COURSE STRUCTURE FOR B.TECH I YEAR

B. Tech. I Year I Semester

S.No	Course Code	Course Title	L	T	P	Credits
1	A31002	Mathematics-I	3	1	0	4
2	A31003	Applied Physics	3	1	0	4
3	A31082	Applied Physics Lab	0	0	3	1.5
4	A31201	Basic Electrical Engineering	3	0	0	3
5	A31281	Basic Electrical Engineering Lab	0	0	2	1
6	A31381	Engineering Workshop	0	1	3	2.5
7	A31081	English Language Skills Lab (ELSL)	0	0	2	1
8	A31501	Programming for Problem Solving-I	2	0	0	2
9	A31581	Programming for Problem Solving Lab-I	0	0	2	1
Total			**11**	**3**	**12**	**20**

B. Tech. I Year II Semester

S.No	Course Code	Course Title	L	T	P	Credits
1	A32007	Mathematics-II	3	1	0	4
2	A32010	Chemistry	3	1	0	4
3	A32088	Chemistry Lab	0	0	3	1.5
4	A32006	English	2	0	0	2
5	A32085	English Communication Skills Lab(ECSL)	0	0	2	1
6	A32502	Programming for Problem Solving-II	2	0	0	2
7	A32582	Programming for Problem Solving Lab-II	0	0	2	1
8	A32303	Engineering Graphics & Modeling	1	0	3	2.5
Total			**11**	**2**	**10**	**18**

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY

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COURSE STRUCTURE FOR B.TECH II YEAR

B. Tech. II Year I Semester

S.No	Course Code	Course Title	L	T	P	Credits
1	A33015	Probability and Statistics for Artificial Intelligence (PSAI)	3	0	0	3
2	A33401	Electronic Devices & Circuits (EDC)	3	0	0	3
3	A33404	Digital Logic Design(DLD)	3	0	0	3
4	A33507	Introduction to Artificial Intelligence (IAI)	3	0	0	3
5	A33505	Mathematical Foundations of Computer Science (MFCS)	3	0	0	3
6	A33508	Concepts of Data Structures (CDS)	3	0	0	3
7	A33584	Data Structures using C++ Lab	0	0	2	1
8	A33483	Digital Logic Design and Electronic Devices & Circuits Lab	0	0	2	1
9	A33MC3	Cyber Law (CL)	2	0	0	0
Total			**20**	**0**	**4**	**20**

B. Tech. II Year II Semester

S.NO	Course Code	Course Title	L	T	P	Credits
1	A34509	Design & Analysis of Algorithms (DAA)	4	1	0	4
2	A34514	Computer Organization and Architecture (COA)	3	0	0	3
3	A34513	Database Management Systems (DBMS)	3	0	0	3
4	A34515	Machine Learning (ML)	3	0	0	3
5	A34516	Essentials of Python (EP)	3	0	0	3
6	A34018	Professional Communication (PC)	1	0	2	2
7	A34586	Database Management Systems Lab	0	0	2	1
8	A34587	Machine Learning using Python Lab	0	0	2	1
9	A34MC2	Environmental Science (ES)	2	0	0	0
Total			**19**	**1**	**6**	**20**

Mathematics I

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(Matrices and Calculus)

I Year I Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Write the matrix representation of system of linear equations and identify the consistency of the system of equations.
2. Find the Eigen values and Eigen vectors of the matrix and discuss the nature of the quadratic form.
3. Analyze the convergence of sequence and series.
4. Discuss the applications of mean value theorems to the mathematical problems, Evaluation of improper integrals using Beta and Gamma functions.
5. Examine the extrema of functions of two variables with/ without constraints.

UNIT-I:

Matrices and Linear System of Equations:

Matrices and Linear system of equations: Real matrices – Symmetric, skew - symmetric, Orthogonal. Complex matrices: Hermitian, Skew – Hermitian and Unitary. Rank-Echelon form, Normal form. Solution of Linear Systems – Gauss Elimination, Gauss Jordan & LU Decomposition methods.

UNIT-II:

Eigen Values and Eigen Vectors:

Eigen values, Eigen vectors – properties, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalization of matrix- Quadratic forms: Reduction to Canonical form, Nature, Index, Signature.

UNIT-III:

Sequences & Series:

Basic definitions of Sequences and series, Convergence and divergence, Ratio test, Comparison test, Cauchy's root test, Raabe's test, Integral test, Absolute and conditional convergence.

UNIT-IV:

Beta & Gamma Functions and Mean Value Theorems:

Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Generalized Mean Value theorem (all theorems without proof) – Geometrical interpretation of Mean value theorems.

UNIT-V:

Functions of several variables:

Partial Differentiation and total differentiation, Functional dependence, Jacobian Determinant-Maxima and Minima of functions of two variables with constraints and without constraints, Method of Lagrange Multipliers.

Textbooks:

1. Higher Engineering Mathematics,B.S. Grewal, Khanna Publishers, 36th Edition, 2010
2. Advanced Engineering Mathematics by Jain &Iyengar Narosa Publications

Reference Books:

1. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, 9th Edition, Pearson, Reprint, 2002.
2. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
3. Advanced Engineering Mathematics (2nd Edition) Michael D. Greenberg

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Applied Physics

I Yearl Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Identify various optical phenomena of light.
2. Discuss the basic principles of quantum mechanics.
3. Classify solids based on the band theory.
4. Elucidate the characteristics of semiconductors and semiconductor devices.
5. Explain the working principle of lasers and optical fibers.

UNIT – I:

Wave Optics:

Principle of Superposition, coherence and methods to produce coherent sources, Interference - Interference in thin films by reflection, Newton's Rings.Diffraction – Fraunhofer and Fresnel Diffraction, Farunhofer diffraction due to single slit, Plane Diffraction Grating, resolving power of Grating.Polarization – Polarization of light waves, Plane of vibration, plane of polarization, Double refraction, Nicol's Prism, Applications of Polarization.

UNIT-II :

Introduction to Quantum Mechanics and free electron theory:

Classical free electron Theory, Electrical Conductivity and Ohm's Law – Drawbacks, Sommerfeld theory (Qualitative).Introduction to quantum physics: Black body radiation and Planck's Law(Qualitative), wave-particle duality, de-Broglie hypothesis of matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle, time independent Schrodinger equation, Born interpretation of wave function, particle in an infinite potential well (one dimension).

UNIT-III:

Band theory of solids and semiconductors:

Kronig-Penny model(Qualitative), E-k diagram, Energy bands in solids, classification of materials into metals, semiconductors, and insulators, Effective mass, Density of States, Fermi distribution function, Fermi level and its importance. Intrinsic semiconductors, carrier concentration in intrinsic semiconductors, energy band diagram and position of Fermi level in intrinsic semiconductors, equation for electrical conductivity of semiconductors, extrinsic semiconductors.

UNIT-IV:

Semiconductor Devices:

Direct and indirect band-gap semiconductors, Formation of p-n junction, energy diagram of PN junction, I-V characteristics of PN junction diode, Photo diode, solar cell-efficiency, light emitting diode and their characteristics, semiconductor laser: device structure and characteristics, Hall effect and its applications.

UNIT-V:

Fiber Optics and Lasers:

Introduction, total internal reflection, acceptance angle and numerical aperture, losses associated with optical fibers, step and graded index fibers, applications of optical fibers.Introduction to interaction of radiation with matter: stimulated absorption, spontaneous emission and stimulated emission, Einstein's coefficients and their relations, characteristics of a laser, important components of a laser: active medium, pumping source, optical resonator. population inversion, Ruby laser, He-Ne laser, applications of lasers.

Textbooks:

1. Engineering Physics, P K Palanisamy, Scietech publication.
2. Engineering Physics, V Rajendran, McGraw Hill Education.

Reference Books:

1. Engineering Physics, S O Pillai, Sivakami, New Age International (P) Limited.
2. Physics Volume I & II, Resnick and Halliday, John Wiley and sons, Inc.

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Applied Physics Lab

I Yearl Semester

L	T	P	C
0	0	3	1.5

Course Outcomes:

1. Apply optical phenomena to characterize optical sources and components.
2. Determine the energy gap of a semiconductor diode and time constant of RC circuit
3. Describe the electrical characteristics of PN junction diode, photodiode, LED and solar cell.
4. Demonstrate the resonance in mechanical and electrical waves.
5. Identify the magnetic Induction along the axis of current carrying coil.

List of Experiments

1. Newton's rings: Determination of the radius of curvature of the lens by forming Newton's rings.
2. Diffraction grating: To determine the number of lines per inch of the grating.
3. Dispersive power: To determine the dispersive power of prism by using spectrometer.
4. Single Slit Diffraction using Lasers- Determination of wavelength of a Monochromatic Source (LASER).
5. Energy gap of P-N junction diode: Determination of the energy gap of a semiconductor diode.
6. Photo diode: Study the V-I Characteristics of Photo diode.
7. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.
8. Solar cell: Study the V-I Characteristics of Solar cell.
9. Stewart & Gee's experiment - Determination of magnetic Induction along the axis of current carrying coil.
10. LCR Circuit- Determination of the Resonance frequency of forced electrical oscillator.
11. RC- Circuit – Determination of the time constant of RC-circuit.
12. Optical fiber: Determination of the Numerical aperture of Optical fiber.

Note: Any 10 experiments are to be performed.

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Basic Electrical Engineering

L	T	P	C
3	0	0	3

I Year I Semester

Course Outcomes:

1. Understand the fundamentals of basic circuit components and their characteristics.
2. Analyze basic electrical circuits with A.C excitation.
3. Understand the concepts of magnetic circuits and transformers.
4. Acquire the basic concepts of electrical motors.
5. Understand the concept of A.C generator and low voltage electrical installations.

