

Faculty of Engineering & Technology
Radha Govind University
Sambhal (UP)



Evaluation Scheme & Syllabus for

B.Tech. First Year

(I & II SEM)

(Common for All Branches Except Agriculture Engineering)

(Effective from session 2025-26)

EVALUATION SCHEME
B.TECH ALL BRANCHES EXCEPT AGRICULTURE ENGINEERING

STUDY AND EVALUATION SCHEME FOR B.TECH ALL BRANCHES EXCEPT AGRICULTURE ENGG.

YEAR1st/SEMESTER-I

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UENGIAL 101	ENGINEERING MATHEMATICS-I	3	1	0	4	30	-	30	70	-	70	100
UENGIAL 102	ENGINEERING PHYSICS-I	3	1	0	4	30	-	30	70	-	70	100
UENGIAL103	ENGINEERING CHEMISTRY	3	1	0	4	30	-	30	70	-	70	100
UBASICAL104	BASIC ELECTRICAL ENGINEERING	3	1	0	4	30	-	30	70	-	70	100
UCOMPAL105	COMPUTER SYSTEM & PROGRAMMING IN C	3	0	0	3	30	-	30	70	-	70	100
UENGIAL106	ENGINEERING PHYSICS-I LAB	0	0	2	1	-	25	25	-	25	25	50
UENGIAL107	ENGINEERING CHEMISTRY LAB	0	0	2	1	-	25	25	-	25	25	50
UBASIAL108	BASIC ELECTRICAL ENGINEERING LAB	0	0	2	1	-	25	25	-	25	25	50
UCOMPAL109	COMPUTER SYSTEM & PROGRAMMING IN C LAB	0	0	2	1	-	25	25	-	25	25	50
Total		15	4	8	23	150	100	250	350	100	450	700

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year I Semester

L	T	P
3	1	0

UENGL101: 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.

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year I Semester

L	T	P
3	1	0

UENGIAL102: 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)

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year I Semester

L	T	P
3	1	0

UENGIAL103: 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 biodegradable polymers. 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: Abhijit Mallick, 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

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)

L	T	P
3	1	0

B.Tech. I Year I Semester

UBASIAL104: 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 RLC Circuits, 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", Kuldeep Sahay, 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

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)

L	T	P
3	0	0

B.Tech. I Year I Semester

UCOMPAL105: COMPUTER SYSTEM 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 associativity.

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

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year I Semester

L	T	P
0	0	2

UENGIAL106: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 cardinal points.
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.

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year I Semester

L	T	P
0	0	2

UENGIAL107: ENGINEERING CHEMISTRY LAB

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

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year I Semester

L	T	P
0	0	2

UBASIAL108: BASIC ELECTRICAL ENGINEERING LAB

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 of Thevenin'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.

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year I Semester

L	T	P
0	0	2

UCOMPAL109:COMPUTER SYSTEM & PROGRAMMING IN C 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 of Interest 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 in ascending 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 the 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.

**EVALUATION SCHEME
B.TECH ALL BRANCHES**

STUDY AND EVALUATION SCHEME FOR B.TECH ALL BRANCHES

YEAR1st/SEMESTER-II

SUBJECTCODE	SUBJECTSNAME	STUDYSCHEME Periods/Week			Credits	MARKSINEVALUATIONSCHEME						Total Marks of Internal & External
		L	T	P		INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
						Th	Pr	Tot	Th	Pr	Tot	
UENGIAL201	ENGINEERING MATHEMATICS-II	3	1	0	4	30	-	30	70	-	70	100
UENGIAL202	ENGINEERING PHYSICS-II	3	1	0	4	30	-	30	70	-	70	100
UELEMAL203	ELEMENTS OF MECHANICAL ENGG	3	1	0	4	30	-	30	70	-	70	100
UPROFAL204	PROFESSIONAL COMMUNICATION	3	0	0	3	30	-	30	70	-	70	100
UBASIAL205	BASIC ELECTRONICS	3	0	0	3	30	-	30	70	-	70	100
UENGIAL206	ENGINEERING PHYSICS-II LAB	0	0	2	1	-	25	25	-	25	25	50
UELEMAL207	ELEMENTS OF MECHANICAL ENGG LAB	0	0	2	1	-	25	25	-	25	25	50
UPROFAL208	PROFESSIONAL COMMUNICATION LAB	0	0	2	1	-	25	25	-	25	25	50
Total		15	3	6	21	150	75	225	350	75	425	650

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year II Semester

L	T	P
3	1	0

UENGLAL201:ENGINEERING MATHEMATICS – II

Unit - 1: Ordinary Differential Equations

Linear differential equations of n th 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.

