

## B.Tech (Common to All Branch .)

### Ist Semester

1. Communication skills
2. Physics (T & P)/ Chemistry (T & P)
3. Maths (T)
4. Fundamentals Computer (T)
5. W/S (T&P)
6. Analog Electronics

### PROFESSIONAL COMMUNICATION

#### **Unit – I : Technical Communication 8**

Nature; Origin and Scope; Feature and General Writing; Significance; Style: Objective Style as Contrary to Literary Composition.

Forms of Technical Communication:

Reports: Types, Significance, Structure & Style of Report;

Writing of Reports: Project, Thesis, Dissertation Writing;

Technical Paper & Scientific Article Writing: Elements, Methods & Technical Objectives;

Technical Proposal: Nature, Divisions, Kinds, Uses.

#### **Unit-II : Pre-Requisites of Technical Written Communication**

**Vocabulary Building** : Homophones (Words Similar in sound but different in Meanings); Word-formation; One-Word

substitute; New & Select Vocabulary Building (about 500 words)

**Functional Grammar** : Patterns and Correct usage (Parts of speech); Syntax Concord; Prepositions; Articles.

**Requisites of Good Sentence and Paragraph Writing**: Requisites of Good Sentence Writing; Paragraph Writing; Unity,

Coherence and Emphasis; Development of Paragraph: Inductive Order, Deductive Order, Spatial, Linear, Chronological

Orders etc. with Emphasis on Argumentative & Expository Writing.

**Unit : III : Business Correspondence**: Principles; Features; Sales and Credit Letters: Letters of Enquiry, Quotation,

Order, Claim, Complaint and Adjustment letters, Bio-Data Making, Resumes/Job Application Processing.

**Unit-IV : Language Learning Through Thematic and Value based Critical Reading (Non-Detailed Text Study) :**

**A Study of following Value-Oriented Essays:**

A.L.Basham : The Heritage of India

S. Radhakrishnan : *The Gandhian Outlook*

Francis Bacon : *Of Studies*

J.B. Priestley : Making Writing Simple

Virginia Woelf : How should one Read a Book

R.K. Narayan : *A Bookish Topic*

C.E.M. Joad : The Civilization of Today

**Study of following Short Stories for making the Students acquaint with the styles of great Writers of World:**

O.H. Henry : The Gift of the Magi

R.N. Tagore : The Renunciation

Katherine Mansfield : *The Fly*

A.P. Chekhor : *The Lament*

M.R. Anand : The Barber's Trade Union

Ruskin Bond : The Eyes Are Not Here

D.H. Lawrence : The Rocking Horse Winner

Ernest Hemingway : The Capital of the World

**Unit-V : Dimensions of Spoken English: Using English Language Laboratory :**

Stress, Intonation, Rhythm, Phonemes, Allophones, Phonetic Transcription, Listening, Reading & Comprehension of

Speech and Reproduction of Response.

**Texts Books/ References**

Singh R.P. (ed) : An Anthology of English Essay; OUP, New Delhi

Singh R.P. (ed) : An Anthology of English Short Stories; OUP, New Delhi.

Hornby A.S. : Guide to Patterns & Usage in English; OUP, New Delhi

Clark S. & Pointon : Word for Word; OUP, New Delhi

Rutherford A. : Basic Communication Skills; Person Education, New Delhi.

Singh R.P. : Functional Skills in Language & Literature; OUP, New Delhi

Bansal R.K. & Harrison : Phonetics in English; Orient Longman, New Delhi

Sethi & Dhamija : A Course in Phonetics & Spoken English; Prentice Hall, New Delhi.

Blum Rosen : Word Power; Cambridge University Press, New Delhi

Seely John : Writing Report; OUP, New Delhi

Suggested Readings :

Arora V.N. et al : Improve Your Writing; OUP Delhi

Mohan K. & Sharma R.C. : Business Correspondence of Report Writing; TMH, New Delhi.

Clive Upton et al : Oxford Dictionary of Pronunciation for Current English; OUP New Delhi.

A Dictionary of Modern English Usages; OUP, New Delhi

Michael Swan : Practical English Usages; OUP, New Delhi

John Alveyblrideh : American English Pronouncing Dictionary; OUP New Delhi.

Jons Daniel : English Pronouncing Dictionary; Cambridge University Press.