UNIT- I:

Introduction to Electrical Engineering and DC Circuits:

Basic definitions, types of elements, types of sources, Kirchhoff's Laws, resistive networks, inductive networks, series, parallel circuits, Star- Delta and Delta- Star transformation, Network theorems- Superposition, Thevenin's - simple problems.

UNIT- II:

AC Circuits:

Representation of sinusoidal waveforms, peak, RMS and average values **-** Elementary treatment of single-phase AC circuits consisting of R, R-L, R-C, R-L-C combinations (series and parallel) **-** Phase representation, real power, reactive power, apparent power, resonance concept. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT -III:

Magnetic Circuits &Transformers:

Magnetic circuits: Magnetic materials, Faraday's laws of Electromagnetic Induction, BH characteristics, Magnetic Circuits - concept of Self & Mutual Inductance.

Transformers: Ideal and practical single phase transformer, OC-SC tests, equivalent circuit, losses in transformer, regulation and efficiency - simple problems.

UNTI -IV:

DC Machines and Induction Motors:

DC Machines: Construction, Principle and Operation of DC Motor, Voltage- torque equations - simple problems.

Three Phase Induction Motor: Construction, Principle and working of three phase Induction Motor, torque slip characteristics, - simple problems.

Single Phase Induction Motor: Single phase Induction Motor construction and working principle, capacitor start – applications.

UNIT -V:

Ac Generator & Electrical Installation:

AC Generator: Construction, Principle of operation of Synchronous Generator, Pitch Factor- Distribution Factor (or winding factor) - EMF equation – simple problems.

Electrical Installation: Fuse, Circuit breakers, difference between fuse and circuit breaker, Types of Batteries, battery backup.

Textbooks:

1. Basic Electrical Engineering, D.P Kothari & I.J Nagrath, Tata McGraw Hill Publishing Company Limited-2nd Edition.
2. Basic Electrical Engineering, T.K. Nagsarkar and M.S. Sukhija, Oxford University Press-3rd Edition.

Reference Books:

1. Circuits and Networks, A.Sudhakar&ShyamMohan.S, Tata McGraw Hill Publishing Company limited, 5th Edition.
2. Basic Electrical Engineering, K.Uma Rao and A.Jayalakshmi, Pearson Publications.
3. Basic Electrical Engineering by D C Kulshreshtha, McGraw Hill Education Private limited, 1st Edition.

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Basic Electrical Engineering Lab

L	T	P	C
0	0	2	1

I Year I Semester

Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters.
4. Understand the performance characteristics of D.C electrical machines.
5. Understand the performance characteristics of A.C electrical machines.

List of experiments/ demonstrations:

Any 5 experiments from Part-A and Part-B should be conducted (Total 10 Experiments)

Part A

1. Verification of Ohms law.
2. Verification of KVL and KCL.
3. Verification of Thevenin's Theorem.
4. Verification of Superposition Theorem.
5. Transient Response of Series R- L and R - C circuits using DC excitation.
6. Determination and Verification of Impedance and Current of RL and RC series circuits.

Part B

1. Transient Response of R-L-C Series circuit using DC excitation.
2. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation).
3. OC & SC Test on Single phase transformer.
4. Brake test on DC shunt motor.
5. Brake test on Three Phase Squirrel cage induction motor.
6. OCC of Three phase alternator.

Reference Books:

1. Circuits and Networks by A. Sudhakar &ShyamMohan.S, Tata McGraw Hill Publishing Company Limited, 5th Edition.
2. Basic Electrical Engineering - by T.K. Nagsarkar and M.S. Sukhija, Oxford University Press, 3rd Edition.
3. Basic Electrical Engineering by D.P Kothari & I.J Nagrath, Tata McGraw Hill Publishing Company Limited, 2nd Edition.

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Engineering Workshop

I Year I Semester

L	T	P	C
0	1	3	2.5

Course Outcomes:

1. Understanding the tools and methods of using to fabricate engineering components
2. Applying the measuring techniques to verify the dimensional accuracy
3. Evaluating various methods and trades of workshop in the component building

(i) Lectures & videos:

Detailed contents:

1. Manufacturing Methods- Metal Forming, Machining, Advanced manufacturing methods (2 lectures)
2. CNC machining, Additive manufacturing (2 lectures)
3. Fitting operations & power tools (1 lecture)
4. House wiring (1 lecture)
5. Carpentry (1 lecture)
6. Plastic moulding(1 lecture)
7. Metal casting (1 lecture)
8. Welding (1 Lecture)

(ii) Workshop Practice:

Detailed contents:

1. Machine shop (Lathe machine)
2. Fitting shop
3. Carpentry
4. House Wiring
5. Welding shop (Arc welding)
6. Tin Smithy

Reference Books:

1. Elements of Workshop Technology, Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Manufacturing Engineering and Technology, Kalpakjian S. And Steven S. Schmid, 4th edition, Pearson Education India Edition, 2002.

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English Language Skills Lab

I Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

1. Reproduce speech sounds and improve fluency in language.
2. Understand syllables and consonant clusters for appropriate pronunciation.
3. Exhibit effective professional skills with rhetoric eloquence.
4. Deliver enthusiastic and well-practiced presentation.
5. Learn Task-Based Language Learning (TBLL) through various language learning activities effectively.

Exercise- I:
CALL Lab:
Introduction to Pronunciation- Speech Sounds, Vowels and Consonants- Practice for Listening .
ICS Lab:
Ice-Breaking activity and JAM session.

Exercise-II:
CALL Lab:
Silent Letters, Consonant Clusters, Homographs.
ICS Lab:
Common Everyday Situations: Conversations and Dialogues.

Exercise-III:
CALL Lab:
Syllables.
ICS Lab:
Communication at Workplace, Social and Professional Etiquette.

Exercise-IV:
CALL Lab:
Word Accent and Stress Shifts.
ICS Lab:
Formal Presentations, Visual Aids in Presentations.

Exercise-V:
CALL Lab:
Intonation, Situational dialogues for practice.
ICS Lab:

Interviews, Types of Interviews.

Reference Books:

1. A textbook of English Phonetics for Indian Students, T. Balasubramanian, Macmillan Publishers,2010.
2. Speaking English Effectively, Mohan, Macmillan Publishers, 2010.

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Programming for Problem Solving-I

I Year I Semester

L	T	P	C
2	0	0	2

Course Outcomes:

1. Design Algorithms and Flowcharts for real world applications using 'C'.
2. Know the usage of various operators in Program development.
3. Design programs involving decision and iteration structures.
4. Apply the concepts code reusability using Functions.
5. Analyze various searching and sorting techniques using Arrays.

UNIT-I:

Problem Solving Using Computers: Introduction, Algorithms, Flowcharts and Pseudo code, Applications of C language.

Overview of C Language: Introduction, Salient Features of C Language, Structure of a "C" Program.

C Language Preliminaries: Keywords and Identifiers, Constants, Variables, Data Types, and Input / Output Statements with suitable illustrative "C" Programs.

UNIT-II:

Operators: Assignment Operators, Relational and Logical Operators, Increment and Decrement Operators, Bitwise Operators, Ternary Operator, Type Conversion, Precedence and Associativity with suitable illustrative "C" Programs.

UNIT-III:

Statements in C:

Conditional/Decision Statements: if, if-else, Nested if-else, else-if ladder, and Switch-Statement with suitable illustrative "C" Programs.

Loop Control Statements: while, do-while and for with suitable illustrative "C" Programs.

UNIT-IV:

Functions: Introduction to Functions, benefits of functions, types of functions, Function calls, return vs exit( ), Parameter Passing mechanism: Call-by-Value, Recursion, Storage Classes.

UNIT-V:

Arrays: Introduction to Arrays, One-Dimensional Arrays, Two-Dimensional Arrays, Arrays and Functions.

Searching and Sorting: Linear Search, Binary Search, Bubble Sort, Insertion Sort.

Textbooks:

1. Computer Science: A Structured Programming Approach Using C, B.A. Forouzon and R.F. Gilbert Third edition, CENGAGE Learning, 2016.
2. C and Data Structures,Ashok N. Kamthane, Pearson Education. 2010.

Reference Books:

1. Problem Solving Using C, M.T. Somashekara,PHI, 2nd Edition 2009.
2. Computer Fundamentals and Programming in C,A.K.Sharma,2nd Edition, University Press.
3. Programming in C 2/e, Pradip Dey and Manas Ghosh,Oxford University Press, 2nd Edition 2011
4.The Fundamentals of Computers, Rajaraman V,4th Edition, Prentice Hall of India,2006
5. Programming in C,R S Bichker, University Press, 2012.

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Programming for Problem Solving Lab – I

I Year I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

1. Apply the specification of syntax rules for numerical constants and variables, data types.
2. Know the Usage of various operators and other C constructs.
3. Design programs on decision and control constructs.
4. Develop programs on code reusability using functions.
5. Implement various searching and sorting techniques using arrays.

Week 1
Ubuntu and Linux Commands.

Week 2
Designing of flowcharts and algorithms using raptor tool.
1. Areas of Polygons.
2. Calculation of Simple and Compound Interest.
3. Swapping of Two numbers with and without temporary variable.
4. Checking whether a number is even or odd.
5. Sum of first 'n' natural numbers.
6. Checking a number whether it is divisible by any given number.
7. Evaluation of mathematical expressions.
8. Programs using scanf( ) and printf( ) statements.

Week 3
Programs on operators. (Minimum 4 Programs)

Week 4, 5 & 6
Programs on Conditional Statements. (Minimum 12 Programs)

Week 7,8 & 9
Programs on Control Statements. (Minimum 12 Programs)

Week 10 &11
Programs on Functions. (Minimum 6 Programs)

Week 12

Programs on One Dimensional Arrays. (Minimum 3 Programs)

Week 13
Programs on Two Dimensional Arrays. (Minimum 2 Programs)

Week 14
Implementation of Linear Search and Binary Search.

