Faculty of Engineering & Technology
P.K.University
Shivpuri (MP)

Evaluation Scheme & Syllabus
B.Tech -Information Technology
First Year (I & II Sem)
(Effective from session 2019-20)

EVALUATION SCHEME

SEMESTER I

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BT IT-101	Engineering Mathematics-I	30	70	NA	NA	NA
BT IT-102	Engineering Physics-I	30	70	25	25	150
BT IT-103	Engineering Chemistry	30	70	25	25	150
BT IT-104	Basic Electrical Engineering	30	70	25	25	150
BT IT-105	Computer System & Programming in C	30	70	25	25	150

SEMESTER II

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BT IT-201	Engg. Maths-II	30	70	NA	NA	100
BT IT-202	Engineering Physics-II	30	70	25	25	150
BT IT-203	Elements of Mechanical Engg	30	70	25	25	150
BT IT-204	Professional Communication	30	70	25	25	150
BT IT-205	Basic Electronics	30	70	NA	NA	100

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I Year I Semester
BT IT-101 : ENGINEERING MATHEMATICS – I

Unit - 1: Differential Calculus – I
Successive Differentiation, Leibnitz's theorem, Limit , Continuity and Differentiability of functions of several variables, Partial derivatives, Euler's theorem for homogeneous functions, Total derivatives, Change of variables, Curve tracing: Cartesian and Polar coordinates.

Unit - 2: Differential Calculus - II
Taylor's and Maclaurin's Theorem, Expansion of function of several variables, Jacobian, Approximation of errors, Extreme of functions of several variables, Lagrange's method of multipliers (Simple applications).

Unit - 3: Matrix Algebra
Types of Matrices, Inverse of a matrix by elementary transformations, Rank of a matrix (Echelon & Normal form), Linear dependence, Consistency of linear system of equations and their solution, Characteristic equation, Eigen values and Eigen vectors, Cayley-Hamilton Theorem, Diagonalization, Complex and Unitary Matrices and its properties

Unit - 4: Multiple Integrals
Double and triple integrals, Change of order of integration, Change of variables, Application of integration to lengths, Surface areas and Volumes – Cartesian and Polar coordinates. Beta and Gamma functions, Dirichlet's integral and its applications.

Unit - 5: Vector Calculus
Point function, Gradient, Divergence and Curl of a vector and their physical interpretations, Vector identities, Tangent and Normal, Directional derivatives.Line, Surface and Volume integrals, Applications of Green's, Stokes and Gauss divergence theorems (without proof).

Text Books:
1. E. Kreyszig, Advanced Engineering Mathematics,John-Wiley & Sons
2. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw- Hill Publishing Company Ltd.
3. R.K.Jain&S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House.

Reference Books:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. Peter V. O' Neil, Advanced Engineering Mathematics, Thomas (Cengage) Learning.
3. Thomas & Finley, Calculus, Narosa Publishing House
4. Rukmanadachari, Engineering Mathematics – I, Pearson Education.

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I Year I Semester
BT IT-102 :ENGINEERING PHYSICS-I

Unit – I: Relativistic Mechanics
Inertial & non-inertial frames, Galilean transformations, Michelson-Morley experiment, Einstein's postulates, Lorentz transformation equations, Length contraction & Time dilation, Relativistic addition of velocities; Variation of mass with velocity, Mass energy equivalence, Concept of rest mass of photon.
Unit – II: Modern Physics: Black body radiation spectrum, Weins law and Rayleigh-Jeans law, Assumption of quantum theory of radiation, Planck's law. Wave-particle duality, de-Broglie matter waves, Bohr's quantization rule, Phase and Group velocities, Davisson-Germer experiment, Heisenberg uncertainty principle and its applications, Wave function and its significance, Schrödinger's wave equation (Time dependent and time independent) – particle in one dimensional potential box, Eigen values and Eigen function.
Unit – III: Wave Optics: Interference: Coherent sources, Interference in thin films (parallel and wedge shaped film), Newton's rings and its applications..
Diffraction: Single, double and N- Slit Diffraction, Diffraction grating, Grating spectra, dispersive power, Rayleigh's criterion and resolving power of grating.
Unit – IV: Polarization and Laser
Polarization: Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical polarized light, Retardation Plate, Optical Activity, Fresnel's theory, Specific rotation.
Laser: Spontaneous and stimulated emission of radiation, population inversion, Einstein's Coefficients, Concept of 3 and 4 level Laser, Construction and working of Ruby, He-Ne lasers and laser applications.
Unit – V: Fiber Optics and Holography :Fiber Optics: Fundamental ideas about optical fiber, Propagation mechanism, Acceptance angle and cone, Numerical aperture, Single and Multi Mode Fibers, Dispersion and Attenuation.
Holography: Basic Principle of Holography, Construction and reconstruction of Image on hologram and applications of holography.

Reference Books:
1. Concepts of Modern Physics - AurthurBeiser (Mc-Graw Hill)
2. Introduction to Special Theory of Relativity- Robert Resnick (Wielly)
3. Optics –AjoyGhatak(Tata McGraw Hill Education Private Ltd. New Delhi)
4. Optics - Brijlal& Subramanian (S. Chand)
5. Engineering Physics- C. Mani Naidu(Pearson)
6. Lasers Principles, Types and Applications- K R Nambiar (New Age)

ENGINEERING PHYSICS LAB

List of Experiments

Any ten experiments, at least four from each group:

Group -A

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of monochromatic light with the help of Fresnel's biprism.
3. To determine the focal length of two lenses by nodal slide and locate the position of cardinalpoints.
4. To determine the specific rotation of cane sugar solution using polarimeter.
5. To determine the wavelength of spectral lines using plane transmission grating.
6. To study the polarization of light by simple reflection using laser.
7. Measurement of Wavelength of a laser (He-Ne) light using single slit diffraction.

Group – B

8. To determine the specific resistance of a given wire using Carey Foster's bridge.
9. To study the variation of magnetic field along the axis of current carrying - Circular coil and then to estimate the radius of the coil.
10. To verify Stefan's Law by electrical method.
11. To calibrate the given ammeter and voltmeter by potentiometer.
12. To study the Hall effect and determine Hall coefficient, carrier density and - mobility of a given semiconductor using Hall effect set up.
13. To determine the energy band gap of a given semiconductor material.
14 To determine E.C.E. of copper using Tangent or Helmholtz galvanometer.
15. To draw hysteresis curve of a given sample of ferromagnetic material and from - this to determine magnetic susceptibility and permeability of the given specimen.
16. To determine the ballistic constant of a ballistic galvanometer.
17. To determine the coefficient of viscosity of a liquid.
18. Measurement of fiber attenuation and aperture of fiber.
19. High resistance by leakage method.
20. Magnetic Susceptibility of paramagnetic solution.

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I Year I Semester
BT IT-103 : ENGINEERING CHEMISTRY

Unit-1 Molecular orbital theory and its applications to homo-nuclear diatomic molecules. Band theory of solids. Liquid crystals and its applications. Point defects in Solids. Structure and applications of Graphite and Fullerenes. Concepts of nano-materials and its applications

Unit-2 Polymers: Basic concepts of polymer- blends and composites. Conducting and biodegradablepolymers. Preparations and applications of some industrially important polymers(Buna N, Buna S, Neoprene, Nylon 6, Nylon 6,6 , Terylene). General methods of synthesis of organometallic compound (Grignard Reagent) and their applications in polymerization.

Unit-3 Electrochemistry: Galvanic cell, electrode potential, Lead storage battery. Corrosion, causes and its prevention. Setting and hardening of cement, applications of cement. Plaster of paris. Lubricants- Classification, mechanism and applications..

Unit-4 Hardness of water. Disadvantage of hard water. Boiler troubles, Techniques for water softening; Lime-soda, Zeolite, Ion exchange resin, Reverse osmosis. Phase Rule and its application to water system.

Unit-5 Fuels; Classification of fuels. Analysis of Coal. Determination of Calorific values (bomb calorimeter &Dulong's method). Biogas. Elementary ideas and simple applications of UV, Visible, IR and H1NMR spectral Techniques.

Textbook

1. Chemistry for Engineers, by S. Vairam and Suba Ramesh; Wiley India

Reference Books

1. Textbook of Engineering Chemistry by Dr. Gopal Krishna Bhatt, Acme Publishers
2. Chemistry (9th ed), by Raymond Chang, Tata McGraw-Hill
3. Chemistry Concepts and Applications by Steven S. Zumdahl; Cengage Learning
4. Engineering Chemistry, Wiley India
5. Engineering Chemistry Author: AbhijitMallick, Viva Books
6. Text Book of Engineering Chemistry by Harsh Malhotra; Sonali Publications
7. Concise Inorganic Chemistry by J.D. Lee; Wiley India
8. Organic Chemistry (6 ed) by Morrison & Boyd; Pearson Education
9. Physical Chemistry by Gordon M. Barrow; Mc-Graw Hill
10. Organic Chemistry, Volume 1(6 ed)& 2 (5ed) by I. L. Finar; Pearson Education

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I Year I Semester
BT IT-103: ENGINEERING CHEMISTRY

LIST OF EXPERIMENTS

1. Determination of alkalinity in the given water sample.
2. Determination of temporary and permanent hardness in water sample using EDTA .
3. Determination of available chlorine in bleaching powder.
4. Determination of chloride content in water sample.
5. Determination of iron content in the given solution by Mohr's method.
6. pH- metric titration.
7. Viscosity of an addition polymer like polyester by viscometer.
8. Determination of iron concentration in sample of water by colorimetric method.
   The method involves the use of KCN as a chelating agent and the measurements
   are carried out at 480nm.
9. Element detection and functional group identification in organic compounds.
10. Preparation of Bakelite and Urea formaldehyde resin.

Note: Institute can replace two experiments from the aforesaid experiments as per

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I Year I Semester
BT IT-104 BASIC ELECTRICAL ENGINEERING

DETAILED SYLLABUS

Unit-I : Electrical Circuit Analysis:
Introduction, Circuit Concepts: Concepts of network, Active and passive elements, Voltage and current sources, Concept of linearity and linear network, Unilateral and bilateral elements, Source transformation, Kirchhoff's laws, Loop and nodal methods of analysis, Star-delta transformation, AC fundamentals: Sinusoidal, square and triangular waveforms – Average and effective values, Form and peak factors, Concept of phasors, phasor representation of sinusoidally varying voltage and current.

Unit-II: Steady- State Analysis of Single Phase AC Circuits:
Analysis of series and parallel RLCCircuits, Concept of Resonance in series & parallel circuits, bandwidth and quality factor; Apparent, active & reactive powers, Power factor, Concept of power factor improvement and its improvement (Simple numerical problems)
Network theorems (AC & DC with independent sources): Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem (Simple numerical problems)

Unit-III : Three Phase AC Circuits:
Three phase system-its necessity and advantages, Star and delta connections, Balanced supply and balanced load, Line and phase voltage/current relations, Three-phase power and its measurement (simple numerical problems).
Measuring Instruments: Types of instruments, Construction and working principles of PMMC and moving iron type voltmeters & ammeters, Single phase dynamometer wattmeter, Use of shunts and multipliers (Simple numerical problems on shunts and multipliers)

Unit-IV: Magnetic Circuit:
Magnetic circuit concepts, analogy between electric & magnetic circuits, B-H curve, Hysteresis and eddy current losses, Magnetic circuit calculations (Series & Parallel).
Single Phase Transformer: Principle of operation, Construction, EMF equation, Equivalent circuit, Power losses, Efficiency (Simple numerical problems), Introduction to auto transformer.

Unit-V: Electrical Machines:

DC machines: Principle& Construction, Types, EMF equation of generator and
torque equation of motor, applications of DC motors (simple numerical problems)
Three Phase Induction Motor: Principle& Construction, Types, Slip-torque characteristics,
Applications (Numerical problems related to slip only)
Single Phase Induction motor: Principle of operation and introduction to methods of starting,
applications.
Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor and
their applications.

Text Books:

1 ."Basic Electrical Engineering", S N Singh; Prentice Hall International
2. "Basic Electrical Engineering", KuldeepSahay, New Age International Publishers
3."Fundamentals of Electrical Engineering", B Dwivedi, A Tripathi; Wiley India
4."Principles of Electrical Engineering", V. Del Toro,; Prentice Hall International
5. "Electrical Engineering", J. B. Gupta, Kataria and Sons

Reference Books:

1."Electrical and Electronics Technology", Edward Hughes; Pearson
2."Engineering Circuit Analysis", W.H. Hayt&J.E. Kimerly; McGraw Hill
3."Basic Electrical Engineering", C L Wadhwa; New Age International
4."Basic Electrical Engineering", T.K. Nagsarkar,M.S. Shukhija; Oxford University Press

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I Year I Semester
BT IT-104 ELECTRICAL ENGINEERING LABORATORY

LIST OF EXPERIMENTS

Note: A minimum of ten experiments from the following should be performed

1. Verification of Kirchhoff's laws

2. Verification of Superposition theorem

3. Verification ofThevenin's Theorem and Maximum Power Transfer Theorem.

4. Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor

5. Study of phenomenon of resonance in RLC series circuit and obtain resonant frequency.

6. Connection and measurement of power consumption of a fluorescent lamp (tube light).

7. Measurement of power in 3- phase circuit by two wattmeter method and determination of its power factor for star as well as delta connected load.

