SHRI G. S. INSTITUTE OF TECHNOLOGY AND SCIENCE

Department of Industrial and Production Engineering

B. TECH IPE II Year (4YDC)

IP-23011: MANUFACTURING PROCESSES - I

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
						THEORY		PRACTICAL		TOTAL MARKS
T	P	Tu	T	P	Tu	CW	END SEM	SW	END SEM	
04	02	00	03	01	-	30	70	40	60	200

PRE- REQUISITES: NA

COURSE OUTCOMES:

Upon successful completion of course, Students should be able to:

1. Have knowledge of different joining processes used in engineering applications
2. Have understanding of different casting processes and their applications
3. Have knowledge of different forming processes and force analysis of metal forming processes
4. Get insight about plastic technology related to manufacturing of plastic products.

COURSE CONTENTS

UNIT 1 Welding: Classification of the process, Electric arc welding - Joint design, Welding symbols, Arc welding equipment, Characteristic curves, Welding parameters, Electrode classification, Types of metal transfer, Manual metal arc welding. Electrodes used and their nomenclature, TIG welding, MIG welding, Submerged Arc welding, Atomic hydrogen welding. Other Joining & Cutting Techniques: Resistance welding, Thermit welding, Electroslag welding, Electron beam welding and laser beam welding, brazing, Braze welding and soldering, Thermal cutting of metals, Defects in welds and weld distortion.

UNIT 2 Foundry : Types of patterns and selection of pattern materials, pattern allowances, Moulding and core sands, Moulding sands - their properties and ingredients, Core & mould making, Moulding machines, Fettling and cleaning of castings, Defects in casting.

UNIT 3 Special Casting Techniques: Gravity die or permanent mould casting, Pressure die casting, Centrifugal die casting, CO_2 moulding, Investment mould casting, Shell moulding, Plaster mould casting and continuous casting.

UNIT 4 Mechanical Working of Metals: Rolling - Principle, Rolling stand arrangement (Rolling mills).

Forging - Forging operations, Drop, Press and Machine forging, forging defects.

Extrusion - Principles, hot and cold extrusion processes, tube extrusion, wire, rod and tube drawing.

UNIT 5 Plastics: Composition of plastic materials, Moulding methods - Injection moulding, compression moulding, transfer moulding, extrusion moulding, Calendering, Blow moulding,

Laminating & Reinforcing, Welding of plastics

PRACTICALS

LIST OF PRACTICALS

1. To study CO_2 moulding process
2. To study shell moulding process
3. To prepare a corner joint as per given drawing by manual arc welding
4. To prepare MS square chisel as per given diagram
5. To prepare AV black pattern as per given diagram
6. To study MMA welding equipment

THEORY ASSESSMENT:

(1) End Semester Exam: 70% weightage,
(2) Continuous assessment: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage, regularity 16.5% weightage)

PRACTICAL ASSESSMENT

(1) Sessional: 40% Weightage (Continuous assessment of experiments and lab manual 50% weightage, final viva 25% weightage, regularity 25% weightage.)
(2) End semester practical viva: 60% weightage

TEXT BOOKS RECOMMENDED:

S.NO	BOOK	UNIT
1.	Rao P. N., Manufacturing Technology, McGraw Hill Publication	**1-5**
2.	Lindberg, Manufacturing Process., Allyn and Bacon Publication	**1-5**
3.	Campbell, Principles of Manufacturing materials & Process.	**1-5**

REFERENCES RECOMMENDED:

S.NO	BOOK	UNIT
1.	Parmar R. S., Welding Processes and Technology.	**1-5**
2.	Jain P. L., Principle of Foundry Technology	**1-5**

IP 23006: PRINCIPLES AND PRACTICE OF MANAGEMENT

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
04	00	00	03	00	-	CW	END SEM	SW	END SEM	100
						30	70	-	-	

PRE- REQUISITES: NA

COURSE OUTCOMES

This course is designed to enable students in their learning for the following:

1. To develop capability for evolving managerial thoughts
2. Ability to understand and comment on managers' expectations
3. Understanding practice and importance of leadership and motivation theories
4. Importance of employer-employee relations for business growth and awareness about need and practice of labour legislation

COURSE CONTENTS

UNIT-1 Introduction: Origin of management concept: Management functions, roles, and principles, Schools of Management Thought, Organization theory: its role and importance, Organization structures, Departmentation, Delegation of authority, Span of control, line and staff relationship.

UNIT-2 Personnel Management: Role and functions of personnel management, Organization of personnel dept., Personnel problems and their solution, welfare techniques, Management by Objectives (MBO), Benefits and Weaknesses of MBO.

UNIT-3 Manpower Selection and Development: Sources of recruitment, Selection methods, Interviewing and testing, Training methods, Performance appraisal and its methods. Motivation and Leadership: Need analysis, theories of motivation, Leader v/s Manager, Leadership theories.