Week 15
Implementation of Bubble Sort and Insertion Sort.

Week 16
Review

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Mathematics II
(Ordinary Differential Equations and Vector Calculus)

I YearII Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Classify the various types of differential equations of first order and first degree and apply the concepts of differential equations to the real-world problems.
2. Solve higher order differential equations and apply the concepts of differential equations to the real-world problems.
3. Find the Laplace Transform of various functions and apply to find the solutions of differential equations.
4. Evaluate the multiple integrals and identify the vector differential operators physically in engineering problems.
5. Evaluate the line, surface and volume integrals and converting them from one to another by using vector integral theorems.

UNIT-I:
First order Ordinary Differential Equations and their Applications:
Formation of Differential equations, Differential equations of first order and first degree: exact, linear and Bernoulli, Applications of ODE: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-II:
Higher Order Linear Differential Equations:
Linear differential equations of second and higher order with constant coefficients, RHS term of the type f(X) $= e^{ax}, \sin ax, \cos ax \text{ and } x^k, e^{ax}V(x), x^kV(x)$. Method of variation of parameters

UNIT-III:
Laplace transforms:
Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms – Application of Laplace transforms to ordinary differential equations.

UNIT-IV:
Multiple Integrals & Vector Differentiation:

Multiple integrals - double and triple integrals – change of order of integration (Only Cartesian form)- change of variables (Cartesian to Polar for double integral, Cartesian to Spherical for triple integral). Gradient- Divergence- Curl and their related properties - Potential function - Laplacian and second order operators.

UNIT-V:

Vector Integration:

Line integral, work done, Surface and Volume integrals. Vector integrals theorems: Green's, Stoke's and Gauss Divergence Theorems (Only Statements & their Verifications).

Textbooks:

1. Higher Engineering Mathematics,B.S. Grewal, Khanna Publishers, 36th Edition, 2010
2. Advanced Engineering Mathematics by Jain &Iyengar Narosa Publications.

Reference Books:

1. Calculus and Analytic geometry,G.B. Thomas and R.L. Finney, 9th Edition, Pearson, Reprint, 2002.
2. Advanced Engineering Mathematics,Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
3. Advanced Engineering Mathematics (2nd Edition) Michael D. Greenberg

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Chemistry

I Year II Semester

L	T	P	C
3	1	0	4

Course Outcomes:

1. Acquire knowledge of atomic, molecular and electronic changes related to conductivity.
2. Apply the various processes of treatment of water for both domestic and industrial purpose.
3. Apply the knowledge of electrode potentials for the protection of metals from corrosion.
4. Analyze the major chemical reactions that are used in the synthesis of compounds.
5. Apply the knowledge of polymers in every day's life.

UNIT- I:

Atomic and molecular structure:

Introduction, Concept of atomic and molecular orbitals, LCAO, Molecular orbitals of di-atomicmolecules, Molecular orbital energy level diagrams of diatomic molecules (N_2, O2 & F_2). Pi-molecular orbitals of butadiene and benzene.

Crystal field theory (CFT): Crystal field theory, Crystal field splitting patterns of transition metal ion d- orbital- tetrahedral, octahedral and square planar geometries.

UNIT- II:

Water Technology:

Hardness of water, expression of hardness ($CaCO_3$ equivalent), units and types of hardness. Estimation of temporary and permanent hardness of water by EDTA method. Numerical problems based on hardness of water. Potable water: characteristics, treatment of water for domestic supply. Desalination of brackish water: reverse osmosis. Alkalinity of water and its determination. Boiler feed water and its treatment: Internal treatment (colloidal, phosphate calgon conditioning of water). External treatment (ion –exchange process).

UNIT- III:

Electrochemistry and corrosion:

Electrode, electrode potential, galvanic cell, cell reactions and cell notation, cell EMF, types of electrodes (Calomel electrode and Quinhydrone electrode) , Determination of P^H using quinhydrone electrode. Nernst equation, Numerical problems.

Batteries: Introduction to cell and battery, Primary (lithium cell) and secondary cells, (lead-Acid cell, and Lithium ion cells). Fuel cells – Hydrogen – Oxygen fuel cell, advantages and engineering applications of fuel cells.

Corrosion: Introduction, types of corrosion: chemical and electrochemical corrosion, factors affecting the rate of corrosion: nature of the metal, position of metal in galvanic series, purity of metal, nature of corrosion product , nature of environment : effect of temperature, effect of pH, humidity. Corrosion control methods: Cathodic protection: sacrificial anode method and impressed current cathode method. Protectivecoatings: metallic coatings (anodic and cathodic), methods of application on metals, electroplating (of copper), electroless plating (of Ni) , organic coatings- paints.

UNIT-IV:

Stereochemistry:

Structural isomers and stereoisomers, configurations, symmetry and chirality, enantiomers, diastereomers, optical activity. Conformations of cyclic (cyclohexane) and acyclic systems (Ethane).

Organic reactions and synthesis of a drug molecule:

Introduction to reactions involving substitution (SN1 & SN2), addition(addition of HBr to propene, Markownikoff and Anti Markownikoff addition), elimination, oxidation(oxidation of alcoholsusing $KMnO_4$& CrO_3), reduction(reduction of carbonyl compounds by $LiAlH_4$& $NaBH_4$). Synthesis of a commonly used drug molecule- paracetamol and Asprin.

UNIT-V:

Polymer Chemistry:

Introduction, classification of polymers, types of polymerization (addition and condensation, mechanisms not included). Plastics- types of plastics -thermoplastics and thermosetting plastics. Preparation, properties and engineering applications of PVC, Teflon and Bakelite. Fibers: Nylon 6, 6 and Terelene (Dacron). Elastomers: natural rubber, structure, vulcanization. Synthetic rubbers: Buna-S, Butyl rubber &Thikol rubber. Conducting polymers: classification and applications.

Biodegradable polymers:Types, examples: Polyhydroxy butyrate (PHB) ,Poly-Hydroxybutyrate-co-b-Hydroxy valerate (PHBV) ,Polyglycolic acid (PGA) , Polylactic acid (PLA) ,Poly (Î-caprolactone) (PCL). Applications of biodegradable polymers.

Textbooks:

1. Engineering Chemistry, P.C Jain & Monica Jain, Dhanpat Rai Publications,2017.
2. Engineering Chemistry,Bharathi Kumari. Y, VGS Publications,2018.

Reference Books:

1. March's Advanced Organic Chemistry, Smith,Wiley publications,2017.
2. Engineering Chemistry, Shiva Sankar, TMH Publications , 2010.

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Chemistry Lab

I Year II Semester

L	T	P	C
0	0	3	1.5

Course Outcomes:

1. Determination of parameters like hardness, alkalinity and chloride content in water.
2. Estimation of rate constant of a reaction from concentration-time relationships.
3. Determination of physical properties like adsorption, surface tension and viscosity.
4. Synthesize a small drug molecule and analyze a salt sample.
5. Calculation of strength of compound using instrumentation techniques.

Choice of 10-12 experiments from the following:

1. Estimation of total hardness of water by EDTA method.
2. Determination of alkalinity of water.
3. Determination of chloride content of water.
4. Estimation of HCl by conductometric titration.
5. Estimation of mixture of acids by conductometric titration.
6. Estimation of HCl by potentiometric titration.
7. Estimation of Fe^{2+} by potentiometry using $KMnO_4$.
8. Determination of the rate constant of a reaction.
9. Determination of surface tension.
10. Determination of viscosity of a lubricant.
11. Chemical analysis of a salt.
12. Synthesis of a polymer/drug.
13. Adsorption of acetic acid by charcoal.
14. Determination of Saponification /acid value of an oil.

Reference Books:

1. Practical Engineering Chemistry by Mukkanti, B.S. Publications, 2010.
2. Volga's Qualitative Inorganic Chemistry by PEAR Publications 2010.

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English

I Year II Semester

L	T	P	C
2	0	0	2

Course Outcomes:

1. Infer the importance of scientific discoveries in promoting social responsibilities.
2. Comprehend the given texts and respond appropriately for technical and professional purposes.
3. Communicate confidently and transfer information into various forms of writing.
4. Understand the importance of health and nutrition for a better society.
5. Present various forms of business writing skills for successful careers.

UNIT-I:

'The Raman Effect' from the prescribed textbook **'English for Engineers'**

Grammar : Articles & Prepositions

Reading : Reading and Its Importance- Techniques for Effective Reading.

Writing : Organizing principles of paragraphs in documents.

Vocabulary: The concept of word Formation, synonyms, antonyms, and standard abbreviations.

UNIT-II:

'Ancient Architecture in India' from the prescribed textbook **'English for Engineers'**

Reading : Improving Comprehension Skills – Techniques for good comprehension

Writing : Sentence Structures, Use of phrases and clauses in sentences

Writing Formal Letters-Eg. Letter of Complaint, Letter of Requisition,

Job Application with Resume.

Vocabulary: Root words and acquaintance with prefixes and suffixes from foreign languages in English, to form derivatives

UNIT-III:

'Blue Jeans' from the prescribed textbook **'English for Engineers'**

Grammar: Tenses: Types and uses.

Reading : Sub-skills of Reading- Skimming and Scanning

Writing :Identifying Common Errors in Writing

Subject-Verb agreement in number, gender and person

Information Transfer-Process writing

UNIT-IV:

'What Should You Be Eating' from the prescribed textbook **'English for Engineers'**

Reading : Intensive Reading and Extensive Reading

Writing : Nature and Style of Sensible Writing

Describing & Defining

Identifying common errors in writing

UNIT-V:

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook **'English for Engineers'**

Vocabulary : Technical Vocabulary and their usage

Reading : Reading Comprehension-Exercises for Practice

Writing : Cohesive Devices

Précis Writing

Technical Reports-Introduction, Characteristics of a Report – Categories of Reports, Formats- Structure of Reports (Manuscript Format) –Types of Reports - Writing a Report.