8. Determination of parameters of ac single phase series RLC circuit

9. To observe the B-H loop of a ferromagnetic material in CRO.

10. Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single phase transformer

11. Determination of efficiency of a dc shunt motor by load test

12. To study running and speed reversal of a three phase induction motor and record speed in both directions.

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I Year I Semester
BT IT-105 COMPUTER SYSTEMS AND PROGRAMMING IN C

Unit1:

Basics of Computer: Introduction to digital computer, basic operations of computer, functional components of computer, Classification of computers.

Introduction to operating system: [DOS, Windows, Linux and Android] purpose, function, services and types.

Number system: Binary, octal and hexadecimal number systems, their mutual conversions, Binary arithmetic.

Basics of programming: Approaches to Problem Solving, Concept of algorithm and flow charts, Types of computer languages:- Machine Language, Assembly Language and High Level Language, Concept of Assembler, Compiler, Loader and Linker.

Unit2:

Standard I/O in "C", **Fundamental data types-** Character type, integer, short, long, unsigned, single and double floating point, Storage classes- automatic, register, static and external, Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and associatively.

Fundamentals of C programming: Structure of C program, writing and executing the first C program, Components of C language. Standard I/O in C.

Unit3:

Conditional program execution: Applying if and switch statements, nesting if and else, use of break and default with switch, program loops and iterations: use of while, do while and for loops, multiple loop variables, use of break and continue statements.

Functions: Introduction, types of functions, functions with array, passing values to functions, recursive functions.

Unit 4:

Arrays: Array notation and representation, manipulating array elements, using multi dimensional arrays. Structure, union, enumerated data types

Unit 5:

Pointers: Introduction, declaration, applications File handling, standard C preprocessors, defining and calling macros, conditional compilation, passing values to the compiler.

Reference:

1. The C programming by Kernighan Brain W. and Ritchie Dennis M., Pearson Education .
2. Computer Basics and C Programming by V.Rajaraman , PHI Learning Pvt. Limited – 2015.
3. Programming in C by Kochan Stephen G. Pearson Education – 2015.
4. Computer Concepts and Programming in C by D.S. Yadav and Rajeev Khanna, New Age International Publication .
5. Computer Concepts and Programming in C by Vikas Gupta, Wiley India Publication
6. Computer Fundamentals and Programming in C. ReemaThareja, Oxford Publication
7. Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill
8. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition , Cengage Learning - 2007.
9. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
10. Computer Concepts and Programming by Anami, Angadi and Manvi, PHI Publication
11. Computer Fundamental and C programming by K K Gupta, Acme Learning Publication

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I Year I Semester
BT IT-105 COMPUTER PROGRAMMING LAB

1. WAP that accepts the marks of 5 subjects and finds the sum and percentage marks obtained by the student.
2. WAP that calculates the Simple Interest and Compound Interest. The Principal , Amount, Rate ofInterest and Time are entered through the keyboard.
3. WAP to calculate the area and circumference of a circle.
4. WAP that accepts the temperature in Centigrade and converts into Fahrenheit using the formula C/5=(F-32)/9.
5. WAP that swaps values of two variables using a third variable.
6. WAP that checks whether the two numbers entered by the user are equal or not.
7. WAP to find the greatest of three numbers.
8. WAP that finds whether a given number is even or odd.
9. WAP that tells whether a given year is a leap year or not.
10. WAP that accepts marks of five subjects and finds percentage and prints grades according to the following criteria:

Between 90-100%--------------Print 'A'

80-90%--------------------------Print 'B'

60-80%-------------------------Print 'C'

Below 60%---------------------Print 'D'

11. WAP that takes two operands and one operator from the user and perform the operation and prints the result by using Switch statement.
12. WAP to print the sum of all numbers up to a given number.
13. WAP to find the factorial of a given number.
14. WAP to print sum of even and odd numbers from 1 to N numbers.
15. WAP to print the Fibonacci series.
16. WAP to check whether the entered number is prime or not.
17. WAP to find the sum of digits of the entered number.
18. WAP to find the reverse of a number.
19. WAP to print Armstrong numbers from 1 to 100.
20. WAP to convert binary number into decimal number and vice versa.
21. WAP that simply takes elements of the array from the user and finds the sum of these elements.
23. WAP to find the minimum and maximum element of the array.

24. WAP to search an element in a array using Linear Search.
25. WAP to sort the elements of the array inascending order using Bubble Sort technique.
26. WAP to add and multiply two matrices of order nxn.
27. WAP that finds the sum of diagonal elements of a mxn matrix.
28. WAP to implement strlen (), strcat (),strcpy () using the concept of Functions.
29. Define a structure data type TRAIN_INFO. The type contain Train No.: integer type Train name: string Departure Time: aggregate type TIME Arrival Time : aggregate type TIME Start station: string End station : string The structure type Time contains two integer members: hour and minute. Maintain a train timetable and implement the following operations:

(i)List all the trains (sorted according to train number) that depart from a particular section.

(ii)List all the trains that depart from a particular station at a particular time.

(iii)List all he trains that depart from a particular station within the next one hour of a given time.

(iv)List all the trains between a pair of start station and end station.

30. WAP to swap two elements using the concept of pointers.
31. WAP to compare the contents of two files and determine whether they are same or not.
32. WAP to check whether a given word exists in a file or not. If yes then find the number of times it occurs.

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I Year II Semester
BT IT-201 ENGINEERING MATHEMATICS – II

Unit - 1: Ordinary Differential Equations
Linear differential equations of nth order with constant coefficients, Complementary function and Particular integral, Simultaneous linear differential equations, Solution of second order differential equations by changing dependent & independent variables, Method of variation of parameters, Applications to engineering problems (without derivation).

Unit - 2: Series Solution and Special Functions
Series solution of second order ordinary differential equations with variable coefficient (Frobenius method), Bessel and Legendre equations and their series solutions, Properties of Bessel function and Legendre polynomials.

Unit - 3: Laplace Transform
Laplace transform, Existence theorem, Laplace transforms of derivatives and integrals, Initial and final value theorems, Unit step function, Dirac- delta function, Laplace transform of periodic function, Inverse Laplace transform, Convolution theorem, Application to solve simple linear and simultaneous differential equations.

Unit - 4: Fourier Series and Partial Differential Equations
Periodic functions, Dirichlet's Conditions, Fourier series of arbitrary periods, Euler's Formulae, Even and odd functions, Half range sine and cosine series, Gibbs Phenomena.
Solution of first order Lagrange's linear partial differential equations, Second order linear partial differential equations with constant coefficients.

Unit - 5: Applications of Partial Differential Equations
Classification of second order partial differential equations, Method of separation of variables for solving partial differential equations, Solution of one and two dimensional wave and heat conduction equations, Laplace equation in two dimension, Equation of transmission lines.

Text Books:
1. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons.
2. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw- Hill Publishing Company Ltd.
3. R.K.Jain&S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House.

Reference Books:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. Peter V. O' Neil, Advanced Engineering Mathematics, Thomas (Cengage) Learning.
3. Chandrika Prasad, Advanced Mathematics for Engineers, Prasad Mudranalaya
4. A. C. Srivastava& P. K. Srivastava, Engineering Mathematics, Vol. – II, PHI Learning Pvt. Ltd.
5. Rukmangadachari, Engineering Mathematics – II, Pearson Education.

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I Year II Semester
BT IT-202 ENGINEERING PHYSICS- II

Unit – I: Crystal Structures and X-ray Diffraction
Space lattice, basis, Unit cell, Lattice parameter, Seven crystal systems and Fourteen Bravais lattices, Co-ordination number, Atomic radius and Packing factor of different cubic structures, Crystal structure of NaCl and diamond, Lattice planes and Miller Indices, Diffraction of X-rays by crystal, Laue's experiment, Bragg's Law, Bragg's spectrometer. Compton Effect.

Unit – II: Dielectric and Magnetic Properties of Materials
Dielectric Properties: Dielectric constant and Polarization of dielectric materials, Relation between E, D and P, Types of Polarization (Polarizability). Equation of internal fields in liquid and solid (One-Dimensional), Claussius-Mossotti equation, Frequency dependence of dielectric constant, Dielectric Losses, Important applications of dielectric material, Ferroelectricity, Piezoelectricity.
Magnetic Properties: Magnetization, Origin of magnetic moment, Dia, para and ferro magnetism, Langevin's theory for diamagnetic material, Phenomena of hysteresis and its applications.

Unit – III: Electromagnetic Theory
Equation of continuity, Maxwell's Equations (Integral and Differential Forms) and its derivations, Displacement Current, Poynting vector and Poynting theorem, EM - Wave equation and its propagation characteristics in free space, non-conducting and conducting media, energy density of electromagnetic wave, Skin depth.

Unit – IV: Band Theory of Solids
Free electron Theory, Formation of bands in Solids, Classification of solids on band theory, Density of states, Fermi-Dirac distribution, Concept of effective mass, Charge carrier density (electrons and holes), Conductivity of semiconductors, carrier concentrations Fermi energy, Position of Fermi level in intrinsic and in extrinsic semiconductors. Temperature dependence of conductivity in semiconductors.

Unit – V: Physics of some technologically important Materials
Superconductors: Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, London equations, Josephson theory, persistent currents, Type I and Type II superconductors, BCS theory (Qualitative), High temperature superconductors and Applications of Super-conductors.
Nano-Materials: Basic principle of nanoscience and technology, structure, properties and uses of Fullerene, Carbon nanotubes Single and double walled nanotubes, synthesis of nanotubes, Properties and Applications of nanotubes.

Reference books:

1. Concept of Modern Physics - by Beiser (Tata Mc-Graw Hill)
2. Solid State Physics - by C. Kittel, 7th edition (Wiley Eastern)
3. Materials Science and Engineering - by V. Raghavan (Prentice- Hall India)
4. Solid State Physics - by S.O. Pillai, 5th edition (New Age International)
5. Introduction to Electrodynamics - by David J. Griffith (PH I)
6. Engineering Physics- C. Mani Naidu(Pearson)
7. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New D

PROFESSIONAL COMMUNICATION
LABORATORY PRACTICAL'S

Interactive and Communicative Practical with emphasis on Oral Presentation/Spoken Communication based on International Phonetic Alphabets (I.P.A)

LIST OF PRACTICAL'S

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.
2. Conversational skills for Interviews under suitable Professional Communication Lab conditions with emphasis on Kinesics.
3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistics / Kinesics.
4. Presentation Skills of Technical Paper/Project Reports/Professional Reports based on proper Stress and Intonation Mechanics.
5. Official /Public Speaking based on Rhythmic Patterns.
6. Theme-Presentation /Key-Note Presentation based on correct argumentation methodologies.
7. Individual Speech Delivery/Conferences with skills to defend Interjections/Quizzes.
8. Argumentative Skills/Role Play Presentation with Stress and Intonation.
9. Comprehensions Skills based on Reading and Listening Practical on a model Audio-Visual Usage.

Reference Books

1. BansalR.K.& Harrison: Phonetics in English, Orient Longman , New Delhi.
2. Sethi&Dhamija: A Course in Phonetics and Spoken English, Prentice Hall, New Delhi.
3. L.U.B. Pandey&R.P.Singh, A Manual of Practical Communication, A.I.T.B.S. Pub. India Ltd. Krishan Nagar, Delhi.
4. Joans Daniel, English Pronouncing Dictionary, Cambridge Univ. Press.

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BT IT-203 ELEMENTS OF MECHANICAL ENGINEERING

UNIT-I:
Force System: Force, Parallelogram Law, Lami's theorem, Principle of Transmissibility of forces. Moment of a force, Couple, Varignon's theorem, Resolution of a force into a force and a couple.Resultant of coplanar force system. Equilibrium of coplanar force system, Free body diagrams, Determination of reactions.
Concept of Centre of Gravity and Centroidand Area Moment of Inertia, Perpendicular axis theorem and Parallel axis theorem

UNIT-II:
Plane Truss: Perfect and imperfect truss, Assumptions and Analysis of Plane Truss by Method of joints and Method of section.
Beams: Types of beams, Statically Determinate Beams, Shear force and bending moment in beams, Shear force and bending moment diagrams, Relationships between load, shear and bending moment.

