experiments:

1. Introduction to Compute Aided Drafting software for 2D and 3D Modeling

2. Computer Aided Drafting of simple machine parts

3. 3D Modeling of simple solid shapes

4. Design and drawing of parts contained in the syllabus

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	SOLID MODELLING LAB	ME-112L	Min "D"	Min "D"	5.0

The exercises in this component shall be designed to demonstrate the basic principles outlined in different units of the theory paper. After completing the exercises the student should have developed a good grasp of the practical utilities of the theory content.