

# **COURSE STRUCTURE & SYLLABUS OF BACHELOR OF TECHNOLOGY (B.TECH)**

## **Course Structure**

### **First Year**

### **Second Semester**

<b>Paper Code</b>	<b>Subject</b>
BF7	Mathematics - II
BF8	Applied Physics
BF9	Programming and Data Structure
BF10	Basic Electronics
BF11	Engineering Drawing and Graphics
BF12	Environmental Studies

## **SYLLABUS**

### **BF7 : MATHEMATICS - II**

#### **1. MATRICES**

Definition, Elements of matrix , Types of matrices ,Algebra of matrices , Properties of matrix multiplication, Method of finding the product of two matrices, Transpose of matrix , Symmetric and Skew-symmetric matrix , Theorem, Adjoint of a matrix, Inverse of matrix, Theorem , Adjoint of a matrix, Inverse of matrix, Elementary Transformation of a matrix, Rank of matrix , Solution of simultaneous linear Equation, consistency of equation, characteristics roots or Eigen values, Caley-Hamilton Theorem, Question Bank, Examination papers.

#### **2. FINITE DIFFERENCE & DIFFERENCE EQUATION & NUMERICAL METHODS:**

Finite Difference: Operators, Difference table, Newton's formula , Lagrange's interpolation formula, Difference Equation: Introduction , Solution of a difference equation, Question Bank: Difference Equation, Numerical methods: Newton Raphson method , Method of false position, Iteration method.

#### **3. DIFFERENTIAL EQUATIONS:**

Definition, Order and degree of differential equation, Formulation of Differential Equation, Solution of a differential equation, Differential Equation of first order and first degree , variable separable, Homogeneous Differential Equations , Equation Reducible to homogeneous form, Linear differential equation,. Equation Reducible to the linear form, Exact differential equation, Equation of first order and higher degree, Complete Solution = C.F. + P.I., Method of finding the complementary function, Rules to find particular integrals.

**Application of Differential Integrals:** Physical applications of linear equations.

#### **4. FUNCTIONS OF COMPLEX VARIABLE:**

Introduction, Complex variable, Functions of complex variable, Limit of a complex variable, Continuity, Differentiability, Analytic function, The necessary condition for  $f(z)$  to be analytic, Sufficient condition for  $f(z)$  to be analytic, C-R equation in polar form, Harmonic functions, Method to find the conjugate function, Milne Thomson method, Mapping of transformation, Bilinear transformation, Schwarz-Christoffel transformation.

**Complex Integration:** Cauchy's integral theorem, Cauchy's integral formula, Cauchy's integral formula for the derivative of an analytic function, Taylor's theorem, Laurent series, Singularity if a function, Residues, Cauchy's Residue theorem.

## **BF8 : APPLIED PHYSICS**

### **UNIT – I**

Interference, Interference of wave, Interference due to thin films of uniform thickness, Interference due to thin films of non-uniform thickness, Newton's ring, Michelson's Interferometer, Engineering applications of Interference, Relativity, Relativity of mass: Time dilation, length contraction, mass and energy, Doppler's effect.

### **UNIT-II**

#### **A. Diffraction:**

Diffraction of wave, Classes of diffraction, Fraunhofer diffraction at a single slit, Condition for maxima and minima, Diffraction at a circular aperture, Plane diffraction grating, Conditions for Principle maxima and minima, Resolving Power, Rayleigh's Criterion for resolution of two Point objects, R.P of grating, R.P at Telescope, X-ray diffraction, Laue spots, Bragg's Law, Bragg's X-ray spectrometer,

#### **B. Ultrasonics:**

Ultrasonic waves, Piezo electric effect, Production of U.Waves by P. electric, Magnetostriction effect, Production of U. Waves and its uses, Flow detection.

#### **C. Polarisation:**

Polarisation by reflection, Brewster's law, Double refraction, Positive and negative crystal, Nicol Prism, Law of Malus, Elliptical and Circular Polarisation, Quarter and half wave Plates, Production of Polarised light, analysis of light.

### **D. NUCLEAR PHYSICS**

### **UNIT-III.**

#### **A.Wave Particle Quality:**

Concept of group velocity, Phase velocity, Wave nature of matter, De-broglie waves, Derivation of De-broglie's formula by analogy with radiation. Wave length of matter waves, Electron diffraction, Davisson and Germer's experiment, Heisenberg uncertainty.