Textbooks:

1. English for Engineers,Sudarshana, N.P. and Savitha, C Cambridge University Press, 2018.

Reference Books:

1. Effective Technical communication, Muhammed Rizvi, TMH, 2008.
2. Advanced English Grammar, Hewings, Cambridge University Press, 2010.

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English Communication Skills Lab

L	T	P	C
0	0	2	1

I Year II Semester

Course Outcomes:

1. Understand the variants in pronunciation.
2. Identify the diverse purposes of listening and speaking.
3. Discuss ideas in diverse communicative settings.
4. Exhibit increased confidence in public speaking.
5. Display critical thinking, problem solving and decision making skills through GD's

Exercise-I:

CALL Lab:

Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

ICS Lab:

Spoken vs. Written language-Formal and Informal English- Introducing Oneself and Others.

Exercise-II:

CALL Lab:

Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

ICS Lab:

Features of Good Conversation – Strategies for Effective Communication Role-Play- Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise-III:

CALL Lab:

Information Transfer.

ICS Lab:

Descriptions-Narrations-Giving Directions and Guidelines-Giving Instructions-Seeking Clarifications-Asking for and Giving Directions-Thanking and Responding-Agreeing and Disagreeing-Seeking and Giving Advice-Making Suggestions.

Exercise-IV:

CALL Lab:

Past Tense Marker and Plural Marker.

ICS Lab:

Public Speaking- Exposure to Structured Talks - Non-verbal Communication- Making a Short Speech – Extempore.

Exercise-V:

CALL Lab:

Intonation- Sentence Stress -Weak Forms and Strong Forms.

ICS Lab:

Group Discussion, Mock Group Discussion sessions

Reference Books:

1. A textbook of English Phonetics for Indian Students, T. Balasubramanian, Macmillan Publishers,2010.
2. Speaking English Effectively, Mohan, Macmillan Publishers, 2010.

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Programming for Problem Solving-II

L	T	P	C
2	0	0	2

I Year II Semester

Course Outcomes:

1. Identify various string handling functions in 'C'.
2. Develop programs with user defined data types.
3. Use Dynamic memory allocation functions with pointers.
4. Distinguish between Stacks and Queues.
5. Analyze various Dynamic Data Structures.

UNIT – I:
Overview of Arrays and Functions.
Strings: Introduction to Strings, String I/O, String Operations with and without built-in functions (strlen( ), strcmp( ), strcat( ),strcpy( ) and strrev( )).

UNIT -II:
Structures: Definition and Initialization of Structures, Accessing structure members, Nested Structures, Array of Structures, Structures and Functions, Unions, typedef, Enumerated Data types.

UNIT-III:
Pointers: Introduction to Pointers, Pointer Arithmetic, Pointers and Arrays, Pointer to Structure, Pointers and Strings, Parameter passing mechanism: Call by Reference, Pointer to Pointer, Dynamic Memory Allocation.

UNIT-IV:
Introduction to Data Structures: Lists and Operations, Linear and Non linear Data structures.
Stacks- Introduction to Stacks, Operations, Implementation of Stack using Arrays.
Queues- Introduction to Queues, Operations, Implementation of Queue using Arrays.

UNIT-V:
Linked Lists: Introduction to Linked List, Operations on Single Linked List(search, Insertion & Deletion).
Files: Introduction to Files, File Operations (Open, Close, read & Write).

Textbooks:

1. COMPUTER SCIENCE: A Structured Programming Approach Using C, B.A.Forouzon and R.F. Gilberg, Third edition, 2016.
2. C and Data Structures,Ashok N. Kamthane, Pearson Education.

Reference Books:

1. Problem Solving Using C,M.T. Somashekara, PHI, 2nd Edition 2009.
2. Computer Fundamentals and Programming in C,A.K.Sharma, 2nd Edition, University Press .
3. Programming in C 2/e,PradipDey and Manas Ghosh, Oxford University Press, 2nd Edition 2011.
4. The Fundamentals of Computers,Rajaraman V., 4th Edition, Prentice Hall of India, 2006.
5. Programming in C,R S Bichker, University Press, 2012.

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Programming for Problem Solving Lab – II

L	T	P	C
0	0	2	1

I Year II Semester

Course Outcomes:

1. Build programs on various string handling functions.
2. Develop applications on user defined data types.
3. Apply dynamic memory allocation through pointers.
4. Implement linear data structures through stacks and queues.
5. Create linked list dynamically through stacks and queues.

Week 1:
Programs on Arrays and Functions. (Minimum 3 Programs)

Week 2 & 3:
Programs on Strings with and without string built-in Functions. (Minimum 6 Programs)

Week 4:
Programs on Accessing Structures and Nested Structures. (Minimum 3 Programs)

Week 5 &6 :
Programs on Array of Structures, Structures and Functions. (Minimum 5 Programs)

Week 7:
Programs on Unions, typedef and enum. (Minimum 4 Programs)

Week 8:
Programs on Pointers, pointer arithmetic, pointer expression, One Dimensional and Two dimensional arrays. (Minimum 4 Programs)

Week 9:
Programs on Pointer to structure, Call by Reference, Pointer to Pointer. (Minimum 3 Programs)

Week 10:
Programs on Dynamic Memory Allocation Functions. (Minimum 3 Programs)

Week 11:
Programs on Stacks and Queues using Arrays.

Week 12 & 13:
Programs on Single Linked List.

Week 14 &15 :
Programs on File Operations. (Minimum 6 Programs)

Week 16:
Review.

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Engineering Graphics & Modeling

I Year II Semester

L	T	P	C
1	0	3	2.5

Course Outcomes:

1. Understand the concepts of engineering drawing of planes, solids and the CAD drawing software.
2. Applying the principles of engineering graphics while drawing the engineering components.
3. Analyze the sectional views for their configurations.
4. Evaluate the surfaces of solids developed for further processing in the engineering applications.

UNIT- I:

Introduction to Engineering Drawing: Principles of engineering graphics and their significance, usage of drawing instruments, conic sections, including the rectangular hyperbola– general method only. Cycloid, Epicycloid, Hypocycloid. Scales – plain & diagonal only.

Introduction to CAD: Introduction to CAD software and its importance, standard toolbar/menus and navigation tools used in the software, using basic commands limits ,units, grid, test , move, offset ,mirror, rotate, trim, extend, fillet etc. drawing lines using line command. Drawing spline, ellipse, circle, rectangle etc.. Concept of layers and dimensioning.

UNIT- II:

Principles of Orthographic Projections: Conventions. Projections of points, projections of lines (first angle projection) inclined to both planes (traces and midpoint problem to be excluded).

Implementation of CAD: Drawing orthographic projections of points and lines using a CAD package.

UNIT – III:

Projections of the Planes: Projections of regular planes inclined to both the planes.

Projections of Solids: Projections of regular solids inclined to both the planes (prisms, pyramids, cones and cylinders, Change of potion method only).

Implementation in CAD: Drawing orthographic projection of planes and regular solids using a CAD package.

UNIT- IV:

Sections and Sectional Views of Right Angular Solids: Prism, Cylinder, Pyramid, Cone. Development of surfacesof right regular solids - Prism, Pyramid, Cylinder and Cone.

Implementation in CAD: Concept of hatching, drawing sectional views of solids and the development of right regular solids using a CAD package.

UNIT-V:

Principles of Isometric projection: Isometric scale, isometric views, conventions, isometric views of lines, planes, simple solids, conversion of isometric views to orthographic views and vice-versa, conventions.

Implementation in CAD: Drawing isometric views of simple solids. Drawing isometric views from giving orthographic views and vice-versa using a CAD package.

Note: Implementation in CAD (For Internal Evaluation Weightage Only)

Textbooks:

1. Engineering Drawing, Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Charotar Publishing House.

Reference Books:

1. Engineering Graphics, Agrawal B. & Agrawal C. M. (2012),TMH Publication
2. Text book on Engineering Drawing,Narayana, K.L. & P Kannaiah (2008)Scitech Publishers.
3. Engineering Drawing and Computer Graphics,Shah, M.B. & Rana B.C. (2008), Pearson Education.
4. http://docs.autodesk.com/ACDMAC/2013/ENU/PDFs/acdmac_2013_users_guide.pdf

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II YEAR B.Tech. AI – I Sem

L	T	P	C
3	0	0	3

Probability and Statistics for Artificial Intelligence

Course Outcomes: After learning the contents of this course the students must be able to:
1. To differentiate among random variables involved in the probability models which are useful for all branches of engineering.
2. Derive relationship among variety of performance measures using probability distributions.
3. Acquire elementary knowledge of parametric and non-parametric –tests and understand the use of observing state analysis for predicting future conditions.
4. Identify and examine situations that generate using problems and able to solve the tests of ANOVA for classified data.
5. Apply proper measurements, Indicators and techniques of Correlation and regression analysis.

UNIT-I:
PROBABILITY AND RANDOM VARIABLES: Introduction to Probability, Random variables- Discrete and Continuous, Expectation, Probability Distribution Function, Mass Function/ Density Function of a Probability Distribution.

UNIT-II:
PROBABILITY DISTRIBUTIONS: Fitting of Binomial, Poisson & Normal distributions and their properties (only Statements) Moment Generating Functions of the above three distributions and hence finding the mean and variance.