UNIT-III:
Simple stress and strain: Normal and shear stresses. One Dimensional Loading; members of varying cross section, bars in series.Tensile Test diagram for ductile and brittle materials, Elastic constants, Strain energy.
Bending (Flexural) Stresses: theory of pure bending, neutral surface and neutral axis, stresses in beams of different cross sections.
Engineering Materials: Importance of engineering materials, classification, mechanical properties and applications of Ferrous, Nonferrous and composite materials.

UNI-IV:
Basic Concepts and Definitions of Thermodynamics: Introduction and definition of thermodynamics, Microscopic and Macroscopic approaches, System, surrounding and universe, Concept of continuum, Thermodynamic equilibrium, Thermodynamic properties, path, process and cycle, Quasi static process, Energy and its forms, Work and heat. Thermodynamic definition of work.
Zeroth law of thermodynamics: Temperature and its' measurement.
First law of thermodynamics: First law of thermodynamics, Internal energy and enthalpy. First law analysis for non-flow processes. Non-flow work Steady flow energy equation; Boilers, Condensers, Turbine, Throttling process, Pumps etc.

UNIT-V:

Second law: Thermal reservoir, Kelvin Planck statement, Heat engines, Efficiency; Clausius' statement Heat pump, refrigerator, Coefficient of Performance. Carnot cycle, Carnot theorem and it'scorollaries.Clausius inequality, Concept of Entropy.

Properties of pure substances: P-v, T-s and h-s diagram, dryness fraction and steam tables. Rankine Cycle.

Internal Combustion Engines: Classification of I.C. Engines and their parts, working principle and comparison between 2 Stroke and 4 stroke engine , difference between SI and CI engines. P-v and T-s diagramsof Otto and Diesel cycles, comparison of efficiency.

Books & References:

1. Engineering Mechanics: Statics by J.LMeriam , Wiley
2. Engineering Mechanics : Statics and Dynamics by R. C. Hibbler, Pearson
3. Strength of Materials by Thimoshenko& Young
4. Mechanics of Solid by R. C. Hibbler, Pearson
5. Engineering Thermodynamics by P.K.Nag, McGraw Hill
6. Thermodynamics An Engineering Approach by Cengel& Boles, McGraw Hill
7. Engineering Thermodynamics by P. Chattopadhyay, OXFORD Publication
8. Internal Combustion Engine by V Ganesan, McGraw Hill Pub .
9. An Introduction to Mechanical Engineering by Wickert& Lewis, Cengage Learning
10. Engineering Mechanics By S. S. Bhavikatti, K. G. Rajashekarappa, New Age International
11. Engineering Mechanics by R K Bansal, Laxmi Publications
12. Fundamentals of Mechanical Engineering by Sawhney, PHI
13. Basic Mechanical Engineering by Pravin Kumar, Pearson

Department of Information Technology
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I Year II Semester
ELEMENTS OF MECHANICAL ENGINEERING LAB

Note: Any 10 experiments (Minimum of 3 from each module) are to be conducted.

Module 1:

1. To conduct the tensile test and determine the ultimate tensile strength, percentage elongation for a mild steel specimen.
2. To conduct the Impact-tests (Izod / Charpy) on Impact-testing machine to find the Impact Strength of the specimen.
3. To determine the hardness of the given specimen using Vicker/Brinell/Rockwell hardness testing machine.
4. To conduct experiment on Torsion of Rod/wire.

Module 2:

1. To Study the working of 2 stroke Diesel/Petrol engine.
2. To Study and working of 4 stroke Petrol/Diesel engine.
3. To Study the model of Babcock and Wilcox and Lancashire boiler.
4. To Study various types of Mounting and Accessories of Boilers.

Module 3:

1. To verify the parallelogram, and Triangle law.
2. To verify the polygon law of force.
3. To determine the coefficient of friction on inclined surface.
4. To determine the efficiency and Mechanical Advantage of Worm & Worm-wheel.
5. To conduct experiment on Force Analysis on simple truss and Jib-crane Apparatus.
6. To conduce friction experiment on screw-jack.

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I Year II Semester
BT IT-204 PROFESSIONAL COMMUNICATIONS

Unit-1 **Fundamentals of** **Communications**	Technical Communication: features: Distinction between General And Technical Communication; Language as a tool of communications; Levels of communication: Interpersonal, Organizational, Mass communication; The flow of communication: Downward, Upward, Lateral/Horizontal (Peer group) : Importance of technical communication; Barriers to Communication.
Unit-II **Written** **Communication**	Words and Phrases: Word formation, Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; correct Usage: all Parts of Speech; Modals; Concord; Articles; Infinitives; Transformation of sentences; Requisites f Sentence Construction: Paragraph Development: Techniques and Methods-Inductive, Deductive, Spatial , Linear, Chronological etc.
Unit-III **Business** **Communication**	Principles, Sales & Credit letters; Claim and Adjustment Letters; Job Application and Resumes. Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts; Types; Writing of Proposal; Significance; Negotiation skills.
Unit-IV **Presentation** **Strategies and Soft** **Skills.**	Nuances and Modes of Delivery; Body Language; Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice; Interpersonal communication: Definition; Types; Team work; Attitude; Way to improve Attitude Listening Skills : Types; Methods for improving Listening Skills.
Unit –V **Value- Based**	Following essays from the prescribed text book with emphasis on Mechanics of writing.

Text Readings

(i) Humanistic and Scientific Approaches to Human Activity by Moody E. Prior
(ii) The Language of Literature and Science by A. Huxley
(iii) Man and Nature by J. Bronowski
(iv) Science and Survival by Barry Commoner
(v) The Mother of the Sciences by A.J. Bahm.

Text Book

1. Improve your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
2. Technical Communication- Principles and Practices by Meenakshi Raman &Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
3. Functional skills in Language and Literature, by R.P. Singh, Oxford Univ. Press, 2005, New Delhi.

Reference Books

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt. Ltd, 2011, New Delhi.
2. Business Correspondence and Report Writing by Prof. R.C.,Sharma& Krishna Mohan, Tata McGraw Hill & Co. Ltd. , 2001, New Delhi.
3. Word Power Made Easy by Norman Lewis, W.R. Goyal Pub. & Distributors, 2009, Delhi.

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I Year II Semester
BT IT-205 BASIC ELECTRONICS

Unit I PNP-N junction diode: Introduction of Semiconductor Materials Semiconductor Diode: Depletion layer, V-I characteristics, ideal and practical, diode resistance, capacitance, Diode Equivalent Circuits, Transition and Diffusion Capacitance, Zener Diodes breakdown mechanism (Zener and avalanche) Diode Application: Series , Parallel and Series, Parallel Diode Configuration, Half and Full Wave rectification, Clippers, Clampers, Zener diode as shunt regulator, Voltage-Multiplier Circuits Special Purpose two terminal Devices :Light-Emitting Diodes, Varactor (Varicap) Diodes, Tunnel Diodes, Liquid-Crystal Displays.

Unit-II Bipolar Junction Transistors and Field Effect Transistor: Bipolar Junction Transistor: Transistor Construction, Operation, Amplification action. Common Base, Common Emitter, Common Collector Configuration DC Biasing BJTs: Operating Point, Fixed-Bias, Emitter Bias, Voltage-Divider Bias Configuration. Collector Feedback, Emitter-Follower Configuration. Bias Stabilization. CE, CB, CC amplifiers and AC analysis of single stage CE amplifier (re Model). Field Effect Transistor: Construction and Characteristic of JFETs. AC analysis of CS amplifier, MOSFET (Depletion and Enhancement)Type, Transfer Characteristic,

Unit- III Operational Amplifiers : Introduction and Block diagram of Op Amp, Ideal & Practical characteristics of Op Amp, Differential amplifier circuits, Practical Op-Amp Circuits (Inverting Amplifier, Non inverting Amplifier, Unity Gain Amplifier, Summing Amplifier, Integrator, Differentiator).
OPAMP Parameters: Input offset voltage, Output offset voltage, Input biased current, Input offset current Differential and Common-Mode Operation

Unit- IV Electronic Instrumentation and Measurements: Digital Voltmeter : Introduction, RAMP Techniques Digital Multimeters: Introduction Oscilloscope: Introduction, Basic Principle, CRT , Block Diagram of Oscilloscope, Simple CRO, Measurement of voltage, current phase and frequency using CRO, Introduction of Digital Storage Oscilloscope and Comparison of DSO with Analog Oscilloscope.

Unit- V Fundamentals of Communication Engineering: Elements of a Communication System, Need of Modulation, Electromagnetic spectrum and typical applications. Basics of Signal Representation and Analysis, Introduction of various analog modulation techniques, Fundamentals of amplitude modulation, Modulation and Demodulation Techniques of AM.

Text Books:

1. Robert L. Boylestand / Louis Nashelsky*"Electronic Devices and Circuit Theory"*, Latest Edition, Pearson Education.
2. H S Kalsi, "Electronic Instrumentation", Latest Edition, TMH Publication,.
3. George Kennedy, "Electronic Communication Systems", Latest Edition, TMH,

Reference Books:

1. David A. Bell, "*Electronic Devices and Circuits",* Latest Edition, Oxford University Press.
2. Jacob Millman, C.C. Halkias, StayabrataJit, "*Electronic Devices and Circuits*", Latest Edition ,TMH.
3. David A. Bell, Electronic Instrumentation and Measurements, Latest Edition, Oxford University Press India.

Faculty of Engineering and Technology
P.K.University
Shivpuri (MP)

Evaluation Scheme & Syllabus
B.Tech -Information Technology
Second Year (III & IV Sem)
(Effective from session 2019-20)

EVALUATION SCHEME

SEMESTER III						
		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	**SUBJECT NAME**	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTIT-301	Engineering Mathematics-III	30	70	NA	NA	100
BTIT-302	Digital Logic Design	30	70	25	25	150
BTIT-303	Data Structures	30	70	25	25	150
BTIT-304	Discrete Structures & Theory of Logic	30	70	25	25	150
BTIT-305	Computer Organization and Architecture	30	70	25	25	150
BTIT-306	Environment & Ecology\	30	70	NA	NA	100

SEMESTER IV						
		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	**SUBJECT NAME**	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTIT-401	Nano Science	30	70	NA	NA	100
BTIT-402	Information Theory & coding	30	70	NA	NA	100
BTIT-403	Operating Systems	30	70	25	25	150
BTIT-404	Theory of Automata & Formal Language	30	70	25	25	150
BTIT-405	Software Engineering	30	70	25	25	150
BTIT-406	Universal Human Value & Prof. Ethics	30	70	NA	NA	100

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II Year III Semester

BTIT-301 : ENGINEERING MATHS–III

UNIT I
Numerical Techniques – **I**: Zeroes of transcendental and polynomial equations, Bisection method, Regula-falsi method, Newton-Raphson method, Rate of convergence of above methods.
Interpolation: Finite differences, Newton's forward and backward interpolation. Lagrange's and Newton's divided difference formula for unequal intervals**.**

UNIT II
Numerical Techniques –**II**: Solution of system of linear equations, Matrix Decomposition methods, Jacobi method, Gauss- Seidal method.
Numerical differentiation & Integration: Trapezoidal rule, Simpson's one third and three-eight rules, Solution of ordinary differential equations (first order, second order and simultaneous) by Euler's, Picard's and fourth-order Runge- Kutta methods.

UNIT III
Statistical Techniques: Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves, Correlation, Linear, non – linear and multiple regression analysis, Binomial, Poisson and Normal distributions. Tests of significations: Chi-square test, t-test.

UNIT IV
Function of Complex variable: Analytic function, C-R equations, Harmonic Functions, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions, Taylor's and Laurent's series, Singularities, Zeroes and Poles, Residue theorem.

UNIT V
Integral Transforms: Fourier integral, Complex Fourier transform, Inverse Transforms, Convolution Theorems, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equations, wave equations and Laplace equations, Z- Transform and its application to solve difference equation.

Text Books:
1. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House..
2. Jain, Iyenger Jain, Numerical Methods for Scientific and Engineering Computation, New Age International, New Delhi
3. J.N. Kanpur, Mathematical Statistics, S. Chand & company Ltd.

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II Year III Semester
BT IT-302 DIGITAL LOGIC DESIGN

UNIT I

Digital System And Binary Numbers: Number System and its arithmetic, Signed binary numbers, Binary codes, Cyclic codes, Hamming Code, the map method up to five variable, Don't care conditions, POS simplification, NAND and NOR implementation, Quine McClusky method (Tabular method).

