BACHELOR OF TECHNOLOGY
CURRICULA & SYLLABI

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Baba Sahab Dr. Bhim Rao Ambedkar
College of Agril Engg & Technology - Etawah-206001 (UP)
(Chandra Shekhar Azad University of Agriculture & Technology, Kanpur)

(For newly admitted students from Session 2018-2019)
ABOUT THE DEPARTMENT

The Department of Computer Science and Engineering established in the year 2002-03 with an intake of 40, is imparting quality education to the students in the field of Computer Science and Engineering through its Undergraduate programme. The department has, over the years, established its reputation as an excellent center for imparting high quality technical education to B. Tech students.

The department has been under Self Finance programme with the support of the core faculty of Agricultural Engineering and its staff. The good numbers of alumni of the department are occupying high positions in Governments, Semi- Governments and Private organizations in the country as well as abroad. The laboratories of the department are being updated from time to time so that they remain well equipped to cater to the Research and Development.

VISION

To EPEome an Acclaimed Department of Higher Learning, Research, Innovation and Incubation in Computer Science and Engineering.

MISSION

1. Educate a new generation of Engineers to meet the challenges of the future by providing them with a firm foundation of both the theory and practical of Computer Science and Engineering at undergraduate levels.

2. Create, develop and disseminate new knowledge by top quality applied research in Computer Science and Engineering by interacting with government agencies and private industry.

3. Promote a sense of leadership and service to the society.
PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) OF B.TECH. PROGRAMME

PEO-I Excel in professional career and/or higher education by acquiring knowledge in area of Computer Science and Engineering.

PEO-II Analyze real life problems, design appropriate system to provide solutions that are technically sound, economically feasible and socially acceptable.

PEO-III Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in life-long learning.

PROGRAM OUTCOMES (POs) of B.Tech. PROGRAMME:

(a) An ability to apply knowledge of mathematics, science and engineering fundamentals to the conceptualization of engineering models.

(b) An ability to identify and formulate the techniques and tools related to Computer Science and Engineering to analyze conflicting technical and engineering issues.

(c) An ability to design, implement and evaluate a Computer Science and Engineering based system, components or processes to meet the desired needs within realistic constraints.

(d) An ability to design and conduct experiments, as well as to analyze and interpret data.

(e) An ability to use current techniques, skills and modern tools necessary for engineering practice.

(f) An ability to apply the engineering knowledge to assess societal, health, safety, legal and cultural issues to the professional engineering practice.

(g) An ability to understand the impact of Computer Science and Engineering in societal and environmental context and demonstrate the knowledge for sustainable development.

(h) An ability to understand and commit to professional ethics, responsibilities and norms of engineering practice.

(i) An ability to function individually and on team to accomplish a common goal.

(j) An ability to communicate effectively and to prepare formal technical plans and detailed reports involving creative use of knowledge of engineering principles in novel ways.

(k) An ability to demonstrate a knowledge and understanding of management and business practices and understand their limitations.

(l) Knowledge of contemporary issues like increased use of portable devices, rising health care costs and etc. which influences engineering design, and an ability to engage in independent and life long learning.
# Credit Structure for B. Tech. (Computer Science & Engineering)

(For newly admitted students from Session 2018-2019)

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## Curriculum for B.Tech. (Computer Science & Engineering)

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NOTE: CNC = COMPULSORY NON CREDIT

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### Semester-IV (2nd Year)

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Semester-VI (3\textsuperscript{rd} Year)

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Note: The evaluation of Industrial/Practical Training shall be offered at the end of VI\textsuperscript{th} semester & evaluation in VII\textsuperscript{th} semester.

Semester-VII (4\textsuperscript{th} year)

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Semester-VIII

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# Engineering Fundamentals & Department Core
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<td>CSE-364</td>
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<td>35</td>
<td>CPE-475</td>
<td>Mobile Application Programming</td>
<td>CSE-364</td>
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<td>36</td>
<td>CPE-476</td>
<td>Database Administration with ORACLE</td>
<td>CSE-241</td>
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<td>37</td>
<td>CPE-477</td>
<td>Data Warehousing &amp; Data Mining</td>
<td>CSE-241</td>
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<td>38</td>
<td>CPE-478</td>
<td>Analytics and Systems of Big Data</td>
<td>CSE-365</td>
<td>3</td>
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<tr>
<td>39</td>
<td>CPE-481</td>
<td>Advanced Programming Techniques</td>
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<td>CPE-482</td>
<td>Software Reuse</td>
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<td>41</td>
<td>CPE-483</td>
<td>Software Verification &amp; Validation</td>
<td>CSE-365</td>
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<td>42</td>
<td>CPE-484</td>
<td>Software Design &amp; Construction</td>
<td>CSE-365</td>
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<td>43</td>
<td>CPE-485</td>
<td>Software Quality Management</td>
<td>CSE-365</td>
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<td>44</td>
<td>CPE-486</td>
<td>Fundamentals of Cloud Computing</td>
<td>CSE-351</td>
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<td>45</td>
<td>CPE-487</td>
<td>Cryptography &amp; Information Security</td>
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<td>46</td>
<td>CPE-488</td>
<td>Introduction to Real Time Systems</td>
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<td>47</td>
<td>CPE-489</td>
<td>Neural Networks &amp; Fuzzy Systems</td>
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**Audit Courses for B. Tech. (Computer Science and Engineering)**

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Paper Code</th>
<th>Course</th>
<th>Prerequisite Course</th>
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<tr>
<td>1</td>
<td>BSH-114</td>
<td>Environment &amp; Studies</td>
<td>-</td>
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<tr>
<td>2</td>
<td>BSH-127</td>
<td>Fundamentals of Electronics Engineering</td>
<td>-</td>
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<tr>
<td>3</td>
<td>IDE-231</td>
<td>Management of Canal Irrigation System</td>
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<td>4</td>
<td>SWE-231</td>
<td>Information Technology for Land and Water</td>
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<td>5</td>
<td>SWE-232</td>
<td>Wasteland Development</td>
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<td>6</td>
<td>BSH-243</td>
<td>Microprocessors &amp; Application</td>
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<td>7</td>
<td>BSH-352</td>
<td>Digital Signal Processing</td>
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**NOTE:** CNC = COMPULSORY NON CREDIT
## OPEN ELECTIVE COURSE

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<th>S.N. Paper</th>
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<td>1.</td>
<td>MOE-481</td>
<td>Fundamentals Of Mechanical Engineering</td>
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<td>2.</td>
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<td>Manufacturing Processes</td>
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<td>AOE-481</td>
<td>Photovoltaic Technology And Systems</td>
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<td>AOE-482</td>
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<td>AOE-483</td>
<td>Human Engineering And Safety</td>
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<td>7.</td>
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<td>Database Management System, Data Mining &amp; Warehousing</td>
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<td>8.</td>
<td>COE-482</td>
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<td>E-Commerce &amp; IT</td>
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### BSH-111 ENGINEERING MATHEMATICS-I

**Course category**: Basic Sciences & Maths (BSM)

**Pre-requisite Course**: NIL

**Contact hours/week**: Lecture : 3, Tutorial : 1 , Practical: 0

**Number of Credits**: 4

**Course Assessment Methods**: Continuous assessment through tutorials, attendance, home assignments, and final Examination.

**Course Outcomes**: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of basic differential operators in various engineering problems.
2. Solve linear system of equations using matrix algebra.
3. Use vectors to solve problems involving force, velocity, work and real life problems and able to analyze vectors in space
4. Evaluate and use double integral to find area of a plane region and us of triple integral to find the volume of region in 3rd dimension

**Topics Covered**

**UNIT-I**

**Differential Calculus**: Leibnitz theorem, Partial derivatives, Euler’s theorem for homogenous function, Total derivative, Change of variable. Taylor’s and Maclaurin’s theorem. Expansion of function of two variables, Jacobian, Extrema of function of several variables.

**UNIT-II**

UNIT-III
Multiple Integrals: Double and triple integrals, change of order of integration, change of variables. Application of multiple integral to surface area and volume. Beta and Gamma functions, Dirichlet integral.

UNIT-IV
Vector Calculus: Gradient, Divergence and Curl. Directional derivatives, line, surface and volume integrals. Applications of Green’s, Stoke’s and Gauss divergence theorems (without Proofs).

Books & References

BSH-112 ENGINEERING PHYSICS-I
Course category: Basic Sciences & Maths (BSM)
Pre-requisite Course: NIL
Contact hours/week: Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits: 5
Course Assessment methods: Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva vice and one midterm Examination, final Examination & Practical Examination

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course:
2. Quantum Mechanics and its application to understand material properties.
4. Use of the principle of optics in the measurement.
5. Applications of Laser and holography in Engineering.

Topics Covered
UNIT-I
Relativistic Mechanics: Inertial and Non-inertial Frames of reference, Galilean transformation, Michelson-Morley Experiment, Postulates of special theory of relativity, Lorentz Transformation, Length contraction, Evidences of length contraction, Time dilation, Evidences for time dilation, Relativistic velocity transformation, Relativistic variation of mass with velocity, Evidence of mass variation with velocity, Relativistic kinetic energy, Mass energy equivalence, Examples from nuclear physics, Relativistic energy-momentum relation.

UNIT-II
Quantum Mechanics: De Broglie waves and Group velocity concept, Uncertainty principle and its application, Davisson-Germer experiment, Derivation of Schrodinger equation for time independent and time dependent cases. Postulates of quantum mechanics, Significance of wave function, Application of Schrodinger wave equation for a free particle (one dimensional and three dimensional case), Particle in a box (one dimensional and three dimensional), Simple harmonic oscillator (one dimensional and three dimensional).

UNIT-III
Geometrical Optics: General theory of image formation: Cardinal points of an optical system; general relationships, thick lens and lens combinations.
Optical Instruments: Need for a multiple lens eyepiece, common type of eyepieces
Physical Optics:
Diffraction: Single, double and N- Slit Diffraction, Diffraction grating, Grating spectra, dispersive power, Rayleigh’s criterion and resolving power of grating.
Polarization: Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical polarized light, Retardation Plate, Polarimeter

UNIT-IV
Modern Optics
Laser: Spontaneous and stimulated emission of radiation, population inversion, concept of 3 and 4 level Laser, construction and working of Ruby, He-Ne lasers and laser applications.
Fiber Optics: Fundamental ideas about optical fiber, Propagation mechanism, Acceptance angle and cone, Numerical aperture, Propagation Mechanism and communication in fiber Single and Multi Mode Fibers, step index and graded index fiber, attenuation and losses.
Holography: Basic Principle of Holography, Construction and reconstruction of Image on hologram and applications of holography.