## PHYSICS

### **Unit – I : Relativistic Mechanics**

Inertial and Non-inertial Frames, Michelson-Morley Experiment, Postulates of Special Theory of Relativity, Galilean and

Lorentz Transformation, Length Contraction and Time Dilation, Addition of Velocities, Mass Energy

Equivalence and

Variation of Mass with Velocity.

### **Unit – II : Interference**

Coherent Sources, Conditions of Interference, Fresnel's Biprism Experiment, Displacement of Fringes, Interference in

Thin Films – Wedge Shaped Film, Newton's Rings.

**Diffraction** : Single and n-Slit Diffraction, Diffraction Grating, Raleigh's Criterion of Resolution, Resolving Power of

Telescope, Microscope and Grating.

### **Unit – III : Polarization**

Phenomenon of Double Refraction, Ordinary and Extra-ordinary Rays, Nicol Prism, Production and Analysis of Plane,

Circularly and Elliptically Polarized Light, Fresnel Theory, Optical Activity, Specific Rotation, Polarimeter.

**Laser** : Principle of Laser Action, Einstein's Coefficients, Construction and Working of He-Ne and Ruby Laser.

### **Unit – IV : Electromagnetics**

Ampere's Law and Displacement Current, Maxwell's Equations in Integral and Differential Forms, Electromagnetic

Wave Propagation in Free Space and Conducting Media, Poynting Theorem.

### **Magnetic Properties of Materials**

Basic Concept of Para-, Dia and Ferro-Magnetism, Langevin's Theory of Diamagnetism, Phenomenon of Hysteresis and Its Applications

### **Unit – V : X-Rays**

Diffraction of X-Rays, Bragg's Law, Practical Applications of X-Rays, Compton Effect.

**Wave Mechanics** : Wave Particle Duality, de Broglie Concept of Matter Waves, Heisenberg Uncertainty Principle,

Schrödinger Wave Equation and Its Applications: Particle in a Box and One Dimensional Harmonic Oscillator.

**References:**

1. Robert Resnick : Introduction to Special Theory of Relativity
2. Arthur Beiser : Perspectives of Modern Physics
3. A.K. Ghatak : Optics
4. Wehr Richards & Adiaiv : Physics of Atoms
5. O.Svelto : Lasers
6. D.J. Griffith : Electrodynamics

## CHEMISTRY

**Unit – I**

**1. Molecular theory of diatomic heteromolecules, Bond theory of bonding in metals, Hydrogen bonding.**

**2. Solid state Chemistry:**

Radius Ratio Rule, Space lattice (only cubes), Type of unit cell, Bragg's Law, Calculation of Density of unit cell. One & Two Dimensional solids, graphite as two dimensional solid and its conducting properties. Fullerene & its applications.

**Unit-II**

1. Basic principles of spectroscopic methods. The use of UV, Visible, IR, <sup>1</sup>H NMR, for the determination of structure of simple organic compounds.
2. Characteristics and classification of polymers.
3. Structures of the following polymers, viz, Natural and synthetic rubbers, Polyamide and Polyester fibres, polymethylmethacrylate, poly acrylonitrile and polystyrene. A brief account of conducting polymers (polypyrrole & polythiophene) & their applications.

**Unit-III**

1. Stability of reaction intermediates, e.g. Carbanion, Carbocation and free radicals. Types of organic reactions, & Mechanism of nucleophilic substitution reaction.
2. Mechanism of the following reactions.  
(i) Aldol condensation. (ii) Cannizzaro reaction (iii) Beckmann rearrangement (iv) Hofmann rearrangement, and (v) Diels-Alder reaction
3. E-Z Nomenclature. Optical Isomerism of organic Compounds containing one chiral center. Examples of optically active compounds without chirality. Conformations of butane.

**Unit-IV**

1. Order & Molecularity of reactions. First & Second order reactions. Energy of activation.
2. Phase Rule: Its application to one component system (Water).
3. Equilibrium Potential, electrochemical cells (galvanic & concentration cells), Electrochemical theory of corrosion & protection of corrosion.

**Unit-V**

1. Hardness of water, softening of water by Lenny-S process & Reverse osmosis. Treatment of boiler feed water by Calgon process, Zeolites and ion-exchange resins.
2. Classification of fuels, Coal, Biomass & Biogas. Determination of gross and net calorific values using Bomb Calorimeter.
3. Environmental pollution : Types of pollution & pollutants, Air Pollution. Formation and depletion of ozone, smog and Acid rain.