UNIT-III:
SAMPLING THEORY & TESTING OF HYPOTHESIS I: Sampling Distribution- Definition of Sample, Population, and Types of Sampling. Estimation- Point estimation, Interval estimation, Testing of Hypothesis- Null hypothesis – Alternative hypothesis, Type I, & Type II errors – critical region confidence interval for mean, Testing of hypothesis for single mean and difference between the means for large samples. Confidence interval for the proportions, Tests of hypothesis for the proportions- single and difference between the proportions for large samples

UNIT-IV:
TESTING OF HYPOTHESIS II: Small Samples - t-distribution, F-Distribution, distribution, ANOVA for one-way classified data.

UNIT-V:

CORRELATION, REGRESSION & CURVE FITTING: Coefficient of Correlation- Regression coefficients- The lines of Regression- the Coefficient of Rank Correlation. **Curve Fitting-** Fitting a Straight line- Second Degree Polynomial- Exponential, Power Curve by Method of Least Squares.

TEXT BOOKS

1. Probability and Statistics for Engineers, by Richard Arnold Johnson, Irvin Miller and John E Freund, New Delhi Prentice Hall.
2. Probability and Statistics, by T. K. V. Iyangar others, S. Chand Publications

References Books:

1. Fundamentals of Mathematical Statistics, by S C Guptha and V K Kapoor, S Chand.
2. Introductory Methods of Numerical Analysis, by S S Sastry, PHI Learning PVT Ltd.
3. Mathematics for Engineers and Scientists, by Alan Jeffrey, sixth edition, CRC press.
4. Introduction to Probability & Statistics for Engineers and Scientists by Sheldon M.Ross

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II YEAR B.Tech. AI – I Sem

L	T	P	C
3	0	0	3

Electronics Devices and Circuits

Course Outcomes:
After going through this course the student will be able to:
CO1: Demonstrate the concepts of semiconductor theory.
CO2: Interpret the characteristics of different semiconductor devices with its applications.
CO3: Apply different biasing techniques of transistors for amplification.
CO4: Analyze transistor amplifiers using small signal model.

UNIT I
Diode: PN junction Diode – Characteristics, Current equation, Temperature dependence, Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances,
Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive Filter, Clippers, Clampers.

UNIT II
Bipolar Junction Transistor (BJT): Principle of Operation and characteristics - Common Emitter, Common Base, Common Collector Configurations, Operating point, DC & AC load lines, Transistor Hybrid parameter model, Determination of h-parameters from transistor characteristics, Conversion of h-parameters.

UNIT III
Transistor Biasing and Stabilization: Bias Stability, Fixed Bias, Collector to Base bias, Self-Bias, Bias compensation using Diodes and Transistors.
Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT IV
Junction Field Effect Transistor: Construction, Principle of Operation, Pinch-Off voltage, Volt-Ampere characteristic, comparison of BJT and FET, Biasing of FET, FET as voltage variable resistor, MOSFET construction and its characteristics in enhancement and depletion modes.

UNIT V

FET Amplifiers: Small Signal Model, Analysis of CS, CD, CG JFET Amplifiers. Basic Concepts of MOSFET Amplifiers.

Special Purpose Devices: Zener Diode - Characteristics, Voltage Regulator; Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode.

TEXT BOOKS:

1. Millman and Halkias," Electronic devices and circuits", 2nd Edition, McGraw Hill Publication, 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Jacob Millman, Herbert Taub and Mothiki S. Prakash Rao, Millman's Pulse, Digital and Switching Waveforms, Tata McGraw-Hill,3rd Edition, 2008.

REFERENCES:

1. Electronic Devices and Circuits – S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, 2 Ed., 2008, TMH.
2. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
3. Electronic Devices and Circuits-J.B Gupta.

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II YEAR B.Tech. AI – I Sem

L	T	P	C
3	0	0	3

Digital Logic Design

Course Outcomes:
Student will be able to:
CO1: Understand various number systems, conversions, range and error detecting and correcting codes and their significance.
CO2: Evaluate the minimization of logic gates using Boolean algebraic principles and k-maps.
CO3: Design various simple and complex combinational circuits with real time applications.
CO4: Analyze the basic principles behind Flip flops & the design of sequential circuits with real time applications.
CO5: Illustrate various types of memory devices and their design.

UNIT -- I:
Number Systems: Binary, Octal, Hex Decimal, and Conversions, range; Binary additions and subtractions (using 1c, and 2c), concept of overflow; representations of negative numbers using 1's and 2's complement and range; BCD numbers**:** Representation of 8421, 2421, Ex-3, Gray and self-complementary codes; additions and subtractions on 8421 codes; Error detecting **codes:** even, odd parity, hamming codes; Error correcting codes**:** hamming codes, block parity codes; Floating point representation.

UNIT --II:
Boolean Algebra and Digital Logic GATES, Basic Boolean laws and properties; Boolean functions; canonical and standard forms (SOP, POS); Gate minimization using three and four variable K-Map's with and without don't cares. Encoders, Decoders, Multiplexers, D-Multiplexers;

UNIT -- III:
Definition of combinational circuits, design procedure for half, full, decimal (8421) adders and subtractors; Combinational Circuit Design for BCD code converters;

UNIT -- IV:

Sequential circuits, latches, Flip Flops; Analysis of clocked sequential circuits, State Reduction and Assignment, Register, Ripple Counters, Synchronous Counters, Other Counters.

UNIT -- V:

Types of Memory – Main memory – random access memory, ROM, Types of ROM; Decoder and RAM interface: Address lines, data lines, chip select signal; Design of large memories using small memories, using decoders; problems in memory design; Cache Memory- design issues, hit and miss ratio related problems; Associative and Auxiliary memory.

TEXT BOOKS:

1. M. Morris Mano, Digital Design, Third Edition, Pearson Education/PHI, 2001.
2. Roth, Fundamentals of Logic Design, Fifth Edition, Thomson, 2004

REFERENCE BOOKS:

1. John F. Wakerly, Digital Design: Principles and Practices, 4th Edition, Pearson / Prentice Hall, 2005.
2. Malvino & Leach, Digital Principles and Applications, Seventh Edition, Tata McGraw-Hill Edu., 2010.
3. A.K. Maini, Digital Electronics, Principles and Integrated Circuits, 1st Edition, Wiley India Publ., 2007.
4. M. Morris Mano and Michael D. Ciletti, Digital Design, 5th Edition, Pearson Education, 2012.

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II YEAR B.Tech. AI & DS – I Sem

L	T	P	C
3	0	0	3

Introduction to Artificial Intelligence

Unit – I

Concept of AI, History, Current Status, Scope, Intelligent Agents, Environments, Problem Formulations, Review of Tree and Graph Structures, State Space Representation, Search Graph and Search Tree.

Unit – II

Uninformed and Informed Search Algorithms : Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search : Generate & Test, Hill Climbing, Best first search, A* algorithm, Game Search, Alpha-Beta Pruning Genetic Algorithm

Unit – III

Probabilistic Reasoning : Probability, Conditional Probability, Bayes Rule, Bayesian Networks- Representation, Construction and Inference, Temporal Model, Hidden Markov Model, Dynamic Bayesian networks (DBN), Natural Language Processing using HMM

Unit – IV

Markov Decision Process, MDP Formulation, Utility Theory, Utility Functions, Value Iteration, Policy Iteration and Partially Observable MDPs.

Unit – V

Reinforcement Learning : Passive Reinforcement Learning, Direct Utility Estimation, Adaptive dynamic Programming, Temporal Difference Learning, Active Reinforcement Learning- Q Learning.

TEXT BOOKS :

1. Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach”, 3rd Edition, Prentice Hall
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill

REFERENCE BOOKS :

3. Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi.
4. Saroj Kaushik, "Artificial Intelligence", Cengage Learning India, 2011

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II YEAR B.Tech. AI – I Sem

L	T	P	C
3	0	0	3

Mathematical Foundations for Computer Science

Course Outcomes:
At the end of the course student would be able to
1. Analyze elementary mathematical arguments and identify fallacious reasoning.
2. Apply discrete mathematics problems that involve: computing permutations and combinations of a set.
3. Analyze and deduce problems involving recurrence relations and generating functions.
4. Perform operations on discrete structures such as sets, functions, relations, and sequences.
5. Apply graph theory models to solve the problems of networks.

UNIT -- I:

Foundations: Basics, Sets, Statements, Connectives, Normal Forms, Fundamentals of Logic, Logical Inferences, First order logic and other methods of Proof, Rules of Inference for Quantified Propositions, Automatic Theorem Proving.

UNIT – II:

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumerating Combinations and Permutations with & without repetitions, constrained repetitions, Pigeon hole principle, Inclusion-Exclusion principle.

UNIT -- III:

Recurrence Relations: Generating Functions, Calculating coefficient of Generating Function, Solving Recurrence relations by substitution method and Generating Functions, The Method of Characteristic Roots, Solutions to inhomogeneous recurrence relations, Binomial Theorem.

UNIT -- IV:

Relations and Digraphs: Relations and Directed Graphs, Special Properties of Binary Relations, Equivalence Relations, Ordering Relations, Lattice, Paths and Closures, Directed Graphs and adjacency matrices.

UNIT -- V:

Graphs - Basic Concepts, Isomorphism and Sub-graphs, Trees and Their Properties, Spanning Trees, Binary Trees, Planar Graphs, Euler‘s Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians by Joe L. Mott,Abraham Kandel, TheodareP.Baker, Second Edition, PHI, 2009.
2. Discrete Mathematical Structures with Applications to Computer Science, Tremblay J P and Manohar R, Tata McGraw Hill Publishing Company Limited, New Delhi, 2007.

REFERENCE BOOKS:

1. Discrete Mathematics R.K.Bisht, H.S.Dhami, OXFORD Higher Education.
2. Discrete Mathematics and its Applications‖, Kenneth H Rosen, Tata McGraw Hill Publishing Company Limited, New Delhi, Sixth Edition, 2007.

