



**INSTITUTE OF TECHNOLOGY
GURU GHASIDAS VISHWAVIDHALAYA**

(A CENTRAL UNIVERSITY ESTABLISHED BY THE CENTRAL UNIVERSITY ORDINANCE 2009, NO: 3 OF 2009)

**DEPARTMENT OF MECHANICAL ENGINEERING
STUDY & EVALUATION SCHEME
W.E.F. SESSION 2010-2011**

**Year: B.Tech. II year
Semester: IV**

S No.	Course No.	SUBJECT	PERIODS			EVALUATION SCHEME			Credits
			L	T	P	INTERNAL ASSESSMENT*	ESE	SUB TOTAL	
(THEORY)									
1.	ME- 241	Fluid Mechanics	4	0	-	40	60	100	4
2.	ME- 242	Manufacturing Science	4	0	-	40	60	100	4
3.	ME- 243	Electrical Machine	4	0	-	40	60	100	4
4.	ME- 244	Machine Drawing	3	1	-	40	60	100	4
5.	ME -245	Numerical Analysis & Computer Programming	3	1	-	40	60	100	4
Total			18	02		200	300	500	20

(PRACATICALS)									
6.	ME- 246	Fluid Mechanics	-	-	6	45	30	75	3
7.	ME- 247	Electrical Machine	-	-	6	45	30	75	3
Total					12	90	60	150	06

Total Credits: 26

Total Contact Hour: 32

Total Marks: 650

***INTERNAL ASSESSMENT-(MSE- Mid Semester Examination of 20 Marks, Two Class Test/Assignment/Quizzes/Group Discussion etc.)**

L-LECTURE, T-TUTORIAL, P-PRACTICAL,CT-CLASS TEST, E.S.E –END SEMESTER EXAMINATION.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-IV Sem	ME-241	FLUID MECHANICS	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

ME-241 FLUID MECHANICS

UNIT – I Properties of Fluid: Fluid ideal and real fluid, properties of fluid, mass density, weight density, specific volume, specific gravity, viscosity, surface tension, capillarity, vapour pressure, compressibility and bulk modules, Newtonian and non-Newtonian fluids.

Fluid Statics: Pressure, Pascal’s law, Hydrostatic law, Pressure measurement, Hydrostatic force on submerged surface and curved surface, law of buoyancy and flotation.

UNIT – II Fluid Kinematics

Description of fluid motion, Lagrangian and Eulerian approach, types of fluid flow, types of flow lines-path line, streak line, stream line, stream tube acceleration of a fluid particle, rotational flow, rotation and vorticity, circulation, velocity function, stream and potential function, flow net, its characteristics and utilities. Control volume and surface concept.

UNIT – III Fluid Dynamics

Conservation of Mass: Continuity equation, conservation of momentum, momentum theorem, Euler’s equation, Bernoulli’s equation and its practical application, Venturimeter, Orifice meter, Nozzle, Pitot tube, Rotameter, notches and weirs.

UNIT – IV

Turbulence: basics of Turbulance, Reynolds stresses, Prandtt’s mixing length hypothesis, friction velocity, laws of walls.

Dimensional Analysis and Similitude: methods of dimensional analysis, Rayleigh’s method, Buckingham’s theorem, dimensional number and their significance, concept and types of physical similarity, dynamic similarity, applications of dynamic similarity.

UNIT – V Viscous Flow

Flow through circular pipes, flow between two parallel plates, loss of head due to friction in viscous flow. Kinetic energy corrections & momentum correction factors.

Flow Through pipe: major & minor loss in pipe, Hydraulic gradient and total energy line, pipe in series and parallel, equivalent pipe, power transmission through pipe, water hammer in pipes.

Text Books:

1. Streeter & Wylis, Fluid Mechanics
2. S.K. Som, C.Biswas, Fluid Mechanics & Machines
3. V.L.Shames, Fluid Mechanics.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-IV Sem	ME-242	MANUFACTURING SCIENCE	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

ME-242 MANUFACTURING SCIENCE

UNIT-I

Casting: Classification of casting process, basic principle, patterns & its materials, pattern allowances, Green and dry sand mould and design considerations. Cores & its use, casting defects & remedies.