**References :**

1. Organic Chemistry (Morrison & Boy)
2. Inorganic Chemistry (I.D. Lee)
3. Physical Chemistry (Barrow)
4. Environmental chemistry (Manahan)

## MATHEMATICS-I

**Unit - I : Matrices**

Elementary row and column transformation, Rank of matrix, Linear dependence, Consistency of linear system of equations, Characteristic equation, Caley-Hamilton Theorem, Eigen values and eigen vectors, Diagonalisation, Complex and unitary matrices .

**Unit - II : Differential Calculus**- Leibnitz theorem, Partial differentiation, Eulers theorem, Curve tracing, Change of variables, Expansion of function of several variables

**Unit - III : Differential Calculus**- Jacobian, , Approximation of errors, Externa of functions of several variables, Lagranges method of multipliers (Simple applications).

**Unit - IV : Multiple Integrals** Double and triple integral, Change of order, Change of variables, Beta and Gamma functions, Application to area, volume, Dirichlet integral and applications.

**Unit - V : Vector Calculus**

Point functions, Gradient, divergence and curl of a vector and their physical interpretations, Line, Surface and Volume integrals, Greens, Stokes and Gauss divergence theorem.

## **Fundamentals of Computer**

**Introduction** : Classification of computer and generation, Basic architecture of computer and its building blocks, Input devices, Computer memories.

**Number System** : Binary, Octal, Decimal, and Hexadecimal representation of characters : ASCII and EBDIC codes, Binary arithmetic and logic circuit.

**Classification of Computer language** : Machine, Assembly and High level language, Brief idea of operating system, Assembler, Compiler and interpreter.

**Fundamentals of computer programming** : Problem solving through computer algorithms and flow chart level of programming.

**Operating system** : Introduction to O.S., Types of operating system, Multiprogramming, Timesharing, Batch, Real time and UNIX

**Internet** : Introduction to internet, Components, Services and working on interne, **introduction to protocols, tools.** Workshop Practice Study & Perfome on various M/C . Conducting job work by using various M/C, Cutting tools, equipments& hand tools i.e. files, chisels, hacksaw, right angle, marking tools measuring tools, etc.

## **Analog Electronics**

Turbulent flow through conduits; lift and drag; pipe networks; boundary layer theory; open channel flow; uniform and varied flow; hydraulic jump; elements of sediment transport; introduction to hydrology and hydrological cycle; elements of meteorology;

precipitation; mean depth of rainfall over area; evaporation, transpiration and evapotranspiration; interception and infiltration; run off and factors affecting run-off; unit hydrograph; methods of determination of run-off.

<b>IInd Semester</b>
1. Physics (T & P)/ Chemistry (T & P)
2. Engg. Graphics
3. Workshop Practice (T&P)
4. Thermodynamics
5. Computer Programming – I (T & P)
6. Engineering Mechanics
7. Maths-II

## Semester 2<sup>nd</sup>

### PHYSICS

#### **Unit – I : Relativistic Mechanics**

Inertial and Non-inertial Frames, Michelson-Morley Experiment, Postulates of Special Theory of Relativity, Galilean and

Lorentz Transformation, Length Contraction and Time Dilation, Addition of Velocities, Mass Energy Equivalence and

Variation of Mass with Velocity.

#### **Unit – II : Interference**

Coherent Sources, Conditions of Interference, Fresnel's Biprism Experiment, Displacement of Fringes, Interference in

Thin Films – Wedge Shaped Film, Newton's Rings.

**Diffraction** : Single and n-Slit Diffraction, Diffraction Grating, Raleigh's Criterion of Resolution, Resolving Power of

Telescope, Microscope and Grating.

#### **Unit – III : Polarization**

Phenomenon of Double Refraction, Ordinary and Extra-ordinary Rays, Nicol Prism, Production and Analysis of Plane,

Circularly and Elliptically Polarized Light, Fresnel Theory, Optical Activity, Specific Rotation, Polarimeter.

**Laser** : Principle of Laser Action, Einstein's Coefficients, Construction and Working of He-Ne and Ruby Laser.

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Schrödinger Wave Equation and Its Applications: Particle in a Box and One Dimensional Harmonic Oscillator.