UNIT II

Combinational Logic: Combinational Circuits: Analysis Procedure, Design procedure, Binary adder-subtractor, Decimal adder, Binary multiplier, Magnitude comparator, Multiplexers, Demultiplexers, Decoders, Encoders.

UNIT III

Sequential Logic And Its Applications: Storage elements: latches & flip flops, Characteristic Equations of Flip Flops, Flip Flop Conversion, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters: Johnson & Ring Counter.

UNIT IV

Synchronous & Asynchronous Sequential Circuits: Analysis of clocked sequential circuits with state machine designing, State reduction and assignments, Design procedure. Analysis procedure of Asynchronous sequential circuits, circuit with latches, design procedure, Reduction of state and flow table, Race-free state assignment, Hazards.

UNIT V

Memory & Programmable Logic Devices: Digital Logic Families: DTL, DCTL, TTL, ECL & CMOS etc., Fan Out, Fan in, Noise Margin; RAM, ROM, PLA, PAL; Circuits of Logic Families, Interfacing of Digital Logic Families, Circuit Implementation using ROM, PLA and PAL; CPLD and FPGA.

Text Books: 1. M. Morris Mano and M. D. Ciletti, "Digital Design", Pearson Education. 2. David J. Comer, "Digital Logic & State Machine Design", Oxford University Press. 3. RP Jain, "Modern Digital Electronics", Tata McGraw Hill Publication. Reference Books: 1. DP Kothari and J.S. Dhillon, "Digital Circuits and Design", Pearson Education. 2. A. Anand Kumar, "Fundamentals of Digital Circuits", PHI Learning Pvt. Ltd.

BT IT-302: DIGITAL LOGIC DESIGN LAB

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, Concept of Vcc and ground, verification of the truth tables of logic gates using TTL ICs.

2. Implementation of the given Boolean function using logic gates in both SOP and POS forms.

3. Verification of state tables of RS, JK, T and D flip-flops using NAND & NOR gates.

4. Implementation and verification of Decoder using logic gates.

5. Implementation and verification of Encoder using logic gates.

6. Implementation of 4:1 multiplexer using logic gates.

7. Implementation of 1:4 demultiplexer using logic gates.

8. Implementation of 4-bit parallel adder using 7483 IC.

9. Design, and verify the 4-bit synchronous counter.

10. Design, and verify the 4-bit asynchronous counter.

11. Implementation of Mini Project using digital integrated circuit's and other components.

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II Year III Semester

BTIT-303: DATA STRUCTURES

UNIT I
Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big-Oh, Time-Space trade- off.

Abstract Data Types (ADT), Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays, Sparse Matrices and their representations.

Linked lists: Array Implementation and Dynamic Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition, Generalized Linked List.

UNIT II
Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Recursion, Tower of Hanoi Problem, Simulating Recursion, Principles of recursion, Tail recursion, Removal of recursion Queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Desuetude and Priority Queue.

UNIT III
Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Tree Traversal algorithms: In order, Preorder and Post order, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm.

UNIT IV
Graphs: Terminology, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency List, Adjacency Multi list, Graph Traversal : Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transitive Closure and Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm, Introduction to Activity Networks.

UNIT V
Searching: Sequential search, Binary Search, Comparison and Analysis Internal Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Radix Sort, Practical consideration for Internal Sorting.

Search Trees: Binary Search Trees (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, AVL trees, Introduction to m-way Search Trees, B Trees & B+ Trees .

Hashing: Hash Function, Collision Resolution Strategies.

Storage Management: Garbage Collection and Compaction.

Refrences:
1. Aaron M. Tenenbaum, YedidyahLangsam and Moshe J. Augenstein, "Data Structures Using C and C++", PHI Learning Private Limited, DelhiIndia
2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd DelhiIndia.
3. AK Sharma, "Data Structure Using C", Pearson EducationIndia.
4. Rajesh K. Shukla, "Data Structure Using C and C++" Wiley DreamtechPublication.
5. Michael T. Goodrich,Roberto Tamassia,David M. Mount "Data Structures and Algorithms in C++", WileyIndia.
6. P. S. Deshpandey, "C and Data structure", Wiley DreamtechPublication.
7. R. Kruse etal, "Data Structures and Program Design in C", PearsonEducation
8. Berztiss, AT: Data structures, Theory and Practice, AcademicPress.
9. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill.
10. Adam Drozdek "Data Structures and Algorithm in Java", CengageLearning

BTIT-303: DATA STRUCTURE USING C/ JAVA LAB

Program in C or C++ for following:

1. To implement addition and multiplication of two 2Darrays.

2. To transpose a 2Darray.

3. To implement stack using array.

4. To implement queue using array.

5. To implement circular queue using array.

6. To implement stack using linked list.

7. To implement queue using linked list.

8. To implement circular queue using linked list.

9. To implement binary tree using linked list.

10. To implement binary search tree using linked list.

11. To implement tree traversals using linked list.

12. To implement BFS using linked list.

13. To implement DFS using linked list.

14. To implement Linear Search.

15. To implement Binary Search.

16. To implement Bubble Sorting.

17. To implement Selection Sorting.

18. To implement Insertion Sorting.

19. To implement Merge Sorting.

20. To implement Heap Sorting

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II Year III Semester

BTIT-304: DISCRETE STRUCTURES & THEORY OF LOGIC

UNIT I
Set Theory: Introduction, Combination of sets, Multi sets, ordered pairs, Set Identities.
Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Order of relations.
Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions.
Natural Numbers: Introduction, Mathematical Induction, Variants of Induction, Induction with Nonzero Base cases.

UNIT II
Algebraic Structures: Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric groups, Group Homomorphism's, Definition and elementary properties of Rings and Fields, Integers Modulo n.

UNIT III
Partial order sets: Definition, Partial order sets, Combination of partial order sets, Hasse diagram.
Lattices: Definition, Properties of lattices – Bounded, Complemented, Modular and Complete Lattice, Morphisms of lattices.
Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra. Combinational and sequential Circuits.

UNIT IV
Propositional Logic: Proposition, well formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference, Natural Deduction.
Predicate Logic: First order predicate, well formed formula of predicate, quantifiers, Inference theory of predicate logic.

UNIT V
Trees: Definition, Binary tree, Binary tree traversal, Binary search tree.
Graphs: Definition and terminology, Representation of graphs, Multi graphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring.
Recurrence Relation & Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences.
Combinatorics: Introduction, Counting Techniques, Pigeonhole Principle

References:
1. Liu and Mohapatra, "Elements of Discrete Mathematics", McGrawHill
2. Jean Paul Trembley, R Manohar, "Discrete Mathematical Structures with Application to Computer Science",McGraw-Hill
3. YN Singh, "Discrete Mathematical Structures", Wiley India, New Delhi, First Edition, August2010.
4. RP Grimaldi, Discrete and Combinatorial Mathematics, AddisonWesley,

BTIT-304: DISCRETE STRUCTURE & LOGIC LAB

Understanding of mathematical computation software such as Mapple, Prolog to experiment the followings:

1. Working of Computation software
2. Discover a closed formula for a given recursive sequence vice-versa
3. Recursion and Induction: Practice of proof techniques
4. Practice of various set operations
5. Testing of set operating using software
6. Counting
7. Combinatorial equivalence
8. Permutations and combinations
9. Difference between structures, permutations and sets
10. Implementation of a recursive counting technique
11. N digit binary sequences not having adjacent1's
12. Probability simulation
13. The Birth day problem
14. Poker Hands problem
15. Baseball best-of-5 series: Experimental probabilities
16. Comparison of theoretical probability with experimental probability
17. Baseball: Binomial Probability
18. Basketball: One and one
19. Expected value problem
20. Binary relations

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II Year III Semester

BTIT-305: COMPUTER ORGANIZATION AND ARCHITECTURE

UNIT I
Functional units of digital system and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register bus and memory transfer, Processor organization, general register organization, stack organization and addressing modes, Look ahead carry adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation, Arithmetic & logic unit design.

UNIT II
Instruction types, formats, instruction cycles and sub cycles (fetch, execute etc), micro-operations, execution of a complete instruction, Hardwire and micro-programmed control: micro-programmed sequencing, concept of horizontal and vertical microprogramming.

UNIT III
Basic concept and hierarchy, semiconductor RAM memories, 2D $\& 2^1 DD$ memory $_2$ organization.ROMmemories,Cachememories:conceptanddesignissues&performance, address mapping and replacement, Auxiliary memories: magnetic disk, magnetic tape and optical disks, Virtual memory: concept implementation.

UNIT IV
Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions, Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors, Serial Communication: Synchronous & asynchronous communication, standard communication interfaces.

UNIT V
Architectural Classification Schemes, Flynn's & Feng's Classification, Performance Metrics and Measures, Speedup Performance Laws, Pipelining and Memory Hierarchy Basic and Intermediate Concepts, Linear and Nonlinear Pipeline Processors, Optimization of Cache Performance.

Reference Books:
1. Patterson, "Computer Organization and Design" Elsevier Pub.2009
2. William Stalling, "Computer Organization",PHI
3. M. Morris Mano, "Computer System Architecture", PearsonLearning
4. Miles Murdocca, Vincent Heuring "Computer Architecture and Organisation: An Integrated Approch" 2nd Edition
5. Kai Hwang, "Advance Computer Architecture",TMH
6. Vravice, Hamacher&Zaky, "Computer Organization",TMH
7. John P Hays, "Computer Organization", McGraw Hill
8. Tannenbaum, "Structured Computer Organization",PHI
9. P Pal Chaudhry, "Computer Organization & Design"PHI

BTIT-305: COMPUTER ORGANIZATION LAB

1. Implementing HALF ADDER, FULL ADDER using basic logicgates
2. Implementing Binary -to -Gray, Gray -to -Binary codeconversions.
3. Implementing 3-8 line DECODER and Implementing 4x1 and 8x1 MULTIPLEXERS.
4. Verify the excitation tables of variousFLIP-FLOPS.
5. Design of an 8-bit Input/ Output system with four 8-bit InternalRegisters.
6. Design of an 8-bit ARITHMETIC LOGIC UNIT.
7. Design the data path of a computer from its register transfer languagedescription.
8. Design the control unit of a computer using either hardwiring or microprogramming based on its register transfer languagedescription.
9. Write an algorithm and program to perform matrix multiplication of two n * n matrices on the 2-D mesh SIMD model, Hypercube SIMD Model or multiprocessor system.
10. Study of Scalability for Single board Multi-board, multi-core, multiprocessor using Simulator.

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BTIT-306: ENVIRONMENT & ECOLOGY

UNIT.1

Definition, Scope & Importance, Need For Public Awareness• Environment definition, Eco system - Balanced ecosystem, Human activities - Food, Shelter, Economic and social Security. Effects or human activities on environment Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment. Sustainable Development.

UNIT•II

Natural Resources• Water Resources· Availability and Quality aspects. Water borne diseases, Water Induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth, Material cycles--Carbon, Nitrogen and Sulpher Cycles. Energy - Different types of energy, Electro-magnetic radiation. Conventional and Non-Conventional sources – Hydro-Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Bio.gas. Hydrogen as an alternative future source of Energy.

UNIT-Ill

Environmental Pollution and their effects. Water pollution, Land pollution. Noise pollution, Public Health aspects, Air Pollution, Solid waste management, e-waste management Current Environmental Issues of Importance: Population Growth, Climate Change and Global warming- Effects, Urbanization, Automobile pollution. Acid Rain Ozone Layer depletion, Animal Husbandry,

UNIT4

V Environmental Protection- Role of Government, Legal aspects, initiativesby Non-Governmental organizations (NGO), Environmental Education,Women Education,

Text Books

l. Environmental Studies -Benny Joseph- Tata Mcgraw Hill-2005
2. Environmental Studies- Or. D.L. Manjunath, Pearson Education-2006.
3. Environmental studies - R, Rajagopalan -Oxford Publication • 2005.
4.Text book of Environmental Science & Technology- M. Anji Reddy- US Publication .
Reference Books
l. Principles of Environmental Science and Engineering -P. Venugoplan Rao, Prentice Hall of India.
2. Environmental Science and Engineering- Meenakshi, Prentice Hall India

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II Year IV Semester

BTIT-401: NANO SCIENCE

UNIT I
Introduction: Definition of Nano-Science and Nano Technology, Applications of Nano-Technology.
Quantum Theory for Nano Science: Particle in a box, Potential step: Reflection and tunneling
(Quantum leak). Penetration of Barrier, Potential box (Traped particle in 3D: Nanodot).
Physics of Solid State Structures: Size dependence of properties, crystal structures, face centered cubic
nanoparticles; Tetrehedrally bounded semiconductor structures; lattice vibrations.
Energy Bands: Insulators, semiconductor and conductors; Reciprocal space; Energy bands and gaps of
semiconductors; effective masses; Fermi Surfaces.
Localized Particles: Acceptors and deep taps; mobility; Excitons.