UNIT-4 Control: Meaning, Process and Evaluations, Developing and compensating employees, Feedback & Feed forward System, Control Methods, Effective Communication.

UNIT-5 Employee Employer Relations and Labour Legislation: Employee - Employer relations, Industrial conflicts, conciliation, Arbitration, Adjudication, collective bargaining, strikes and lockouts, Grievances, Procedures, Trade Unions and their functions. Principle and practice of labour legislation.

THEORY ASSESSMENT

(1**) End Semester Exam**: 70% weightage,
(2**) Continuous assessment**: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage, regularity 16.5% weightage)

TEXT BOOKS RECOMMENDED:

S.NO	BOOK	UNIT
1	Koontz H. and O "Donnel H., *Essential of Management*, 8th ed., McGraw-Hill, New Delhi, 2009.	**1-5**
2	Robbins, S. *Fundamentals of Management*. 5th ed., Pearson Education, Canada, 2008.	**1-5**
3	Terry & Francklin, Principles of Management, Richard – Erwin.	**1-5**

REFERENCES RECOMMENDED:

S.NO	BOOK	UNIT
1	Terry & Francklin, Principles of Management, Richard – Erwin.	**1-5**

MA 23003: MATHEMATICS III

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
						THEORY		PRACTICAL		TOTAL MARKS
T	P	Tu	T	P	Tu	CW	END SEM	SW	END SEM	
04	00	01	04	00	–	30	70	-	-	100

PRE-REQUISITES: NA

COURSE OUTCOMES

Upon successful completion of this course the student should be able to:

1. Knowledge and practice of surface and volume integral calculus as well as physical significance and the practical applications of vector calculus
2. Ability to solve partial differential equations (PDE) as well as concept of separation of variable method and Laplace transformation for solving PDE
3. Ability to solve the problems related to Fourier series and Fourier Transformation as well as knowledge of various numerical methods for solving interpolation problems
4. Knowledge and practice for solving the problems related to Numerical differentiation and numerical integration as well as understanding of the fundamentals of statistics and various control charts.

COURSE CONTENTS:

UNIT 1 Advance Calculus: Jacobians, Taylor's and Maclaurin's series of two variables, Maxima and as Minima of functions of two variables, Lagrange' 3 method of undetermined multipliers and their applications, Elementary ideas of multiple integrals, Change of order of integration, and change of variables in double integrals using Jacobians, beta and gamma functions, Vector Calculus, Gauss Divergence Theorem, Stoke's Theorem.

UNIT 2. Fourier Series and Partial Differential Equations: Expansion of functions 111 a Fourier series, Half range series Sine and Cosine series and change of interval. Fourier Integral. Formation of partial differential equations, partial differential equations of first order and first degree 1..,e Pp + Qq== R, Kg .Linear homogeneous partial differential equation of nth order with constant coefficient, separation of ' variables, Application to Simple problems of vibrations of strings and beam and heat conduction é equation. .

UNIT 3 Laplace and Fourier Transforms: Definition of LT, LT of elementary and periodic functions, C properties of LT including LT of derivatives, Inverse Laplace Transform and its properties. g Convolution Theorem Application of LT to ordinary differential equations with constant and variable coefficients, Simultaneous differential equations Fourier transforms: sine and cosine transforms and their application to solution of linear PDE.

UNIT 4 Calculus of Finite Differences: Difference table, Operators E and A, Newton's forward and backward interpolation formula, Lagrange's interpolation formula, differentiation and integration, difference equations with constant coefficients.

UNIT 5 Statistics: Brief idea of sampling, ***t, F and x2*** distributions and their applications, ANOVA, Statistical Quality Control (SQC), Control Charts, Sampling inspection, Acceptance sampling, Producer's and Consumer's risk, OC. curve, Taguchi method. .

THEORY ASSESSEMENT

Students will be assessed as following theory Paper:

1. End Semester Exam: 70% Weightage,
2. Continuous assessment: 30% weightage (Two midterm tests: 67% weightage, assignment:16.5% weightage regularity 16. 5% weightage)

TEXT BOOKS RECOMMENDED:

S. NO.	BOOKS	UNIT
1	Ramana B V, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.	1-5
2	Jain, R.K and S K. lyengar, Advanced Engineering Mathematics, Narosa Publishing House, New-Delhi, 2006.	1-5
3	Ramesh Sircar, Statistical Techniques & Applications New Control Book Agency, Calcutta.	1-5

REFERENCE BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Erwin Kreyszig, Advanced Engineering Mathematics, 8th edition, John Willy and sons Publications 1999.	1-5
2	Balagurusamy E , Numerical Methods, Tata McGraw-Hill Publishing Company Ltd. ,New Delhi	1-5

ME 23008: MECHANICS OF SOLIDS

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
04	02	01	03	01	–	30	70	40	60	200

PRE-REQUISITES: NA

COURSE OUTCOMES

Having successfully completed the module the students will be able:

1. Fundamental knowledge about mechanics of materials and importance of elasticity constants in solid mechanics
2. Ability to calculate various stresses and strains in shafts and beams for given loading conditions along with ability to represent that in diagrammatic form
3. Ability to understand and calculate deflection and curvature of deflected beam by various methods
4. Ability to analyze the problems related to mechanics of materials using energy methods
5. Ability to apply the concepts of mechanics of materials to understand the behavior of thick and thin cylinders and column under different loading conditions.