#### **References:**

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5. O.Svelto : Lasers
6. D.J. Griffith : Electrodynamics

## CHEMISTRY

### **Unit – I**

**1. Molecular theory of diatomic heteromolecules, Bond theory of bonding in metals, Hydrogen bonding.**

**2. Solid state Chemistry:**

Radius Ratio Rule, Space lattice (only cubes), Type of unit cell, Bragg's Law, Calculation of Density of unit cell. One & Two Dimensional solids, graphite as two dimensional solid and its conducting properties. Fullerene & its applications.

### **Unit-II**

1. Basic principles of spectroscopic methods. The use of UV, Visible, IR, <sup>1</sup>H NMR, for the determination of structure of simple organic compounds.

2. Characteristics and classification of polymers.

3. Structures of the following polymers, viz, Natural and synthetic rubbers, Polyamide and Polyester fibres, polymethylmethacrylate, poly acrylonitrile and polystyrene. A brief account of conducting polymers (polypyrrole & polythiophene) & their applications.

### **Unit-III**

1. Stability of reaction intermediates, e.g. Carbanion, Carbocation and free radicals. Types of organic reactions, &

Mechanism of nucleophilic substitution reaction.

2. Mechanism of the following reactions.

(i) Aldol condensation. (ii) Cannizzaro reaction (iii) Beckmann rearrangement (iv) Hofmann rearrangement, and (v) Diels-Alder reaction

3. E-Z Nomenclature. Optical Isomerism of organic Compounds containing one chiral center. Examples of optically active compounds without chirality. Conformations of butane.

### **Unit-IV**

1. Order & Molecularity of reactions. First & Second order reactions. Energy of activation.

2. Phase Rule: Its application to one component system (Water).

3. Equilibrium Potential, electrochemical cells (galvanic & concentration cells), Electrochemical theory of corrosion & protection of corrosion.

### **Unit-V**

1. Hardness of water, softening of water by Lenny-S process & Reverse osmosis. Treatment of boiler feed water by

Calgon process, Zeolites and ion-exchange resins.

2. Classification of fuels, Coal, Biomass & Biogas. Determination of gross and net calorific values using Bomb Calorimeter.

3. Environmental pollution : Types of pollution & pollutants, Air Pollution. Formation and depletion of ozone, smog and Acid rain.

### **References :**

1. Organic Chemistry (Morrison & Boyd)
2. Inorganic Chemistry (I.D. Lee)
3. Physical Chemistry (Barrow)
4. Environmental chemistry (Manahan)

## Engineering Graphics

Programming techniques, review of programming languages useful to civil engineering works, structural analysis concepts, modeling of problems, relation between elements and

systems, programming with and flexibility and stiffness matrix displacement plain stress/strain problems, eigen value problems, programming for pre and post processor, civil engineering computer projects.

## **Workshop Practice**

Study & Perform on various M/C . Conducting job work by using various M/C, Cutting tools, equipments& hand tools i.e. files, chisels, hacksaw, right angle, marking tools measuring tools, etc.

## **Thermodynamics**

### **: Fundamental Concepts and Definitions**

Definition of thermodynamics, system, surrounding and universe, phase, concept of continuum, macroscopic & microscopic point of view. Density, specific volume, pressure, temperature. Thermodynamic equilibrium, property, state,path, process, cyclic process, Energy and its form, work and heat, Enthalpy. 3

### **Laws of thermodynamics**

**Zeroth law:** Concepts of Temperature, zeroth law. 1

**First law:** First law of thermodynamics. Concept of processes, flow processes and control volume, Flow work, steady flow energy equation, Mechanical work in a steady flow of process. 2

**Second law:** Essence of second law, Thermal reservoir, Heat engines. COP of heat pump and refrigerator. Statements

of second law. Carnot cycle, Clausius inequality. Concept of Entropy. 3

### **: Properties of steam and thermodynamics cycles:**

Properties of steam, use of property diagram, Steam-Tables, processes involving steam in closed and open systems.Rankine cycle. 4

Introduction to I.C. Engines-two & four stroke S.I. and C.I. engines. Otto cycle, Diesel cycle.