UNIT II
Quantum Nanostructure: Preparation of quantum wells, Wires and Dots, Size and Dimensionality effect, Fermi
gas; Potential wells; Partial confinement; Single electron Tunneling, Infrared detectors; Quantum dot laser
superconductivity. Properties of Individual Nano Particles: Metal nano clusters; Magic numbers; Theoretical
modeling of nano particles; geometric structure; electronic structure; Reactivity, Fluctuations, Magnetic clusters;
Bulk to nanostructure, semiconducting nano particles, Optical Properties, Photo fragmentation, Columbic
Explosion. Rare Gas & Molecular clusters; Inert gas clusters; Super fluid clusters; Molecular clusters.

UNIT III
Growth Techniques of Nanomaterials: Litho and Nonlithograpahic techniques, RF Plasma, Chemical methods,
Thermolysis, Pulsed laser method, Self-assembly, E-beam evaporation, Chemical Vapour Deposition, Pulsed
Laser Deposition.

UNIT IV
Methods of Measuring Properties: Structure: X-ray Diffraction Technique, Particle size determination, surface
structure. Microscopy: Scanning Probe Microscopy (SPM), Atomic Force Microscopy (AFM), Field Ion
Microscopy, Scanning Electron Microscopy, Transmission Electron Microscopy(TEM). Spectroscopy: Infra red
and Raman Spectroscopy, X-ray Spectroscopy, Magnetic resonance, Optical and Vibration Spectroscopy,
Luminescence.

UNIT V
Carbon Nano Materials: Bucky Ball and Carbon Nano- Tubes: Nano structures of carbon (fullerene), Fabrication,
Structure. Electrical, Mechanical and Vibrational properties and applications. Nano Diamond, Boron Nitride
Nano-tubes, Single Electron Transistors, Molecular Machine, Nano-Biometrics, Nano Robots.

Text/Reference Books:
1. CP Poole Jr, FJ Owens, "Introduction to Nanotechnology".

Department of Information Technology
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II Year IV Semester

BTIT-402: INFORMATION THEORY AND CODING

UNIT I
Review of probability theory, Definition of Information Measure and Entropy: Measure of information, Average information content of symbols in long independent sequences, Average information content of symbols in long dependent sequences. Mark-off statistical model for information source, Entropy and information rate of mark-off source, Mutual information. Asymptotic Properties of Entropy and Problem Solving in Entropy.

UNIT II
Block Code and its Properties, Data compression, Kraft-Mcmillan Equality and Compact Codes, Encoding of the source output, Shannon's encoding algorithm, Coding Strategies, Huffman Coding, Shannon-Fano-Elias Coding and Introduction to Arithmetic Coding.

UNIT III
Introduction to Information Channels, Communication Channels, Discrete communication channels, Continuous channels. Discrete memory less Channels, Mutual information, Channel Capacity, Channel coding theorem, Differential entropy and mutual information for continuous ensembles, Channel capacity Theorem.

UNIT IV
Introduction to Error Control Coding: Introduction, Types of errors, examples, Types of codes Linear Block Codes: Matrix description, Error detection and correction, Standard arrays and table look up for decoding.

UNIT V
Binary Cycle Codes, Algebraic structures of cyclic codes, Encoding using an (n-k) bit shift register, Syndrome calculation. BCH codes. RS codes, Golay codes, Shortened cyclic codes, Burst error correcting codes. Burst and Random Error correcting codes. Convolution Codes, Time domain approach. Transform domain approach.

References:
1. K. Sam Shanmugam, "Digital and analog communication systems", John Wiley.
2. Simon Haykin, "Digital communication", John Wiley.
3. Ranjan Bose, "ITC and Cryptography", Tata McGraw-Hill.
4. Thomas M. Cover, Joy A. Thomas, "Elements of Information Theory, 2nd Edition", Wiley Publication.
5. Roberto Togneri, Christopher J.S deSilva, "Fundamentals of Information Theory and Coding Design", CRC Press.
6. Steven Roman, "Introduction to Coding and Information Theory", Springer New York. 7. Glover and Grant, "Digital Communications", Pearson Education

Department of Information Technology
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II Year IV Semester

BTIT-403: OPERATING SYSTEMS

UNIT I
Introduction : Operating system and functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multiprocess Systems, Multithreaded Systems, Operating System Structure- Layered structure, System Components, Operating System services, Re-entrant Kernels, Monolithic and Microkernel Systems.

UNIT II
Concurrent Processes: Process Concept, Principle of Concurrency, Producer/ Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation; Classical Problem in Concurrency- Dining Philosopher Problem, Sleeping Barber Problem; Inter Process Communication models and Schemes, Process generation.

UNIT III
CPU Scheduling: Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram, Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling. Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery fromdeadlock.

UNIT IV
Memory Management: Basic bare machine, Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.

UNIT V
I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security.

References:
1. Silberschatz, Galvin and Gagne, "Operating Systems Concepts",Wiley
2. Andrew S. Tanenbaum, "Modern Operating System", PHILearning
3. Tanenbaum /Woodhaull "Operating System Design and Implementation", Pearson Publication.
4. Harvey M Dietel, " An Introduction to Operating System", PearsonEducation
5. Flynn, "Understanding Operating System" ,Cengage.
6. D M Dhamdhere, "Operating Systems : A Concept basedApproach", McGrawHill.
7. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw HillEducation".
8. Stuart E. Madnick& John J. *Donovan.OperatingSystems.*McGrawHill.
9. A. K. Sharma, "Operating System", UniversityPress.
10. Achyut S Godbole, Atulkahate , "Operating System", McGrawHill

BTIT-403 OPERATING SYSTEMS LAB

1. To implement CPU SchedulingAlgorithms
   - FCFS
   - SJF
   - SRTF
   - PRIORITY
   - ROUNDROBIN
2. Simulate all Page ReplacementAlgorithms
   - FIFO
   - LRU
3. Simulate Paging Technique of MemoryManagement

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

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BTIT-404: THEORY OF AUTOMATA AND FORMAL LANGUAGES

UNIT I
Introduction; Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill-Nerode Theorem

UNIT II
Regular expression (RE), Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages . Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation ofFA.

UNIT III
Context free grammar (CFG) and Context Free Languages (CFL): Definition, Examples, Derivation, Derivation trees, Ambiguity in Grammar, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure proper ties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.

UNIT IV
Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA.

UNIT V
Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computerof Integer functions, Universal TM, Church's Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs. Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory.

References:
1. Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", PearsonEducation.
2. KLP Mishra and N. Chandrasekaran, "Theory of Computer Science: Automata, Languages and Computation", PHI Learning Private Limited, DelhiIndia.
3. Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishing house.
4. YN Singh "Mathematical Foundation of Computer Science", New Age International.
5. Malviya, AK "Theory of Computation and Application", B Paperback Publications
6. Papadimitrou, C. and Lewis, CL, "Elements of the Theory of Computation", Pearson Publication.

BTIT-404: TAFL Lab

Understanding of software like JFLAP for experimenting with formal languages
1. Deterministic Finite Automata(DFA)
2. Nondeterministic Finite Automata(NFA)
3. Conversion of NFA to DFA
4. DFA Minimization
5. DFA to regular grammar conversion
6. DFA to regular expression conversion
7. Combining automata
8. Regular expression to DFA conversion
9. Mealy and Moore machine
10. Pushdown automata
11. Single tape Turing machine
12. Multi-tape Turing machine
13. Context free grammars (CFG) with singlesymbols
14. CFG with multiple symbols
15. LL Parsing
16. LR Parsing
17. Regular expressions
18. Regular pumping lemma
19. Context free pumping lemma

CFG to Chomsky Normal form transformation

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BTIT-405: SOFTWARE ENGINEERING

UNIT I
Introduction: Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

UNIT II
Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modelling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

UNIT III
Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

UNIT IV
Software Testing: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, TopDown and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

UNIT V
Software Maintenance and Software Project Management: Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re- Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

References:
1. RS Pressman, Software Engineering: A Practitioners Approach, McGraw Hill. 2. Pankaj Jalote, Software Engineering, Wiley 3. Rajib Mall, Fundamentals of Software Engineering, PHI Publication. 4. KK Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
5. Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication. 6. Ian Sommerville, Software Engineering, Addison Wesley. 7. Kassem Saleh, "Software Engineering", Cengage Learning. 8. P fleeger, Software Engineering, Macmillan Publication

BTIT-405: SOFTWARE ENGINEERING LAB

For any given case/ problem statement do the following;

1. Prepare a SRS document in line with the IEEE recommended standards.

2. Draw the use case diagram and specify the role of each of the actors. Also state the precondition, post condition and function of each use case.

3. Draw the activity diagram.

4. Identify the classes. Classify them as weak and strong classes and draw the class diagram.

5. Draw the sequence diagram for any two scenarios.

6. Draw the collaboration diagram.

7. Draw the state chart diagram.

8. Draw the component diagram.

9. Perform forward engineering in java. (Model to code conversion)

10. Perform reverse engineering in java. (Code to Model conversion)

11. Draw the deployment diagraM

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II Year IV Semester

BTIT-406 : Universal Human Values and Professional Ethics

UNIT 1: Course Introduction –
Need, Basic Guidelines, Content and Process for Value Education

1. Understanding the need, basic guidelines, content and process for Value Education
2. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfill the above human aspirations: understanding and living in **harmony** at various levels

UNIT 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
8. Understanding the needs of Self ('I') and 'Body' - *Sukh* and *Suvidha*
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensure *Sanyam* and *Swasthya*
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

13. Understanding Harmony in the family – the basic unit of human interaction

14. Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*;

Trust (*Vishwas)* and Respect (*Samman)* as the foundational values of relationship

15. Understanding the meaning of *Vishwas*; Difference between intention and competence

16. Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship

17. Understanding the harmony in the society (society being an extension of family):
Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals

18. Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj),*
Universal Order (*Sarvabhaum Vyawastha)*- from family to world family!

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

19. Understanding the harmony in the Nature

20. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature

21. Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space

22. Holistic perception of harmony at all levels of existence

- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

23. Natural acceptance of human values

24. Definitiveness of Ethical Human Conduct

25. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

26. Competence in professional ethics:

a) Ability to utilize the professional competence for augmenting universal human order
b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

27. Case studies of typical holistic technologies, management models and production systems

28. Strategy for transition from the present state to Universal Human Order:

a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b) At the level of society: as mutually enriching institutions and organizations

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BTIT-406 Python Language Programming Lab

1. To write a python program that takes in command line arguments as input and print the number of arguments.

2. To write a python program to perform Matrix Multiplication.

3. To write a python program to compute the GCD of two numbers.

4. To write a python program to find the most frequent words in a text file.

5. To write a python program find the square root of a number (Newton's method).

6. To write a python program exponentiation (power of a number).

7. To write a python program find the maximum of a list of numbers.

8. To write a python program linear search.

9. To write a python program Binary search.

10. To write a python program selection sort.

11. To write a python program Insertion sort.

12. To write a python program merge sort.

13. To write a python program first n prime numbers.

14. To write a python program simulate bouncing ball in Pygame.

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Evaluation Scheme & Syllabus
B.Tech -Information Technology
Third Year (V & VI Sem)

(Effective from session 2019-20)

EVALUATION SCHEME

		SEMESTER V				
		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	**SUBJECT NAME**	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BT IT-501	Managerial Economics	30	70	NA	NA	100
BT IT-502	Database Management Systems	30	70	25	25	150
BT IT-503	Industrial Sociology	30	70	NA	NA	100
BT IT-504	Design and Analysis of Algorithm	30	70	25	25	150
BT IT-505	Web Technologies	30	70	25	25	150
BT IT-506	Principles of Programming Languages	30	70	25	25	150

		SEMESTER VI				
		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	**SUBJECT NAME**	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BT IT-601	Industrial Management	30	70	NA	NA	100
BT IT-602	Computer Networks	30	70	25	25	150
BT IT-603	Compiler Design	30	70	25	25	150
BT IT-604	Computer Graphics	30	70	25	25	150
BT IT-605	Internet of Things	30	70	NA	NA	100
BT IT-606	Cyber security	30	70	NA	NA	100
BT IT-607	Data Warehousing & Data Mining Lab	NA	NA	25	25	50

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III Year V Semester

BT IT-501 : Managerial Economics

UNIT I
Introduction of Engineering Economics and Demand Analysis: Meaning and nature of Economics, Relation between science, engineering, technology and economics; Meaning of Demand, Determinants of Demand, Shifts in demand, Law of Demand, Price Elasticity of Demand &Types, Income Elasticity, Cross price Elasticity, Determinants of Elasticity, uses and importance of elasticity.