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year II Semester

L	T	P
3	1	0

UENGIAL202: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, Coordination 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), Clausius-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 nano tubes.

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

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year II Semester

L	T	P
3	1	0

UPROFAL203: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 Centroid and 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 its corollaries. 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 diagrams of Otto and Diesel cycles, comparison of efficiency.

Books & References:

1. Engineering Mechanics: Statics by J.L Meriam, Wiley
2. Engineering Mechanics : Statics and Dynamics by R. C. Hibbler, Pearson
3. Strength of Materials by Timoshenko & 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

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)

L	T	P
3	0	0

B.Tech. I Year II Semester

UPROFAL204:PROFESSIONAL COMMUNICATION

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.

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)

L	T	P
3	0	0

B.Tech. I Year II Semester

UBASIAL205: 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 & Technology
Radha Govind University, Sambhal (UP)***

B.Tech. I Year II Semester

**UENGIAL206
ENGINEERING PHYSICS- II LAB**

L	T	P
0	0	2

1. To determine the energy band gap of a given semiconductor material.
2. To study Hall effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup.
3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
4. To verify Stefan's law by electric method.
5. To determine resistance per unit length and specific resistance of a given resistance using Carey Foster's Bridge.
6. To study the resonance condition of a series LCR circuit.
7. To determine the electrochemical equivalent (ECE) of copper.
8. To calibrate the given ammeter and voltmeter by potentiometer.
9. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.
10. To measure high resistance by leakage method.

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year II Semester

L	T	P
0	0	2

UELEMAL207: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 conduct friction experiment on screw-jack.

Faculty of Engineering & Technology
Radha Govind University, Sambhal (UP)
B.Tech. I Year II Semester

L	T	P
0	0	2

UPROFAL208:PROFESSIONAL COMMUNICATION LAB :

LABORATORY PRACTICALS

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. Bansal R.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

**Faculty of Engineering and Technology
Radha Govind University
Sambhal (UP)**



Department of Computer Science Engineering & IT

Evaluation Scheme & Syllabus for

B.Tech. Second Year

(III & IV Semester)

(Effective from session 2025-26)

EVALUATION SCHEME

STUDY AND EVALUATION SCHEME FOR B.TECH. COMPUTER SCIENCE & ENGG.												
YEAR 2nd /SEMESTER-3rd												
SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal &External
		L	T	P		INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
						Th	Pr	Tot	Th	Pr	Tot	
UENGICO301	ENGINEERING MATHEMATICS-III	3	1	0	4	30	-	30	70	-	70	100
UDIGICO302	DIGITAL LOGIC DESIGN	3	0	0	3	30	-	30	70	-	70	100
UDATACO303	DATA STRUCTURES	3	0	0	3	30	-	30	70	-	70	100
UDISCCO304	DISCRETE STRUCTURES & THEORY OF LOGIC	3	0	0	3	30	-	30	70	-	70	100
UCOMPCO305	COMPUTER ORGANIZATION AND ARCHITECTURE	3	1	0	4	30	-	30	70	-	70	100
UENVICO306	ENVIRONMENT & ECOLOGY	3	0	0	3	30	-	30	70	-	70	100
UDIGICO307	DIGITAL LOGIC DESIGN LAB	0	0	2	1	-	25	25	-	25	25	50
UDATACO308	DATA STRUCTURES LAB	0	0	2	1	-	25	25	-	25	25	50
UDISCCO309	DISCRETE STRUCTURES & THEORY OF LOGIC LAB	0	0	2	1	-	25	25	-	25	25	50
UCOMPCO310	COMPUTER ORGANIZATION AND ARCHITECTURE LAB	0	0	2	1	-	25	25	-	25	25	50
Total		18	2	8	24	180	100	280	420	100	520	800

STUDY AND EVALUATION SCHEME FOR B.TECH. COMPUTER SCIENCE & ENGG.

YEAR 2nd /SEMESTER-4th

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UNANOCO401	NANO SCIENCE	3	0	0	3	30	-	30	70	-	70	100
UINTRCO402	INTRODUCTION TO MICROPROCESSOR	3	1	0	4	30	-	30	70	-	70	100
UOPERCO403	OPERATING SYSTEM	3	0	0	3	30	-	30	70	-	70	100
USOFTCO404	SOFTWARE ENGINEERING	3	1	0	4	30	-	30	70	-	70	100
UTHEOCO405	THEORY OF AUTOMATA AND FORMAL LANGUAGES	3	1	0	4	30	-	30	70	-	70	100
UUNIVCO406	UNIVERSAL HUMAN VALUE & PROFESSIONAL ETHICS	3	0	0	3	30	-	30	70	-	70	100
UOPERCO407	OPERATING SYSTEM LAB	0	0	2	1	-	25	25	-	25	25	50
USOFTCO408	SOFTWARE ENGINEERING LAB	0	0	2	1	-	25	25	-	25	25	50
UINTRCO409	INTRODUCTION TO MICROPROCESSOR LAB	0	0	2	1	-	25	25	-	25	25	50
Total		18	3	6	24	180	75	255	420	75	495	750

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER
UENGICO301: ENGINEERING MATHS–III

L	T	P
3	1	0

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.