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II YEAR B.Tech. AI – I Sem

L	T	P	C
3	0	0	3

Concepts of Data Structures

Course Outcome :

At the end of the course student would be able to

1. Analyze the representation of various static, dynamic and hierarchical data structures.
2. Design and implement the mechanism of stacks, general tree data structures with their applications.
3. Implementation of various advanced concepts of binary trees with real time applications.
4. Implement various algorithms on graph data structures, including finding the minimum spanning tree , shortest path with real time applications etc
5. Outline the concepts of hashing, collision and its resolution methods using hash function.

UNIT - I

C++ Programming Concepts: Review of C, input and output in C++, functions in C++- value parameters, reference parameters, Parameter passing, arrays, pointers, new and delete operators. **OOPs Concepts**: class and object, access specifiers, constructors and destructor, Inheritance and Polymorphism, Exception Handling .

Basic Concepts - Data objects and Structures, Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Complexity Analysis Examples, Introduction to Linear and Non Linear data structures.

UNIT - II

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

Linear list ADT-array representation and linked representation, Stack ADT, definition, array and linked implementations, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition, array and linked Implementations, Circular queues-Insertion and deletion operations. Singly Linked Lists-Operations-Insertion, Deletion, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion.

UNIT - III

Trees – definition, terminology, Binary trees-definition, Properties of Binary Trees, Binary Tree ADT, representation of Binary Trees-array and linked representations, Binary Tree traversals, Threaded binary trees, Priority Queues –Definition and applications, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

UNIT - IV

Searching - Linear Search, Binary Search, Hashing-Introduction, hash tables, hash functions, Overflow Handling, Comparison of Searching methods.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Merge sort, Comparison of Sorting methods.

UNIT - V

Graphs–Definitions, Terminology, Applications and more definitions, Properties, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph Search methods - DFS and BFS, Complexity analysis,

Search Trees-Binary Search Tree ADT, Definition, Operations- Searching, Insertion and Deletion, Balanced search trees-AVL Trees-Definition and Examples only, B-Trees-Definition and Examples only, Red-Black Trees-Definitions and Examples only, Comparison of Search Trees.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in C++, 2nd Edition, SartajSahni, Universities Press.
2. Data structures and Algorithms in C++, Adam Drozdek, 4th edition, Cengage learning.

REFERENCE BOOKS:

1. Data structures with C++, J. Hubbard, Schaum's outlines, TMH.
2. Data structures and Algorithms in C++, M.T. Goodrich, R. Tamassia and D. Mount, Wiley India.
3. Data structures and Algorithm Analysis in C++, 3rd edition, M. A. Weiss, Pearson.
4. Classic Data Structures, D. Samanta, 2nd edition, PHI.

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II YEAR B.Tech. AI – I Sem

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Data Structure using C++ Lab

1. Write a C++ program for displaying Student details using Classes and Objects
2. Write a C++ program that uses stack operations to convert a given infix expression into its postfix equivalent, Implement the stack using an array.
3. Write a C++ program to implement a double ended queue ADT using an array, using a doubly linked list.
4. Write a C++ program that uses functions to perform the following:
    a. Create a singly linked list of integers.
    b. Delete a given integer from the above linked list.
    c. Display the contents of the above list after deletion.
5. Write a template based C++ program that uses functions to perform the following:

    a. Create a doubly linked list of elements.
    b. Delete a given element from the above doubly linked list.
    c. Display the contents of the above list after deletion.
6. Write a C++ program that uses functions to perform the following:

    a. Create a binary search tree of characters.
    b. Traverse the above Binary search tree recursively in preorder, in order and post order,
7. Write a C++ program that uses function templates to perform the following:

    a. Search for a key element in a list of elements using linear search.
    b. Search for a key element in a list of sorted elements using binary search.
8. Write a C++ program that implements Insertion sort algorithm to arrange a list of integers in ascending order.
9. Write a template based C++ program that implements selection sort algorithm to arrange a list of elements in descending order.
10. Write a template based C++ program that implements Quick sort algorithm to arrange a list of elements in ascending order.
11. Write a C++ program that implements Heap sort algorithm for sorting a list of integers in ascending order.

12. Write a C++ program that implements Merge sort algorithm for sorting a list of integers in ascending order
13. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.
14. Write a C++ program that implements Radix sort algorithm for sorting a list of integers in ascending order

    a. Write a C++ program that uses functions to perform the following: Create a binary search tree of integers.
    b. Traverse the above Binary search tree non recursively in inorder.\

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II YEAR B.Tech. AI – I Sem

L	T	P	C
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EDC & DLD Lab

Minimum 6 experiments from each part:

List of Experiments (DLD)

1. Verify the functionality of logic gates &Flip-flops
2. Verification of De-Morgan's laws
3. Implementation and verification of full adder and full subtractor using logic gates.
4. Implementation and verification of 4X1 multiplexer & Demultiplexer using logic gates.
5. Implementation and verification of 2X4 Decoder and 1X4 De-multiplexer using logic gates.
6. Implementation of given function and verification using IC 74LS151 (8X1 multiplexer).
7. To design and verify the 4-bit ripple counter & decade counter
8. Verify the functionality of 4-bit magnitude comparator using IC 74LS85.
9. Verify the functionality of Universal Shift Register IC 74LS194/195

List of Experiments (EDC)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. UJT Characteristics

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II YEAR B.Tech. AI – I Sem

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CYBER LAW

Course Objective: The objective of this course is to make students understand the importance of Cyber laws in India and its applications.

Course Outcome: Students will understand a) Understand Cyber laws in India b) Features of IT Act2000 c) Cyber Crimes & legal framework d) E commerce in India.

UNIT - I

Introduction to Cyber Law

Need for Cyber Law, Introduction to UNICITRAL Model Law on E-Commerce, Cyber Jurisprudence at International and Indian Level, Jurisdictional Aspects in Cyber Law, Issues of jurisdiction in cyberspace, Types of jurisdiction, Prerequisites of jurisdiction.

Case Lets: Indian & International Cases

UNIT - II

Cyber Crimes & Legal Framework

Introduction to Cyber Crimes, Cyber Crimes Vs. Conventional Crime, Reasons for cybercrimes and cyber criminals, Cyber Crimes against Individuals, Institution and State, Cyber Crimes Hacking Digital Forgery, Cyber Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber Terrorism, Cyber Defamation. - Right of Interception under IT Act. Different offences under IT Act, 2000

Case Lets: Indian & International Cases

UNIT – III

Cyber Forensic and Computer Crimes.

Crimes targeting Computers: Definition of Cyber Crime & Computer related Crimes, Classification & Differentiation between traditional crime and cybercrimes. (a) Data Theft (b) Hacking (c) Spreading Virus & Worms (d) Phishing (e) Cyber Stalking / Bullying (f) Identity Theft & Impersonation (g) Credit card & Online Banking Frauds (h) Obscenity, Pornography & Child Pornography (i) Cyber Defamation, Defacement, (j) Illegal online selling &

Gambling (k) Denial of Service Attacks (l) Cyber terrorism (m)Software Piracy & illegal downloading

Case Lets: Indian & International Cases

UNIT-IV

Information Technology Law (Cyber Law)

Evolution of the IT Act, Genesis and Necessity, Salient features of the IT Act, 2000, various authorities under IT Act and their powers. Penalties & Offences, amendments. Impact on other related Acts (Amendments to Indian Penal code, Indian evidence Act, Banker Book Evidence Act, RBI Act)

Case Lets: Indian & International Cases

UNIT - V

Evolution of E Commerce and Laws in India

Introduction to E Commerce in India. E – Commerce; Issues and provisions in Indian Law, E – Governance; concept and practicality in India, Digital / Electronic Signature in Indian Laws E – Taxation issues in Cyberspace, E – Contracts and its validity in India.

Case Lets: Indian & International Cases

TEXT BOOKS :

Apar Gupta, Commentary on Information Technology Act, 2000, Lexis Nexis, (2015).

Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi, (2012).

Karnika Seth, Computers, Internet and New Technology Laws, Lexis Nexis Butterworths Wadhwa Nagpur, (2013).

REFERENCE BOOKS :

S. R. Bhansali, Information Technology Act, 2000, University Book House Pvt. Ltd., Jaipur (2003).

Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)

Vasu Deva, Cyber Crimes and Law Enforcement, Commonwealth Publishers, New Delhi, (2003).

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II YEAR B.Tech. AI – II Sem

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Design and Analysis of Algorithms

Course Outcomes:
At the end of the course student would be able to
1. Acquire the knowledge of algorithm analysis and its notations that are applied on the problems solved by divide and conquer paradigm.
2. Apply the major graph algorithms for model engineering problems and knowledge of the greedy paradigm
3. Apply the dynamic-programming paradigm and recite algorithms that employ this paradigm.
4. Apply the concept of back tracking, branch and bound paradigm for real time problems.
5. Analyze the complexity of problems and differentiate that in terms of P and NP problems with examples.

UNIT-I
Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Disjoint Sets- disjoint set operations, union and find operations.
Divide and conquer: General method, applications - Binary search, Quick sort, Merge sort, Stassen‘s matrix multiplication.

UNIT-II
Graphs: Breadth First Search, Depth First Search, spanning trees, connected and bi-connected components
Greedy method: General method, Applications- Optimal storage on Tapes, Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT-III
Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT-IV:

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph colouring, Hamiltonian cycles.
Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT-V:
Lower Bound Theory: Comparison Trees, NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Clique Decision Problem (CDP), Node cover decision problem.

Text Books:
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, Galgotia publications Pvt. Ltd.
2. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.

References:
1. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, McGraw Hill.
2. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.

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II YEAR B.Tech. AI – II Sem

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Computer Organization and Architecture

Course outcomes:
At the end of the course student would be able to
1. Understand the basic organization of computer and different instruction formats and addressing modes.
2. Outline the concepts of 8086 microprocessor and arithmetic operations.
3. Make use of microprocessor instructions to write simple programs in assembly language.
4. Classify various modes of data transfers.
5. Outline various inter connection structures of multi processors.