#### **B. Wave Equation:**

Concept of wave function and probability interpretation, Schrodinger's time –dependent and time independent wave equations, Physical significance of wave function, Application of Schrödinger's time- independent wave equation, Tunneling effect, Tunnel Diode.

### **UNIT-IV**

#### **A. Laser**

#### **B.Magnetism**

### **UNIT-V**

#### **A. Semiconductor Physics:**

## **B. Modern Physics:**

Motion of an electron in electric and magnetic field, Specific charge of an electron, electrostatic and magnetostatic focusing, Electron microscope, Bainbridge mass spectrograph, Positive ray, Scanning electron microscope.

## **BF9 : PROGRAMMING AND DATASTRUCTURE**

- 1. Introduction To Computers:** Introduction to Computers, its evolutions. First, second, third, fourth, fifth generation of computer. Basics of data, information, and data processing.
- 2. Number System:** Number System, Representation of information, Positional Number System, Non positional number system, bit, byte, radix, floating point, The Binary Number Base Systems, Binary-Decimal, decimal–binary conversion. Octal, Hexa- Decimal Number system. Simple problems for conversion of Hexadecimal, Octal to other number system etc. Binary Coded Decimal, Extended Binary Coded Decimal Interchange Code ASCII notations –advantages disadvantages.
- 3. Binary Arithmetic :** Binary Addition, Binary Subtraction, Multiplication, Division and their simple examples. Logic gates : AND, OR, NAND, NOR gates.
- 4. Computer Software :** Software System- application Software and their Examples in real life. Operating System and their usage. Multitasking –Multiprogramming- Multiprocessing Operating System. An overview of WWW and its Software.  
Flow charts and simple problems on flow chart.
- 5. Computer Hardware :** Hardware :Basic PC Components, Monitors, Keyboard, Storage devices :Hard Disk ; Storage related simple problems, CD, Mother-board, Printers its classification etc, OCR, OMR, BAR Code etc.
- 6. Memory Hierarchies :** Main Memory, Secondary Memory, RAM, ROM, PROM, EPROM, EEPROM etc.
- 7. Processing Unit :** CPU ;ALU, Components of CPU ; Register, Accumulator, IR, etc  
Concepts of vector Processing, Array Processing.
- 8. Elements Of Programming Languages Fortran & C:**  
Introduction to programming logic, algorithm, simple types of real integer variables in FORTRAN and C. Mathematical representations of C and FORTRAN functions. Simple programs in C programming language.

## **BF10 : BASIC ELECTRONICS**

### **1. ELECTRONIC COMPONENTS**

(1) Passive Components :-

- (i) Resistors :- Types, Rating, Colour Code, Tolerance, Fixed Value, Variable (Potentiometer), Thermistor, Negative & Positive temperature Coefficient, Basic Construction of Various types of Resistors.
- (ii) Capacitors :- Types (air, paper, ceramic, mica, electrolyte), Fixed Value & Variable, Rating, Basic Construction.
- (iii) Inductors :- Types, Inductors of high frequency application.

(2) Active Components :-

- (i) Voltage & Current Source
- (ii) Ideal and Practical Voltage Source & Current Source, equivalent circuit, Conversion of Voltage Source into current source and vice-versa.

### **2. SEMICONDUCTOR THEORY AND P-N JUNCTION**

Insulator, Intrinsic and Extrinsic Semiconductors, Energy band diagrams, Doping, Conduction in Semiconductors, P-N junction, Forward and Reverse biased p-n junction, V-I characteristics of p-n junction diode.

**3. SPECIAL PURPOSE DIODE**

Zener diodes, Tunnel diodes, Varactor diodes, Schottky diodes, Light emitting diode (LED's), Diodes for High Frequency applications.

**4. P-N-P AND N-P-N TRANSISTORS**

Base, Common Emitter and Common Collector (CB, CE, & CC) Configuration, Biasing of transistors, methods of Transistor Biasing, Base Resistor Method, Biasing with feedback resistors, Voltage divider bias method, Transistor action & Characteristics, Comparison of CB, CC & CE configuration, Application of CB, CE, & CC configuration.