## **Computer Programming –I (C Language)**

### **1. Introduction :**

- a. Scope of C Language
- b. Distinction and similarities with other HLLs
- c. Special features and Application areas

### **2. Elements of C**

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables
- e. Operators unary, binary, ternary
- f. Operator precedence

### **3. Console Input-Output**

- a. Types of I-O
- b. Unformatted console I-O: getchar(), Gets(), Puts(),
- c. Formatted I-O : Scanf(), Printf()

4. **Control Flow :**
  - a. Statements and blocks
  - b. if
  - c. Switch
  - d. Loops : For, While, Do-While
  - e. Go to and labels
5. **Arrays :**
  - a. Basic Concepts
  
  - b. Memory Representation
  - c. One Dimensional Array
  - d. Two Dimensional Array
  - e. Three Dimensional Array
6. **Functions :**
  - a. Basic concept
  - b. Declaration and prototype
  - c. Calling
  - d. Arguments
7. **Pointers :**
  - a. Basic Concepts
  - b. &,\* operator
8. **Structure, Union and Enumerated Data Types**
  - a. Basic Concepts
  - b. Declarations and Memory Map
  - c. Elements of Structures
9. **File Handling :**
  - a. Types of Files
  - b. File Organization
  - c. Opening, Reading, Writing, Closing

### Engineering Mechanics

#### **Force system and Analysis**

**Basic concept:** Laws of motion. Transfer of force to parallel position. Resultant of planer force system. Free Body Diagrams, Equilibrium and its equation.

**Friction:** Introduction, Laws of Coulomb friction, Equilibrium of bodies involving dry friction-Belt Friction.

#### **Structure Analysis**

**Beams:** Introduction, Shear force and Bending Moment, shear force and Bending Moment Diagram for statically determinate beams.

**Trusses:** Introduction, Simple Trusses, Determination of Forces in simple trusses members, methods of joints and method of section.

## Center of Gravity

Center of Gravity and Moment of Inertia, Polar Moment of Inertia, C.G and M.I of composite section, section modulus

## Math-II

Complex numbers, analytic functions, Cauchy's theorems, elementary functions , function, Series expansions, calculus, of residues and application. Vector space, basis and dimension, transformation, row reduction method and it application t linear system.

IIIrd Semester
1. Digital Electronics (T & P)
2. Mechanics of Solids
3. Data Structure & Algorithm (T&P)
4. Electrical Science-I
5. Control System (T & P)
6. Maths-III
7. Hydraulic & Fluid Mechanics

## Digital Electronics

1. **Number system & Code** :- Weighted code; Non weighted code, Radix & Radix conversion; sign & magnitude Representation , complement Notation .  
Fixed point arithmetic : BCD Addition, Subtraction multiplication & Division
2. **Boolean algebra and digital logic gates** : Features of logic Algebra, postulates of Boolean algebra. Theorems of Boolean algebra . Boolean function derived logic gates. Exclusive –OR, NAND Logic gate conversion.
3. **Minimization techniques** : Minterm, Maxtrm , Karnaugh Map. K Map upto 4 Variables. Simplification of logic function with K. map Variable mapping .
4. **Combinational and Sequential systems** : Combinational logic ckt design, Half and full adder sub tractor, Binary serial and Paroled adders, BCD adder, Binary Deluder, BCD to Decimal, BCD to 7 Segment decoder, MUX, Demux , Encoder.  
**Latches, Tip.** Flops , R.S.D. J.K.T Flip flops. Master slave flip flops. Counters asyrichronous Registers, Counters.

## Mechanics of Solids

### Stress and Strain Analysis

**Simple stress and strain:** Introduction, Normal shear stresses, stress-strain diagrams for ductile and brittle materials,

Elastic constants, one dimensional loading of members of varying cross sections, strain Energy. **3**

**Compound stress and strains:** Introduction, state of plane stress, Principal stress and strain, Mohr's stress circle.

**Pure Bending of Beams:** Introduction, Simple Bending theory, Stress in Beams of different cross sections.

**Torsion:** Introduction, Torsion of Shafts of circular section, Torque and Twist, Shear stress due to Torque.

**Maculies Metrhold Column & Strut Thick & Thin Cylinder**

## **Data Structure & Algorithms**

Introduction to software design principles, modularity, abstract data types, data structures and algorithms; Analysis of algorithms; Linear data structures – stacks, arrays, lists, queues and linked representations; Pre-fix, in-fix and post-fix expressions; Recursion; Set operations; Hashing and hash functions; Binary and other trees, traversal algorithms, Huffman codes; Search trees, priority queues, heaps and balanced trees; Sorting techniques; Graphs and digraphs; Algorithmic design techniques; Data structures for external storage, multi-way search and B-trees.