EXPERIMENTS
1. To determine the wavelength of monochromatic light by Newton’s Ring
2. To determine the specific rotation of cane sugar solution using polarimeter
3. To determine the wavelength of spectral lines using plane transmission grating.
4. To verify Brewster’s law using rotating Nicol prism
5. To verify Stefan’s law by electrical method
6. To Study resonance in LCR circuit with a c source.
7. To determine the height of a tower with a Sextant.
8. To determine the refractive index of a liquid by Newton’s ring.

Books & References
1. Introduction to Special theory Relativity-Robert Resnick, Wiley Eastern Ltd.
5. Optics- N. Subrahmaniam, Brij Lal, M.N. Avadhanulu, S. Chand
6. Fiber optics and laser Principles and Applications-Anuradha De, New Age International
BSH-121  ENGINEERING MATHEMATICS – II

Course category: Basic Sciences & Maths (BSM)
Pre-requisite Course: NIL
Contact hours/week: Lecture : 3, Tutorial : 1, Practical: 0
Number of Credits: 4
Course Assessment methods: Continuous assessment through tutorials, attendance, home assignments, one mid term Examination, Final Examination.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of various mathematical techniques such as differential operators, matrix algebra and vector differentiation and integration.
2. To identify, formulate and solve the real life problems.
3. To inculcate the habit of mathematical thinking and lifelong learning.

Topics Covered
UNIT-I 9
Differential Equations: Linear differential equations with constant coefficients \((\frac{d^n}{dx^n}y=0)\), complementary function and particular integral. Simultaneous linear differential equations, solution of second order differential equations by changing dependent and independent variables, Method of variation of parameters, Applications of differential equations to engineering problems

UNIT-II 9
Special functions: Series solution of second order differential equations with variable coefficient (Frobenious method). Bessel and Legendre equations and their series solutions, Properties of Bessel function and Legendre polynomials

UNIT-III 9

UNIT-IV 9

Books & References
BSH-122 ENGINEERING PHYSICS-II

Course category : Basic Sciences & Maths (BSM)
Pre-requisite Course : NIL
Contact hours/week : Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits : 5
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and one Mid Term Examination, Final Examination & Practical Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Basics of crystallography application in Engineering
2. Use of the principles of sound wave and acoustics in civil engineering with the consideration of NDT.
3. Basic principles of electricity and magnetism applied in Engineering.
5. Basic principles of semiconducting materials and its application.

Topics Covered
UNIT-I
Crystal Structures and X-ray Diffraction: Space lattice, basis, Unit cell, Lattice parameter, Seven crystal systems and Fourteen Bravais lattices, Crystal-System Structure, Packing factor (cubic, body and face), Crystal structure of NaCl and diamond, Lattice planes and Miller Indices, Reciprocal Lattice, Diffraction of X-rays by crystal, Laue’s experiment, Bragg’s Law, Bragg’s spectrometer.

UNIT-II
Sound Waves and Acoustics: Sound waves, intensity, loudness, reflection of sound, echo; Reverberation, reverberation time, Sabine’s formula, remedies over reverberation; Absorption of sound, absorbent materials; Conditions for good acoustics of a building; Noise, its effects and remedies; Ultrasonics –Production of ultrasonics by Piezo-electric and magnetostriiction; Detection of ultrasonics; Engineering applications of Ultrasonics (Non-destructive testing).

UNIT-III
Electrodynamics –I: Basic concepts of Gauss’s law, Ampere’s law and faradays law of electromagnetic induction. Correction of Ampere’s law by Maxwell (concept of displacement current), Maxwell’s equation, transformation from integral form to differential form, physical significance of each equation
Electrodynamics –II: Maxwell’s equation in free space, velocity of electromagnetic wave, transverse character of the wave and orthogonality of E, H and k vectors, Maxwell’s equations in dielectric medium and velocity of e. m. wave, comparison with free space, Maxwell’s equations in conducting media, solution of differential equation in this case and derivation of penetration depth
UNIT-IV

Physics of Advanced Materials

**Semiconducting Materials**: Concept of energy bands in solids, Carrier concentration and conductivity in intrinsic semiconductors and their temperature dependence, carrier concentration and conductivity in extrinsic semiconductors and their temperature dependence. Hall effect in semiconductors, Compound semiconductors, Optoelectronic Materials.

**Superconducting Materials**: Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, Type I and Type II superconductors, Electrodynamics of superconductors, BCS theory (Qualitative), High temperature superconductors and Applications of Superconductors.

**Nano-Materials**: Basic principle of nanoscience and technology, structure, properties and uses of Fullerene and Carbon nanotubes, Applications of nanotechnology.

**EXPERIMENTS**

1. To determine the specific resistance of a given wire using Carrey Foster’s Bridge.
2. To study the variation of magnetic field along the axis of current carrying circular coil.
3. To study the Hall’s effect and to determine Hall coefficient in n type Germanium.
4. To study the energy band gap of n-type Germanium using four probe method.
5. To determine e/m of electron using Magnetron valve.
6. To draw hysteresis curve of a given sample of ferromagnetic material.
7. To determine the velocity of Ultrasonic waves.
8. To determine the Elastic constants (Y, η, σ) by Searl’s method.

**Books & References**

5. Introduction to Nano Technology - Poole Owens, Wiley India.

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**BSH-123  GRAPH THEORY**

**Course category** : Basic Sciences & Maths (BSM)
**Pre-requisite Course** : NIL
**Contact hours/week** : Lecture : 3, Tutorial : 1, Practical: 2
**Number of Credits** : 5
**Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and one Mid Term Examination, Final Examination & Practical Examination.
**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Write precise and accurate mathematical definitions of objects in graph theory.
2. Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory.
3. Use mathematical definitions to identify and construct examples.
4. Validate and critically assess a mathematical proof.
Topics Covered

UNIT-I

**Preliminaries:** Sets, relations, functions & multi-sets, Inductive definition and proof by induction, Cardinality of sets Basic concepts of Graph Theory: Digraphs, graphs and other similar objects, Representations of diagraphs and graphs, Operations on graphs, degree sequence and isomorphism Connectedness and distance: Walks, trails, circuits, cycles, and paths, Connected digraphs and graphs, Weighted graphs and digraphs and distance

UNIT-II

**Trees and their applications:** Basic properties of trees and forests, Minimum-weight spanning trees, Enumeration of labeled trees, Rooted trees and uniquely decipherable coding, Tree traversals and parentheses-free notations Networks and flows: Legal flows and capacities of cuts, The Ford-Fulkerson Algorithms and Maxflow-Mincut theorem

UNIT-III

**Edge and Vertex traversal problems:** Euler circuits and Euler trails, Fleury’s algorithm and the Chinese Postman problem, Hamilton cycles and the Travelling Salesman problem Planar embeddings of graphs: Basic properties of planar graphs, Kuratowski’s theorem and non-planar graphs, The DMP planarity algorithm, Polyhedral graphs and geometric dual

UNIT-IV

**Colorings and Matchings in graphs:** Legal colorings and k-colorable graphs, Chromatic Polynomial and Four color theorem, Matchings in graphs and Stable marriage algorithm Directed graphs: Tournaments, directed paths and cycles, connectivity and strongly connected digraphs, branching, Infinite graphs and digraphs

EXPERIMENTS

1. Write a recursive program that computes the value of ln(N!).
2. Write a C program to Implement Euler Circuit which starts and ends on the same vertex.
3. Write a C Program to Implement Hamiltonian Cycle Algorithm.
4. Write a C Program to assign a colour to each of the states so that no two adjacent states share the same colour. The program should output each state and its colour. Example: Alabama touches Florida, Mississippi, Tennessee, and Georgia. Arkansas touches Louisiana, Texas, etc.
5. Graph implementation of BFS and DFS using C. 56
6. Write a C Program to Implement Euler Circuit problem. In graph theory, this starts and ends on the same vertex.
7. Write a C Program for the 'marriage problem', for N boys and N girls and an NxN binary matrix telling us which pairings are suitable, and want to pair each girl to a boy. Implement perfect matching in a bipartite graph.
8. Write a C program to implement ford-fulkerson algorithm
9. Write A C program for the implementation of the Branch and Bound Algorithm: The Asymmetric Travelling Salesman Problem
11. Write a C program to check whether the given graph is tree.
12. Write a C program to extract spanning tree (without using Kruskal and prim's Algorithm).
13. Write a C program to perform following operations on a given 2 connected graph i. Union ii. Intersection iii. deletion of a vertex iv. deletion of any edge v. fusion of 2 vertex
14. Write a C program to input an image (Graph) and find out its adjacency and incidence matrix.
15. Write a C program to extract walk, path from any vertex to any vertex in a given graph.
16. Write a C program for the i. test for emptyness ii. return the number of vertices iii. return the number of edges iv. test if a given vertex exists v. test if a given edge exists vi. add a vertex (this operation does not add any edge) vii. add an edge (this operation may result in adding new vertices) viii. delete a vertex (this operation may result in deleting edges) ix. delete an edge (this operation may result in deleting vertices)
Textbooks & Reference books

BSH-231 DISCRETE MATHEMATICS

Course category : Basic Sciences & Maths (BSM)
Pre-requisite Course : NIL
Contact hours/week : Lecture: 3, Tutorial: 1, Practical: 0
Number of Credits : 4
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, one Mid Term Examination, Final Examination.
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use logical notation to define different function such as set, function and relation.
2. Use of basic properties of group theory in computer science.
3. Use of graph theory models to solve problems of connectivity and constraint satisfaction, for example, scheduling.
4. Use of induction hypotheses to prove formulae.

Topics Covered

UNIT-I
Set Theory, Relation and Function: Definition of sets, Countable and uncountable sets, Venn Diagrams, Proofs of some general identities on sets. Definition and types of relation, composition of relation, equivalence relation, partial order relation. Function: Definition, types of function, one to one, into and onto function, inverse function, composition of functions.

UNIT-II
Algebraic Structures: Definition, properties and types of algebraic structures, Semi groups, Monoid, Groups, Abelian group, properties of groups, Subgroups, Cyclic groups, Cosets, Factor group, Permutations groups, Normal subgroups, examples and standard results. Rings and fields: Definition and Standard results.

UNIT-III
Graphs: Simple graph, multigraph, graph terminology, representation of graphs, Bipartite, regular, planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, graph colouring, chromatic number, chromatic polynomials. Tree: types and definition, rooted tree, properties of trees.

UNIT-IV
Combinatorics: Basic counting Technique, Pigeon-hole principle, Discrete Numeric function, Recurrence relations and their solution, Generating function, Solution of recurrence relations by method of generating function.