**5. FIELD EFFECT TRANSISTOR (FET):-**

Construction, Operation & characteristic of FET, FET as a switch, Typical application of FET, MOSFET-Working Principle of MOSFET.

**6. INTEGRATED CIRCUITS (IC'S):-**

OP-AMP Characteristics, inverting & non-inverting OP-AMP, Differential Op-Amp's, Common Mode Rejection, application of OP-AMP (Adder, Subtractor, Voltage follower, Integrator, Differentiator)

**BF11 : ENGINEERING DRAWING AND GRAPHICS**

**1. FUNDAMENTAL OF ENGINEERING DRAWING:**

Introduction, Use of Different Drawing Instruments, Dimensioning, Scales, Geometrical constructions.

**2. ENGINEERING CURVES:**

Introduction, Conic sections, Different methods of constructions of Cycloidal Curves, Cycloid, Epicycloid, Hypocycloid, Involute, Spiral, Helix.

**3. ORTHOGRAPHIC PROJECTIONS:**

Introduction, First Angle Method of Projections, Third angle method of projections.

**4. ORTHOGRAPHIC SECTIONAL VIEWS:**

Introduction, Full Section, Sectional side view, Horizontal Section, Offset section, Ribs in section, cutting planes/section planes.

**5. ISOMETRIC PROJECTIONS:**

Isometric projection and Isometric Axes, Isometric scale, Isometric Lines, Angles, Curves and Circles in Isometric.

**6. PROJECTIONS OF STRAIGHT LINES:**

Introduction, Line parallel to two principle planes and perpendicular to the third, Line parallel to one principle plane and inclined to the other, oblique line, Traces of Lines.

**7. PROJECTION OF PLANES:**

Types of planes, various positions of planes, Traces of planes, planes parallel to one reference plane, planes perpendicular to one reference plane and inclined to the other oblique planes, projections on Auxiliary planes.

**8. PROJECTION OF SOLIDS:**

Types of Solids, Frustums and truncated solids, Various positions of Solids, Axis of Solid is perpendicular to one reference plane, Axis of the solid is parallel to one reference plane and inclined to the other, Oblique solid axis inclined to both the H.P and V.P.

#### **9. SECTIONS OF SOLIDS:**

Introduction , section plane, portion of solid assumed to be removed ,section, section lines, Apparent section, True shape of section, sectional view.

#### **10. DEVELOPMENT OF SURFACES:**

Introduction, Application of Development of surfaces in Engineering products, method of Development concepts of points and lines, Development of prisms, Development of cylinder, Development of pyramid, Development of cone.

#### **11. FREE –HAND SKETCHES:**

Introduction, Terminology used in the screw threads, V or triangular threads, ISO –metric screw threads, screw fastenings, Hexagonal Nut, Square nut, Flanged nut capnut, Dometnut, capstan nut, Ring nut, wing nut, washers, Bolts, Hexagonal Headed bolts, Square headed bolt, cheese or cylindrical headed bolt, cup headed bolt , cheese or cylindrical headed bolt, cup headed or round headed bolt, T-headed bolt, counter sunk headed bolt, Hook bolt, Eye bolt, different types of studs, screws, Locking arrangement for nut , foundation bolts, Rivets and Rivetted Joints.

## **BF 12 : ENVIRONMENTAL STUDIES**

### **UNIT 1**

**General Concepts** : Definition, Scope and importance, need for public awareness, multidisciplinary nature of environmental studies, management of environment.

### **UNIT 2**

**Natural Recourses** : Forest Resources : Use and over-exploitation, deforestation, Water Resources : Use and over-utilization of surface and ground water Mineral Resources : Use and exploitation. Food Resources : World food problem & changes.

### **UNIT 3**

**Ecosystems** : Concept, structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow, food chain, food webs and ecological pyramids, forest, grassland and desert ecosystem.

### **UNIT 4**

**Environmental Pollution** : Definition, causes, effects, air, water, soil and noise pollution. Environmental Protection Act. Environmental problem and planning.

### **UNIT 5**

**Human Population and the Environment** : Population explosion, value education, role of information technology. Visit to a local area to document environmental assets and polluted site – urban / rural / industrial / agriculture etc.

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