## **Electrical Science-I**

Introduction :- Current, Voltage, Resistance, Effect of Electrical Energy, Ohms's Law

**D.C Circuits :-** Series circuit, Parallel circuits, Series-Parallel Circuit, Kirchoff's Law, Mesh Analysis, Nodal analysis.

**Network Theorems :-** Superposition Theorem. Delta Star & Star Delta Transformation.

**A.C Fundamentals: -** Generation of Alternating Voltage & Current, Basic terms, Average Value R.M.S Value, Peak Factor, Foam factor

**Measuring Instruments:-** Electrical Instruments, Essentials of Indicating Instruments, Moving Non Instruments, instrument type Single Phase Energy meters.

## **Control System Engineering**

1. **Concept of control system** :- Examples and application of open loop and closed loop systems, differential equations. Determination of transfer function & Signal flow graph method
2. **Time Response Analysis and Frequency Domain**: Method study state error & error specification in frequency domain and their correlation with time Domain. Bode plot Design specification in frequency domain and their co. relation with time domain.
3. **Stability of the system**: Absolute stability and Relative stability Routh's stability criterion Hurwitz criterion-root louse method of analysis Polar plots Nyquist stability criterion M and N locei Niraolas chart .

**State variable analysis** : Z Transform and stale, state variable and stale Model- solution of state equation . Concepts of Controllability & operability.

## Maths-III

Differential Equations:- Eigen-values and eigen-vectors. Inner product space and orthonormal bases. Elementary differential equations. Hypergeometric equations, lengendre polynomials. Bessel functions, Fourier series, Strum-liouville tems of first order equations. Laplace transformation and applications to differential equations one dimensional wave equation, one dimensional heat equation and equation in rectangular form.

### Hydraulics & Fluid Mechanics

Text Reference	S.W. Yuan, Foundations of Fluid Mechanics Prentice Hall, 1969. V.L. Streeter, Fluid Mechanics McGraw Hill, 1976. A.L. Prasuhn; Fundamentals of Fluid Mechanics, Prentice Hall, 1980.
Description	Introduction, fluid characteristics, continuum  concept, properties of fluids, fluid statics, flow kinematics, control volume equations, flow analysis, solution of Navier-Stokes equations for some special cases, boundary layer theory, dimensional analysis.

<b>IVth Semester</b>
1. Optimization
2. Introduction to Auto Mobile Engg.

3. Electrical Science-II
4. Introduction to Environmental Engg.
5. Fundamental of Surveying
6 Principles of Management

## Semester 4<sup>th</sup>

### Optimization

Optimization of functions of one and many variables with and without constraints; Kuhn-Tucker conditions; gradient methods; linear programming; simplex based and integer programming methods; duality theory; transportation and assignment problems; dynamic programming; branch and bound methods; models of linear production systems, sequencing and scheduling, PERT, CPM

### Introduction to Automobile Engineering

Text Reference	E.F. Obert, Internal Combustion Engines- Analysis and Practice, International Text book, 1965 M. Khovakh, Motor Vehicle Engines, Mir, Moscow, 1979.
Description	Constructional features and performance characteristics of petrol and diesel engines, Performance at high altitude and supercharged state. Theory of combustion, Study on inlet and exhaust systems. Fuel systems of petrol and diesel engines. Governing of engines.
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### Syllabus Electrical Science-II

**A.C Circuit :-** A.C Through Pure R, L& C Circuit, RL Circuit RC Circuit, RLC Circuit Series Resonance Parallel Resonance, Q Factor.

**Induction Machine :-** Introduction Principle of D.C Generator and Motor, Construction, Types of D.C Machine, EMF Equation.

**Synchronous Machine:-** Introduction, Principle of Synchronous Speed of Number of Poles, Construction, advantages of Rotating field system over Stationary field System.

**Transformer :-** Basic Principle of Transformer, E.M.F Equation, Construction, Types of T/F Transformer on No Load, Transformer on Load.