COURSE CONTENTS

UNIT I Stress and Strain: Tension, compression and shear, Complementary shear stresses. Modulus Elasticity, Modulus of Rigidity, Bulk Modulus, Poisson's Ratio, Relations among the moduli, Stress due to temperature, statically indeterminate system, Shear stress in a Circular member due to Torsion.

UNIT 2 (a) Bending Moment and Shear Forces: Diagrams of Shear Forces and bending moment for cantilevers beams simply supported beams with or without over hanging ends. Relation between Loads and Shearing Forces and Bending Moments. **(b)** Bending Stress : Theory of Bending, bending and shearing Stress in beams and their distribution with varied load, modulus of section and modulus of rupture, beams of varying cross section, uniform strength. **(c)** Introduction to Composite Beams

UNIT 3 Stress on oblique section of a bar subjected to axial stress, Complex Stresses, Principal stress and strain, Mohr's Circle, Combined direct and bending stress

UNIT 4 (a) Deflection: Uniform Curvature, Relation between curvature and deflection, cantilevers and simply supported beams of varying cross-section, MaCauley's Method, Deflection due to Shear, Propped Beam (**b)**Parts subjected to column action with and without lateral loadings, Euler s theory of columns.

UNIT 5 (a) Elastic strain energy: Resilience, Proof Resilience. Materials under tension, Static, Sudden and Falling Loads, Strain Energy due to Direct Shear, and torsion, Castigliano's theorem. **(b)** Introduction to thin and thick cylinder

PRACTICAL

LIST OF PRACTICALS

1. To conduct impact test (Izod and Charpy test)
2. To conducting the cross shear test on the specimen
3. To conduct the tensile test on ductile material.
4. To conduct the torsion strength of the specimen
5. To find out deflection of beam under different conditions
6. To determine the critical buckling load with following supports and calculate the % error.
7. To conduct the fatigue test and determine the fatigue strength of the material.
8. To study Brinell Hardness test
9. To study Rockwell Hardness test.

THEORY ASSESSMENT

Students will be assessed as following theory Paper:

1. **End Semester Exam**: 70% Weightage,
2. **Continuous assessment**: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage regularity 16. 5% weightage)

PRACTICAL ASSESSMENT

(1) Sessional: 40% Weightage (Continuous assessment of experiments and lab manual 50% weightage, final viva 25% weightage, regularity 25% weightage.)

(2) End semester practical viva: 60% weightage

TEXT BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Popov, E P, Mechanics of solids, Prentice-Hall India	1-5
2	Ramamrutham, Mechanics of solids, Dhanpat Rai Publication, India	1-5

REFERENCE BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Beer and Johnson, Mechanics of Material, Tata McGraw Hill.	1-5

EI 23017: BASIC ELECTRONICS ENGINEERING

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
04	02	00	03	01	_	30	70	40	60	200

PRE- REQUISITES: NA

COURSE OUTCOMES:

1. Knowledge of different diode Characteristics and their applications as clippers, clampers, comparators, samplers, rectifiers & filters, voltage doublers, and peak detectors
2. Knowledge of photo transistors and transistors characteristics as well as their analytical expressions of characteristics and transistor rating
3. Understanding of transistors biasing and thermal stabilization along with thermal compensation and thermal runway
4. Knowledge of PET, JFET and MOSFET, and their characteristics and biasing as well as understanding of CS and CD amplifier and its design.

COURSE CONTENTS:

UNIT 1. Diode Characteristics: V-I characteristics & their temperature dependence, static & dynamic resistances, C7,. C9, switching times. Special diodes breakdown, photodiodes, LEDs. Introduction to BJT, FET,UJT & SCR. Diode Applications : Load Line concept, clippers, clampers, comparators, samplers, rectifiers & filters, voltage doublers, peak detectors.

UNIT 2. Transistors Characteristics: The junction transistor, BIT, current components, transistors as amplifier, CB, CE & CC configurations, static & dynamic transistors characteristics, analytical expression of characteristics, transistor rating, photo transistors.

UNIT 3. Transistors Biasing & Thermal Stabilization: The Q point, bias stability, different biasing techniques, stabilization against variation of Ico, VBE & β, bias compensation, biasing in linear ICs, thermal compensation, thermal runway & stability.