Books & References
1. Discrete Mathematical Structures with applications to computer science - J.P. Tremblay and R. Manohar,
2. Graph Theory with application to engineering and computer science - Prentice Hall
3. Combinatorics: Theory and applications - V. Krishnamurthy, East
BSH-232  APPLIED COMPUTATIONAL METHODS

Course category : Basic Sciences & Maths (BSM)
Pre-requisite Course : NIL
Contact hours/week : Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits : 5
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, one Mid Term Examination and Final Examination.

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. To find the root of a curve using Bisection, Regula falsi Newton’s Method.
2. Use of moments and kurtosis to find the type of curve.
3. To interpolate a curve using Gauss, Newton’s interpolation formula.
4. To find the derivative of a curve.
5. To find the area of a curve.

Topics Covered
UNIT-I
Numerical Methods: Solution of algebraic and Transcendental equations, Bisection method, Method of False position (Regula-Falsi method) and Newton-Raphson method, Solution of linear simultaneous equations; Guass-Siedel method, Crout’s method.

UNIT-II

UNIT-III

UNIT-IV
Statistical Methods and Probability Distributions: Frequency Distributions, mean, mode, median, standard deviation, Moments, Skewness, Kurtosis, Types and measurement of Skewness and Kurtosis. Correlation; Regression and regression lines. Binomial Distribution, Poisson’s Distribution, Normal Distribution.

Experiments
1. To implement Regula-Falsi method to find root of algebraic equation.
2. To implement Newton-Raphson method to find root of algebraic equation.
3. To implement Newton’s Divided Difference formula to find value of a function at a point.
4. To implement Numerical Integration by using Simpson’s one-third rule.
5. To implement numerical solution by using Runge-Kutta method of order four to find solution of differential equation.
6. To implement numerical solution of differential equation by Picard’s method.
7. To implement numerical solution of differential equation by using Euler’s method.
8. To estimate regression equation from sampled data and evaluate values of standard deviation, regression coefficient.
Books & References

BSH-241 OPTIMIZATION TECHNIQUES

Course category : Basic Sciences & Maths (BSM)
Pre-requisite Course: NIL
Contact hours/week: Lecture: 3, Tutorial: 1, Practical: 0
Number of Credits: 4
Course Assessment methods: Continuous assessment through tutorials, attendance, home assignments, one Mid Term Examination and Final Examination.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. To find the root of a curve using iterative methods.
2. To interpolate a curve using Gauss, Newton’s interpolation formula.
3. Use the theory of optimization methods and algorithms developed for various types of optimization problems.
4. To apply the mathematical results and numerical techniques of optimization theory to Engineering problems.

Topics Covered

UNIT-I

UNIT-II
Linear Programming: Constrained Optimization Techniques: Simplex method, Solution of System of Linear Simultaneous equations, Revised Simplex method, Transportation problems, Karmarkar’s method, Duality Theorems, Dual Simplex method, Decomposition principle.

UNIT-III

UNIT-IV

Books & References
1. Engineering Optimization- S.S. Rao, New Age International
3. Optimization for Engineering Design-Kalyanmoy Deb; Prentice Hall of India
Engineering Fundamental (EF)

CSE-111 INTRODUCTION TO C & FUNCTIONAL PROGRAMMING

Course Category : Engineering Fundamental (EF)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and Practical Examination
Course Outcomes :
The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Basic Terminology used in Computer Programming.
2. Programs Development in C Language by Writing, Compiling and Debugging.
4. Difference between Call by Value and Call by Reference.
5. Dynamic Memory Allocations and Use of Pointers.

Topics Covered

UNIT-I


Fundamentals of C Programming: Structure of C Program, Writing and Executing the First C Program, Components of C Language. Standard I/O in C

Conditional program execution: Applying if and switch Statements, Nesting if and else

Program Loops and Iterations: use of while, do while and for Loops, Multiple Loop Variables,

Use of break and continue Statements.

UNIT-II

Arrays: One Dimensional, Multidimensional Array and Their Applications, Declaration and Manipulation of Arrays

Strings: String Variable, String Handling Functions, Array of Strings

Functions: Designing Structured Programs, Functions in C, User Defined and Standard Functions, Formal vs. Actual Arguments, Function Category, Function Prototype, Parameter
Passing, Recursive Functions.

**Storage classes**: Auto, Extern, Register and Static Variables

**UNIT-III**

**Pointers**: Pointer Variable and its Importance, Pointer Arithmetic Pointers and Arrays, Pointer and Character Strings, Pointers and Functions, Array of Pointers, Pointers to Pointers, Dynamic Memory Allocation

**Structure and Union**: Declaration and Initialization of Structures, Structure as Function Parameters, Structure Pointers, Unions.

**File Management**: Defining and Opening a File, Closing a File, Input/Output Operations in Files, Random Access to Files, Error Handling

The Pre-processor Directives, Command Line Arguments, Macros

**UNIT-IV**

**Principles of Functional Programming**: Expressions, Evaluations, Functions and Types

**Type Definitions and Built-in Types**: Numbers, Characters, Strings and Lists. Basic Operations on Lists, Including Map, Fold And Filter, together with Their Algebraic Properties. Recursive Definitions and Structural Induction, Simple Program Calculation, Infinite Lists and Their Uses.

**EXPERIMENTS**

1. Write a program to find the nature of the roots as well as value of the roots. However, in case of imaginary roots, find the real part and imaginary part separately.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first n terms of the sequence. For example, for n = 8, the output should be 0 1 1 2 3 5 8 13
3. Write a program to print all the prime numbers between m and n, where the value of m and n is supplied by the user.
4. The number such as 1991 is a palindrome because it is same number when read forward or backward. Write a program to check whether the given number is palindrome or not.
5. A positive integer number IJK is said to be well-ordered if I < J < K. For example, number 138 is called well-ordered because the digits in the number (1, 3, 8) increase from left to right, i.e. 1 < 3 < 8. Number 365 is not well-ordered because 6 is larger than 5. Write a program that will find and display all possible three digit well-ordered numbers. The program should also display the total number of three digit well-ordered numbers found.
6. Write a function to compute the highest common factor of integer numbers m and n. Use this function to find the highest common factor of integer numbers a and b.
7. Write a program to multiply matrix A (m×n) by B (p×q), given that n = p.
8. Write a program to sort a list of n integer numbers in descending order using bubble sort method.
Textbooks
2. Schioldt, Herbert, Complete Reference with C, Tata McGraw Hill

Reference books

EEE-111 PRINCIPLES OF ELECTRICAL ENGINEERING

Course category: Department Core (DC)
Pre-requisites: Physics and Math (10+2)
Contact
hours/week: Lecture: 3, Tutorial: 1, Practical:2
Number of Credits: 5
Course Assessment: Continuous assessment through tutorials, assignments, One mid term Examination, final Examination & Practical Examination

Methods
Course Outcome: The student are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
1. Able to understand the basic concepts of network and circuit.
2. To solve the basic electrical circuits.
3. Familiarity with the basic concepts of AC circuits.
4. Introductory concept of measurement, instrumentation, working & performances of different kind of measuring instruments (PMMC, MI).
5. Able solve magnetic circuits.
6. Able to analyze three phase circuits.
7. Introduction and application to different electrical machines.

Topic Covered
UNIT I
D C Circuit Analysis and Network Theorems: 9
Circuit Concepts: Concepts of network, Active and passive elements, Voltage and current sources, Concept of linearity and linear network, Unilateral and bilateral elements, R, L and C as linear elements, Source transformation Kirchhoff's laws; Loop and nodal methods of analysis; Star-delta transformation Network theorems: Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem.

UNIT II
Steady- State Analysis of Single Phase AC Circuits: 9
AC fundamentals: Sinusoidal, square and triangular waveforms – Average and effective values, Form and peak factors, Concept of phasor, phasor representation of sinusoidally varying voltage and current, Analysis of series, parallel and series-parallel RLC Circuits, Resonance in series and Parallel circuit
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

UNIT III
Measuring Instruments, Magnetic Circuit & 1 phase Transformers:

Types of instruments, Construction and working principles of PMMC and Moving Iron type voltmeters & ammeters, Use of shunts and multipliers.
Magnetic circuit, concepts, analogy between electric & magnetic circuits, B-H curve, Hysteresis and eddy current losses.

UNIT IV
Electrical Machines:

Concept of electromechanical energy conversion DC machines: Types, EMF equation of generators and torque equation of motor, Characteristics and applications of DC Generators & motors
Three Phase Induction Motor: Types, Principle of operation, Torque-slip characteristics, Applications
Single Phase Induction motor: Principle of operation and introduction to methods of starting, applications.
Three Phase Synchronous Machines: Principle of operation of alternator, emf equation, Principle of operation and starting of synchronous motor, their applications.

Text Books:

Principles Of Electrical Engineering Laboratory

1. Verification of Kirchhoff’s law
2. Verification of Norton’s theorem
3. Verification of Thevenin’s theorem
4. Verification of Series R-L-C circuit
5. Verification of Parallel R-L-C circuit.
6. Measurement of Power and Power factor of three phase inductive load by two wattmeter method
7. To draw the magnetization characteristics of separately excited dc motor.
8. To perform the external load characteristics of dc shunt motor.
9. To perform O.C. and S.C. test of a single phase transformer
CSE-112 SOFTWARE LAB-I

Course Category : Engineering Fundamental (EF)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 0, Tutorial : 0, Practical : 4
Number of Credits : 2
Course Assessment : Continuous assessment through Viva voce, Practical Methods work/record, attendance and Final Practical Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

2. Programming in C Language by Writing, Compiling and Debugging.
5. Programming for Searching and Sorting.

EXPERIMENTS

The students should write programs in C to get the familiarization with following topics.

1. Get Familiar with C Compiler
2. Implement and Test Small Routine in C
3. Evaluation of Expression
4. Iteration, Function and Recursive Function
5. Arrays
6. Structures and Union
7. Searching and Selection
8. Sorting,
9. Strings Handling
10. Basic Pointer Programming
11. Files
12. Use of Standard C Library

CSE-121 OBJECT ORIENTED MODELING & C++

Course Category : Engineering Fundamental (EF)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical : 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home Methods

Course Outcomes: assignments, practical work, record, viva voce and One mid term Examination, final Examination & Practical Examination The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course Understand the Concept of Object Oriented Programming and Master OOP using C++.