## **Introduction to Environmental Engineering**

Introduction, environmental pollution, noise, noise pollution, water pollution, air, air pollution, water quality management, pollution caused by an industry, selection of site of an industry, assessing environmental impact, case studies, computer applications, laboratory tests. Water Treatments, Solids Waste Management, Composting

## **Fundamental of Surveying**

Introduction, different types of surveying instruments, measurement of length and area, chain surveying, obstructions in chaining and its remedy, measurement of horizontal and vertical angles, height of an object, dumpy level and its application, standard bench mark, reduced level, measurement of reduced level of a point and ground, reduced level at different locations of theodolite, plane table ground for construction of road, building, pond and other structures, field tests.

## **Principles of Management**

1. Nature and importance of management
2. Principles of management
3. Planning
4. Organizing
5. Staffing
6. Directing Supervision
7. Control

## Semester Vth

Sr.No.	Name of Subject	L	P	U
1.	Applied Thermodynamics	4	2	4
2.	Design of Machine Element-I	3	0	4
3.	Theory of Machine-I	4	0	4
4.	I. C. Engine	3	2	4
5.	Production Techniques	3	2	4
6.	Steam & Gas Turbine	4	2	4

### BTME 231

## 2. Applied Thermodynamics

Thermodynamics of power developing and power absorbing reciprocating machines; vapour, gas and refrigeration cycles; regeneration, reheat, compound cycle modifications, combined gas turbine-vapour cycle, binary systems; thermodynamic relations; reactive systems; combustion, adiabatic flame temperature, dissociation, equilibrium.

Text ref. 1. Thermodynamics by A. Cengle

2. Thermodynamics by wein wely

## Sem. V

### Design of Machine Element-1st

Fundamentals and principles of design; design and selection of machine elements such as shafts, bearings and gears etc; design of mechanisms.

Design analysis for additional machine elements; retainment of bearings and design of machine housing; introduction to techniques of optimisation reliability and value analysis; exercises in detail design; design solutions to meet specified functional requirements.

Text Ref. 1. Design of mk element by R.S. Khusmi

2. MK Design by A. Sengle

### BTME 341 Sem. V

### 3. Theory of Machine-1st

Dynamic force analysis in mechanisms; determination of flywheel size; balancing of rotating & reciprocating masses; whirling of shafts; forced vibration & vibration isolation; multi-degree freedom systems; systems with distributed mass & elasticity.

Text. Ref. TOM by P.L Ballaney

### BTME 351 Sem.V

#### I.C.Engine

Internal combustion engines; vehicle performance; analysis and design of vehicle components. Experimental or theoretical investigation of problems selected from the field of automotive vehicles.

### BTME 361 Sem. V

#### Production Technique

Analysis, economics and quality control of metal cutting, plastic working of metals, joining and casting processes, laboratory exercises in metal cutting, plastic working of metals, testing and inspection of weldments and castings

**BTME371 Vth Sem.**

### Steam and Gas Turbines

Text Reference	Cohn H. Rogers, G.F.C. and servanamutto. H.I.H., "Gas Turbine Theory," Longman scientific and Technical, Third Edition, 1987. Salisbury, J.K. "steam turbines and their Cycles." John Wiley and Sons, 1950. Horlock, H.H. "Axial Flow Turbines," butterworths, London, 1966.
Description	Optimization of steam and gas cycles, current technology. Turbines: Nozzle analysis, state characteristics, losses and performance; blade design, blade selection and stage design; multistage turbines, wet steam stages and turbines. Compressors: centrifugal and axial flow compressors for gas turbines; selection of

profiles, design and performance. Combustion chambers for gas turbines: classification and characteristics; introduction to jet and rocket propulsion.

### Semester VIth

Sr.No.	Code(ID)	Name of Subject	L	P	U
1.		Theory of Machine -II	4	0	4
2.		Design of Machine Element –II	4	0	4
3.		Heat & Mass Transfer	3	2	4
4.		Machine Tool Engg.	4	2	4
5.		Power Plant Engg.	4	0	4
6.		Material Science	4	0	4
7.		Auto-CAD (Practical)	4	2	4
8.		Operation research	4	0	4
		Practical Training (45 Days)			

#### **BTME 312 Sem. VI**

##### **Theory of Machine-II**

Theory of Belt, Cam Design, Flywheel , Gear Mechanism, Revited Jointed, Bolted Jointed Welded Joints, Acceleration Mechanism and its applications

#### **BTME 322 Sem VI**

##### **Design of Machine Element-II**

Concept of system design; modeling of structural and kinematic systems, and determination of system characteristics; reliability of systems; design of machine elements for specified reliability; concepts of optimization; techniques of design optimization for linear and non-linear problems.