UNIT 4. Transistors at low frequency: Graphical analysis, hybrid model, h-parameter conversions, analysis using h-parameters, classification of amplifier, (Class A, B, C). Emitter follower, comparison of CB, CE, CC, simplified model, common emitter with emitter resistor, high i/p impedance circuits, Darlington pair, bootstrapping

UNIT 5 Field effect transistors, The JFET, pinch off, V/I Characteristics, small signal model, MOSFET, the CS & CD amplifiers, Biasing techniques for JFET & MOSFET, PET as VDR. 'Introduction about sensor and transducer and their interfacing.

PRACTICAL

LIST OF PRACTICALS

1. Measurement of amplitude, frequency and phase using cathode ray oscilloscope
2. Study and Hands on power supply, function generator and multimeter.

3. To obtain V-I characteristics of a Silicon/ Germanium PN Junction diode
4. To obtain V-I characteristics of a Light Emitting Diode(LED)
5. To obtain V-I characteristics of a Zener Diode
6. To implement a voltage regulator on Bread coard using a Zener Diode
7. Performance verification of Clipper circuits
8. Performance verification of Clamper circuits
9. Implement and verify the behavior of Half wave rectifier
10. Implement and verify the behavior of Center tap full wave rectifier
11. Implement and verify the behavior of Bridge rectifier with Filter
12. Determine Q- Point for various biasing techniques of BJT
13. Calculate Zi, Ai, Av, Ap and Zo using h-model for CE, CB and CC configuration of BJT.

THEORY ASSESSMENT

Students will be assessed as following theory Paper:

1. End Semester Exam: 70% Weightage,
2. Continuous assessment: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage regularity 16. 5% weightage)

PRACTICAL ASSESSMENT

1. **Sessional: 40% Weightage (**Continuous assessment of experiments and lab manual 50% weightage, final viva 25% weightage, regularity 25% weightage.)
2. **End semester practical viva: 60% weightage**

TEXT BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Millman & Halkias, Integrated Electronics, TMH	1-5
2	Robert Boylested, Electronic devices & circuits, PHI	1-5
3	Donald A Neamen Semiconductor Physics and devices, Basic Principle, TATA MC Graw Hill	1-5

REFERNECE BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Sedra and Smith: Microelectronics, Oxford Press.	1-5
2	Ben G Sireetman Solid State Electronic Devices Pearson Education	1-5

IP-23515: OPERATIONS RESEARCH

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
						THEORY		PRACTICAL		TOTAL MARKS
T	P	Tu	T	P	Tu	CW	END SEM	SW	END SEM	
04	02	01	03	01	-	30	70	40	60	200

PRE- REQUISITES: NA

COURSE OUTCOMES:

After successful completion of this course students will be able to:

1. Analyze any real life system with limited constraints and depict it in a model form and convert the problem into a mathematical model
2. Analyze and Simulate different real life probabilistic situations using Monte Carlo simulation technique..
3. Understand variety of problems such as linear programming, assignment, transportation, Game theory, Dynamic programming and simulation etc.
4. Understand different queuing situations and find the optimal solutions using models for different situations

COURSE CONTENTS:

UNIT 1 Introduction: History and Development of O.R. present trend& Linear Programming - Simplex method, Big-M-Method, Two-phase method, Degeneracy, Unrestricted variables, Duality in LP, Revised simplex, Sensitivity Analysis.

UNIT 2 : Allocation: (i) Assignment Model. (ii) Transportation - Optimality Test, Degeneracy Unbalanced Problems, Trans-shipment.

UNIT 3 Introduction to Integer Programming. Branch and Bound Algorithm. Dynamic Programming: Characteristics of Dynamic optimization Model Bellman's Principle problem, Salesmen problem, Forward and Backward recursion. Non Linear Programming: Introduction, Computer Application in Operations Research.

UNIT 4 Waiting Line Models: Introduction, Classification, States in queue, Probability distribution of arrivals and service times, Single server model (M/M/l). Multiple server model (M/M/S). Single server model with finite capacity.

UNIT 5 Game Theory : Rectangular, Two persons Zero sum games, Maximin and Minimax Principles, Saddle point, Dominance, Graphical and Algebraic methods of solution, Solution by transforming into Linear Programming Problem. Simulation: Building a simulation model, Monte Carlo simulation as applied to discrete system.

PRACTICALS

LIST OF PRACTICALS

1. Solving problems using LINGO and LINDO software
2. Solving problems using TORA and MS EXCEL software
3. Solving problems on Assignment model
4. Solving problems on Integer Programming
5. Solving problems on Inventory models
6. Solving problems on Queuing model

THEORY ASSESSMENT

(1) End Semester Exam: 70% weightage,

(2) Continuous assessment: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage, regularity 16.5% weightage)

PRACTICAL ASSESSMENT:

(1) Sessional: 40% Weightage (Continuous assessment of experiments and lab manual 50% weightage, final viva 25% weightage, regularity 25% weightage.)

(2) End semester practical viva: 60% weightage.