1. Implementing the Real Life Problems using Object Oriented Techniques.
2. Improvement in Problem Solving Skills.

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Topics Covered

UNIT-I


UNIT-II

Operator Overloading - Friend Functions- Type Conversions- Templates - Inheritance – 9 Virtual Functions- Runtime Polymorphism. Exception Handling - Streams and Formatted I/O

UNIT-III


UNIT-IV


EXPERIMENTS

Write C++ Programs to illustrate the concept of the following:

1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O Operations
6. Scope Resolution and Memory Management Operators
7. Inheritance
8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator Overloading
12. Function Overloading
13. Constructors and Destructors
14. this Pointer
15. File I/O Operations

Analyze, Design and Develop Code for the Following System (one for a batch of three students) using Object Oriented Methodology

1. ATM (Automated Teller Machine ) System
2. Online Reservation System
3. Online Quiz System
4. Stock Maintenance System
5. Course Registration System
6. Payroll System
7. Expert System
8. Library Management System
9. Real Time Scheduler
10. Online Purchase System

Textbooks
4. James Rumbaugh, et. al Object Oriented Modeling and Design-, PHI
6. E. Balaguruswamy, Object Oriented Programming with C++, TMH Publication
8. Booch, Maksimchuk, Engle, Young, Conallen and Houston, Object Oriented Analysis and Design with Applications, Pearson Education

Reference books
2. Booch, G. Object-Oriented Design with Applications. Redwood City, Benjamin/Cummings

CSE-122 SOFTWARE LAB-II

Course Category : Engineering Fundamental (EF)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 0, Tutorial : 0, Practical: 4
Number of Credits : 2
Course Assessment : Continuous assessment through three Viva voce, Practical work/record, attendance and Final Practical Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Differentiate between structures oriented programming and object oriented programming.
2. Use object oriented programming language like C++ and associated libraries to develop object oriented programs
3. Understand and apply various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems using C++ language.
4. Apply concepts of operator-overloading, constructors and destructors
5. Reuse the code and write the classes which work like built-in types.
6. Apply object -oriented concepts in real world applications.
EXPERIMENTS

To write following programs in C++

1. Using basic statements like control statements, looping statements, various I/O statements and various data structures.
2. Creating classes in C++ for understanding of basic OOPS features.
3. Representing concepts of data hiding, function overloading and operator overloading.
4. Using memory management features and various constructors and destructors.
5. Representing Inheritance, virtual classes and polymorphism.
6. Writing generic functions.
7. File handling programs.

ECE-231 DIGITAL CIRCUITS AND LOGIC DESIGN

Course Category : Engineering Fundamental (EF)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4
Course Assessment : Continuous assessment through tutorials, attendance, home methods
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
1. Design a finite state machine and sequential logic design.
2. Synthesize a logic design from a natural language description of a problem.
3. Realize a complete arithmetic and logic unit.
4. Generate a realization of combinational logic in a programmable gate array.
5. Simulate a complete design to evaluate functional correctness and timing.

Topics Covered

UNIT-I

UNIT-II

UNIT-III
Sequential Logic - Basic Latch - Flip-Flops (SR, D, JK, T and Master-Slave) - Triggering of 9 Flip-Flops - Counters - Design Procedure - Ripple Counters - BCD and Binary - Synchronous Counters.
UNIT-IV

Registers - Shift Registers - Registers with Parallel Load - Memory Unit - Examples of RAM, 9 ROM, PROM, EPROM - Reduction of State and Flow Tables - Race-Free State Assignment - Hazards.

Textbooks


Reference books


CSE-233 SOFTWARE LAB-III

Course Category : Engineering Fundamental (EF)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 0, Tutorial : 0, Practical: 4
Number of Credits : 2
Course Assessment : Continuous assessment through three Viva voce, Practical Methods

Course offers : Work/record, attendance and Final Practical Examination The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Analyze and represent problems in the object-oriented programming paradigm.
2. Design and implement object-oriented software systems.
3. Demonstrate the efficient implementation of various Data Structures in memory and their operation.
4. Build programs on fundamental algorithmic problems including Searching, Sorting, Tree Traversals, Graph traversals, and shortest paths.
5. Explain the main principles for client-server programming
6. Design and implement Client-side systems, server-side system and event-driven graphical user interface.
7. Integrate their knowledge and skills to produce a real life application.

EXPERIMENTS

C++:

1. Program using functions with default arguments implementation of call by value, address, reference
2. Simple classes for understanding objects, member functions & constructors classes with primitive data members, classes with arrays as data members classes with pointers as data members classes with constant data members classes with static member functions
3. Compile time polymorphism - operator overloading, function overloading  
4. Run time polymorphism - inheritance, virtual functions, virtual base classes  
5. File handling - sequential access, random access  

**JAVA:**  
1. Simple JAVA applications for understanding references to an instant of a class, handling strings in JAVA, simple package creation, developing user defined packages in JAVA  
2. Interfaces  
3. Threading - creation of threading in JAVA applications, multi-threading  
4. Exception handling mechanism in JAVA - handling predefined exceptions, handling user defined exceptions  

**Internet Programming:**  
1. Web page creation using HTML  
   i) To embed an image map in a web page  
   ii) To fix the hot spots  
   iii) Show all the related information when the hot spots are clicked.  
2. Web page creation with all types of Cascading style sheets  
3. Client side scripts for validating web form controls using DHTML  
4. JAVA programs to create applets  
5. i) Create a color palette with matrix of buttons  
   ii) Set background and foreground of the control text area by selecting a color from color palette.
   iii) In order to select foreground or background use check box control as radio but-tions.
   iv) To set background images.  
6. Programs in JAVA using servlets  
7. Programs in JAVA to create three-tier applications using JSP and Databases  
   i. for conducting online examination  
   ii. for displaying students mark list.  
8. Programs using XML-schema-XSLT/XSL  
9. Programs using AJAX  
10. Implementation of web services and databases.
CSE-244 SOFTWARE LAB-IV

Course category: Engineering Fundamental (EF)
Pre-requisite: NIL
Course
Contact hours/week: Lecture : 0, Tutorial : 0 , Practical: 4
Number of Credits: 2
Course Assessment: Continuous assessment through three Viva voce, Practical work/record, attendance and Final Practical Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Tools and techniques for optimizations in design processes.
2. Design and develop the software packages/systems to support the management of an organization in question.
3. Design and develop a DBMS.

EXPERIMENTS

1. Write user-friendly computer programs to implement algorithms in your course of Optimization Techniques.
2. Design and develop a software packages/systems for your University Management System.
3. Design and develop your own DBMS. Design and develop a simulator for (i) Logic Circuit Design, (ii) Electronic Circuit Design

DEPARTMENT CORE (DC)

CSE-231 PRINCIPLES OF DATA STRUCTURES THROUGH C/C++

Course Category: Department Core (DC)
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits: 5
Course Assessment: Continuous assessment through tutorials, attendance, home Assignments, practical work, record, viva voce and One Mid Term Examination and One Final Theory & Practical Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Describe how arrays, records, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.
2. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.
3. Compare and contrast the benefits of dynamic and static data structures implementations.
4. Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.
5. Demonstrate organization of information using Trees and Graphs and also to perform different operations on these data structures.
6. Design and implement an appropriate organization of data on primary and secondary memories for efficient its efficient retrieval.
7. Discuss the computational efficiency of the principal algorithms for sorting, searching and hashing.
8. Describe the concept of recursion, its application, its implementation and removal of recursion.

**Topics Covered**

**UNIT-I**

**Introduction:** Basic Terminology, Elementary Data Organization, Structure Operations, Complexity and Time-Space Tradeoff

**Arrays:** Definition, Representation and Analysis, Single and Multi Dimension Array, Address Calculation, Application of Arrays, Character, String in C, Character String Operation, Arrays Parameters, Ordered List, Sparse Matrices and Vectors

**Stacks:** Array Representation and Implementation of Stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of Stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of Postfix Expressions using Stack, Application of Recursion in Problem like Tower of Hanoi

**UNIT-II**

**Queues:** Array and Linked Representation and Implementation of Queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular Queues, D-Queues and Priority Queues.

**Linked List:** Representation and Implementation of Singly Linked Lists, Two-Way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and Deletion to / from Linked Lists, Insertion and Deletion Algorithms, Doubly Linked List, Linked List in Array, Polynomial Representation and Addition, Generalized Linked List, Garbage Collection and Compaction.

**UNIT-III**


**Binary Search Trees:** Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-Trees.

**UNIT-IV**

**Searching and Hashing:** Sequential Search, Binary Search, Comparison and Analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.
**Sorting:** Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical Consideration for Internal Sorting.


**EXPERIMENTS**

Write C/C++ Programs to illustrate the concept of the following:

1. Sorting Algorithms-Non-Recursive
2. Sorting Algorithms-Recursive
3. Searching Algorithm
4. Stack
5. Queue
6. Linked List
7. Graph

**Textbooks**

2. R. Kruseetal, Data Structure and Program Design in C, Pearson Education Asia Delhi
3. A. M. Tenenbaum, Data Structures using C & C++, PHI, India
5. Bruno R Preiss, Data Structure and Algorithms with Object Oriented Design Pattern in C++, John Wiley & Sons

**Reference books**


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**CSE-232  INTERNET & JAVA PROGRAMMING**

<table>
<thead>
<tr>
<th>Course Category</th>
<th>Department Core (DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-requisite Course</td>
<td>NIL</td>
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<tr>
<td>Contact Hours/Week</td>
<td>Lecture : 3, Tutorial : 1, Practical: 2</td>
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<td>Number of Credits</td>
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<td>Course Assessment</td>
<td>Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and One Final Theory &amp; Practical Examination</td>
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<td>Methods</td>
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<tr>
<td>Course Outcomes</td>
<td>The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course</td>
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1. To identify different components of client server architecture on Internet computing.
2. Knowledge of how to develop and deploy applications and applets in JAVA.
3. Knowledge of how to develop and deploy GUI using JAVA Swing and AWT.
4. Design, develop and implement interactive web applications.
5. Be able to implement, compile, test and run JAVA programs comprising more than one class and to address a particular software problem.
6. To understand the basic concepts of Internet services and related technologies.
7. Develop programs using the JAVA Collection API as well as the JAVA standard class library.

Topics Covered

UNIT-I

Internet: Internet, Connecting to Internet: Telephone, Cable, Satellite Connection, Choosing an ISP, Introduction to Internet Services, E-Mail Concepts, Sending and Receiving Secure E-Mail, Voice and Video Conferencing.

UNIT-II


UNIT-III

JAVA Swing: Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text Fields, Buttons, Tabbed Panes.

JDBC: Connectivity Model, JDBC/ODBC Bridge, JAVA. SQL Package, Connectivity to Remote Database.