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER
UDIGICO302: DIGITAL LOGIC DESIGN

L	T	P
3	0	0

Unit-I

Digital Design and Binary Numbers:

Binary Arithmetic, Negative Numbers and their Arithmetic, Floating point representation, Binary Codes, Cyclic

Codes, Error Detecting and Correcting Codes, Hamming Codes.

Minterm and Maxterm Realization of Boolean Functions, Gate-level minimization: The map method up to four variable, don't care conditions, SOP and POS simplification, NAND and NOR implementation, Quine Mc- Cluskey Method (Tabular method).

Unit-II

Combinational Logic:

Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Code Converters, Parity Generators and Checkers, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Hazards and Threshold Logic

Unit-III

Memory and Programmable Logic Devices:

Semiconductor Memories, RAM, ROM, PLA, PAL, Memory System design.

Unit-IV

Synchronous Sequential Logic:

Sequential Circuits, Storage Elements: Latches, Flip Flops, Analysis of Clocked Sequential circuits, state reduction and assignments, design procedure.

Registers and Counters: Shift Registers, Ripple Counter, Synchronous Counter, Other Counters.

Unit-V

Asynchronous Sequential Logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race free state assignment, hazards.

References:

1. M. Morris Mano and M. D. Ciletti, "Digital Design", Pearson Education.
2. A.K .Singh, "Foundation of Digital Electronics and Logic design", New Age international.
3. M. Rafiquzzaman, "Fundamentals of Digital Logic and Microcomputer Design", Wiley Dreantech Publication.
4. ZVI Kohavi, "Switching and Finite Automata theory", Tata McGraw-Hill.
5. C.H Roth, Jr., "Fundamentals of Logic Design", Jaico Publishing.
6. Rajaraman & Radhakrishnan, "Digital Logic and Computer Organization", PHI Learning Private Limited, Delhi India.
7. Donald D. Givone, "Digital Principles and Design", Tata MCGraw Hill.
8. Marcovitz: Introduction to logic Design, Tata McGraw-hill Education (India) Pvt. Ltd.

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER
UDATACO303 : DATA STRUCTURES

L	T	P
3	0	0

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 Dijkstra 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.

References:

1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, “Data Structures Using C and C++”, PHI Learning Private Limited, Delhi India
2. Horowitz and Sahani, “Fundamentals of Data Structures”, Galgotia Publications Pvt Ltd Delhi India.
3. AK Sharma, “Data Structure Using C”, Pearson Education India.
4. Rajesh K. Shukla, “Data Structure Using C and C++” Wiley DreamtechPublication.
5. Michael T. Good rich,Roberto Tamassia,David M. Mount “Data Structures and Algorithms in C++”, Wiley India.
6. P. S. Deshpandey, “C and Data structure”, Wiley Dream tech Publication.
7. R. Kruse etal, “Data Structures and Program Design in C”, Pearson Education
8. Berztiss, AT: Data structures, Theory and Practice, Academic Press.
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”, Cengage Learning

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER
UDISCCO304 : DISCRETE STRUCTURES & THEORY OF LOGIC

L	T	F
3	0	0

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, August 2010.
4. RP Grimaldi, Discrete and Combinatorial Mathematics, Addison Wesley,

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER

UCOMPCO305: COMPUTER ORGANIZATION AND ARCHITECTURE

L	T	P
3	1	0

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 & 21 memory organization. ROM memories, Cache memories: concept and design issues & 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", Pearson Learning
4. Miles Murdocca, Vincent Heuring "Computer Architecture and Organisation: An Integrated Approach" 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

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER
UENVICO306 : ENVIRONMENT & ECOLOGY

L	T	P
3	0	0

UNIT.1

Definition, Scope & Importance, Need For Public Awareness• Environment definition, Eco system - Balanced ecosystem, Human activities - Food, Shelter, Economic and social Security. Effects of 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 Sulphur 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-III

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,

UNIT IV

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

Text Books

1. 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
1. Principles of Environmental Science and Engineering -P. Venugoplan Rao, Prentice Hall of India.
 2. Environmental Science and Engineering- Meenakshi, Prentice Hall India

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER

UDIGICO307 DIGITAL LOGIC DESIGN LAB

Objective: To understand the digital logic and create various systems by using these logics.