TEXT BOOKS RECOMMENDED:

S.NO	BOOK	UNIT
1.	Taha H. A., Operation Research, Mc Millian.	**1-5**
2.	Banerjee B., Operation Research, Business Publicity, Bombay.	**1-5**
3.	Hira & Gupta, Operation Research, S. Chand.	**1-5**
4.	Chitale A. K., J. Negi, Text Book of Operation Research, Jain Bros., Delhi.	**1-5**
5.	Sharma S. D., Kedarnath, Operation Research, Ramnath & Co., Meerut.	**1-5**

REFERENCES RECOMMENDED:

S. No.	BOOK	UNIT
1	Rao S. S., Optimization, Jain Bros., New Delhi, India	1-5

IP- 23512: MANUFACTURING PROCESSES – II

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
04	02	00	03	01	-	30	70	40	60	200

PRE-REQUISITES: NA

COURSE OUTCOMES

After successful completion of this course students will have:

1. Understanding of the basic mechanism of metal cutting, conventional machine tools and estimation and relationship between performance measures and machining parameters
2. Understanding of the surface finishing, super finishing and polishing processes and their importance
3. Knowledge of the press working processes
4. Understanding the elements of Gear as well as various gear manufacturing and finishing processes

COURSE CONTENTS

UNIT 1 Principle of generation of surface, classification of machining processes and machine tools, cutting tool materials, their properties & types of single point cutting tools. Type of lathe and operation such as turning, taper turning, thread cutting, grooving, parting off. Use of multiple tool for manufacturing of simple components, Concepts of feed, speed and depth of cut. Machining time estimation: Evaluation of machining time for turning, facing, drilling, milling and shaping operations.

UNIT 2 Shaping, Planning and slotting operation and machines, Quick return mechanism, Hydraulic system for shaper. Drilling and drilling machines, Types of drills, tapes and reamers, Geometry of drills, reamers and taps, Tapping and Spot facing operations. Milling machines, Types and operations. Types of milling cutters, Up and Down milling, gang craddle milling. Broaching operation, types of broaching machines and broaches design of broaching tools.

UNIT 3 Grinding process and grinding machines, Grinding wheel, Types nomenclature and their selection. Centreless grinding and job feeding arrangement, Dressing and trueing of grinding wheels. Super finishing processes: Honning, lapping, super-finishing, polishing and buffing.

UNIT 4 Press working: Types of presses, Classification and specifications, press working operations as Blanking, piercing, shearing, bending, forming, embossing, coining drawing and deep drawing, operations. Elements of dies and punches, Clearance, Compound, combination, progressive and inverted dies and their operations, Blank layout, Metal spinning.

UNIT 5 Gear and their types, elements of gears, different method of producing gears, gear cutting on milling m/c and by generating methods viz, hobbing, shaping, and rack cutting, gear finishing by shaving and grinding.

PRACTICALS

LIST OF PRACTICALS

1. Study various measuring instruments
2. Study of various types of Lathe Machines
3. Manufacturing job on the lathe as per drawing
4. Study of Milling machine and Indexing machine
5. Manufacturing of gear on milling machine as per drawing
6. To study Shaper machine and various mechanisms of Shaper.
7. Prepare a job on shaper machine as per the drawing
8. Study of Grinding machine and tool cutter
9. Do study of Super finishing process
10. Study various press working operations.

THEORY ASSESSMENT

(1) End Semester Exam: 70% weightage,

(2) Continuous assessment: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage, regularity 16.5% weightage)

PRACTICAL ASSESSMENT

(1) Sessional: 40% Weightage (Continuous assessment of experiments and lab manual 50% weightage, final viva 25% weightage, regularity 25% weightage.)

(2) End semester practical viva: 60% weightage.

TEXT BOOKS RECOMMENDED:

S.NO	BOOK	UNIT
1.	Campbell J. S., Principles of Manufacturing Materials & Processes.	**1-5**
2.	Lindberg, Manufacturing Processes.	**1-5**
3.	Chapman W. A. J., Workshop Technology part II and III.	**1-5**

REFERENCES RECOMMENDED:

S. No.	BOOK	UNIT
1	ASME, Fundamentals of Tool Design	**1-5**

HU 23504: ENGINEERING ECONOMICS AND FINANCIAL ANALYSIS

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
						THEORY		PRACTICAL		TOTAL MARKS
T	P	Tu	T	P	Tu	CW	END SEM	SW	END SEM	
04	00	00	03	00	-	30	70	-	-	100

PRE-REQUISITES: NA

COURSE OUTCOMES:

Upon successful completion of the course the student should be able to:

1. Knowledge of the flow of economic activities in order to understand the complex relation among firms, household, and government in an economic System working to resolve central economic problems of its-stakeholders
2. Ability to understand consumer's purchase behavior, producer's production planning and their profit planning as well as understanding of costing and pricing of the product under various competitive market situations
3. Fundamental knowledge of accountancy, role of financial management in business decision and goal of financial management
4. Ability to understand forms of business ownership and applying the tools of Financial Analysis.