UNIT-IV


EXPERIMENTS

1. Basic programs of simple statements, conditional statements, iterative statements and arrays
2. Programs having object oriented concepts like Inheritance and Interface
3. Programs for Exception Handling and Event Handling
4. Programs of Threads and Multithreading
5. Programs related to Applets and Swings
6. Programs including JAVA Beans and Servlets

Textbooks

1. Naughton, Schildt, The Complete Reference JAVA2, TMH.
2. Balaguruswamy E, Programming in JAVA, TMH

Reference books

1. Margaret Levine Young, The Complete Reference Internet, TMH.
2. Dustin R. Callway, Inside Servlets, Addison Wesley.
CSE-241 DATABASE MANAGEMENT SYSTEMS

Course Category: Department Core (DC)
Pre-requisite Course: NIL
Contact Hours/Week: Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits: 5
Course Assessment: Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
1. List and define the fundamental concepts of database management system.
2. Manually execute a given (simple) database design a transaction over it.
3. Manually infer the type of a given (simple) database transaction.
4. Implement (simple) algorithms and data structures as database transaction.
5. Design (large) databases that are modular and have reusable components.
6. Explain on a simple problem how to apply concurrency control over concurrent database transactions.

Topics Covered

UNIT-I

Data Modeling using Entity Relationship Model: ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of An ER Diagrams to Tables, Extended ER Model, Relationship of Higher Degree.

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
UNIT-IV


EXPERIMENTS

1. Exercises to be based on Sybase / Oracle / Postgres / VB / Power Builder / DB2 / MS-Access.
2. Applications involving vendor development systems, stores management system, finance management etc.
3. Creation and querying of database tables for following cases.
   i. Write SQL queries using logical operations (=, <, >, etc)
   ii. Write SQL queries using SQL operators
   iii. Write SQL query using character, number, date and group functions
   iv. Write SQL queries for relational algebra
   v. Write SQL queries for extracting data from more than one table
   vi. Write SQL queries for sub queries, nested queries
   vii. Write program by the use of PL/SQL
   viii. Concepts for ROLL BACK, COMMIT & CHECK POINTS
   ix. Create VIEWS, CURSORS and TRG GERS & write ASSERTIONS.
   x. Create FORMS and REPORTS
4. Design of tables by normalization and dependency analysis.
5. Writing application software with host language interface

Textbooks

1. Date C J, An Introduction to Database Systems, Addison Wesley
7. Majumdar & Bhattacharya, Database Management System, TMH

Reference books

CSE-242  THEORY OF COMPUTATION

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4
Course Assessment : Continuous Assessment through Tutorials, Assignments, Quizzes and Three Minor Tests and One Major Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
2. Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving.
3. Prove the basic results of the Theory of Computation.
4. State and explain the relevance of the Church-Turing thesis.

Topics Covered

UNIT-I

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, Equivalence of NFA and DFA, Minimization of Finite Automata, 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 Proper ties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping Lemma for CFLs.

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-IV


Textbooks


Reference books

1. Hopcroft, Ullman, “Introduction to Automata Theory, Languages and Computation”, Pearson Education
2. Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishing house

CSE-243 COMPUTER ORGANIZATION & DESIGN

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits : 5
Course Assessment Methods : Continuous assessment through tutorials, attendance, home

Course Outcomes : Assignments, practical work, record, viva voce and one Mid Term Examination, Final Examination & Practical ExaminationThe students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. To understand the basic structure and operation of digital computer.
2. To study the design of arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations
3. To study the two types of control unit techniques and the concept of Pipelining
4. To study the hierarchical memory system including cache memories and virtual memory
5. To study the different ways of communicating with I/O devices and standard I/O interfaces

Topics Covered

UNIT-I

UNIT-II

Control Design: Hardwired & Micro Programmed Control Unit, Processor Design: Processor Organization: General Register Organization, Stack Organization, Addressing Mode, Instruction Format, Data Transfer & Manipulations, Program Control, Reduced Instruction Set Computer, Pipelining

UNIT-III

Arithmetic - Addition & Subtraction of Signed Numbers - Multiplication - Integer Division - Floating Point Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operations.

UNIT-IV

Input-Output Organization: I/O Interface, Modes of Transfer, Interrupts & Interrupt Handling, Direct Memory Access, Input-Output Processor, Serial Communication. Memory Organization: Memory Hierarchy, Main Memory (RAM and ROM Chips), Auxiliary Memory, Cache Memory, Virtual Memory

EXPERIMENTS

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.
4. Implementing 4x1 and 8x1 MULTIPLEXERS.
5. Verify the excitation tables of various FLIP-FLOPS.
6. Design of an 8-bit Input/ Output system with four 8-bit Internal Registers.
7. Design of an 8-bit ARITHMETIC LOGIC UNIT.
8. Design the data path of a computer from its register transfer language description.
9. Design the control unit of a computer using either hardwiring or microprogramming based on its register transfer language description.
10. Implement a simple instruction set computer with a control unit and a data path.

Textbooks

1. Computer System Architecture - M. Mano

Reference books

CSE-351 PRINCIPLES OF OPERATING SYSTEMS

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Understand the structure and functions of OS.
2. Learn about Processes, Threads and Scheduling algorithms.
3. Understand the principles of concurrency and Deadlocks.
4. Learn various memory management scheme.
5. Study I/O management and File systems.

Topics Covered

UNIT-I


UNIT-II

Memory Management-Major Issues: Fetch, Placement, Contiguity, Relocation Adjustment, 9 Paging and Virtual Memory, Translate-Look-Aside Buffer (Associative Memory), Single and Multi-Level Page Tables, Paging with Segmentation, Problems of Large Address Spaces and How They Are Addressed

Virtual Storage Management- Storage Hierarchy, Cache Usage, Partial Residency, Page Replacement Strategies, Working Sets

UNIT-III

Concurrency Problems and Solutions- Critical Section Problem, Process Synchronization and 9 Coordination, Semaphores, Special Instructions, Monitors, Inter-process Communication, Remote Procedure Calls, Special Problems of Transaction-Based Systems Deadlock and Resource Conflict- Prevention, Avoidance, Detection, Recovery,

Process and Thread Management-Process/Thread Creation and Termination, Process/Thread States and Their Transitions

CPU Scheduling Algorithms, Non-Preemptive Approaches, Preemptive Approach, Multi-Processor Considerations
UNIT-IV

Physical Storage Management- Disk Scheduling Algorithms, Disk Performance Features, 9 Disk Reliability Concerns


EXPERIMENTS

1. Study of hardware and software requirements of different operating systems (UNIX,LINUX,WINDOWS XP, WINDOWS7/8
2. Execute various UNIX system calls for
   a. Process management
   b. File management
   c. Input/output Systems calls
3. Implement CPU Scheduling Policies:
   a. SJF
   b. Priority
   c. FCFS
   d. Multi-level Queue
4. Implement file storage allocation technique:
   a. Contiguous(using array)
   b. Linked –list(using linked-list)
   c. Indirect allocation (indexing)
5. Implementation of contiguous allocation techniques:
   a. Worst-Fit
   b. Best- Fit
   c. First- Fit
6. Calculation of external and internal fragmentation
   a. Free space list of blocks from system
   b. List process file from the system
7. Implementation of compaction for the continually changing memory layout and calculate total movement of data
8. Implementation of resource allocation graph RAG)
9. Implementation of Banker's algorithm
10. Conversion of resource allocation graph (RAG) to wait for graph (WFG) for each type of method used for storing graph.
11. Implement the solution for Bounded Buffer (producer-consumer)problem using inter process communication techniques-Semaphores
12. Implement the solutions for Readers-Writers problem using inter process communication technique -Semaphore

Textbooks

Reference books


CSE-352 COMPUTER GRAPHICS

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Have a basic understanding of the core concepts of computer graphics.
2. Be capable of using OpenGL to create interactive computer graphics.
3. Understand a typical graphics pipeline.
4. Have made pictures with their computer.

Topics Covered

UNIT-I


SIMPLE LINE DRAWING METHODS- Point Plotting Techniques, Qualities of Good Line Drawing Algorithms, Digital Differential Analyzer(DDA), Bresenham’s Algorithm, Generation of Circles

UNIT-II

TWO DIMENSIONAL TRANSFORMATIONS and CLIPPING AND WINDOWING-What is Transformation?, Matrix Representation of Points, Basic Transformation, Need for
Clipping and Windowing, Line Clipping Algorithms, Midpoint Subdivision Method, Other Clipping Methods, Sutherland - Hodgeman Algorithm, Viewing Transformations.

**GRAPHICAL INPUT TECHNIQUES**- Graphical Input Techniques, Positioning Techniques, Positional Constraints, Rubber Band Techniques.

**EVENT HANDLING AND INPUT FUNCTIONS**- Introduction, Polling, Event Queue, Functions for Handling Events, Polling Task Design, Input Functions, Dragging and Fixing, Hit Detection, OCR.

**UNIT-III**

**THREE DIMENSIONAL GRAPHICS**- Need for 3-Dimensional Imaging, Techniques for 3 Dimesional Displaying, Parallel Projections, Perspective Projection, Intensity Cues, Stereoscope Effect, Kinetic Depth Effect, Shading.

**CURVES AND SURFACES**- Shape Description Requirements, Parametric Functions, Bezier Methods, Bezier Curves, Bezier Surfaces, B-Spline Methods

**UNIT-IV**

**SOLID AREA SCAN CONVERSION**- Three Dimensional Transformations Solid Area Scan Conversion, Scan Conversion of Polygons, Algorithm Singularity, Three Dimensional Transformation, Translations, Scaling, Rotation, Viewing Transformation, Perspective, Algorithms, Three Dimensional Clipping, Perspective View of Cube.

**HIDDEN SURFACE REMOVAL**- Need For Hidden Surface Removal, Depth - Buffer Algorithm, Properties that Help in Reducing Efforts, Scan Line Coherence Algorithm, Span - Coherence Algorithm, Area-Coherence Algorithms, Warnock's Algorithm, Priority Algorithms

**EXPERIMENTS**

Develop program to

1. Understand the basic concepts of computer graphics.
2. Design scan conversion problems using C/C++ programming.
3. Apply clipping and filling techniques for modifying an object.
4. Understand the concepts of different type of geometric transformation of objects in 2D and 3D.
5. Understand the practical implementation of modeling, rendering, viewing of objects.