Melting Furnaces and practices: Cupola, charge calculation, opens furnaces, converter and crucible furnaces, direct arc furnace, induction furnace.

UNIT-II

Welding: Principle of Gas and electric arc welding, soldering, brazing and adhesive bonding, arc welding, power sources and consumables. TIG & MIG processes and their parameter selection, electrodes, types & coatings, welding defects and remedies.

Resistance welding: principle, equipments & types.

Newer Welding Process: Laser Beam Welding, Electron Beam Welding & their parameter.

Solid State Welding: Friction, Diffusion, Explosion welding, their process, merit & demerit.

UNIT-III

Forming: mechanism of forming process, elastic and plastic deformation.

Rolling: classification, theories of Hot & Cold rolling, rolling mills & its types, calculation of rolling parameter & rolling defect.

Forging: classification of forging process, forging equipments, calculation of forging parameters, forging defects.

UNIT-IV

Extrusion: types, extrusion equipments & analysis of processes, drawing of rods, wire & tube-analyses of wire drawing, tube drawing, defects in extrusion & drawing.

Plastic processing, injection, compression & blow moulding, plastic design principles processes, machines and equipments, parameters and force calculations.

UNIT-V

Sheet-metal working: Role of sheet Metal Components, cutting mechanism, description of cutting processes blanking, piercing, description of forming processes like bending cup drawing, coining embossing, basic elements of press, classification, punch and die clearances, die elements, material selection.

Text Books:

1. Rao, P.N., “Manufacturing Technology”, Tata McGraw Hill, N. Delhi.
2. Kalpakjian, “Manufacturing Engineering And technology” Addison Wesley
3. Chapman, WAJ, “Workshop Technology”, 5th edition, Viva books Private Limited, New Delhi
4. Manufacturing Technology BY M.P. Grover

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-IV Sem	ME-243	ELECTRICAL MACHINES	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

ME-243 ELECTRICAL MACHINES**UNIT-I**

Fundamental concept of electrical machines: Elementary synchronous machines, relation between Electrical & Mechanical angle, deduction of synchronous frequency, elementary 2-pole D.C. machine, generated. M.f. due to short pitched distributed winding, rotating magnetic field, Torque equation of A.C. machines.

UNIT-II

D.C. Machine: Construction details of D.C. motors, E.m.f. and torque equation, types of Excitation method of D.C. motors and correspondence Torque-speed characteristics, speed control of motors, Braking, Tests.

UNIT-III

Introduction Motors: Construction feature of motor, equivalent circuit analysis, Torque-slip-characteristics, starting methods of induction motor, speed-control, Tests.

UNIT-IV

Synchronous Machine: Construction details of alternator, analysis of equipment circuit, operating characteristics of alternatives.

1. Phase Machine, cross-field theory, Torque-slip characteristics, single-phase two winding motor, split, phase motor.

UNIT-V Drives: Speed torque characteristics of industrial equipment, joint speed-torque characteristics, stability of drives, force and torque acting in electric drives, acceleration and deceleration time, motor power rating selection and load diagram, Duty Cycles.

Text Books:

1. Cotton., “Electrical Technology”
2. Kothari and Nagrath, “ Electrical Machines”
3. P.S. Bhimra, Electrical Machine, Khanna Publication.
4. J.B.Gupta, Theory & Performance of Electric Machines, S.K. Kataria & Sons Publications.
5. Ashfaq hussain, Electric Machine, Dhanpat Rai & Company.

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-IV Sem	ME-244	MACHINE DRAWING	3	1	-	4	Max Marks-60 Min Marks- Duration-4Hrs

ME-244 MACHINE DRAWING

UNIT-I

Machining symbol, surface roughness grades, materials symbols, welding joints & symbols, screw threads & screw fastening, different types of thread profile & nuts, bolts, rivet & riveted joints, laps & butt, joint with single & double straps.