COURSE CONTENTS :

UNIT 1 Nature and scope of economics, Economic cyclic flow, Central Economic Problems, macro and micro economics, Laws of demand and supply, Demand curve and demand function, Cardinal and ordinal utility analysis of consumer equilibrium, price and income relations of consumer's equilibrium, Demand derivation, Elasticity of demand.

UNIT 2 Production, Cost and Price: Equilibrium price, Production function, Laws of returns to variable proportions, Laws of returns to scale, Cost concepts, cost functions and their inter-relations, break-even point

UNIT 3 Pricing and Market: Equilibrium of firms and industry. Price determination under perfect competition, Imperfect competition and monopoly. '

UNIT 4 Accountancy and Business Organization: Book keeping and Accountancy, Trading account, Profit and loss account and balance sheets, Business and Industrial organization - Types, features, merits and demerits

UNIT 5 Financial management and Analysis: Concept, Scope and functions and goals of financial management, Financial analysis, Ratio analysis, Fund flow analysis, Break even analysis.

THEORY ASSESSMENT

Students will be assessed as following theory Paper:
(1) End Semester Exam: 70% Weightage,

2) Continuous assessment: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage regularity 16. 5% weightage)

TEXT BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Dwivedi and Dwivedi: Engineering Economics, Vikas Publishing House, New Delhi India.	1-5
2	Truett and Truett, Managerial Economics, Wiley India, New Delhi, India. , Ghose, B .N., Managerial Economics and Business decisions, Ane Books Pvt. Ltd, New Delhi, India	1-5
3	Pandey l. M., Financial Management, Vikas Publishing House, New Delhi, India	1-5

REFERNECES RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Maheshwary, Maheshwary and Maheshwary: Accounting for management, Vikas Publishing House, New Delhi, India.	1-5
2	James C. Van Home, Financial Management and Policy, Pearson Education Inc., New Delhi.	1-5

ME 23555: THEORY OF MACHINES

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
4	02	00	03	01	–	30	70	40	60	200

PRE-REQUISITES: NA

COURSE OUTCOMES:

After successful completion of this course students are expected to have:

1. Knowledge of basic components of planer motion mechanisms, analyze the displacement, velocity and acceleration of various links of kinematic chain as well as ability to analyze the forces on various links of kinematic chain
2. Understanding of the basic concept behind power transmission through friction and mechanical contact like belt drive, chain drive, clutches and gear drives
3. Understanding of the phenomena of balancing as well as ability to find out balancing conditions for statically and dynamically unbalanced mechanical component in a machine tool
4. Ability to analyze the linear single degree of free/forced damped and undamped vibrations of system as well as to calculate whirling and critical speed of a rotating shaft.

COURSE CONTENTS

UNIT 1 (a) Motion and Force Analysis : Plane motion, Kinematic concept of links, Basic terminology and definitions, Inversion of kinematic chains, Absolute and relative motion, Vector diagram, Instantaneous center, Velocity and Acceleration Polygons, Special Graphical Methods for Slider Crank Mechanism. **(b)** Concept of Free Body 'and its Equilibrium, Kinematic and dynamic quantities and their C relationships, Static Force Analysis, Piston ' Effort, Dynamic Force Analysis, Equivalent Dynamical Systems

UNIT 2 Power Transmission: The Kinematic design of pulleys, Flat belts and V-belt, Transmission of power by belts, Conditions for maximum power transmission, Efficiency of power transmission.

UNIT 3 Friction Devices, Coulomb friction, Pivot and Collars, Power screw, Plate clutch and Cone clutch, Band and Block Brakes

UNIT 4 Gears : Fundamental laws of gearing, Classification and basic terminology, Involute tooth profile and Kinematic consideration, Spur gears, other types of Gears, Standards in tooth forms, Gear trains, Simple, Compound and Epicyclic Gear Trains.

UNIT 5 (a) Balancing: Static and Dynamic Balancing or Rotating Masses in Same and Different Planes. **(b)**Vibrations: Degree of Freedom, Natural Frequency of Single Degree of Freedom Systems, Damped and un-damped systems, Forced Vibration, Whirling of Shafts-and Critical Speeds

PRACTICAL

LIST OF PRACTICALS

1. To verify Grashof's Law
2. To study and draw the displacement, velocity and acceleration diagram of slider crank mechanism and to study the effect of crank radius.
3. To study and draw the displacement, velocity and acceleration diagram of crank and slotted lever quick return mechanism
4. To study the properties of involute teeth in contact
5. To generate the involute profile of a gear tooth
6. To determine the coefficient of friction between belt and pulley.
7. To determine the natural frequency of a system.
8. Study of whirling of shaft and determination of critical speed.