**Textbooks**


**Reference books**

CSE-353 DESIGN & ANALYSIS OF ALGORITHMS

Course Category : Department Core (DC)
Pre-Requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical : 2
Number of Credits : 5
Course Assessment Methods : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Define the basic concepts of algorithms and analyze the performance of algorithms.
2. Discuss various algorithm design techniques for developing algorithms.
3. Discuss various searching, sorting and graph traversal algorithms.
4. Understand NP completeness and identify different NP complete problems.
5. Discuss various advanced topics on algorithm

Topics Covered

UNIT-I

UNIT-II
Dynamic Programming with Examples such as Multistage Graphs, Knapsack, All Pair Shortest Paths – Warshal's and Floyd's Algorithms, Resource Allocation Problem.

UNIT-III
Backtracking, Branch and Bound with Examples such as Travelling Salesman Problem, Graph Coloring, N-Queen Problem, Hamiltonian Cycles and Sum Of Subsets Advanced Data Structures: Red-Black Trees, B – Trees, Binomial Heaps, Fibonacci Heaps.

UNIT-IV
EXPERIMENTS

1. To analyze time complexity of Insertion sort.
2. To analyze time complexity of Quick sort.
3. To analyze time complexity of Merge sort.
4. To Implement Largest Common Subsequence.
5. To Implement Matrix Chain Multiplication.
6. To Implement Strassen’s matrix multiplication Algorithm, Merge sort and Quick sort.
7. To implement Knapsack Problem.
8. To implement Activity Selection Problem.
9. To implement Dijkstra’s Algorithm.
10. To implement Warshall’s Algorithm.
11. To implement Bellman Ford’s Algorithm.
12. To implement Naive String Matching Algorithm.
14. To implement Prim’s Algorithm.
15. To implement Kruskal’s Algorithm.

Textbooks


Reference books

2. Bentley, J.L., Writing Efficient Programs, PHI

CSE-354 ADVANCED COMPUTER ARCHITECTURE

Course Category: Department Core (DC)
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1, Practical: 2
Number of Credits: 5
Course Assessment: Continuous assessment through tutorials, attendance, home Assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Understand the advanced concepts of computer architecture.
2. Exposing the major differentials of RISC and CISC architectural characteristics.
3. Investigating modern design structures of Pipelined and Multiprocessors systems.
4. Become acquainted with recent computer architectures and I/O devices, as well as the low-level language required to drive/manage these types of advanced hardware.
5. Preparing selected reports that imply some emergent topics supporting material essence.

**Topics Covered**

**UNIT-I**

RISC Processors, Characteristics of RISC Processors, RISC vs CISC, Classification of Instruction Set Architectures, Review of Performance Measurements, Basic Parallel Processing Techniques: Instruction Level, Thread Level and Process Level, Classification of Parallel Architectures.

**UNIT-II**

Basic Concepts of Pipelining, Arithmetic Pipelines, Instruction Pipelines, Hazards in A Pipeline: Structural, Data, and Control Hazards, Overview of Hazard Resolution Techniques, Dynamic Instruction Scheduling, Branch Prediction Techniques, Instruction-Level Parallelism using Software Approaches, Superscalar Techniques, Speculative Execution.

**UNIT-III**

Basic Concept of Hierarchical Memory Organization, Main Memories, Cache Design and Optimization, Virtual Memory Design and Implementation, Memory Protection, Evaluating Memory Hierarchy Performance, RAID, Centralized vs. Distributed Shared Memory.

**UNIT-IV**

Interconnection Topologies, Synchronization, Memory Consistency, Review of Modern Multiprocessors, Distributed Computers, Clusters, Grid, Mainframe Computers, Bus Structures and Standards, Types and Uses of Storage Devices, Interfacing I/O to The Rest of the System, Reliability and Availability, I/O System Design

**EXPERIMENTS**

1. Write an algorithm and program to perform matrix multiplication of two n * n matrices on the 2-D mesh SIMD model.
2. Write an algorithm and program to perform matrix multiplication of two n * n matrices on Hypercube SIMD Model.
3. Write an algorithm and program for Block oriented Matrix Multiplication on multiprocessor system.
5. Study of various computer Architecture (MIPS, Power etc.) using simulator.
6. Study of Memory and system controllers, Interrupt and DMA controllers using simulator.
Textbooks
3. SIMA, Advanced Computer Architectures, Addison-Wesley.

Reference books

CSE-361 PRINCIPLE OF COMPILER DESIGN

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this Course.
1. Define the phases of a typical compiler, including the front--- and back--- end.
2. Identify tokens of a typical high--- level programming language; define regular expressions for tokens and design; implement a lexical analyzer using a typical scanner generator.
3. Explain the role of a parser in a compiler and relate the yield of a parse tree to a grammar derivation; design and implement a parser using a typical parser generator.
4. Apply an algorithm for a top--- down or a bottom--- up parser construction; construct a parser for a small context--- free grammar.
5. Explain the role of a semantic analyzer and type checking; create a syntax--- directed definition and an annotated parse tree; describe the purpose of a syntax tree.
6. Explain the role of different types of runtime environments and memory organization for implementation of typical programming languages.
7. Describe the purpose of translating to intermediate code in the compilation process.
8. Design and implement an intermediate code generator based on given code patterns

Topics Covered

UNIT-I

Compiler Structure: Analysis-Synthesis Model of Compilation, Various Phases of A Compiler, Tool Based Approach to Compiler Construction Lexical Analysis: Interface with Input, Parser and Symbol Table, Token, Lexeme and Patterns, Difficulties in Lexical Analysis, Error Reporting, and Implementation. Regular Definition, Transition Diagrams, LEX.
UNIT-II

UNIT-III
Syntax Directed Definitions: Inherited and Synthesized Attributes, Dependency Graph, Evaluation Order, Bottom Up and Top Down Evaluation Of Attributes, L- and S-Attributed Definitions.
Type Checking: Type System, Type Expressions, Structural and Name Equivalence of Types, Type Conversion, Overloaded Functions and Operators, Polymorphic Functions.

UNIT-IV

EXPERIMENTS
1. Write a program using Lex to calculate the number of characters, number of words and the number of lines present in the given text file as input.
2. Write a program using Lex to implement the set of regular expression and indicates the acceptance of a given string for a particular regular expression.
3. Write a C program to implement the conversion of regular expression to non-deterministic finite automation
4. Write a program using Yacc to check whether a string belong to the given grammar or not.
5. Write a C program to compute FIRST and FOLLOW of the non-terminals of given grammar.
6. Write a C program to check the given grammar is Left recursive and remove Left recursion.
7. Write Syntax Directed Translation actions using Yacc to generate Parse Tree for the grammar for arithmetic expressions.
8. Write Syntax Directed Translation actions using Yacc to translate arithmetic expressions into Post-fix form.
9. Write Syntax Directed Translation actions using Yacc to translate arithmetic expressions into three address code.

Textbooks

Reference books
CSE-362 ARTIFICIAL INTELLIGENCE

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and
Methods One Mid Term Examination and Final Theory & Practical Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. The intelligent agents—software or hardware entities that perform useful tasks with some degree of autonomy.
2. An understanding of the basic areas of artificial intelligence including problem solving, knowledge representation, reasoning, decision making, planning, perception and action, and learning -- and their applications (e.g., data mining, information retrieval)
3. Design and implement key components of intelligent agents of moderate complexity in JAVA and/or Lisp or Prolog and evaluate their performance.
4. Develop familiarity with current research problems, research methods, and the research literature in AI

Topics Covered

UNIT-I
Artificial Intelligence Introduction, Intelligent Agents, Solving Problems by Searching Beyond Classical Search Adversarial Search Constraint Satisfaction Problems

UNIT-II
Knowledge and Reasoning Logical Agents First-Order Logic Inference in First-Order Logic Classical Planning and Acting in the Real World Knowledge Representation Uncertain Knowledge and Reasoning Quantifying Uncertainty Probabilistic Reasoning Probabilistic Reasoning over Time 16 Making Simple Decisions Making Complex Decisions

UNIT-III

UNIT-IV
Forms of Learning Supervised Learning, Decision Trees Evaluating and Choosing the Best Hypothesis A Logical Formulation of Learning Statistical Learning with Complete Data Natural Language Processing Communicating, Perceiving, and Acting Natural Language Processing Natural Language for Communication Perception Robotics
EXPRIMENTS

1. Write the program to solve the water jug problem using production rule set.
2. Write the program to solve the water jug problem using A* ALGORITHM.
3. Write the program to solve the 8 puzzle problem using A* ALGORITHM.
4. Write the program to solve the salesman problem using A* ALGORITHM.
5. Write the program to solve the farmer transfer three belonging from one side of the river to other side using AO* ALGORITHM.
6. Write the program to solve the DISEASE problem using Bayesian reasoning.
7. Write the program to solve the Object finding problem using Bayesian reasoning.
8. Write the program to solve the Object finding problem using D S theory.
9. Write the program to solve the Decision Trees Evaluating.
10. Write the program for walk, drive, take the bus, take a cab, and fly problem using mean end analysis.

Textbooks


Reference books

2. David Poole, Alan Mackworth, Randy Goebel, Computational Intelligence: a logical approach, Oxford University Press, 2012.

CSE-363 WEB TECHNOLOGIES

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Identify common design mistakes when creating a web based application.
2. Discuss the process of editing a web page using text editors and web page editors
3. Cover commonly used HTML tags and discuss how this knowledge is important to a web designer
4. Demonstrate an understanding of basic CSS, XML, JAVA Script, JSP, ASP.NET and PHP.
Topics Covered

UNIT-I


UNIT-II

Markup Language Basics: SGML, HTML, CSS And XML

SGML: Standard Generalized Markup Language (SGML) - Structures, Elements, Content Models, DTD, Attributes Entities.


CSS: Use of Cascading Style Sheet in Web Pages.


UNIT-III

Client-Side Scripting using JAVA Script

JAVA script Overview; Constants, Variables, Operators, Expressions & Statements; User-Defined & Built-in Functions; Client-Side Form Validation; Using Properties and Methods of Built-in Objects

UNIT-IV

Server-Side Scripting Using JSP, ASP.NET And PHP

JSP :Introduction to JSP, JSP Architecture, JSP Directives, JSP Scripting Elements, Default Objects in JSP, JSP Actions, JSP with Beans and JSP with Database, Error Handling in JSP, Session Tracking Techniques in JSP, Introduction to Custom Tags.