UNIT II

Concept of Supply: Law of Supply, Factors affecting Supply, Elasticity of supply.

Demand Forecasting: Introduction, Meaning and Forecasting, Methods or Techniques of Demand Forecasting, Criteria for Good Demand Forecasting, Demand Forecasting for a New Product;

UNIT III

Cost Analysis- Introduction, Types of Costs, Cost-Output Relationship: Cost Function, Cost-Output Relationships in the Short Run, and Cost-Output Relationships in the Long Run; Short run and long run, Break- Even Analysis; Production functions: laws of variable proportions, law of returns; Economies of scale: Internal and external

UNIT IV

Market Structure: Market Structure Perfect Competition, Imperfect competition – Monopolistic, Oligopoly, duopoly sorbent features of price determination and various market conditions

UNIT V

Nature and characteristics of Indian economy, concepts of LPG, elementary concepts of National Income, Inflation and Business Cycles ,Concept of N.I. and Measurement., Meaning of Inflation, Types and causes , Phases of business cycle .Investment decisions for boosting economy(National income and per capital income)

References:
1. Premvir Kapoor, Sociology and Economics for Engineers, Khanna Publishing House (Edition 2018)
2. Salvatore D, "Principles of Microeconomics", Oxford University Press.
3. Koutsoyiannis A, "Modern Microeconomic", Macmillan Education Ltd.
4. Dwivedi DN, "Principles of Microeconomics", Pearson Education.
5. Cowell, FA, "Microeconomic Principles and Analysis", Oxford University Press.

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III Year V Semester

BT IT-502 Database Management Systems

UNIT I
Introduction: Overview, Database System vs File System, Database System Concept and Architecture, Data Model Schema and Instances, Data Independence and Database Language and Interfaces, Data Definitions Language, DML, Overall Database Structure. Data Modeling Using the Entity Relationship Model: ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ERModel.

UNIT II
Relational data Model and Language: Relational Data Model Concepts, Integrity Constraints, Entity Integrity, Referential Integrity, Keys Constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple and Domain Calculus. Introduction on SQL: Characteristics of SQL, Advantage of SQL. SQl Data Type and Literals. Types of SQL Commands. SQL Operators and Their Procedure. Tables, Views and Indexes. Queries and Sub Queries. Aggregate Functions. Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL

UNIT III
Data Base Design & Normalization: Functional dependencies, normal forms, first, second, 8 third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design

UNIT IV
Transaction Processing Concept: Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. Distributed Database: Distributed Data Storage, Concurrency Control, Directory System.

UNIT V
Concurrency Control Techniques: Concurrency Control, Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction, Case Study of Oracle

References:
1. Korth, Silbertz, Sudarshan," Database Concepts", McGrawHill
2. Date C J, "An Introduction to Database Systems", AddisionWesley
3. Elmasri, Navathe, " Fundamentals of Database Systems", AddisionWesley
4. O'Neil, Databases, ElsevierPub.
5. RAMAKRISHNAN"Database Management Systems",McGraw Hill
6. Leon & Leon,"Database Management Systems", Vikas PublishingHouse
7. Bipin C. Desai, " An Introduction to Database Systems", GagotiaPublications

BT IT-502: Database Management Systems Lab Objectives:

1. Installing oracle/MYSQL

2. Creating Entity-Relationship Diagram using case tools.

3. Writing SQL statements Using

    ORACLE/MYSQL: a)Writing

    basic SQL SELECT statements.

    b) Restricting and sorting

    data. c)Displaying data

    from multiple tables.

    d)Aggregating data using

    group function.

    e)Manipulating data.

    e)Creating and managing tables.

4. Normalization

5. Creating cursor

6. Creating procedure and functions

7. Creating packages and triggers

8. Design and implementation of payroll processing's system

9. Design and implementation of Library Information System

10. Design and implementation of Student Information System

11. Automatic Backup of Files and Recovery of Files

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BT IT-503: Industrial Sociology

UNIT I

Industrial Sociology: Nature, Scope and Importance of Industrial Sociology. Social Relations in Industry, Social Organization in Industry- Bureaucracy, Scientific Management and Human Relations

UNIT II

Rise and Development of Industry: Early Industrialism – Types of Productive Systems – The Manorial or Feudal system. The Guild system, The domestic or putting-out system, and the Factory system. Characteristics of the factory system. Causes and Consequences of industrialization. Obstacles to and Limitations of Industrialization.

UNIT III

Industrialization in India. Industrial Policy Resolutions – 1956.Science. Technology and Innovation Policy of India 2013

UNIT IV

Contemporary Issues: Grievances and Grievance handling Procedure. Industrial Disputes: causes, Strikes and Lockouts. Preventive Machinery of Industrial Disputes: Schemes of Workers Participation in Management- Works Committee, Collective Bargaining, Bi-partite & Tri-partite Agreement, Code of Discipline, Standing Orders. Labor courts & Industrial Tribunals

UNIT V

Visualizing the future: Models of industrialization- Collectivist, anarchist, free market, environmentalist, etc. Cultural issues, consumer society and sociological concerns

References:
1. PREMVIR KAPOOOR, Sociology & Economics for Engineers, Khanna Publishing House (Edition 2018).
2. GISBERT PASCAL, Fundamentals of Industrial sociology, Tata McGraw Hill, New Delhi, 1972.
2. SCHNEIDER ENGNO V., Industrial Sociology 2nd Ed., McGraw Hill Publishing Co., New Delhi, 1979.
3. MAMORIA C.B. And MAMORIA S., Dynamics of Industrial Relations in India.
4. SINHA G.P. and P.R.N. SINHA, Industrial Relations and Labour Legislations, New Delhi, Oxford and IBH Publishing Co.,
5. S.C. SHARMA, Industrial Safety and Health Management, Khanna Book Publishing Co. (P) Ltd., Delhi
5. NADKARNI, LAKSHMI, Sociology of Industrial Worker, Rawat, Jaipur,1998.
6. BHOWMICK SHARIT, Industry, Labour and Society,Orient, 2012.
7. RICHARD BROWN, JOHN CHILD, AND S R PARKER, The Sociology of Industry 1st Edition, Routledge, 2015

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III Year V Semester

BT IT- 504: Design and Analysis of Algorithm

UNIT I
Introduction: Algorithms, Analyzing Algorithms, Complexity of Algorithms, Growth Functions, Performance Measurements, Sorting and Order Statistics-Shell Sort, Quick Sort, Merge Sort, Heap Sort, Comparison of Sorting Algorithms, Sorting in Linear Time

UNIT II
Advanced Data Structures: Red-Black Trees, B – Trees, Binomial Heaps, Fibonacci Heaps, Tries, Skip List

UNIT III
Divide and Conquer with Examples Such as Sorting, Matrix Multiplication, Convex Hull and Searching.
Greedy Methods with Examples Such as Optimal Reliability Allocation, Knapsack, Minimum Spanning Trees – Prim's and Kruskal's Algorithms, Single Source Shortest Paths- Dijkstra's and Bellman Ford Algorithms.

UNIT IV
Dynamic Programming with Examples Such as Knapsack. All Pair Shortest Paths – Warshal's   and Floyd's Algorithms,Resource Allocation Problem. Backtracking,Branchand Bound with Examples Suchas Travelling Salesman Problem,Graph Coloring, n-Queen Problem, Hamiltonian Cycles and Sum of Subsets

UNIT V
Selected Topics: Algebraic Computation, Fast Fourier Transform, String Matching, Theory of NP-Completeness, Approximation Algorithms and Randomized Algorithms

References:
1. Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms", Printice Hall of India.

2. E. Horowitz & S Sahni, "Fundamentals of ComputerAlgorithms",

3. Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education,2008.

4. LEE "Design & Analysis of Algorithms (POD)",McGrawHill

5. Gajendra Sharma, Design & Analysis of Algorithms, Khanna PublishingHouse
6. Richard E.Neapolitan "Foundations of Algorithms" Jones & BartlettLearning

7. Jon Kleinberg and Éva Tardos, Algorithm Design, Pearson,2005.

8. Michael T Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Wiley,2006.

9. Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins,1997

10. Robert Sedgewick and Kevin Wayne, Algorithms, fourth edition, Addison Wesley,2011.

11. Harsh Bhasin,"Algorithm Design and Analysis",First Edition,Oxford UniversityPress.

BT IT-504 Design and Analysis of Algorithm

Lab Objective:-

1. Program for Recursive Binary & Linear Search.

2. Program for Heap Sort.

3. Program for Merge Sort.

4. Program for Selection Sort.

5. Program for Insertion Sort.

6. Program for Quick Sort.

7. Knapsack Problem using Greedy Solution

8. Perform Travelling Salesman Problem

9. Find Minimum Spanning Tree using Kruskal's Algorithm

10. Implement N Queen Problem using Backtracking

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III Year V Semester

BT IT-505: WEB TECHNOLOGIES

UNIT I
I**ntroduction:** Introduction and Web Development Strategies, History of Web and Internet, Protocols Governing Web, Writing Web Projects, Connecting to Internet, Introduction to Internet services and tools, Introduction to client-server computing.
CoreJava:Introduction,Operator,Datatype,Variable,Arrays,Methods&Classes,Inheritance,PackageandInterface,ExceptionHandling, Multithread programming, I/O, Java Applet, String handling, Event handling, Introduction to AWT,AWT controls, Layout managers

UNIT II
Web Page Designing: HTML: List, Table, Images, Frames, forms, CSS, Document type definition,XML: DTD, XML schemes, Object Models, presenting and using XML, Using XML Processors: DOM and SAX, Dynamic HTML

UNIT III
Scripting: Java script: Introduction, documents, forms, statements, functions, objects; introduction to AJAX, **Networking** Internet Addressing, Introduction Address, Factory Methods, Instance Methods, TCP/IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagram.

UNIT IV
Enterprise Java Bean: Preparing a Class to be a JavaBeans, Creating a JavaBeans, JavaBeans Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean
Java Database Connectivity (JDBC): Merging Data from Multiple Tables: Joining, Manipulating, Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures

UNIT V
Servlets: Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resource s, Session Tracking, Cookies, Session Tracking with Http Session
Java Server Pages (JSP): Introduction, Java Server Pages Overview, A First Java Server Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries..

References:
 1. Burdman, Jessica, "Collaborative Web Development" AddisonWesley
 2. Xavier, C, " Web Technology and Design" , New AgeInternational
 3. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPBPublication
 4. Tanveer Alam, Internet & Java Programming, Khanna PublishingHouse
 5. Bhave, "Programming with Java", PearsonEducation
 6. Herbert Schieldt, "The Complete Reference:Java",TMH.
 7. Hans Bergsten, "Java Server Pages", SPDO'Reilly
 8. Margaret Levine Young, "The Complete Reference Internet",TMH
 9. Naughton, Schildt, "The Complete Reference JAVA2",TMH

BT IT-505: Web Technologies Lab

This lab is based on the Web Technologies. Some examples are as follows:

1. Write HTML/Java scripts to display your CV in navigator, your Institute website, Department Website and Tutorial website for specific subject

2. Write an HTML program to design an entry form of student details and send it to store at database server like SQL, Oracle or MS Access.

3. Write programs using Java script for Web Page to display browsers information.

5. Write a Java applet to display the Application Program screen i.e. calculator another.

6. Writing program in XML for creation of DTD, which specifies set of rules. Create a style sheet in CSS/ XSL & display the document in internet explorer.

7. Program to illustrate JDBC connectivity. Program for maintaining database by sending queries. Design and implement a simple servlet book query with the help of JDBC & SQL. Create MS Access Database, Create on ODBC link, Compile & execute JAVA JDVCSocket.

8. Install TOMCAT web server and APACHE. Access the above developed static web pages for books web site, using these servers by putting the web pages developed.

9. Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following. Create a Cookie and add these four user id's and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form and authenticate with the values available in thecookies.

10. Install a database (Mysql or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number Write a java program/servlet/JSP to connect to that database and extract data from the tables and displaythem.Insertthedetailsoftheuserswhoregisterwiththewebsite,whenever anewuserclicksthe submit button in the registration page.