UNIT -- I:
Introduction to computer organization- Digital Computers, Instruction codes, stored program organization, computer registers, computer instructions , instruction cycle, types of instruction formats (Zero, one, two and three address), RISC instructions.
Addressing modes: mode field, implied, immediate register, register direct, register indirect, auto increment, decrement, indexed, relative, base address mode, Numerical examples and problems.

UNIT -- II:
CPU-Organization: 8086 – CPU – Block diagram and pin diagram, concept of pipelining, minimum and maximum mode, segment register and generation of 20 bit address, concept of address, data, control and systems bus, Types of flags.

UNIT -- III:
CPU and Main Memory interface- Programming the basic computer – Machine Assembly Languages. **Assembler:** basic assembly language instructions (ADD, SUB, LOAD, STORE, MOV, CMP, JUMP). **Micro-programmed control:** control memory, address sequencing, micro program example and design of control unit.

UNIT -- IV:
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.
I/O interface: I/O Bus and Interface modules, I/O versus Memory Bus. **Modes of Transfer:** Example of programmed I/O, interrupt-initiated I/O, software considerations. Daisy-Chaining priority.
DMA: DMA Controller, DMA Transfer, Intel 8089 IOP.

UNIT -- V:

Multi Processors: Characteristics of Multi-Processor;
Interconnection structures: Time shared common bus, multiport memory, crossbar switch, multi-stage switching network;
Introduction to Flynn's classification: SISD, SIMD, MISD, MIMD (Introduction).

Text Books:
1. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI, 2011.
2. Microprocessor and Interfacing – Douglas V Hall, Second Edition, TATA McGraw Hill, 2006.

Reference Books:
1. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, V Edition,McGraw Hill.
2. Computer Organization and Architecture – William Stallings, 6th Edn.Pearson/PHI.

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II YEAR B.Tech. AI – II Sem

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Database Management Systems

Course Outcomes:
At the end of the course student would be able to
1. Design Entity-Relationship Model for enterprise level databases.
2. Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.
3. Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement
4. Able to apply suitable indexing and hashing mechanisms and embed transaction concepts.
5. Ability to analyze various concurrency control protocols and working principles of recovery algorithms.

UNIT-I
Introduction to Database System Concepts: Database-System Applications, Purpose of Database Systems, View, Database Language, Database Architecture, Database Users and Administrators.
Introduction to the Relation Models and Database Design using ER Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Feature, Structure of relational databases , database schema , keys, schema diagrams.

UNIT-II
Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions Nested Sub queries, Modification of the Database.
Intermediate and Advanced SQL: Join Expressions, Views, Integrity Constraints, SQL Data Types, Authorization. Functions and Procedures, Triggers, Advanced Aggregation Features.

UNIT-III
Formal Relational Query Languages: The Relational operations, The Tuple Relational Calculus, The Domain Relational Calculus.
Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Decomposition Using Multi valued Dependencies, More Normal Forms.

UNIT-IV

Indexing and Hashing: Basic Concepts, Ordered Indices, B+-Tree Index Files, B+-Tree Extensions, Multiple-Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices.
Transactions: Transaction Concept, a Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels.

UNIT-V
Concurrency Control: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp- Based Protocols, Validation-Based Protocols, Multi version schemes.
Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, ARIES, Remote Backup Systems.

Text Books:
1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan,Database System Concepts‖, 6th Edition, Tata McGraw-Hill.
2. Raghu Rama Kirshnan, Johannes Gehrk, ―Database Management System‖ Tata McGraw Hill 3rd Edition.

Reference Books:
1. Peter Rob & Carlos Coronel ―Database System Concepts Cengage Learning.
2. RamezElmasri, Shamkanth B. Navrate ― Fundamentals of Database Systems ― 7th Edition, Pearson Education. C.J. Date ―Introduction to Database Systems Pearson Education.

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II YEAR B.Tech. AI – II Sem

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Machine Learning

Course Outcomes:

1. Understanding Machine Learning & it's applications
2. Understanding Supervised, Unsupervised and Reinforcement Machine Learning
3. Understanding important Machine Learning Algorithms
4. Learning different Machine Learning tools

Unit – I

Introduction to Machine Learning, History, Current Status, Application of Machine Learning, Relation between Artificial Intelligence and Machine Learning, Data Driven Machine Learning, Types of Machine Learning : Supervised Learning, Unsupervised Learning, Learning Systems, Concept Learning, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm

Unit – II

Decision Tree learning : Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

Artificial Neural Networks (ANN) : Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm. Applications of Decision Tree and ANN

Unit – III

Support Vector Machines : (Paper handouts) Maximum margin linear separators. Quadractic programming solution to finding maximum margin separators. Kernels for learning non-linear functions.

Bayesian learning : Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier

Unit – IV

Instance-Based Learning : Constructing explicit generalizations versus comparing to past specific examples, k-Nearest-neighbor algorithm, Case-based learning.
Text Classification : Bag of words representation. Vector space model and cosine similarity. Relevance feedback and Rocchio algorithm, Versions of nearest neighbor and Naive Bayes for text

Unit – V
Clustering and Unsupervised Learning : Learning from unclassified dat,. Clustering. Hierarchical Aglomerative Clustering. k-means partitional clustering. Expectation maximization (EM) for soft clustering, Semi-supervised learning with EM using labeled and unlabled data.
Classification problems in language: word-sense disambiguation, sequence labelling, Hidden Markov models (HMM's), Veterbi algorithm for determining most-probable state sequences. Forward-backward EM algorithm for training the parameters of HMM's. Use of HMM's for speech recognition, part-of-speech tagging, and information extraction.

TEXT BOOKS :
1) Machine Learning – Tom M. Mitchell, – MGH
2) Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)
REFERENCE BOOKS :
3) Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ. Press.
4) Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001.

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II YEAR B.Tech. AI – II Sem

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Essentials of Python

Course Outcome :

At the end of the course student would be able to

1. Understand the techniques to code in python and write the standard programs using python.
2. Understand to use different IDE's and package of python
3. Understand the python codes for machine learning
4. Having proper idea on different python packages and also the main packages used for machine learning.

Unit – I

Introduction to Python:

Features of Python Language, Data Types, Operators, Expressions, Control Statement, Standard I/O Operations, Functions, OOP using Python, Modules, Packages, Doc Strings, Built-in Functions, Exception, File management.

Unit – II

Strings and Regular Expressions:

String Operations, Built-in String Methods and Functions, Comparing Strings, function in Regular Expression.

Sequence: List, Tuples, Dictionaries.

Why Python for Machine Learning, Other platforms, languages and frameworks for ML

Unit – III

Understanding Python IDEs : Anaconda, Machine learning with scikit-learn, K-means clustering, Data Preprocessing or Data Munging, Dimensionality Reduction, Entropy, Decision tree as a classifier, Random Forest, Perceptron Learning Algorithm

Unit – IV

Other Python Packages : numpy for matrix computation, iPython for enhanced interactive console, sympy for symbolic calculations, pandas for data structures and analysis, pymc for stochastic calculation, libpgm for Bayesian networks.

Unit – V

Scientific Python using matplotlib, different types of plotting, Graphs, Pie-charts, vector Estimating occupancy using decision tree, Introduction to Theano and Kera.

TEXT BOOKS

1. "Reema Thareja", Python Programming using Problem Solving Approach, First Edition, Oxford Higher Education.
2. "Sebastian Raschka", Python Machine Learning, PACKT Publishing, Open Source

REFERENCE BOOKS:

1. Kenneth A.Lambert, Fundamentals of Python
2. Machine Learning with Python/Scikit-Learn, - Application to the Estimation of Occupancy and Human Activities, GSCOP

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II YEAR B.Tech. AI – II Sem

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Prof. Communication

Introduction:
The world is in need of effective and efficient professionals. Technical students are to be equipped with Professional Communication skills to enable them to face the growing employment demands. The course has been introduced to bridge the gap between communication skills of ELCS and ACS.

COURSE OBJECTIVES:
To enable a student:
- Develop self-appraisal for future challenges
- Understand professional etiquette and learn appropriate mannerism
- Learn about leadership, team building skills
- Attempt to solve problems by taking appropriate decisions
- Present effectively in formal situations

COURSE OUTCOMES:
A student learns:
- Acquire enhanced personality
- Exhibit appropriate professional etiquette
- Practice team building with strong communication skills
- Develop problem solving skills and decision-making
- Demonstrate effective presentation skills

Unit: I: Self-Appraisal
Self-Introspection/ Self Retrospection
Introducing self & others
Goal setting
SWOT Analysis,

Unit: II: Professional Etiquette
Etiquette-Telephone Etiquette- Netiquette
Email, Social Network
Behavioral Traits
Case study

Unit: III: Team Building

Leadership skills-Case Studies
Team Essentials
Negotiation Skills
Group Discussion-Functional Aspects

Unit: IV: Logical Thinking and Analytical Reasoning
Decision Making
Problem Solving
Conflict management
Case Study

Unit: V: Presentation Skills
Poster Presentation
Oral Presentation-Individual Presentation, Team Presentation,
Thematic Presentation

References:
1) Rao,M.S. Soft Skills Enhancing Employability.New Delhi: I.K.Publishing House,2010.
2) Rao, Nageshwar. Communication Skills. New Delhi: Himalaya Publishing House Pvt.Ltd, 2008.
3) Ashrif Rizvi. Effective Technical Communication, Tata Mc Grahill, 2011.
4) Daniel G. Riordan & Steven E. Pauley.Technical Report Writing Today, Biztantra Publishers, 2005.
5) David A McCurry & Joanne Buckely, Handbook for Technical Writing CENGAGE Learning 2008.
6) Raymond Murphy's English Grammar with CD, Murphy, Cambridge University Press, 2012.
7) William Standard. Living English Structures- Allen-Pearson, 2011.
8) S M Guptha. Current English Grammar and Usage, PHI, 2013.
9) Krishna Swami. Modern English Grammar-, McMillan, 2009.
10) Anjana Agarwal. Powerful Vocabulary Builder, New Age International Publishers, 2011.

