SHRI G. S. INSTITUTE OF TECHNOLOGY AND SCIENCE
DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING
B.E./B. TECH II Year
Semester – A
IP23001: MANUFACTURING PROCESSES – I

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Classification of the process, Electric arc welding - Joint design
	1	Welding symbols, Arc welding equipments, Characteristic curves
	1	Welding parameters, Electrode classification, Types of metal transfer
	1	Manual metal arc welding. Electrodes used and their nomenclature, TIG welding, MIG welding
	1	Submerged arc welding, Atomic hydrogen welding, Resistance welding, Thermit welding
	1	Electroslag welding, Electron beam welding
	1	laser beam welding, brazing, Braze welding
	1	Thermal cutting of metals.Defects in welds and weld distortion
(Unit II)	1	Foundry : Types of patterns and selection of pattern materials
	1	Pattern allowances,
	1	Moulding and core sands
	1	Moulding sands - their properties and ingredients
	1	Core &mould making,
	1	Moulding machines
	1	Fettling and cleaning of castings
	1	Defects in casting
(Unit III)	1	Fundamental of Special Casting Techniques
	1	Gravity die or permanent mould casting
	1	Pressure die casting
	1	Centrifugal die casting
	1	CO_2moulding, Investment mould casting
	1	Shell moulding
	1	Plaster mould casting
	1	Continuouscasting.
(Unit IV)	1	Fundamental of Mechanical Working of Metals
	1	Rolling – Principle
	1	Rolling stand arrangement (Rolling mills).
	1	Forging - Forging operations, Drop, Press
	1	Machine forging, forging defects.
	1	Extrusion - Principles, hot and cold extrusion processes
	1	tube extrusion, wire drawing
	1	Rod and tube drawing.
(Unit V)	1	Plastics : Composition of plastic materials
	1	Moulding methods - Injection moulding
	1	compression moulding, transfer moulding
	1	extrusion moulding,
	1	Calendering
	1	Blow moulding
	1	Laminating & Reinforcing
	1	Welding of plastics.
TOTAL	**40**	******

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B.E./B. TECH II Year
Semester – A
IP 23006: PRINCIPLES & PRACTICES OF MANAGEMENT

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	02	Management Concept & Importance
	02	Managerial Principles & Managerial Functions
	02	Roles of Manager
	01	Schools of Management Thought
(Unit II)	01	Nature & Process of Planning
	01	Principles of Planning
	02	Decision Making: Definition, Types, Process, Administrative Model
	01	Policies & strategies
(Unit III)	01	Principles of Organization
	02	Organization Structures
	02	Departmentations, Basis & Methods
	02	Delegation of Authority
(Unit IV)	01	Concept & Significance
	01	McGregor's Theory, Maslow Model
	02	Concepts of Leadership
	02	Characteristics of Leader& leadership Styles
	01	Leadership Theories
	02	Leadership vs. Management
(Unit V)	01	Objectives, Functions
	01	Manpower Planning
	01	Recruitment , Selection, Training & Development
	01	Job Evaluation & Merit Rating
	01	Importance, Process, Channels
	02	Communication Networks
	01	Effective Communication-Barriers
	01	Effective Communication-Guidelines
	01	Process, Types of Control
	01	Control Methods: BreakEven Analysis
TOTAL	**40**	******

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DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING
B.E./B. TECH II Year
Semester – A
MA 23003: MATHEMATICS-III

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	02	Formation of partial differential equations
	02	Partial differential equation of first order and first degree, i.e.,Pp+Qq = R
	02	Linear homogeneous partial differential equation of nth order with constant coefficient
	02	Separation of variables, Applications to simple problem
(Unit II)	02	Expansion of functions in a Fourier series
	02	Half range series Sine and Cosine series and change of interval
	01	Fourier Integral
	02	Fourier transforms: Sine and Cosine transforms
	01	Fourier transforms application to solution of Linear Partial Differential Equations
(Unit III)	02	Definition of Laplace Transform, Laplace Transform of elementary and periodic functions
	01	Properties of Laplace Transform including Laplace Transform of derivatives
	02	Inverse Laplace Transform and its properties, Convolution Theorem
	03	Application of Laplace Transform to ordinary differential equations with constant and variable coefficients.
(Unit IV)	01	Difference table, Operators E and Δ
	02	Newton's forward and backward interpolation formula
	02	Lagrange's interpolation formula and Divided difference method for unequal intervals
	03	Numerical Differentiation and Integration
(Unit V)	02	Brief idea of sampling, t, F and χ^2 distributions and their applications
	01	ANOVA
	02	Statistical Quality Control and Control Charts
	02	Sampling inspection, Acceptance sampling, Producer's and Consumer's risk, O.C. curve
	01	Taguchi method
TOTAL	**40**	******