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/De-multiplexer and Encoder using logic gates.
5. Implementation of 4x1 multiplexer using logic gates.
6. Implementation of 4-bit parallel adder using 7483 IC.
7. Design, and verify the 4-bit synchronous counter.
8. Design, and verify the 4-bit asynchronous counter.

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

L	T	P
0	0	2

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER
UDATACO308: DATA STRUCTURE (USING C/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

L	T	P
0	0	2

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER
UDISCCO309: DISCRETE STRUCTURE & LOGIC LAB

L	T	P
0	0	2

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 adjacent 1'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

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR III SEMESTER UCOMPCO310: COMPUTER
ORGANIZATION LAB

L	T	P
0	0	2

1. Implementing HALF ADDER, FULL ADDER using basic logic gates
 2. Implementing Binary -to -Gray, Gray -to -Binary code conversions.
 3. Implementing 3-8 line DECODER and Implementing 4x1 and 8x1 MULTIPLEXERS.
 4. Verify the excitation tables of various FLIP-FLOPS.
 5. Design of an 8-bit Input/ Output system with four 8-bit Internal Registers.
 6. Design of an 8-bit ARITHMETIC LOGIC UNIT.
 7. Design the data path of a computer from its register transfer language description.
 8. Design the control unit of a computer using either hardwiring or microprogramming based on its register transfer language description.
 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.
- Study of Scalability for Single board Multi-board, multi-core, multiprocessor using Simulator

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR IV SEMESTER
UNANOCO401: NANO SCIENCE

L	T	P
3	0	0

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; Tetrahedrally 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 Non litho grapahic 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 Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR IV SEMESTER
UINTRCO402: INTRODUCTION TO MICROPROCESSOR

L	T	P
3	1	0

UNIT I

Introduction to Microprocessor, Microprocessor architecture and its operations, Memory, Input & output devices, Logic devices for interfacing, The 8085 MPU, Example of an 8085 based computer, Memory interfacing.

UNIT II

Basic interfacing concepts, Interfacing output displays, Interfacing input devices, Memory mapped I/O, Flow chart symbols, Data Transfer operations, Arithmetic operations, Logic Operations, Branch operation, Writing assembly language programs, Programming techniques: looping, counting and indexing.

UNIT III

Additional data transfer and 16 bit arithmetic instruction, Arithmetic operations related to memory, Logic operation: rotate, compare, counter and time delays, Illustrative program: Hexadecimal counter, zero-to-nine, (module ten) counter, generating pulse waveforms, debugging counter and time delay, Stack, Subroutine, Restart, Conditional call and return instructions, Advance subroutine concepts, The 8085 Interrupts, 8085 vector interrupts.

UNIT IV

Program: BCD-to-Binary conversion, Binary-to-BCD conversion, BCD-to-Seven segment code converter, Binary-to-ASCII and ASCII-to-Binary code conversion, BCD Addition, BCD Subtraction, Introduction to Advance instructions and Application, Multiplication, Subtraction with carry.

UNIT V

8255 Programmable peripheral interface, interfacing keyboard and seven segment display, 8254 (8253) programmable interval timer, 8259A programmable interrupt controller, Direct Memory Access and 8237 DMA controller.

Introduction to 8086 microprocessor: Architecture of 8086 (Pin diagram, Functional block diagram, Register organization).

References:

1. Ramesh Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085", 5th Edition, Penram International Publication (India) Pvt.Ltd.
2. Douglas V. Hall, "Microprocessors and Interfacing", Tata McGraw Hill.
3. Yu-cheng Liu, Glenn A. Gibson, "Microcomputer Systems: The 8086 / 8088 Family -Architecture, Programming and Design", Second Edition, Prentice Hall of India.
4. Barry B. Brey, "The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium IV, Architecture, Programming & Interfacing", Eighth Edition, Pearson Prentice Hall, 2009.
5. Peter Abel, "IBM PC Assembly language and programming", Fifth Edition, Prentice

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR IV SEMESTER
UOPERCO403: OPERATING SYSTEMS

L	T	P
3	0	0

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 from deadlock.