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II YEAR B.Tech. AI – II Sem

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Database Management Systems Lab

Course Outcomes:

1. Use the SQL commands such as DDL, DML, DCL, TCL to create, manipulate, access data from database objects and providing authorization to access database by different users.
2. To apply various integrity Constraints on the database tables for preserving the integrity of the database.
3. Design and implement Pl/SQL programs which includes procedures, functions, cursor and triggers.

1. Database Schema for a customer-sale scenario

Customer(**Cust id : integer,** cust_name: string)
Item(**item_id: integer,**item_name: string, price: integer)
Sale(**bill_no: integer,** bill_data: date, **cust_id: integer, item_id: integer**, qty sold: integer)

For the above schema, perform the following—

a. Create the tables with the appropriate integrity constraints
b. Insert around 10 records in each of the tables
c. List all the bills for the current date with the customer names and item numbers
d. List the total Bill details with the quantity sold, price of the item and the final amount
e. List the details of the customer who have bought a product which has a price>200
f. Give a count of how many products have been bought by each customer
g. Give a list of products bought by a customer having cust_id as 5
h. List the item details which are sold as of today
i. Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount Create a view which lists the daily sales date wise for the last one week.

2. Database Schema for a Student Library scenario

Student (Stud_no : integer,Stud_name: string) Membership (Mem_no: integer,Stud_no: integer) Book (book_no: integer, book_name:string, author: string)Iss_rec(iss_no:integer, iss_date: date, Mem_no: integer, book_no: integer)

For the above schema, perform the following

a. Create the tables with the appropriate integrity constraints
b. Insert around 10 records in each of the tables
c. List all the student names with their membership numbers

d. List all the issues for the current date with student and Book names

e. List the details of students who borrowed book whose author is CJDATE
f. Give a count of how many books have been bought by each student
g. Give a list of books taken by student with stud_no as 5
h. List the book details which are issued as of today
i. Create a view which lists out the iss_no, iss _date, stud_name, book name
j. Create a view which lists the daily issues-date wise for the last one week.

3. Database Schema for a Employee-pay scenario
Employee (emp_id:integer,emp_name:string)
Department (dept_id:integer,dept_name:string)
paydetails (emp_id : integer, dept_id: integer, basic: integer, deductions: integer, additions: integer, DOJ: date)
Payroll **(emp_id: integer**, pay date: date)
For the above schema, perform the following
1. Create the tables with the appropriate integrity constraints
2. Insert around 10 records in each of the tables
3. List the employee details department wise
4. List all the employee names who joined after particular date
5. List the details of employees whose basic salary is between 10,000 and 20,000
6. Give a count of how many employees are working in each department
7. Give a names of the employees whose netsalary>10,000
8. List the details for an employee_id=5
9. Create a view which lists out the emp_name, department, basic, dedeuctions, netsalary
10. Create a view which lists the emp_name and his netsalary

4. Database Schema for a Video Library scenario
Customer(**cust_no: integer**, cust_name: string) Membership(**Mem_no: integer**, **cust_no: integer**) Cassette(**cass_no:integer**, cass_name:string, Language: String) Iss_rec**(iss_no: integer**, iss_date: date, **mem_no: integer**, **cass_no: integer**)
For the above schema, perform the following
a. Create the tables with the appropriate integrity constraints
b. Insert around 10 records in each of the tables
c. List all the customer names with their membership numbers

d. List all the issues for the current date with the customer names and cassette names
e. List the details of the customer who has borrowed the cassette whose title is ― The Legend‖
f. Give a count of how many cassettes have been borrowed by each customer
g. Give a list of book which has been taken by the student with mem_no as 5
h. List the cassettes issues for today
i. Create a view which lists outs the iss_no, iss_date, cust_name, cass_name
j. Create a view which lists issues-date wise for the last one week.

5. Database Schema for a student-Lab scenario

Student(**stud_no: integer**, stud_name: string, **class: string**) Class (**class: string,descrip: string**)Lab (**mach_no: integer**, Lab no: integer, description: String) Allotment (**Stud_no: Integer, mach_no: integer, day of week: string)**

For the above schema, perform the following

a. Create the tables with the appropriate integrity constraints

b. Insert around 10 records in each of the tables

c. List all the machine allotments with the student names, lab and machine numbers

d. List the total number of lab allotments day wise

e. Give a count of how many machines have been allocated to the 'IT' class

f. Give a machine allotment details of the stud_no 5 with his personal and class details

g. Count for how many machines have been allocated in **Lab_no 1** for the day of the week as ―Monday‖

h. How many students class wise have allocated machines in the labs

i. Create a view which lists out the stud_no, stud_name, mach_no, lab_no, dayofweek

j. Create a view which lists the machine allotment details for ―Thursday‖.

k. Create a cursor, which displays all employee numbers and names from the EMP table.

l. Create a cursor, which update the salaries of all employees as per the given data.

m. Create a cursor, which displays names of employees having salary > 50000.

n. Create a procedure to find reverse of a given number

o. Create a procedure to update the salaries of all employees as per the given data

p. Create a procedure to demonstrate IN, OUT and INOUT parameters

q. Create a function to check whether given string is palindrome or not.

r. Create a function to find sum of salaries of all employees working in depart number 10.

s. Create a trigger before/after update on employee table for each row/statement.

t. Create a trigger before/after delete on employee table for each row/statement.

u. Create a trigger before/after insert on employee table for each row/statement.

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II YEAR B.Tech. AI – II Sem

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Machine Learning using Python Lab

Exercise 1

a) Installation and Environment setup of python.
b) Write a program to demonstrate the use of basic Data Types
c) Write a program to demonstrate the Operators and Expressions
d) Write a program to demonstrate the Functions and parameter passing Techniques.

Exercise 2

a) Write a Program to implement

i. Packages ii. Modules iii. Built-in Functions

b) Write a Program to implement

i. List ii. Tuple iii. Dictionaries

c) Programs on Stings, String Operations and Regular Expressions

Exercise 3

a) Write a Program to implement Class and Object
b) Write a Program to implement Static and Instance methods, Abstract Classes and Interfaces.
c) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)

Exercise 4

a) Write a program to implement Inheritance and Polymorphism
b) Write a program to implement Files
c) Write a program to illustrate Handling.

Exercise 5

a) Write a program using scikit-learn to implement K-means Clustering
b) Program to calculate the entropy and the information gain
c) Program to implement perceptron

Exercise 6

a) Generate a decision tree. Find the Depth of decision trees and observe the results, then propose some changes in DecisionTreeClassifier function to limit.

b) Occupancy estimator using random forest

Exercise 7

a) Calculating with matrices using numpy : inv, pinv, matrix_rank, solve, lstsq, svd, transpose, eig, sort, linspace, meshgrid, mgrid, ogrid, concatenate, tile, squeeze, integrate

Exercise 8

a) Program using panda

b) Program using matplotlib – use minimum 5 plotting techniques

Exercise 9

a) Graph using matplotlib

Exercise 10

a) Vector using matplotlib

Exercise 11

a) Program to estimating occupancy using decision tree

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Environmental Science

Course Outcomes:
Students will be able to:

- Define and explain the structure and functions of ecosystem, value of biodiversity, threats and conservation of biodiversity.
- Explain the limitations of the resources and impacts of over utilization of all natural resources.
- Explain the sources and effects of environmental pollutions and list the available techniques to control the pollution.
- Explain the global environmental issues like climate change, ozone hole and can explain the scope of EIA, Environmental Management Plan, and environmental audit and list the EIA methods.
- Mention the salient features of environmental acts and rules, define the sustainable goals along with measures required for the sustainability.

UNIT I:
Ecosystem: Definition, Scope and Importance of ecosystem, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bio-magnification.
Biodiversity and Biotic Resources: Introduction, Definition, levels of Biodiversity, Value of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT II:
Natural Resources: Classification of Resources, **Water resources**: use and over utilization of surface and ground water, Dams: benefits and problems, Rain water harvesting; **Energy resources**: growing energy needs, Renewable and Non Renewable Energy resources. **Land resources**: land degradation – Landslide and Soil Erosion; **Forest Resources –** Uses and Exploitation.

UNIT III:
Environmental Pollution And Control: Types of Pollution, Sources, Effects and Control measures of Air Pollution, Water Pollution, Soil Pollution and Noise Pollution.

UNIT IV:

Global Environmental Problems and Global Efforts: Greenhouse effect, Global Warming, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Aid Rains.

Environmental Impact Assessment (EIA): Scope of EIA and EIA methods, scope of Environmental audit and Environmental Management Plan.

UNIT V:

Environmental Policy, Legislation, Rules And Regulations: Salient features of Environmental Protection act, Air (Prevention and Control of pollution) Act- 1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Municipal solid waste, Hazardous waste, E-waste, Bio-medical waste, Radioactive waste Rules.

Towards Sustainable Future: Concept of Sustainable Development, Sustainable goals defined by UN, Threats to Sustainability, Environmental Education, Role of IT in Environment, Smart Cities, Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

TEXT BOOKS:

1. Text Book of Environmental Studies by Anubha Kaushik (4th Edition), New age International Publishers.
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

REFERENCE BOOKS:

1. Text book of Environmental Science and Technology by M.Anji Reddy 2007.
2. Environmental Science: Towards a Sustainable Future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental studies, From crisis to cure by R.Rajagopalan, 2005.