#### **BTME 332 Sem. VI**

##### **Heat & Mass Transfer**

Heat conduction with unsteady boundary conditions; recent advances in natural and forced convection; condensation and boiling phenomena; heat transfer in high speed flows; liquid metal heat transfer, radioactive metal heat-transfer between surfaces in absorbing media; complex problems involving simultaneous conduction, convection and radiation.

Text Ref. HMT by J.P. Holman

## **BTME 342 VI**

### **Machine Tool Engineering**

Design principles of machine tools; stiffness and rigidity of separate construction elements and their combined behaviour under load; design of stepped and stepless drives; electrical, mechanical and hydraulic drives; design of bearings and sideways; machine tool controls; machine tool dynamics; recent developments in machine tool design.

## **BTME 352 Sem.**

### **Power Plant Engineering**

Classification of power plants. Components and layout of; thermal, nuclear, hydro electric power plants. Site selection for various power plants. Combined cycle power plants. Magneto Hydro Dynamics (MHD) systems. Economics of power generation, economic loading of power stations. Load curve analysis; load factor, diversity factor. Power plant instrumentation and controls.

Text ref. Power Plant Engg. By Arora & S. Domkundwar

## **BTME 362**

### **Materials Science Sem VI**

Study of the basic properties of materials in relation to their molecular structure; emphasis on the structure of metallic, polymeric and ceramic materials in relation to their mechanical, electrical, electronic and chemical properties, methods of imparting desirable properties to materials by inducing changes in molecular

structure; property requirements and material selection, criteria for widely ranging service conditions.

Text. Ref. 1. Material Science by O.P Khanna

### **BTNE 382 Sem VI**

#### **Operation Research**

Correlation & regression analysis, queueing theory, deterministic & probabilistic inventory systems, simulation, decision theory, sampling, design of experiments & analysis of variance, non parametric tests, Markov analysis.

Text. Ref. OR by Kantt, Swaroop, Gupta

### **Semester VIIth**

<b>Sr.No.</b>	<b>Code(ID)</b>	<b>Name of Subject</b>	<b>L</b>	<b>P</b>	<b>U</b>
1.		CAD/CAM LAB.	0	4	4
2.		Production Planning & control	4	0	4
3.		Computer Aided Manufacturing	4	0	4
4.		Quality Control , Assurance & reliability	4	0	4
5.		Refrigeration &Air Conditioning	4	0	4
6.		Production Management	4	0	4
7.		Project-I(minor) With Practical Training (45 day)			

### **BTME 372**

#### **CAED (Mech. Engg.)**

Computer Aided Drafting and tools for graphics; mathematical tools; convergence criteria; design tools like modelling, simulation, spread sheets and use of specialised packages etc.; students will be required to do projects, specialised works for which a pool of guides will be drawn from several disciplines

### **BTME 421 VII**

## **Production Planning & Control**

Generalized model of production systems; types of production flows; life cycle concepts; facilities location and layout planning; aggregate and batch production planning; inventory systems; materials requirements planning; elements of monitoring & production control.

### **BTME 431 Sem.VII**

#### **Computer Aided Manufacturing**

Introduction, features of NC machine tools, NC part programming, CAM system devices, interpolators for manufacturing systems, control loops of NC systems, computerized numerical control, adaptive control systems, CAD to CAM, CAPP, industrial robots, computer aided production planning & control, computer aided inspection and quality control, CIM systems.

### **BTME 441 Sem. VII**

#### **Quality Control, Assurance & Reliability**

Basic concepts of probability and probability distributions, standard probability distribution, sampling and sampling distributions, confidence intervals, testing significance, statistical tolerance, various types of control charts, statistical process control techniques, value analysis, defect diagnosis and prevention, basic concepts of reliability, reliability design evaluation and control, methods of applying total quality management, production process.

### **BTME 451 Sem. VII**

#### **Refrigeration & Air Conditioning**

Principles, thermodynamic analysis, load estimates and design of various refrigeration and air conditioning systems for comfort and industrial applications.  
Theoretical or experimental

### **Semester VIIIth**

<b>Sr.No.</b>	<b>Code(ID)</b>	<b>Name of Subject</b>	<b>L</b>	<b>P</b>	<b>U</b>
		Project Training			