PHP(Hypertext Preprocessor)-Introduction, Syntax, Variables, Strings, Operators, If-Else, Loop, Switch, Array, Function, Form ,Mail, File Upload, Session, Error, Exception, Filter, PHP-ODBC

EXPERIMENTS

1. Create a HTML static web page which shows the use of different tags in that.
2. Insert an image and create a link such that clicking on image takes user to other page.
3. Prepare a sample code to illustrate three types of lists in HTML.
4. Use tables to provide layout to your HTML page describing your university infrastructure
5. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.
6. Create a simple form that will show all the INPUT METHODS available in HTML.
7. Create a sample code to illustrate the Embedded, External and Inline style sheets for your web page.
8. Write down simple JAVA Script using timeout such that image will be changed after every 1 ms at a specified position.
9. Design a registration form and validate its field by using JAVA script.
10. Write an XML example of given tree that demonstrates the creation of user-designed tags and display it in a browser.
11. college, employee, fname, lname, joindate, bdate, age, salary (with atleast 3 elements)
12. Write a program in XML for creation of DTD which specifies a particular set of rules.
13. Create a bean student with attributes (first name, last name, age, class). In another JSP page display the bean values using \textless jsp:usebean\textgreater.
14. Write a program to use JDBC connectivity program for maintaining database by sending queries through JSP Page.
15. Use ad-rotator to change advertisements on client side request.(ASP.NET)
16. Implement Session tracking using user authentication in ASP.NET.
17. Write a PHP script to create a database Student DB.
18. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

Textbooks

1. Uttam K. Roy, \textit{Web Technologies, 1/e}, Oxford University Press, USA
2. M. Srinivasan, Web Technology: Theory and Practice, Pearson Education India
7. www.w3c.org
8. www.w3schools.com

Readings:

Various journal and conference articles, research reports, and book excerpts as appropriate

Reference books

2. Hans Bergsten, JAVA Server Pages, O'Reilly.
CSE-364  COMPUTER NETWORKS

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical : 2
Number of Credits : 5

Course Assessment : continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory Practical Examination

Methods : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

Course Outcomes
1. Understand the concepts of communication architecture and protocols
2. Identify different types of communication mediums and techniques
3. Define and identify different types of multiplexing, data encoding, modulation, and switching techniques
4. Illustrate different standards of Local Area Network in terms of technologies and hardware used
5. Illustrate network addressing and analysis techniques
6. Understand the Wide Area Network technologies
7. Understand the network routing concepts
8. Understand the internetworking concepts and architectures

Topic Covers

UNIT-I


UNIT-II


UNIT-III

UNIT-IV

**Transport Layer**: Design Issues, Connection Management, Internet Transport Protocol (UDP), Transmission Control Protocol (TCP) - Adaptive Retransmission Congestion Control

**Congestion Avoidance – QOS.**


**EXPERIMENTS**

1. To create scenario and study the performance of CSMA/CD protocol through simulation.
2. To create scenario and study the performance of token bus and token ring protocols through simulation.
3. Implementation of Error detection and correction algorithms.
4. Implementation and study of 1-bit sliding window viz., stop and wait protocol.
5. Implementation and study of Go back-N protocol.
7. To get the MAC or Physical address of the system using Address Resolution Protocol.
10. To write a client-server application for chat using TCP.
11. To write a C program to develop a DNS client server to resolve the given hostname.

**Textbooks**

1. Forouzan, Data Communication and Networking, TMH

**Reference books**

2. Comer, Computer Networks & Internet with Internet Applications, Pearson Education
4. W Stallings, Computer Networks with Internet Protocols, Pearson Education
5. W Stallings, Local and Metropolitan Area Networks, 6th edition, Pearson Education
CSE-365      SOFTWARE ENGINEERING

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Enhance the Software Project Management skills.
2. Develop functioning software which benchmarks to the international standards.

Topics Covered

UNIT-I

UNIT-II

UNIT-III

UNIT-IV
EXPERIMENTS

1. Identifying the Requirements from Problem Statements
2. Estimation of Project Metrics
3. Modeling UML Use Case Diagrams and Capturing Use Case Scenarios
4. E-R Modeling from the Problem Statements
5. Identifying Domain Classes from the Problem Statements
6. State chart and Activity Modeling
7. Modeling UML Class Diagrams and Sequence diagrams
8. Modeling Data Flow Diagrams
9. Estimation of Test Coverage Metrics and Structural Complexity
10. Designing Test Suites

Textbooks


Reference books


CSE-471 INTRODUCTION TO MACHINE LEARNING

Course Category : Department Core (DC)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 2
Number of Credits : 5
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. To explain theory underlying machine learning
2. To construct algorithms to learn linear and non-linear models
3. To implement data clustering algorithms
4. To construct algorithms to learn tree and rule-based models
5. To apply reinforcement learning techniques

Topics Covered

UNIT-I


– Generalization Bound – Approximation- Generalization Tradeoff – Bias and Variance

– Learning Curve
UNIT-II


UNIT-III


UNIT-IV


UNIT-V

REINFORCEMENT LEARNING-Passive Reinforcement Learning – Direct Utility Estimation


EXPERIMENTS

1. A simple \textit{linear regression} attempts to draw a straight line that will best minimize the residual sum of squares between the observations and the predictions in python program language
2. Linear Regression Logistic Regression in python program language
3. Decision Tree in python program language
4. SVM in python program language
5. Naive Bayes in python program language
6. KNN in python program language
7. K-Means in python program language
8. Random Forest in python program language
9. Dimensionality Reduction Algorithms in python program language
10. Gradient Boost & Adaboost in python program language

Textbooks


Reference books


CSE-472  PARALLEL & DISTRIBUTED COMPUTING

Course Category: Department Core (DC)
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits: 5
Course Assessment: Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. understand and account for models, limitations, and fundamental concepts in the area of message passing and shared memory concurrency, and apply this understanding to example systems and algorithms
2. adapt, and design algorithms for execution in parallel and distributed settings, and analyze the algorithms for correctness, reliability, security, and performance

Topics Covered

UNIT-I


UNIT-II


UNIT-III

UNIT-IV


EXPERIMENTS

1. Write a program to simulate the functioning of Lamport's logical clock in 'C'.
2. Write a program to simulate the Distributed Mutual Exclusion in 'C'.
3. Write a program to implement a Distributed chat server using TCP sockets in 'C'.
4. Implement RPC mechanism for a file transfer across a network in 'C'.
5. Write a JAVA code to implement 'JAVA RMI' mechanism for accessing methods of remote systems.
6. Write a code in 'C' to implement sliding window protocol.
7. Implement corba mechanism by using c++ program at one end and JAVA program at the other.
8. Write a code in 'C' to Increment a counter in shared memory.

Textbooks


Reference books

2. D. Culler, J. P. Singh, A. Gupta, Parallel Computer Architecture, Elsevier
3. Andrew S. Tanenbaum and Maarten Van Steen, Distributed Systems Principles and Paradigms, PHI
### CSE-481  MOBILE COMPUTING

**Course Category**: Department Core (DC)  
**Pre-requisite Course**: NIL  
**Contact Hours/Week**: Lecture: 3, Tutorial: 1, Practical: 2  
**Number of Credits**: 5  
**Course Assessment Methods**: Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination.  
**Course Outcomes**: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Demonstrate the actual meaning of power and energy management in wireless mobile networks.  
2. Outline knowledge on Mobile IP.  
3. Be familiar with the network protocol stack  
4. Learn the basics of mobile telecommunication system  
5. Be exposed to Ad-Hoc networks  
6. Gain knowledge about different mobile platforms and application development

#### Topics Covered

**UNIT-I**  
Introduction, Issues in Mobile Computing, Overview of Wireless Telephony: Cellular Concept,  
GSM: Air-Interface, Channel Structure, Location Management: HLR, VLR, Hierarchical, Handoffs, Channel Allocation In Cellular Systems, CDMA, GPRS.

**UNIT-II**  

**UNIT-III**  

**UNIT-IV**  
Adhoc Networks, Localization, MAC Issues, Routing Protocols, Global State Routing (GSR), Destination Sequenced Distance Vector Routing (DSDV), Dynamic Source Routing (DSR), Ad Hoc On Demand Distance Vector Routing (AODV), Temporary Ordered Routing Algorithm (TORA), QOS in Ad Hoc Network.
EXPERIMENTS

1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Implement an application that implements Multi threading
6. Develop a native application that uses GPS location information.
7. Implement an application that writes data to the SD card.
8. Implement an application that creates an alert upon receiving a message.
9. Write a mobile application that creates alarm clock

Textbooks


Reference books

8. Burkhardt, Pervasive Computing, Pearson
MANAGEMENT (M)

BSH-242 MANAGEMENT INFORMATION SYSTEM

Course category : Management (M)
Pre-requisite Course : NIL
Contact hours/week : Lecture : 2, Tutorial : 1 , Practical: 0
Number of Credits : 3
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, and One Mid Term Examination and Final Theory Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Understands the concept, its development and management supports for the Management Information System
2. Ability to define needs and dimensions of MIS, steps for short and long range plans and budget for MIS
3. Analyses the elements and data sources, constraints and develops formats and documents of MIS
4. Develops methods, planning for implementation and process of evaluation of MIS

Topics Covered
UNIT-I
Meaning and role of Management Information System, Development of Management Information system, Organisation for Management Information System, Systems and user training; Top Management Support for Management Information System

UNIT-II
Meaning, needs and dimension of Management information system Plan, Strategic Planning for Management Information System, Step in Planning; Information System; Steps in Planning Information needs for short and long-range plans budgeting for management information system

UNIT-III
Information elements and data sources; constraints in Management Information System design, Information flow charts; Documentation and Formats in Management Information System,
Alternative Approaches to Design.

UNIT-IV
Methods and tasks in implementation, Planning for implementation, Behavioural implications in Management Information System, Approaches and process of evaluation of Management Information System. Case Study
Books & References
1. Brein James, Computer in Business Management An Introduction
3. Contar Jesome, Management Information System
4. Bentley Trevoi, Management Information System and Data Process
5. Davis Gozdam B. & Doson, Modern Information System
6. Jawedekar W.S., Management Information System
7. Schulthesis, Management Information System.