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B.E./B. TECH II Year
Semester – A
ME23008 : MECHANICS OF SOLIDS

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Stress and Strain: Tension, compression and shear
	1	Complementary shear stresses
	1	Modulus Elasticity, Modulus of Rigidity, Bulk Modulus, Poisson's Ratio
	1	Relations among the moduli
	1	Statically indeterminate system,
	1	Shear stress in a Circular member due to Torsion
	1	Stress due to temperature
	1	Tutorial (problem solving)
(Unit II)	1	Bending Moment and Shear Forces: Diagrams of Shear Forces and bending moment for cantilevers beams
	2	Simply supported beams with or without over hanging ends.Relation between Loads and Shearing Forces and Bending Moments.
	2	Bending Stress : Theory of Bending, bending and shearing Stress in beams and their distribution with varied load
	2	Modulus of section and modulus of rupture, beams of varying cross section, uniform strength
	1	Tutorial (problem solving)
(Unit III)	2	Stress on oblique section of a bar subjected to axial stress
	2	Complex Stresses,
	1	Principal stress and strain
	1	Combined direct and bending stress
	1	Mohr's Circle
	1	Tutorial (problem solving)
(Unit IV)	2	Deflection: Uniform Curvature, Relation between curvature and deflection
	1	Cantilevers and simply supported beams of varying cross-section,
	1	MaCauley's Method
	2	Deflection due to Shear, Propped Beam
	1	Parts subjected to column action with and without lateral loadings, Euler s theory of columns
	2	Tutorial (problem solving)
(Unit V)	2	Elastic strain energy: Resilience
	2	Proof Resilience. Materials under tension
	1	Static, Sudden and Falling Loads
	1	Strain Energy due to Direct Shear, and torsion, Castigliano's theorem.
	1	Introduction to thin and thick cylinder
	1	Tutorial (problem solving)
TOTAL	**40**	******

SHRI G. S. INSTITUTE OF TECHNOLOGY AND SCIENCE
DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING
B.E./B. TECH II Year

Semester – A
EI 23017 : BASIC ELECTRONICS ENGINEERING

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Diode Characteristics: V-I characteristics
	1	Temperature dependence, static & dynamic resistances, CT, CD
	1	Special diodes – breakdown
	1	Photodiodes, LEDs
	1	Introduction to BJT, FET
	1	UJT & SCR
	1	Diode Applications : Load Line concept
	1	Clippers, Clampers
	1	Comparators, samplers
	2	Rectifiers and Filters
	1	Voltage doublers, peak detectors
(Unit II)	1	Transistors Characteristics : The junction transistor
	1	BJT, current components
	1	Transistors as amplifier
	2	CB, CE & CC configurations
	1	Static & dynamic transistors characteristics
	1	Analytical expression of characteristics
	1	Transistor rating, photo transistors
(Unit III)	1	Transistors Biasing, Thermal Stabilization
	1	The Q point, bias stability
	1	Different biasing techniques
	1	Stabilization against variation of ICO, VBE & β, Bias Compensation
	1	Biasing in linear ICs.
	1	Thermal compensation, Thermal runaway and Stability
(Unit IV)	1	Transistors at low frequency: Graphical analysis
	1	Hybrid model, h-parameter conversions
	1	Analysis using h-parameters
	1	Classification of amplifier, (Class A, B, C).
	1	Emitter follower, comparison of CB,CE, CC,
	1	Simplified model, common emitter with emitter resistor
	1	High i/p impedance circuits, Darlington pair, Bootstrapping
(Unit V)	1	Field effect transistors: The JFET
	1	Pinch off, V/I Characteristics
	1	Small signal model
	1	MOSFET
	1	The C_S & C_D amplifiers
	1	Biasing techniques for JFET & MOSFET
	1	FET as VDR
TOTAL	**40**	******