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 Dhamdhare, "Operating Systems : A Concept based Approach", McGrawHill.
7. Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education".
8. Stuart E. Madnick & John J. Donovan. Operating Systems. McGraw Hill.
9. A. K. Sharma, "Operating System", University Press.
10. Achyut S Godbole, Atulkahate , "Operating System", McGrawHill

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR IV SEMESTER
USOFTCO404: SOFTWARE ENGINEERING

L	T	P
3	1	0

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: Halstead's Software Science, Function Point (FP) Based Measures**, Cyclamate 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, Top-Down 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, McGrawHill.
2. Pankaj Jalote, Software Engineering, Wiley
3. Rajib Mall, Fundamentals of Software Engineering, PHIPublication.
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, AddisonWesley.
7. Kassem Saleh, "Software Engineering", CengageLearning.
8. P fleeger, Software Engineering, Macmillan Publication

Department of Computer Science Engineering & IT

(Faculty of Engineering and Technology)

Radha Govind University , Sambhal (UP)

II YEAR IV SEMESTER

UTHEOCO405 : THEORY OF AUTOMATA AND FORMAL LANGUAGES

L	T	P
3	1	0

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 of FA.

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 properties 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 Computer of **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", **Pearson Education.**
2. KLP Mishra and N. Chandrasekaran, "Theory of Computer Science: Automata, **Languages** and Computation", PHI Learning Private Limited, Delhi India.
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.**

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR IV SEMESTER
UUNIVCO406: Universal Human Values and Professional Ethics

L	T	P
3	0	0

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 fulfilment 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 fulfilment 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.

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR IV SEMESTER
UOPERCO407 : OPERATING SYSTEMS LAB

L	T	P
0	0	2

1. To implement CPU Scheduling Algorithms

- FCFS
- SJF
- SRTF
- PRIORITY
- ROUNDROBIN

2. Simulate all Page Replacement Algorithms

- FIFO
- LRU

3. Simulate Paging Technique of Memory Management

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

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR IV SEMESTER

USOFTCO408 : SOFTWARE ENGINEERING LAB

L	T	P
0	0	2

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.**

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University , Sambhal (UP)
II YEAR IV SEMESTER

UINTRCO409 : INTRODUCTION TO MICROPROCESSOR LAB

L	T	P
0	0	2

1. Tutorials on 8085 Programming.
2. Interfacing and programming of 8255. (E.g. traffic light controller).
3. Interfacing and programming of 8254.
4. Interfacing and programming of 8279.
5. A/D and D/A converter interface.
6. Stepper motor interface.

Display interface

Faculty of Engineering and Technology
Radha Govind University
Sambhal(UP)



Department of Computer Science Engineering & IT

Evaluation Scheme & Syllabus for

B.Tech. Third Year (V & VI Semester)

(Effective from session 2025-26)

STUDY AND EVALUATION SCHEME FOR B.TECH. COMPUTER SCIENCE & ENGG.												
YEAR 3 rd /SEMESTER-5th												
SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
		L	T	P		INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
						Th	Pr	Tot	Th	Pr	Tot	
UMANACO501	MANAGERIAL ECONOMICS	3	0	0	3	30	-	30	70	-	70	100
UDATACO502	DATABASE MANAGEMENT SYSTEM	3	1	0	4	30	-	30	70	-	70	100
UINDUCO503	INDUSTRIAL SOCIOLOGY	3	0	0	3	30	-	30	70	-	70	100
UDESICO504	DESIGN & ANALYSIS OF ALGORITHM	3	0	0	3	30	-	30	70	-	70	100
UWEBTCO505	WEB TECHNOLOGIES	3	0	0	3	30	-	30	70	-	70	100
UPRINCO506	PRINCIPLES OF PROGRAMMING LANGUAGE	3	0	0	3	30	-	30	70	-	70	100
UDATACO507	DATABASE MANAGEMENT SYSTEM LAB	0	0	2	1	-	25	25	-	25	25	50
UDESICO508	DESIGN & ANALYSIS OF ALGORITHM LAB	0	0	2	1	-	25	25	-	25	25	50
UWEBTCO509	WEB TECHNOLOGIES LAB	0	0	2	1	-	25	25	-	25	25	50
UPRINCO510	PRINCIPLES OF PROGRAMMING LANGUAGE LAB	0	0	2	1	-	25	25	-	25	25	50
Total		18	1	8	23	180	100	280	420	100	520	800