THEORY ASSESSMENT

Students will be assessed as following theory Paper:

1. **End Semester Exam**: 70% Weightage,
2. **Continuous assessment**: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage regularity 16. 5% weightage)

PRACTICAL ASSESSMENT:

1. **Sessional: 40% Weightage (**Continuous assessment of experiments and lab manual 50% weightage, final viva 25% weightage, regularity 25% weightage.)
2. **End semester practical viva: 60% weightage**

TEXT BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Bevan T., Theory of Machines, CBS Publication	1-5
2	Ambekar A. G., Mechanisms and Machine Theory, PHI, India	1-5

REFERNECES RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Myszka David H., Machines and Mechanisms, PHI, India	1-5

ME 23516: FLUID MECHANICS AND THERMAL ENGINEERING

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
04	02	00	03	01	–	30	70	40	60	200

PRE-REQUISITES: NA

COURSE OUTCOMES:

After successful completion of this course students will have

1. Knowledge about the basics and importance of mechanics in fluid flow and various applications of fluid kinematics
2. Knowledge of dimensional analysis and physical significance of dimensionless numbers as well as the concept of drag and lift in viscous fluid flow and losses due to viscous flow in pipes
3. Understanding about the basic concepts of thermodynamics and its laws as well as the properties of gases and thermodynamic cycles
4. Knowledge about the concepts of thermodynamics in heat transfer, refrigeration and air conditioning.

COURSE CONTENTS:

UNIT 1 Fundamentals: Types of Flows, One and Two Dimensional Flows, Irrotational and Rotational Flows, Stream and Potential Functions. Basic Laws of Fluid Flow: Continuity, Momentum and (Energy Equations as Applied to System and Control Volume. Euler's and Bemoulli' 5 Equations. ' Application to Flow through Office, Venturimeter, Pitot Tube, Moment of Momentum Theorem C and its Application to Fixed and Moving Vanes.

UNIT 2 Dimensional Analysis: Buckingham's Theorems, Similarities, Physical Significance of Reynold's, Mach and Froude Numbers etc.

UNIT 3 Viscous Flow: Concept of Boundary, Drag, Lift, Flow through Pipes, Hydraulic Gradient and Losses due to Friction and Sudden Enlargement/Contraction, Pipes in Series and Parallel.

UNIT 4 (a) Fundamentals: Application of Mass and Energy Equation to Steady Flow System, Heat and Work Transfer in Flow and Non-Flow Processes. Second flow, Kelvin Planck's and Clausius Statement, Concept of Entropy, Clausius Inequality; Entropy Changes in Non-Flow processes, Properties of Gases and Vapours, Rankine Cycle. **(b)** Air Cycles and Compressors: Otto, Diesel, Dual Combustion and Brayton Cycle, Air Standard Efficiency. Mean Effective Pressure, Introduction to Reciprocating Compressors.

UNIT 5 (a) Heat Transfer: Conduction 1n Parallel, Radial and Composites Walls, Connective Heat Transfer with Laminar and Turbulent Flows, Overall Heat Transfer Coefficient, Thermal

Boundary Layer, Important Correlations, Flow Through Heat Exchanger, Fin Analogy, Fundamentals of Radiative Heat Transfer and Shape Factors. **(b)** Refrigeration and Air Conditioning: Principles of Refrigeration, A/C Cycles, Coefficient of Performance and Properties of Refrigerants.

PRACTICAL

LIST OF PRACTICALS

1. To study the Flow through a 2-D converging- diverging duct and verifying
    a. Bernoulli's equation as applied to incompressible flow
2. To calibrate measuring device viz. Venturimeter and Orificemeter
3. To study the frictional characteristics of fully developed flow through pipes of different materials
4. To study the minor losses in pipe fittings
5. To study the velocity distribution across a wind tunnel using a Pitot static tube
6. Thermal conductivity of pipe insulation (By Lagged pipe method)
7. Thermal conductivity of insulating powder (Spherical shell method)
8. To study vapour compression cycle and domestic refrigerator
9. To study the vapour absorption system based on Electrolux refrigeration.

THEORY ASSESSMENT

Students will be assessed as following theory Paper:

1. End Semester Exam: 70% Weightage,
2. Continuous assessment: 30% weightage (Two midterm tests: 67% weightage, assignment: 16.5% weightage regularity 16. 5% weightage)

PRACTICAL ASSESSMENT

(1) **Sessional: 40% Weightage (**Continuous assessment of experiments and lab manual 50% weightage, final viva 25% weightage, regularity 25% weightage.)