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B.E./B. TECH II Year

Semester – A
ME 23005: MECHANICAL METALLURGY

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Atomic Structure, Atomic bonding
	2	Crystal Structure, Allotropic structure of Alloys
	1	Dislocations
	2	Grain boundaries
	1	Strengthening Mechanism of alloys, Solidification and grain growth
(Unit II)	1	Elastic and Plastic deformation, Strength, Stiffness
	2	Ductility, Impact strength, Malleability, Brittleness, Toughness
	1	Hot and Cold Working of Metals
	1	Properties and Microstructure of metals
(Unit III)	2	Phase diagrams, Phase rule, Lever's rule
	1	Iron and Iron Carbide metastable diagram
	2	Continuous Cooling Curve
	2	Hardening, Tempering, Austempering, Martempering
	1	Case Carburizing, Nitriding, Cynading , Carbonitriding
	2	Induction Hardening, Flame Hardening
	1	Age Hardening and Hardenability
(Unit IV)	1	Modern Trends in the manufacturing of iron and steel
	2	Cast steel Composition, microstructure
	1	Applications of Plain Carbon steels and cast iron effects of impurities in ferrous metal
	1	Alloy steels, High speed steels, Hard field Mn steel, stainless steel
	2	Composition Micro Structure, Properties and Application of Aluminium and its principle alloys
	1	Copper and its Principle Alloys
	1	Bearing Metals
(Unit V)	1	Tensile test, Compression, Hardness, Impact test, Shear
	2	Fatigue test, Dye penetration testing, Magnetic Particle Inspection
	1	Eddy Current testing, Ultrasonic test and radiographic test
	2	Manufacturing of metal powders, Sintering and secondary operations
	1	Properties of finished parts
	1	Design Consideration and applications
TOTAL	**40**	******

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B.E./B. TECH II Year

SEMESTER - B
IP-23515: OPERATIONS RESEARCH

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	History and development of O.R.
	1	Linear programming-Formulation and graphical method
	1	Simplex
	1	Numericals
	1	Big-M method
	1	Two phase method
	1	Degeneracy ,duality in LP
	1	Revised simplex
	1	Numericals
	1	Sensitivity analysis
(Unit II)	1	Assignment model
	1	Numericals
	1	Introduction to transportation model
	1	Methods of allocation
	1	Optimization of transportation problem
	1	Numericals
	1	Degeneracy ,unbalanced problems
	1	Transshipment
(Unit III)	1	Integer programming- introduction, branch and bound algorithm
	1	Numericals
	1	Dynamic programming-characteristics
	1	Salesmen problem
	1	shortest route problem, Forward and backward recursion
	1	Numericals
	1	Nonlinear programming
	1	Computer application in operations research
(Unit IV)	1	Waiting line model-introduction, classification, states in queue
	1	Probability distribution of arrivals and service time
	1	Single server model
	1	Numericals
	1	Multi server model
	1	Numericals server model with finite capacity
(Unit V)	1	Game theory –rectangular , two persons zero sum games
	1	Maxmin and minmax principal , saddle point
	1	Graphical method of solution
	1	Algebraic method of solution
	1	Dominance
	1	Solution by transforming into linear programming problem
	1	Simulation- building a simulation model
	1	Monte carlo simulation as applied to descrete system
TOTAL	**40**	******