STUDY AND EVALUATION SCHEME FOR B.TECH. COMPUTER SCIENCE & ENGG.												
YEAR 3 rd /SEMESTER-6th												
SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
		L	T	P		INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
						Th	Pr	Tot	Th	Pr	Tot	
UINDUCO601	INDUSTRIAL MANAGEMENT	3	0	0	3	30	-	30	70	-	70	100
UCOMPCO602	COMPUTER NETWORKS	3	1	0	4	30	-	30	70	-	70	100
UCOMPCO603	COMPILER DESIGN	3	1	0	4	30	-	30	70	-	70	100
UINTECO604	INTERNET OF THINGS	3	1	0	4	30	-	30	70	-	70	100
UCOMPCO605	COMPUTER NETWORKS-LAB	0	0	2	1	-	25	25	-	25	25	50
UCOMPCO606	COMPILER DESIGN-LAB	0	0	2	1	-	25	25	-	25	25	50
Total		12	3	4	17	120	50	170	280	50	330	500

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester

UMANACO501 : MANAGERIAL ECONOMICS

L	T	P
3	0	0

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.

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester

L	T	P
3	1	0

UDATACO502: 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, Concept of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagram to Tables, Extended ER Model,

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, AddisonWesley
3. Elmasri, Navathe, — Fundamentals of Database Systems, AddisonWesley
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, GgotiaPublications

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester
UINDUCO503 : INDUSTRIAL SOCIOLOGY

L	T	P
3	0	0

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. PREM VIR KAPOOR, 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

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester
UDESICO504: DESIGN AND ANALYSIS OF ALGORITHM

L	T	P
3	0	0

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, Branch and Bound with Examples Such as 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. Cormen, Charles E. Leiserson and Ronald L. Rivest, —Introduction to Algorithms, Printice Hall of India.
2. E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms",
3. Aho, Hopcraft, Ullman, —The Design and Analysis of Computer Algorithms, Pearson Education, 2008.
4. LEE "Design & Analysis of Algorithms (POD)", McGraw Hill
5. Gajendra Sharma, Design & Analysis of Algorithms, Khanna Publishing House
6. Richard E. Neapolitan "Foundations of Algorithms" Jones & Bartlett Learning
7. Jon Kleinberg and Éva Tardos, Algorithm Design, Pearson, 2005.
8. Michael T Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis,
9. and Internet Examples, Second Edition, Wiley, 2006.
10. Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins, 1997
11. Robert Sedgewick and Kevin Wayne, Algorithms, fourth edition, Addison Wesley, 2011.
12. Harsh Bhasin, Algorithm Design and Analysis, First Edition, Oxford University Press.

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)

III Year V Semester

UWEBTCO505 : WEB TECHNOLOGIES

L	T	P
3	0	0

UNIT-I

Introduction: 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. Core Java: Introduction, Operator, Datatype, Variable, Arrays, Methods & Classes, Inheritance, Package and Interface, Exception Handling, 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 Resources, 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 Age International
3. Ivan Bayross,|| HTML, DHTML, Java Script, Perl & CGI||, BPB Publication
4. **Tanveer Alam, Internet & Java Programming, Khanna Publishing House**
5. Bhave, —Programming with Java||, Pearson Education
6. Herbert Schildt, —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

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester

UPRINCO506: PRINCIPLES OF PROGRAMMING LANGUAGES

L	T	P
3	0	0

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 T.V.Gopal, Fourth ed., PrenticeHall
2. —Programming Language Design Concept||, David A. Watt, WilleyIndia
3. —Programming languages: Concepts and Constucts||, Ravi Sethi, Second Ed.,Pearson.
4. —Types and programming Languages||, Benjamin C. Pierce. The MIT Press Cambridge, Massachusetts London, England

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester

UDATACO507: DATABASE MANAGEMENT SYSTEMS

L	T	P
0	0	2

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

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester

UDESICO508 : 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

L	T	P
0	0	2

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester
UWEBTCO509 : WEB TECHNOLOGIES LAB

L	T	P
0	0	2

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 an 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 the cookies.
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 display them. Insert the details of the users who register with the website, whenever a new user clicks the 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.

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year V Semester

UPRINCO510 : PRINCIPLES OF PROGRAMMING LANGUAGES

L	T	P
0	0	2

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

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year VI Semester
UINDUCO601 : INDUSTRIAL MANAGEMENT

L	T	P
3	0	0

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.