11. Write a JSP which insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database

12. Design and implement a simple shopping cart example with session tracking API.

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BT IT -506: Principles of Programming Languages

UNIT I
Introduction: Role of Programming Languages: Why Programming Languages, Towards Higher-Level Languages, Programming Paradigms, Programming Environments Language Description: Syntactic Structure, Language Translation Issues: Programming Language Syntax, Stages in Translation, Formal Translation Models

UNIT II
Data, Data Types, and Basic Statements : Names , Variables , Binding, Type Checking, Scope, Scope Rules , Lifetime and Garbage Collection, Primitive Data Types, Strings, Array Types, Associative Arrays ,Record Types, Union Types, Pointers and References Arithmetic Expressions , Overloaded Operators, Type Conversions , Relational and Boolean Expressions, Assignment Statements, Mixed Mode Assignments, Control Structures, Selection ,Iterations, Branching, Guarded Statements

UNIT III
Subprograms and Implementations : Subprograms, Design Issues, Local Referencing, Parameter Passing, Overloaded Methods, Generic Methods, Design Issues for Functions , Semantics of Call and Return, Implementing Simple Subprograms, Stack and Dynamic Local Variables, Nested Subprograms, Dynamic Scoping

UNIT IV
Object-Orientation, Concurrency, and Event Handling : Grouping of Data and Operations — Constructs for Programming Structures, Abstraction Information Hiding, Program Design with Modules, Defined Types, Object Oriented Programming — Concept of Object, Inheritance, Derived Classes and Information Hiding – Templates, Semaphores, Monitors, Message Passing, Threads, Statement Level Concurrency Exception Handling (Using C++ and Java as Example Language).

UNIT V
Functional and Logic Programming Languages : Introduction to Lambda Calculus ,Fundamentals of Functional Programming Languages, Programming with Programming with ML, Introduction to Logic and Logic Programming Programming with Prolog.

References:
1. "Programming Languages: Design and Implementations" , Terrance W.Pratt, Marvin V.Zelkowitz, T.V.Gopal, Fourth ed., PrenticeHall
2. "Programming Language Design Concept", David A. Watt, WilleyIndia
3. "Programming languages: Concepts and Constucts", Ravi Sethi, SecondEd.,Pearson.
4. "Types and programming Languages", Benjamin C. Pierce. The MIT Press Cambridge,Massachusetts London, England

BT IT-506 Principles of Programming Languages

Lab Objective:-

1. Program for linear search in XML

2. Program for binary search in XML

3. Program for insertion sort in XML

4. Program for bubble sort in XML

5. Program for merge sort in XML

6. Program for Quick sort in XML

7. Program for making a dictionary in XML

8. Program for merging two unsorted-students-name-list in sorted order

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BT IT-601: INDUSTRIAL MANAGEMENT

UNIT I

Introduction: Concept and scope of Industrial Management. Productivity: Definition, measurement, productivity index, types of production system, Industrial Ownership

UNIT II

Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Social responsibilities of Management, Introduction to Human resources management: Nature of HRM, functions and importance of HRM

UNIT III

Work Study: Introduction, definition, objectives, steps in work study, Method study: definition, objectives, steps of method study, Work Measurement: purpose, types of study — stop watch methods — steps — allowances — standard time calculations — work sampling, Production Planning and Control Inventory Control: Inventory, Cost, Models of inventory control: EOQ, ABC, VED

UNIT IV

Quality Control: statistical quality control, Control charts for variables and attributes, Acceptance Sampling-Single sampling- Double sampling plans, Introduction to TQM.

UNIT V

Project Management: Project network analysis, CPM, PERT and Project crashing and resource Leveling

References:
1. Engineering Management (Industrial Engineering & Management)/ S.C. Sharma & T.R. Banga, Khanna Book Publishing Co. (P) Ltd., Delhi (ISBN: 978-93-86173-072)
2. Industrial Engineering and Management/ P. Khanna, Dhanpatrai publications Ltd.
3. Production & Operation Management /PaneerSelvam /PHI.
4. Industrial Engineering Management/NVS Raju/Cengage Learning.
5. Industrial Engineering Management I RaviShankar/ Galgotia.

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BT IT-602: COMPUTER NETWORKS

UNIT I Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling

UNIT II Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

UNIT III Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP, IP packet, IP address, IPv6

UNIT IV Transport Layer: Transport Layer - Design issues, connection management, session Layer-Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TCP - Window Management.

UNIT V Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application. Example Networks - Internet and Public Networks

REFRENCES:
1. Forouzen, "Data Communication and Networking",TMH
2. A.S. Tanenbaum, Computer Networks, Pearson Education
3. W. Stallings, Data and Computer Communication, MacmillanPress
4. Bhavneet Sidhu, An Integrated approach to Computer Networks, Khanna PublishingHouse
5. .Gary R.Wright,W.Richard Stevens "TCP/IP Illustrated,Volume2 The Implementation"Addison-Wesley
6. Anuranjan Misra, "Computer Networks", AcmeLearning

BT IT-602: COMPUTER NETWORKS LAB

1. To learn handling and configuration of networking hardware like RJ-45 connector, CAT-6 cable, crimping tool,etc.
2. Configuration of router, hub, switch etc. (using real devices orsimulators)
3. Running and using services/commands like ping, trace route, nslookup, arp, telnet, ftp,etc.
4. Network packet analysis using tools like Wireshark, tcpdump,etc.
5. Network simulation using tools like Cisco Packet Tracer, NetSim, OMNeT++, NS2, NS3,etc.
6. Socket programming using UDP and TCP (e.g., simple DNS, data & time client/server, echo client/server, iterative& concurrent servers)
7. Programming using raw sockets
8. Programming using RPC

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III Year VI Semester

BT IT-603: COMPILER DESIGN

UNIT I

Introduction to Compiler: Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Optimization of DFA-Based Pattern Matchers implementation of lexical analyzers, lexical-analyzer generator, LEX compiler, Formal grammars and their application to syntax analysis, BNF notation, ambiguity, YACC. The syntactic specification of programming languages: Context freegrammars, derivation and parse trees, capabilities of CFG

UNIT II

Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing2 tables

UNIT III

Syntax-directed Translation: Syntax-directed Translation schemes, Implementation of Syntax-directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser. More about translation: Array references in arithmetic expressions,procedures call, declarations and case statements.

UNIT IV

Symbol Tables: Data structure for symbols tables, representing scope information. Run- Time Administration: Implementation of simple stack allocation scheme, storage allocation in block structured language. Error Detection & Recovery: Lexical Phase errors, syntactic
phase errors semantic errors

UNIT V

Code Generation: DesignIssues,theTargetLanguage.AddressesintheTarget Code,Basic BlocksandFlowGraphs,Optimizati on of Basic Blocks, Code Generator .Code optimization: Machine-Independent Optimizations, Loop optimization, DAG representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis

REFRENCES:
1. K. Muneeswaran,Compiler Design,First Edition,Oxford UniversityPress.
2. J.P. Bennet, "Introduction to Compiler Techniques", Second Edition, TataMcGraw-Hill,2003.
3. Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI,2001.
4. Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", PearsonEducation
5. V Raghvan, " Principles of Compiler Design",TMH
6. Kenneth Louden," Compiler Construction", Cengage Learning.Charles Fischer and Ricard LeBlanc," Crafting a Compiler with C", PearsonEducation

BT IT-603: **COMPILER DESIGN LAB**

1. Implementation of LEXICAL ANALYZER for IFSTATEMENT

2. Implementation of LEXICAL ANALYZER for ARITHMETICEXPRESSION

3. Construction of NFA from REGULAREXPRESSION

4. Construction of DFA from NFA

5. Implementation of SHIFT REDUCE PARSINGALGORITHM

6. Implementation of OPERATOR PRECEDENCEPARSER

7. Implementation of RECURSIVE DESCENT PARSER

8. Implementation of CODE OPTIMIZATIONTECHNIQUES

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BT IT-604: COMPUTER GRAPHICS

UNIT I

Introduction and Line Generation: Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Mid-point circle generating algorithm, and parallel version of these algorithms

UNIT II

Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing. Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms- Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against non rectangular clip windows; Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping

UNIT III

Three Dimensional: 3-D Geometric Primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

UNIT IV

Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects, Introductory concepts of Spline, Bspline and Bezier curves and surface

UNIT V

Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A- buffer method, Scan line method, basic illumination models– Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

References:
1. Donald Hearn and M Pauline Baker, "Computer Graphics C Version", Pearson Education
2. Foley, Vandam, Feiner, Hughes – "Computer Graphics principle", Pearson Education.
3. Rogers, " Procedural Elements of Computer Graphics", McGraw Hill
4. W. M. Newman, R. F. Sproull – "Principles of Interactive computer Graphics" – Tata MCGraw Hill.
5. Amrendra N Sinha and Arun D Udai," Computer Graphics", Tata MCGraw Hill.
6. R.K. Maurya, "Computer Graphics " Wiley Dreamtech Publication.
7. M.C. Trivedi, NN Jani, Computer Graphics & Animations, Jaico Publications
8 Rishabh Anand, Computer Graphics- A practical Approach, Khanna Publishing House
9. Mukherjee, Fundamentals of Computer graphics & Multimedia, PHI Learning Private Limited.
10. Donald Hearn and M Pauline Baker, "Computer Graphics with OpenGL", Pearson education

BT IT-604: COMPUTER   GRAPHICS   LAB

1. To implement DDA algorithms for line and circle.

2. To implement Bresenham's algorithms for line, circle and ellipse drawing

3 . To implement Mid Point Circle algorithm using C .

4. To implement Mid Point Ellipse algorithm using C .

5. To perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.

6. To implement Cohen–Sutherland 2D clipping and window–viewport mapping.

7. To implement Liang Barksy Line Clipping Algorithm.

8. To perform 3D Transformations such as translation, rotation and scaling.

9. To convert between color models.

10. To perform animation using any Animation software

11. To perform basic operations on image using any image editing software

12. To draw different shapes such as hut, face, kite, fish etc.

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BT IT-605: INTERNET OF THINGS

UNIT I
Internet of Things (IoT): Vision, Definition, Conceptual Framework, Architectural view, technology behind IoT, Sources of the IoT, M2M Communication, IoT Examples .
Design Principles for Connected Devices: IoT/M2M systems layers and design standardization, communication technologies, data enrichment and consolidation, ease of
designing and affordability

UNIT II
HardwareforIoT: Sensors,digitalsensors,actuators,radiofrequencyidentification(RFID) technology, wireless sensor networks, participatory sensing technology .Embedded Platforms for IoT: Embedded computing basics, Overview of IOT supported Hardware platforms such as Arduino, NetArduino, Raspberry pi, Beagle Bone, Intel Galileo boards and ARM cortex

UNIT III
Network & Communication Aspects in IoT: Wireless medium access issues, MAC
protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

UNIT IV
Programming the Ardunio: Adonis platform boards anatomy, ardunio IDE, coding, using emulator, using libraries, additions in ardunio, programming the ardunio for IoT.

UNIT V
Challengesin IoT Design Challenges: Development challenges,Securitychallenges,Other challenges
IoT Applications : Smart metering, e-health, city automation, automotive applications, home automation, smart cards, Communicating data with H/W units, mobiles, tablets, Designing of smart street lights in smart city

References:
1. Olivier Hersent,DavidBoswarthick, Omar Elloumi"The Internet of Things key applications andprotocols", willey
2. Jeeva Jose, Internet of Things, KhannaPublicatiosn
3. Michael Miller "The Internet of Things" byPearson
4. Raj Kamal "INTERNET OF THINGS", McGraw-Hill, 1ST Edition,2016
5. ArshdeepBahga, Vijay Madisetti " Internet of Things(A hands on approach)" 1ST edition, VPI publications,2014
6. Adrian McEwen,HakinCassimally "Designing the Internet of Things" WileyIndia

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III Year VI Semester

BT IT-606: CYBER SECURITY

Introduction- Intro I Introduction to Information Systems, Types of Information Systems, Development of Information Systems, Introduction to Information Security, Need for Information Security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis.

Application Security- (Database, E-mail and Internet), Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control. Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail Viruses, Macro Viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to E-Commerce- Electronic Payment System, e- Cash, Credit/Debit Cards. Digital Signature, Public Key Cryptography

Developing Secure Information Systems- Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, Access Control, CCTV and Intrusion Detection Systems, Backup Security Measures.

Security Policies- Development of Policies, WWW Policies, Email Security Policies, Policy Review Process-Corporate Policies-Sample Security Policies, Publishing and Notification Requirement of the Policies. Evolving Technology Security – Mobile, Cloud, Outsourcing, SCM.