(2) End semester practical viva: 60% weightage

TEXT BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Kumar K.L., Engineering Fluid Mechanics, Tata McGraw Hill	1-5
2	Kapoor H. R., Thermal Engineering, Vol.1 and II, Tata McGraw Hill.	1-5
3	Mathur M. L. and Mehta F., Thermal Engineering, Vol.1 and II , Jain Brothers Publication	1-5

REFERNECE BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Irwing Shames, Fluid Mechanics, Tata McGraw Hill Publication, New Delhi, India.	1-5
2	Nag, P.K. Engineering Thermodynamics, Tata McGraw Hill Publication, New Delhi, India.	1-5

CO23559: OBJECT ORIENTED PROGRAMMING SYSTEM

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
						THEORY		PRACTICAL		TOTAL MARKS
T	P	Tu	T	P	Tu	CW	END SEM	SW	END SEM	
04	02	00	03	01	_	30	70	40	60	200

PRE-REQUISITES: NA

COURSE OUTCOMES:

1. Fundamentals knowledge and programming skills in Java language, developing problem-solving and programming skills using COP concept
2. Ability to develop a web-based system using java classes, java utilities, applets and swings
3. Knowledge of object oriented analysis such as basic concepts, comparison with structural methodology as well as modeling techniques such as object, dynamic and function models, CRC, Rational Unified process method
4. Awareness about UML class diagram consideration such as reusability, extensibility, robustness (exception handling), programming language support for object orientation in Java (or C++)

COURSE CONTENTS:

UNIT 1 Review of object oriented programming concepts using C++ or Java.
UNIT 2 Basic of Objective Orientation: Objects and Classes. Identifying candidates for classes and OPEC": Attributes and Methods, Abstraction, Encapsulation, Inheritance, Polymorphism. Relationships-Association, Aggregation, Composition, Generalization and Specialization.
UNIT 3 Object Oriented Analysis: Basic concepts, Comparison With Structural methodology, Modelling Techniques: Object , Dynamic and Function Models, CRC, Introduction to Rational Unified process method.
UNIT 4 Object Oriented Design and, Programming: Basic concept, Comparison with Structural Methodologies; Concepts of Interface, Components (packages), OOD Method, Introduction to UML Class diagram consideration: Reusability, extensibility, robustness (Exception Handling), Programming language support for object orientation in Java (or C++).
UNIT 5 Rapid Prototyping: introduction to conventional Testing, Object Oriented Testing.

PRACTICAL

LIST OF PRACTICALS

1. Write a C Program to display no from 1to 9?
2. Write a C Program to count even and odd no. in a list of nos. using if-__ else and using array?

3. Write a C Program to print multiplication table using do___ while loop?
4. Write a C Program to compute the “power of 2” using for loop?
5. Write a C Program to check whether given year is leap year or not?
6. Write a C++/ java Program to display no from 1to 9?
7. Write a C++/ java Program to count even and odd no. in a list of nos. using if-__ else and using array?
8. Write a C++/ java Program to print multiplication table using do___ while loop?
9. Write a C++/ java Program to compute the “power of 2” using for loop?
10. Write a C++/ java Program to check whether given year is leap year or not?
11. Design a class to represent a bank account. Include the following members:
    a. Data Members:
        ι. Name of the depositer
        ιι. Account no
        ιιι. Type of account
        ιϖ. Balance amount
    b. Methods:
        1. To assign initial values
        2. To deposit an amount
        3. To withraw an amount
        4. To display the name
12. Modify the above program to incorporate constructor to provide initial values.
13. Assume that bank maintains two kind of accounts for customers, one called as saving account and other as customer account. The saving account provides compound interest and withdrawl facilities but no cheque book facility. The current account provides cheque book facility but no interest current account holders should also maintain a minimum balance and if the balance falls below this level a service charge is imposed.
14. Create a class account that stress customer name account numbers and type of account from this device the classes current account and saving account to make them more specific to their requirements include necessary members functions in order to achieve the following tasks:-
    a. Accept deposits from a customer and update the balance.
    b. Display the balance.
    c. Compute and deposit interest.
    d. Permit withdrawl and update the balance.
    e. Check for the minimum balance impose penalty and update the balance.
15. A mini project to each student for the concept of Object Oriented Analysis and Design

THEORY ASSESSMENT

Students will be assessed as following theory Paper:
(1) End Semester Exam: 70% Weightage,

2) Continuous assessment: 30% weightage (Two midterm tests: 67% weightage, assignment:16.5% weightage regularity 16. 5% weightage)

PRACTICAL ASSESSMENT

(1) Sessional: 40% Weightage (Continuous assessment of experiments and lab manual 50% weightage, final viva 25% weightage, regularity 25% weightage.)

(2) End semester practical viva: 60% weightage

TEXT BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Atul Kahate, "Object, Oriented Analysis and Design", Tata McGraw Hill Publishing Company	1-5
2	R.S. Pressman, "Software Engineering, A Practitioner's Approach" 'Tata McGraw Hill Book , Company, New York, USA	1-5
3	Clayton Walnum, "Java by Example", Oue Corporation, USA. ' .	1-5

REFERNECE BOOKS RECOMMENDED:

SR. NO.	BOOKS	UNIT
1	Grady Booch, "Object Oriented Analysis and Design", 2nd edition, Pearson Education.	1-5
2	James Martin, "Principles of Object Oriented Analysis and Design".	1-5
.3	Peter Cad and Edward Yourdon, "Object Oriented Analysis", Person Education"	1-5