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year VI Semester
UCOMPCO602 : COMPUTER NETWORKS

L	T	P
3	1	0

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

REFERENCES:

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. Michael A. Gallo and William M. Hancock "Computer communication and Networking Technology"Cengage Learning
7. Anuranjan Misra, —Computer Networksll, AcmeLearning

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year VI Semester
UCOMPCO603 : COMPILER DESIGN

L	T	P
3	1	0

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 free grammars, 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 parsing 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: Design Issues, the Target Language. Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization 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

REFERENCES:

1. K. Muneeswaran, Compiler Design, First Edition, Oxford University Press.
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 Loudon, Compiler Construction, Cengage Learning. Charles Fischer and Ricard LeBlanc, Crafting a Compiler with C, Pearson Education

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year VI Semester
UINTECO604 : INTERNET OF THINGS

L	T	P
3	1	0

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

Hardware for IoT: Sensors, digital sensors ,actuators, radio frequency identification (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 Arduinio: Adonis platform boards anatomy, arduino IDE, coding, using emulator, using libraries, additions in arduino, programming the arduino for IoT.

UNIT V

Challenges in IoT Design Challenges:Developmentchallenges,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, David Boswarthick, Omar Elloumi—The Internet of Things key applications and protocols, willey
2. Jeeva Jose, Internet of Things, Khanna Publicatiosn
3. Michael Miller —The Internet of Things by Pearson
4. Raj Kamal —INTERNET OF THINGS, McGraw-Hill, 1ST Edition,2016
5. Arshdeep Bahga, Vijay Madiseti — Internet of Things(A hands on approach) 1ST edition, VPI publications,2014
6. Adrian McEwen,HakinCassimally —Designing the Internet of Things WileyIndia

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year VI Semester

UCOMPCO605 : 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 or simulators)
3. Running and using services/commands like ping, trace route, nslookup, arp, telnet, ftp, etc.
4. Network packet analysis using tools like Wireshark, tcp dump, 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

L	T	P
0	0	2

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
III Year VI Semester

UCOMPCO606 : COMPILER DESIGN LAB

1. Implementation of LEXICAL ANALYZER for IFSTATEMENT
2. Implementation of LEXICAL ANALYZER for ARITHMETIC EXPRESSION
3. Construction of NFA from REGULAR EXPRESSION
4. Construction of DFA from NFA
5. Implementation of SHIFT REDUCE PARSING ALGORITHM
6. Implementation of OPERATOR PRECEDENCE PARSER
7. Implementation of RECURSIVE DESCENT PARSER
8. Implementation of CODE OPTIMIZATION TECHNIQUES

L	T	P
0	0	2

**Faculty of Engineering and Technology
Radha Govind University
Sambhal (U.P)**



Department of Computer Science Engineering & IT

**Evaluation Scheme & Syllabus for
B. Tech. Fourth Year
(VII & VIII Semester)**

(Effective from session 2025-26)

EVALUATION SCHEME

STUDY AND EVALUATION SCHEME FOR B.TECH. COMPUTER SCIENCE & ENGG.												
YEAR 4th/SEMESTER-7th												
SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UENTRCO701	Entrepreneurship Development	3	0	0	3	30	-	30	70	-	70	100
UDISTCO702	Distributed System	3	1	0	4	30	-	30	70	-	70	100
UARTICO703	Artificial Intelligence	3	1	0	4	30	-	30	70	-	70	100
USOFTCO704	Software Testing & Audit	3	1	0	4	30	-	30	70	-	70	100
UCRYPCO705	Cryptographic & Network Security	3	0	0	3	30	-	30	70	-	70	100
UMINOCO706	Minor Project	0	0	2	1	-	25	25	-	25	25	50
UDISTCO707	Distributed System	0	0	2	1	-	25	25	-	25	25	50
UINDUCO708	Industrial Training	0	0	2	1	-	25	25	-	25	25	50
Total		15	3	6	21	150	75	225	350	75	425	650

STUDY AND EVALUATION SCHEME FOR B.TECH. COMPUTER SCIENCE & ENGG.												
YEAR 4th/SEMESTER-8th												
SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	Marks In Evaluation Scheme						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UNONCCO801	Non-Conventional Energy Resources	3	0	0	3	30	-	30	70	-	70	100
UDIGICO802	Digital Image Processing	3	1	0	4	30	-	30	70	-	70	100
UPATTCO803	Pattern Recognition	3	1	0	4	30	-	30	70	-	70	100
UDATACO804	Data Compression	3	0	0	3	30	-	30	70	-	70	100
UMAJOCO805	Major Project	-	0	14	7		100	100		200	200	300
USEMICO806	Seminar	-	0	2	1		25	25		25	25	50
Total		12	2	16	22	120	125	245	280	225	505	750

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV YEAR VII SEMESTER
UENTRCO701: ENTREPRENEURSHIP DEVELOPMENT

L	T	P
3	0	0

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 Age International.
2. Havinal, Veerbhadrappa, "Management and Entrepreneurship" New Age International
3. Joseph, L. Massod, "Essential of Management", Prentice Hall of India.