Information Security Standards-ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law.
Case Study – Corporate Security

References:

1. Charles P. Pfleeger, Shari LawerancePfleeger, "Analysing Computer Security", Pearson Education India.
2. V.K.Pachghare, "Cryptography and information Security", PHI Learning Private Limited, Delhi India.
3. Sarika Gupta &Gaurav Gupta, Information Security and Cyber Laws, Khanna Publishing House
4. AnshulKaushik, Cyber Security, Khanna Publishing House
5. Dr.SuryaPrakashTripathi, RitendraGoyal, Praveen Kumar Shukla ,"Introduction to Information Security and Cyber Law" Willey Dreamtech Press.
6. Michael E.Whitman and Herbert J Mattord "Principle of Information Security" Cengage
7. Mike Chapple and David Seidl "Cyberwarfare: Information operations in a connected world"

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BT IT-**607: Data Warehousing & Data Mining Lab**

It is expected that student should implement concept of Data Mining and Warehousing. The open source Data Mining Tools like Rapid Miner, Weka etc. can be used to implement the concept of Data Mining and Warehousing. Some examples are as follows (Subject Teacher may add more):

1. Implementation of OLAP operations

2. Implementation of Varying Arrays

3. Implementation of Nested Tables

4. Demonstration of any ETL tool

5. Write a program of Apriori algorithm using any programming language.

6. Create data-set in arff file format. Demonstration of preprocessing on WEKA data-set.

7. Demonstration of Association rule process on data-set contact lenses.arff /supermarket

   (or any other data set) using apriori algorithm.

8. Demonstration of classification rule process on WEKA data-set using j48 algorithm.

9. Demonstration of classification rule process on WEKA data-set using Naive Bayes algorithm.

10. Demonstration of clustering rule process on data-set iris.arff using simple k-means.

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Evaluation Scheme & Syllabus
B.Tech -Information Technology
Fourth Year (VII & VIII Sem)
(Effective from session 2019-20)

EVALUATION SCHEME

SEMESTER VII						
		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	**SUBJECT NAME**	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTIT-701	Entrepreneurship Development	30	70	NA	NA	100
BTIT-702	Distributed System	30	70	25	25	150
BTIT-703	Artificial Intelligence	30	70	NA	NA	100
BTIT-704	Software Testing and Audit	30	70	NA	NA	100
BTIT-705	Cryptography & Network Security	30	70	NA	NA	100
	Mini project	NA	NA	25	25	50
	Industrial training	NA	NA	25	25	50

SEMESTER VIII						
		THEORY		PRACTICAL		TOTAL
SUBJECT CODE	**SUBJECT NAME**	SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
BTIT-801	Non-Conventional Energy Resources	30	70	NA	NA	100
BTIT-802	Mobile Computing	30	70	NA	NA	100
BTIT-803	Pattern Recognition	30	70	NA	NA	100
BTIT-804	Data Compression	30	70	NA	NA	100
	Project	NA	NA	25	25	50
	Seminar	NA	NA	25	25	50

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IV Year VII Semester

BTIT-701: Entrepreneurship Development

UNIT I

Entrepreneurship- definition. growth of small scale industries in developing countries and their positions vis-a-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control types. 5 Government policy for small scale industry; stages in starting a small scale industry.

UNIT II

Project identification- assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return and net present value methods.

UNIT III

Accountancy- Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control, quality control, marketing, industrial relations, sales and purchases, advertisement, wages and incentive, inventory control, preparation of financial reports, accounts and stores studies.

UNIT IV

Project Planning and control:
The financial functions, cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. profit planning and programming, planning cash flow, capital expenditure and operations. control of financial flows, control and communication.

UNIT V

Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxes and workman compensation act. 5
Role of various national and state agencies which render assistance to small scale industries.

Reference Books:
1. Forbat, John, "Entrepreneurship" New AgeInternational.
2. Havinal, Veerbhadrappa, "Management and Entrepreneurship" New Age International
3. Joseph, L. Massod, "Essential of Management", Prentice Hall ofIndia.

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BTIT-702: DISTRIBUTED SYSTEMS

UNIT I

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models.
Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks ,Lamport's& vectors logical clocks.
Concepts in Message Passing Systems: causal order, total order, total causal order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.

UNIT II

Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms. Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

UNIT III

Agreement Protocols: Introduction, System models, classification of Agreement Problem,Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.
Distributed Resource Management: Issues in distributed File Systems, Mechanism for buildingdistributed file systems, Design issues in Distributed Shared Memory, Algorithm for Implementation of Distributed Shared Memory.

UNIT IV

Failure Recovery in Distributed Systems: Concepts in Backward and Forward recovery, Recoveryin Concurrent systems, Obtaining consistent Checkpoints, Recovery in Distributed Database Systems. Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols.

UNIT V

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.
Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated Data

REFERENCES:

1. Singhal&Shivaratri, "Advanced Concept in Operating Systems", McGrawHill
2. Ramakrishna,Gehrke," Database Management Systems", McGrawHill
3. Vijay K.Garg Elements of Distributed Compuitng ,Wiley
4. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", PearsonEducation
5. Tenanuanbaum, Steen," Distributed Systems",PHI

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IV Year VII Semester

BTIT-703: ARTIFICIAL INTELLIGENCE

UNIT I
Introduction : Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

UNIT II
Introduction to Search : Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.

UNIT III
Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks
.
UNIT IV
Machine Learning : Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bays models, Learning with hidden data - EM algorithm, Reinforcement learning,

UNIT V
Pattern Recognition : Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbor (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

REFERENCES:
1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", PearsonEducation
2. Elaine Rich and Kevin Knight, "Artificial Intelligence",McGraw-Hill
3. E Charniak and D McDermott, "Introduction to Artificial Intelligence", PearsonEducation
4. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall ofIndia,

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IV Year VII Semester

BTIT-704: SOFTWARE TESTING AND AUDIT

UNIT I

Review of Software Engineering:
Overview of software evolution, SDLC, Testing Process, Terminologies in Testing: Error, Fault, Failure, Verification, Validation, Difference between Verification and Validation, Test Cases, Testing Suite, Test Oracles, Impracticality of Testing All data; Impracticality of testing All Paths.

Verification:
Verification methods, SRS verification, Source code reviews, User documentation verification, Software project audit, Tailoring Software Quality Assurance Program by Reviews, Walkthrough, Inspection, and Configuration Audits.

UNIT II
Functional Testing:
Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing:
Control flow testing, Path testing, Independent paths, Generation of graph from program, Identification of independent paths, Cyclamate Complexity, Data Flow Testing, Mutation Testing.

UNIT III
Regression Testing: What is Regression Testing? Regression Test cases selection, Reducing the number of test cases, Code coverage prioritization technique.
Reducing the number of test cases: Prioritization guidelines, Priority category, Scheme, Risk Analysis.

UNIT-IV:
Software Testing Activities: Levels of Testing, Debugging, Testing techniques and theirApplicability, Exploratory Testing

Automated Test Data Generation:
Test Data, Approaches to test data generation, test data generation using genetic algorithm, Test Data Generation Tools, Software Testing Tools, and Software test Plan.

UNIT-V:
Object oriented Testing: Definition, Issues, Class Testing, Object Oriented Integration and System Testing.
Testing Web Applications: What is Web testing?, User interface Testing, Usability Testing, Security Testing, Performance Testing, Database testing, Post Deployment Testing.

REFERENCES:
1. Yogesh Singh, "Software Testing", Cambridge University Press, New York,2012
2. K..K. Aggarwal&Yogesh Singh, "Software Engineering", New Age International Publishers, New i,2003.
3. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Fifth Edition, McGraw-Hill International Edition, NewDelhi,2001.

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IV Year VII Semester

BTIT-705: CRYPTOGRAPHY & NETWORK SECURITY

UNIT I
Introduction to security attacks, services and mechanism, Classical encryption techniques-substitution ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers.
Modern Block Ciphers: Block ciphers principles, Shannon's theory of confusion and diffusion, fiestal structure, Data encryption standard(DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations, Triple DES

UNIT II
Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm, Advanced Encryption Standard (AES) encryption and decryption Fermat's and Euler's theorem, Primarily testing, Chinese Remainder theorem, Discrete Logarithmic Problem, Principals of public key crypto systems, RSA algorithm, security of RSA

UNIT III
Message Authentication Codes: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions, Secure hash algorithm (SHA)
Digital Signatures: Digital Signatures, Elgamal Digital Signature Techniques, Digital signature standards (DSS), proof of digital signature algorithm,

UNIT IV
Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key distribution, X.509 Certificates, Public key Infrastructure.
Authentication Applications: Kerberos, Electronic mail security: pretty good privacy (PGP), S/MIME.

UNIT V
IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management.
Introduction to Secure Socket Layer, Secure electronic, transaction (SET)
System Security: Introductory idea of Intrusion, Intrusion detection, Viruses and related threats, firewalls

REFERENCES:

1. William Stallings, "Cryptography and Network Security: Principals and Practice", Pearson Education.
2. Behrouz A. Frouzan: Cryptography and Network Security, Tata McGrawHill
3. C K Shyamala, N Harini, Dr. T.R.Padmnabhan Cryptography and Security,Wiley
4. Bruce Schiener, "Applied Cryptography". John Wiley &Sons
5. Bernard Menezes," Network Security and Cryptography", CengageLearning.
6. AtulKahate, "Cryptography and Network Security", Tata McGrawHill

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IV Year VIII Semester

BTIT-801: NON-CONVENTIONAL ENERGY RESOURCES

UNIT-I
Introduction: Various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits.
Solar Cells: Theory of solar cells. solar cell materials, solar cell array, solar cell power plant, limitations.

UNIT-II
Solar Thermal Energy: Solar radiation, flat plate collectors and their materials, applications and performance, focussing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations.

UNIT-III
Geothermal Energy: Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations. 4 Magneto-hydrodynamics
(MHD): Principle of working of MHD Power plant, performance and limitations. 2 Fuel Cells: Principle of working of various types of fuel cells and their working, performance and limitations.

UNIT-IV
Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations. 2 Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. performance and limitations of energy conversion systems.

UNIT-V
Bio-mass: Availability of bio-mass and its conversion theory. 2 Ocean Thermal Energy Conversion (OTEC): Availability, theory and working principle, performance and limitations. Wave and Tidal
Wave:Principle of working, performance and limitations. Waste Recycling Plants.

Text/References Books:
1. Raja etal, "Introduction to Non-Conventional Energy Resources" Scitech Publications.
2. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications,2006.
3. M.V.R. Koteswara Rao, " Energy Resources: Conventional & Non-Conventional "BSP
Publications,2006.
4. D.S. Chauhan,"Non-conventional Energy Resources" New Age International. 5. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners"PHI
Learning.
6. Peter Auer, "Advances in Energy System and Technology". Vol. 1 & II Edited by Academic Press.

Department of Information Technology
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P.K. University, Shivpuri (MP)
IV Year VIII Semester

BTIT-802: MOBILE COMPUTING

Unit – I

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: airinterface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

Unit – II

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

Unit – III

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

Unit – IV

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

Unit – V

Ad-hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

Text Books:

1. Thampi - Mobile Communications and Computing ,Wiley
2. J. Schiller, Mobile Communications, Addison Wesley.
3. Charles Perkins, Mobile IP, Addison Wesley.
4. Charles Perkins, Ad hoc Networks, Addison Wesley.
5. Upadhyaya, "Mobile Computing", Springer
6. Stojmenovic, Handbook of Wireless Networks and Mobile Computing, Wiley India.

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IV Year VIII Semester

BTIT-803: PATTERN RECOGNITION

UNIT I

Introduction: Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

UNIT II

Statistical Patten Recognition: Bayesian Decision Theory, Classifiers, Normal density and discriminate functions,

UNIT III

Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods - Principal Component Analysis (PCA), Fisher Linear discriminate analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

UNIT IV

Nonparametric Techniques: Density Estimation, Parzen Windows, K-Nearest Neighbor Estimation, Nearest Neighbor Rule, Fuzzy classification.

UNIT V

Unsupervised Learning & Clustering: Criterion functions for clustering, Clustering Techniques: Iterative square - error partition clustering – K means, agglomerative hierarchical clustering, Cluster validation

REFERENCES:

1. Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification", 2nd Edition, John Wiley, 2006.
2. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer,2009.
3. S. Theodoridis and K. Koutroumbas, "Pattern Recognition", 4th Edition, Academic Press,2009

Department of Information Technology
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IV Year VIII Semester

BTIT-804: DATA COMPRESSION

UNIT I
Compression Techniques: Loss less compression, Lossy Compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

UNIT II
The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression.

UNIT III
Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move- to-front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markoy Compression.

UNIT IV
Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantize, Adaptive Quantization, Non uniform Quantization.

UNIT V
Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm, Tree structured Vector Quantizes. Structured Vector Quantizes

REFERENCES:
1. Khalid Sayood, Introduction to Data Compression, Morgan KaufmannPublishers
2. Elements of Data Compression,Drozdek, CengageLearning
3. Introduction to Data Compression, Second Edition,KhalidSayood,The MorganaufmannSeries
4.Data Compression: The Complete Reference 4th Edition byDavid Salomon,Springer
5.Text Compression1st Edition by Timothy C. Bell Prentice Hall