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B.E./B. TECH II Year

SEMESTER - B
IP 23512: MANUFACTURING PROCESSES – II

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Principle of generation of surface,
	1	Classification of machining processes and machine tools
	1	Cutting tool materials, their properties
	1	Types of single point cutting tools
	1	Type of lathe and operation such as turning, taper turning, thread cutting, grooving
	1	Parting off. Use of multiple tool for manufacturing of simple components
	1	Concepts of feed, speed and depth of cut
	1	Machining time estimation : Evaluation of machining time for turning
	1	Facing, drilling, milling and shaping operations
(Unit II)	1	Shaping, Planning and slotting operation and machines
	1	Quick return mechanism
	1	Hydraulic system for shaper
	1	Drilling and drilling machines,
	1	Types of drills tapes and reamers,
	1	Geometry of drills
	1	Reamers and taps
	1	Tapping and Spot facing operations.
	1	Milling machines,
	1	Types and operations
	1	Types of milling cutters
	1	Up and Down milling, gang craddle milling
	1	Broaching operation, types of broaching machines
	1	Broaches design of broaching tools
	1	Super finishing processes
	1	Honning, lapping,
	1	Superfinishing, polishing and buffing
(Unit III)	1	Grinding process and grinding machines , Grinding wheel
	1	Types nomenclature and their selection
	1	Centre less grinding and job feeding arrangement
	1	Dressing and trueing of grinding wheels
(Unit IV)	1	Press working : Types of presses, Classification and specifications
	1	Press working operations as Blanking, piercing, shearing, bending, forming
	1	Embossing, coining drawing and deep drawing
	1	Operations. Elements of dies and punches, Clearance, Compound, combination
	1	Progressive and inverted dies and their operations, Blank layout, , Metal spinning
(Unit V)	1	Gear and their types, elements of gears
	1	Different method of producing gears
	1	Gear cutting on milling m/c and by generating methods viz
	1	Hobbing, shaping, and rack cutting
	1	Gear finishing by shaving and grinding.
TOTAL	**40**	******

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DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING
B.E./B. TECH II Year

SEMESTER - B
HU 23504: ENGINEERING ECONOMICS AND FINANCIAL ANALYSIS

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Nature and Scope of Economics
	2	Economic Cyclic flow, Central Economic Problems
	1	Macro and Micro Economics, Laws of demand and supply
	1	Demand Curve and demand function
	1	Cardinal and Ordinal utility analysis of consumer equilibrium
	1	Price and income relations of consumer's equilibrium
	2	Demand deviation
	1	Elasticity of demand
(Unit II)	1	Production, Cost and Price
	2	Equilibrium price, Production function
	1	Laws of returns to variable proportions
	1	Laws of returns to scale
	2	Cost functions and Break- even point
(Unit III)	2	Pricing and Market
	2	Equilibrium of firms and industry
	1	Price determination under perfect competition
	2	Imperfect Competition and Monopoly
(Unit IV)	2	Book Keeping and Accountancy
	1	Trading Account
	2	Profit and loss account and balance sheets
	3	Business and Industrial Organization Types, Features, Merits and Demerits
(Unit V)	2	Financial Management Analysis and Concept
	2	Scope and Functions and goals of financial management
	1	Financial Analysis
	1	Ratio Analysis
	1	Fund flow Analysis
	1	Break even Analysis
TOTAL	**40**	******

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B.E./B. TECH II Year

SEMESTER - B
ME 23555: THEORY OF MACHINES

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Mechanism: Basic Kinematic concepts and definitions
	2	Mechanism, link, kinematic pair, classification of kinematicpairs, degree of freedom, kinematic chain
	1	Binary ternary and quaternary joints and links, Degrees offreedom for plane mechanism, grubler's equation
	1	Inversion of mechanism, four bar chains and their inversions
	1	Single slider crank chain, double slider crank chain and theirinversion.
	1	Kennedy theorem, Instantaneous Centre of rotation
	2	Velocity and acceleration analysis of mechanism
	1	Tutorial (problem solving)
(Unit II)	1	The Kinematic design of pulleys
	2	Flat belts and V-belt, Transmission of power by belts,
	1	Conditions for maximum power transmission,
	1	Efficiency of power transmission.
	1	Tutorial (problem solving)
(Unit III)	2	Friction Devices, Coulomb friction, Pivot and Collars
	2	Band and Block Brakes
	1	Plate clutch
	1	Cone clutch
	1	Power Screw
	1	Tutorial (problem solving)
(Unit IV)	2	Fundamental laws of gearing, Classification and basic terminology,
	1	Involute and cycloid tooth profile
	1	Spur gears, other types of Gears,
	2	Gear trains, Simple, Compound
	1	Epicyclic Gear Trains
	1	Tutorial (problem solving)
(Unit V)	2	Static and Dynamic Balancing , Rotating Masses in Same Plane
	2	Rotating Masses in Different Planes
	1	Degree of Freedom, Natural Frequency of Single Degree ofFreedom Systems,
	1	Damped and un-damped systems
	1	Forced Vibration, Whirling of Shafts-and Critical Speeds
	1	Tutorial (problem solving)
TOTAL	**40**	******