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV YEAR VII SEMESTER
UDISTCO702: DISTRIBUTED SYSTEMS

I	T	P
3	1	0

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 building distributed 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, Recovery in 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 Ramakrishna,Gehrke," Database Management Systems", McGrawHill
2. Vijay K.Garg Elements of Distributed Computing ,Wiley
3. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education
4. Tenanuanbaum, Steen," Distributed Systems",PHI

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV YEAR VII SEMESTER
UARTICO703 ARTIFICIAL INTELLIGENCE

L	T	P
3	1	0

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”, Pearson Education
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, McGraw-Hill
3. E Charniak and D McDermott, “Introduction to Artificial Intelligence”, Pearson Education
4. Dan W. Patterson, “Artificial Intelligence and Expert Systems”, Prentice Hall of India,

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VII Semester

USOFTCO704: SOFTWARE TESTING AND AUDIT

L	T	P
3	1	0

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 their Applicability, 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 Delhi, 2003.
3. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VII Semester
UCRYPCO705: CRYPTOGRAPHY & NETWORK SECURITY

L	T	P
3	0	0

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, feistel 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.Padmabhan **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

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VII Semester

L	T	P
0	0	2

UMINOCO706 Minor Project

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VII Semester

L	T	P
0	0	2

UDISTCO707 Distributed System lab

1. Simulate the functioning of Lamport's Logical Clock in C.
2. Simulate the Distributed Mutual Exclusion in C.
3. Implement a Distributed Chat Server using TCP Sockets in C.
4. Implement Java RMI“ mechanism for accessing methods of remote systems.
5. Simulate Balanced Sliding Window Protocol in C.
6. Implement CORBA mechanism by using C++program at one end and Java program on the other.

Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VII Semester

UINDUCO708: INDUSTRIAL TRAINING

1. Learning professional skills like exercising leadership, behaving professionally, behaving ethically, listening effectively, participating as a member of a team, developing appropriate workplace attitudes
2. Demonstrating understanding of professional customs & practices and working with professional standards
3. Improving problem-solving, critical thinking skills and report writing.

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
UNONCCO801: NON CONVENTIONAL ENERGY RESOURCES

L	T	P
3	0	0

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.

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 Computer Science Engineering & IT
(Faculty of Engineering and Technology)**

Radha Govind University, Sambhal (UP)
UDIGICO802: DIGITAL IMAGE PROCESSING

L	T	P
3	1	0

UNIT-I

Introduction and Fundamentals Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization.

Image Enhancement in Frequency Domain

Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

UNIT II

Image Enhancement in Spatial Domain

Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.

UNIT III

Image Restoration A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT IV

Morphological Image Processing Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

UNIT V

Registration Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth

Segmentation Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection

REFERENCES:

1. Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.
2. Digital Image Processing and Computer Vision, R.J. Schalk off. Published by: John Wiley and Sons, NY.
3. Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall, Upper Saddle River, NJ.
4. Sonka, Digital Image Processing and Computer Vision, Cengage Learning
5. Gonzalez and Woods, Digital Image Processing, AddisonWesley.

Department of Computer Science Engineering & IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VIII Semester
UPATTCO803: PATTERN RECOGNITION

L	T	P
3	1	0

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 Pattern 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 Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VIII Semester

UDATACO804: DATA COMPRESSION

L	T	P
3	0	0

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 Markov 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 Kaufmann Publishers
2. Elements of Data Compression, Drozdek, Cengage Learning
3. Introduction to Data Compression, Second Edition, Khalid Sayood, The Morgan Kaufmann Series
4. Data Compression: The Complete Reference 4th Edition by David Salomon, Springer
5. **Text Compression 1st Edition by Timothy C. Bell Prentice Hall**

**Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VIII Semester**

UMAJOCO805 Major Project

L	T	P
0	0	14

- 1 Analyse and understand the real life problem and apply their knowledge to get programming solution.
- 2 Engage in the creative design process through the integration and application of diverse technical knowledge and expertise to meet customer needs and address social issues.
- 3 Use the various tools and techniques, coding practices for developing real life solution to the problem.
- 4 Find out the errors in software solutions and establishing the process to design maintainable software applications
- 5 Write the report about what they are doing in project and learning the team working skills .

**Department of Computer Science Engineering &IT
(Faculty of Engineering and Technology)
Radha Govind University, Sambhal (UP)
IV Year VIII Semester**

USEMICO806 Seminar

L	T	P
0	0	2

1. Developing a technical artifact requiring new technical skills and effectively utilizing a new software tool to complete a task
2. Writing requirements documentation, Selecting appropriate technologies, identifying and creating appropriate test cases for systems.