UNIT-II

Sectional views: keys, cotter joints, knuckle joints, shaft coupling, flanged coupling, different types of shaft coupling, shaft bearing, bushed bearing, plumber block, foot step bearing.

Pulleys: fast & loose pulleys, stepped pulley's belt pulley, rope pulley.

Spur gearing, drawing of teeth profile of spur gear, rake & pinion, gear in mesh, cycloidal tooth profile.

UNIT-III

Assembly drawing of Engine parts like piston, stuffing box, cross-heads, eccentrics, connecting rod: Assembly drawing of stop valve, feed check valve, safety valve, blow off cock.

Assembly drawing of lathe tail stock post.

Text Books and References Books:

1. Bhatt.N.D. Machine Drawing
2. Gill.P.C. Machine Drawing
3. Dhawan RK. Machine Drawing

Category of Course	Course Code	Course Title	Periods/Week				Theory Paper
			L	T	P	C	
Mechanical Engg. B. TECH-IV Sem	ME-245	NUMERICAL ANALYSIS & COMPUTER PROGRAMMING	3	1	-	4	Max Marks-60 Min Marks- Duration-3Hrs

ME-245 NUMERICAL ANALYSIS & COMPUTER PROGRAMMING

UNIT-I Approximation and errors in Computation

Approximation and round of errors, truncation errors and Taylor series, Determination of roots of polynomials and transcendental equations by Graphical methods and Bisection, Regula-falsi, secant and Newton-Raphon methods, solution of Linear simultaneous, linear algebraic equations by gauss Elimination Gauss-Jordan and Gauss-Siedel iteration method.

UNIT-II Empirical Laws, Curve Fitting & Interpolation

Curve fitting linear and non-linear regression analysis (Method of group average and least squares) finite differences, backward, forward and central difference relation and their use in Numerical differentiation and integration and their application in interpolation.

UNIT-III Numerical Solution of Ordinary Differential Equations

Numerical Integration by Trapezoidal rule, Simpson's ($1/3^{\text{rd}}$ & $3/8^{\text{th}}$) rule and its error estimation. Application of difference relations in the solution of partial differential equations. Numerical solution of ordinary differential equations by Taylor's series, Euler, modified Euler, Runge-Kutta and Predictor-Corrector method.

UNIT-IV Numerical Solutions of partial differential Equations

Introduction, classification of second order equations, finite difference approximations to partial derivatives, elliptic equations, solution of Laplace equation, solution by Poisson's equation, solution of elliptic equations by relaxation method, parabolic equations, solution of one-dimensional heat equation, solution of two-dimensional heat equation, Hyperbolic equations, solution of wave equation.

UNIT-V Computer Programming

I/O Statement, Mathematical Relational & Conditional statement & Expressions. Switch Loops and Control Statement. Introduction to one dimensional array and two dimensional arrays. Basic of I/O file Handling.

Text Books:

1. Numerical Methods in Engineering & Science-Dr. B.S.Grewal-Khanna Publishers, 6th Edn.2004.
2. Numerical Methods-P.Kandasamy,K.Thilagavathy & K. Gunavathy-S Chand & Co.,2nd Rev. Edn.-2003
3. Let us C-Yashwant kanitkar
4. Introductory Methods of Numerical Analysis-S.S.Sastry,3rd Edn.-PHI-New Delhi,2003
5. Numerical Methods Analysis-James B.Scarborough, 6th Edn. Oxford & IBH Publishing Co.-New Delhi.
6. Theory & Problem in Numerical Methods-T Veerarajan,T. Ramchandran-TMH,New Delhi,2004
7. Numerical Methods for Engineers-Sтивен C. Chapra,Raymond P. Canale,4th Edn.,TMH,New Delhi,2004
8. The Spirit of C-Henry Mullish & Herbert L.Cooper-Jaico Pub. House.