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B.E./B. TECH II Year

SEMESTER - B
ME 23516: FLUID MECHANICS AND THERMAL ENGINEERING

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Introduction to fluid mechanics, types of flows, one and two dimensional flows.
	1	Stream and potential functions ant some simple numerical problems.
	1	Basic laws of fluid flow: Continuity equation.
	1	Moment of momentum equation, Euler's equation and Bernoulli's equation.
	2	Application of Bernoulli's equation: Venturimeter, Pitot tube, orifice meter.
(Unit II)	1	Dimensional analysis
	1	Buckingham Theorems
	1	Similarities, Significance of Raynolds number.
	1	Mach and Froud numbers.
	1	Problem solving related to Mach number and froud number.
	1	Signification of prototype model
	1	Application of Buckingham π- Theorem.
(Unit III)	1	Introduction to Boundary layer theory, Concept of B.L. theory.
	1	Application of Boundary layer theory
	1	Problem solving to B.L thickness.
	1	Drag and lift force for viscous flow fluid
	2	Losses due to friction and sudden enlargement
	1	Losses due to sudden contraction in pipes.
	2	Pipes in series and parallel and numerical solving.
(Unit IV)	2	Introduction to thermodynamics, Application of mass and energy equation to steady flow system.
	1	Heat and work transfer in flow and non- flow process.
	2	Second law of thermodynamics by Clausius statement and Kelvin Planck's.
	2	Concept of entropy, Clausius inequality.
	2	Properties of gas and vapours, Rankine cycle and Air standard cycles.
(Unit V)	1	Introduction to heat transfer in various modes.
	1	Conduction in parallel, Radial walls.
	1	Conduction in composite walls.
	1	Convective heat transfer with Laminar and Turbulent flows.
	2	Overall heat transfer coefficient and problem solving.
	1	Thermal B.L., Important correlations.
	1	Flow through Heat Exchanger, Principle of Refrigeration, 1 TR COP of heat pump and refrigeration.
	1	Working of VCR cycle and numerical problems.
TOTAL	**40**	******

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B.E./B. TECH II Year

SEMESTER - B
ME 23559: OBJECT ORIENTED PROGRAMMING

UNIT NO.	NO. OF LECTURES	TOPICS COVERED
(Unit I)	1	Motivation and objective of this course
	1	Basic Introduction to the concepts of oops
	1	Introduction to java programming language
	1	Introduction to conditional statements
	1	Introduction to iterative statements
	1	Expression Evaluation
(Unit II)	2	Basics of oops.
	1	Concept of class and object
	1	Methods in Java
	1	Class and object example
	1	Constructors in java
	1	Static and this keyword
	1	Basics of inheritance.
	1	Types of Inheritance(1)
	1	Types of Inheritance(2)
	1	Basics of Polymorphism
	1	Method overloading and overriding
	1	Runtime Polymorphism, super and final keyword
	1	Concepts of Abstraction
	1	Concept of Encapsulation
	1	Access modifiers with Examples
(Unit III)	1	Comparison of object oriented with structural methodology.
	1	Dynamic Modeling using DFD
	1	Functional Modeling
	1	Basics of CRC and how to draw the crc cards
	1	Rational Unified Process Method
(Unit IV)	1	Concept of Interface and Abstract class and difference between them
	1	Example of Interface and abstract class
	1	Packages
	1	Introduction to Exceptional Handling
	1	Exceptional handling examples
	1	Various Keywords in Exceptional Handling
	1	Concepts of Array in Java
	1	Introduction to UML Diagrams
	1	Different UML Diagrams with Examples(1)
	1	Different UML Diagrams with Examples(2)
(Unit V)	1	Introduction to Testing and types of testing in software engg.
	1	Difference between object oriented and Conceptual Testing with Examples
	1	Object Oriented Testing
TOTAL	**40**	******