BSH-351 ENGINEERING AND MANAGERIAL ECONOMICS

Course category : Management (M)
Pre-requisite Course : NIL
Contact hours/week : Lecture : 2, Tutorial : 1 , Practical: 0
Number of Credits : 3
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, and One id Term Examination and Final Theory Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Students will acquire basic knowledge in Engineering & managerial economics, which allows students to gain theoretical and empirical skill of economics.
2. To make Engineering students prepared for economic empowerment so that they could manage their wealth, help them in starting their own business or during managerial period.
3. Students will develop Interdisciplinary skills which can help them to thrive in the life-long changing environment in various fields of Industry of Economics.
4. Students will acquire practical knowledge of economics, the kind of markets, cost theory, various issues of demand and other major economic concepts.
5. Able to explain succinctly the meaning and definition of managerial economics; elucidate on the characteristics and scope of managerial economics.
6. Able to describe the techniques of managerial economics.
7. Able to explain the applications of managerial economics in various aspects.
8. To learn about the management and economics of the industrial environment

Topics Covered
UNIT-I

UNIT-II
Demand Forecasting: Meaning, significance and methods of demand forecasting,
Law of Supply, Determinants and Elasticity of supply
UNIT-III
Production function, Laws of returns to scale & Law of Diminishing returns scale.
Overview of cost: fixed cost, variable cost, average cost, marginal cost, Opportunity cost, An overview of Short and Long run cost curves
Profit analysis and concept of profit, Theories of Profits

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

Books & References
2. H L Ahuja, Managerial Economics, S Chand & Co. New Delhi
4. Prof. D.N. Kakkar, Managerial Economics for Engineering, PHI publication, New Delhi
5. Varshney and Maheshwari, Managerial Economics, Sultan Chand and Sons, New Delhi.

HUMANITIES & SOCIAL SCIENCE CORE (HSSC)

BSH-113 PROFESSIONAL COMMUNICATION
Course category: Humanities & Social Science Core (HSSC)
Pre-requisite Course: NIL
Contact hours/week: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits: 4
Course Assessment methods: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of various facets of communication skills, such as, Reading, Writing, Listening and speaking skills.
2. To identify, formulate and solve the real life problems with positive attitude.
3. To inculcate the habit of learning and developing the communication and soft skills by practice.

Topics Covered
UNIT-I
Communication
Principles of Communication – Communication as coding and decoding – signs and symbols – verbal and non-verbal symbols – Language AND communication; language VS communication, language as a tool of communication – media/channels for communication; Types of Communication- functional, situational, verbal and non-verbal, interpersonal, group, interactive, public, mass line, dyadic – with illustrations LSRW in Communication – Listening – active vs passive (Talk less, listen more); Speaking - Speech vs. enunciation (mind your tone); Reading – Focus on the structure not on the theme alone, Technical Communication, General Communication, Barriers of Communication, Levels of Communication

UNIT-II
Language Acquisition through Grammar, Usage and Mechanics of Writing
Vocabulary, Phrase, Clause, Parts of Speech: Types ,Examples with Use Gender, Singular, Plural, Article, Sequence of Tenses, Use of Modifiers, Sentence-Loose Sentence, Periodical Sentence, Topic Sentence, Paragraph-Different Orders and Methods of Paragraph Writing, Inductive Method, Deductive Method, Spatial Method, Question and Answer Method, Chronological Method, Expository Method, Common Errors, Antonyms, Synonyms, One-word Substitutes, Homophone, Homonym, Comprehension and Précis, Words Frequently Misspelt, Punctuation and Capitalization, Abbreviations and Numerals, Proofreading, Using the Library

UNIT-III
Technical Writing

UNIT-IV
Spoken and Presentation Skills
Impromptu speech – tackling hesitation, shyness and nervousness in speaking – Public speaking, academic and professional presentations – Group discussions – facilitators and impediments Planning, preparing and delivering a presentation, essentials of presentation - etiquette; clarity; lively delivery – Speech generation; speech rhythm; speech initiators body language – voice, posture and gesture; eye contact; dress codes; verbal crutches; stresses, pronunciation – contextualization – creating and understanding contexts, Speech Drill.

Books & References
1. Complete Course in English - Dixon Robert J., Prentice Hall of India, New Delhi
2. A Practical English Grammar - Thomson and Martinet, ELBS
6. Word Power Made Easy - Lewis, Norman, Pocket Books
8. Business Communication - Chhabra T.N., Sun India Publication, New Delhi
BSH-124 HUMAN VALUES & PROFESSIONAL ETHICS

Course category : Humanities & Social Science Electives (HSSE)
Pre-requisite Course : NIL
Contact hours/week : Lecture : 2, Tutorial : 1 , Practical: 0
Number of Credits : 3
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. To create conducive environment for professionals to grow as good and responsible human beings imbibing values and ethics.
2. Understanding the significance of environment.
3. Developing humanitarian outlook.

Topics Covered

UNIT-I

UNIT-II

UNIT-III

UNIT-IV
Ethical Approaches:- Theistic Approach, Atheistic Approach, General and Special Ethics, Professional Ethics: Ethics at work place, Ethics as Skill, Values and Ethics, Ethics with Value Education, Managerial and Business & Corporate Ethics, Corporate Social Responsibilities.

Books & References
4. Misra, Anuranjan and Shukla, Dr. R.K. Human values and Professional Ethics, Amazon(Paper Back).
5. Fernando, A.C Business Ethics: An Indian Perspective, Pearson,India.
BSH-125 INDUSTRIAL PSYCHOLOGY

Course category : Humanities & Social Science Electives (HSSE)
Pre-requisite Course : NIL
Contact hours/week : Lecture : 2, Tutorial : 1, Practical: 0
Number of Credits : 3

Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of various facets of psychology, it problems and understanding.
2. To identify, formulate and solve the real life problems with positive attitude.
3. To inculcate the habit of learning and developing the industrial problems from psychological eyes.

Topics Covered

UNIT-I
Introduction to Industrial Psychology and its basic concepts
Nature, Importance and scope of Industrial Psychology, Scientific management, Time and motion study and human relations school

UNIT-II
Individual in workplace
Motivation and job satisfaction, Stress management, Organisational culture, Leadership and group-dynamic.

UNIT-III
Work environment, Recruitment and selection
Engineering Psychology, Fatigue and boredom, Work environment, Accident and safety, Job-analysis, Recruitment and selection, Psychological tests.

UNIT-IV
Performance management and training
Performance appraisal, Importance and Methods of Performance appraisal, Training and development- Concepts and Benefits to the organization.

Books & References


BSH-126 INDUSTRIAL SOCIOLOGY

Course category : Humanities & Social Science Electives (HSSE)
Pre-requisite Course : -
Contact hours/week : Lecture : 2, Tutorial : 1, Practical: 0
Number of Credits : 3
Course Assessment methods: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of various facets of sociology, it problems and understanding.
2. To identify, formulate and solve the real life problems with positive attitude.
3. To inculcate the habit of learning and developing the industrial problems from sociological perspectives.

Topics Covered

UNIT-I
Introduction to Industrial Sociology
Nature, Scope and importance of Industrial Sociology, Development of Industrial Sociology and other social sciences. Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim

UNIT-II
Rise and development of industry

UNIT-III
Contemporary issues in Industrial Sociology
Industrial Policy Resolutions

UNIT-IV
Industrial relations machinery in India

Books & References
4. Dhanagare, D.N. , Themes and Perspectives in Indian Sociology, Rawat

PROJECT (P)

CSE-473 PROJECT PART- I

Course category: Department Core (DC)
Pre-requisite Course: NIL
Contact hours/week: Lecture : 0, Tutorial : 0 , Practical: 10
Number of Credits: 5
Course Assessment: Continuous assessment through three viva voce/presentation, preliminary project report, effort and regularity and end semester presentation.

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course:

1. Learning of latest trends and technology in selected field of interest.
2. Apply the acquired knowledge to practical situations.
3. Develop self-interest to explore the selected technical field of interest in future.
4. Acquire presentation skills.
5. Develop better interpersonal communication skills and increase self confidence.

CSE-482  PROJECT PART-II

Course category: Department Core (DC)
Pre-requisite Course: Project Part-I (CSE-473)
Contact hours/week: Lecture: 0, Tutorial: 0, Practical: 10
Number of Credits: 5
Course Assessment: Continuous assessment through three viva voce/presentation, final project report, contribution made to literary world and Final examination.
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course:

1. B. Tech. project is designed to allow students to work with faculty members on one long project that may require effort over two semesters. The final year project gives students an excellent opportunity to develop and demonstrate their innovation skills, design skills and research interests. These projects quite often lead to publications of their original work.

Develops ability of report writing.

Develops ability to be aware of current trends in specific area of interest

PROGRAMME ELECTIVE 1 & 2

CPE-471  ADVANCE JAVA

Course Category: Program Elective (PE1&PE2)
Pre-requisite Course: NIL
Contact Hours/Week: Lecture: 3, Tutorial: 1, Practical: 0
Number of Credits: 4
Course Assessment: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination.
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course:

1. Be proficient in using JAVA Servlets and related Web development tools.
2. Identify different components of client/server Architecture on Internet computing.
3. Design, develop and implement interactive Web applications.
4. Know how to develop and deploy applications and applets in JAVA.
5. Know how to design and develop GUI using JAVA Swing and AWT

**Topics Covered**

**UNIT-I**

**Collections:** Collection Interfaces, Concrete Collections, Collections Framework.

**Multithreading:** Creating Thread and Running it, Multiple Thread Acting on Single Object, Synchronization, Thread Communication, Thread Group, Thread Priorities, Daemon Thread, Life Cycle of Thread.

**UNIT-II**

**Networking:** Internet Addressing, Internet address, Factory Methods, Instance Methods, TCP/IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagrams

**Enterprise JAVA Bean:** Preparing a Class to be a JAVA bean, Creating a JAVA bean, JAVA bean Properties, Types of Beans, Stateful Session Bean, Stateless Session Bean, Entity Bean

**UNIT-III**

**JAVA Database Connectivity (JDBC):**

Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures

**Servlets:** Servlet Overview and Architecture, Interface Servlet and Servlet Life Cycle, Handling HTTP Get Requests, Handling HTTP Post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with Http session.

**UNIT-IV**

**JAVA Server Pages (JSP):** Introduction, JAVA server Pages Overview, A First JAVA server Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries

**Remote Method Invocation:** Defining Remote Interface, Implementing Remote Interface, Compiling and Executing Server and Client.

**Common Object Request Broker Architecture (CORBA):** Technical/Architectural Overview, CORBA Basics, CORBA Services

**Introduction Smart Phone Application Development:** Introduction to Android Platform, Creating Application Template, Adding Activity, Intent, Services to Application, Using Google Map API

**Textbooks**

1. H. M. Deitel, P. J. Deitel, S. E. Santry , Advanced JAVA 2 Platform HOW TO PROGRAM, Prentice Hall

**Reference books**

2. Antonio Goncalves, Beginning Fish 3 From Novice to Professional. JAVATM EE 6 Platform with Glass
**CPE-472 .NET TECHNOLOGY**

<table>
<thead>
<tr>
<th>Course Category</th>
<th>Program Elective (PE1&amp;PE2)</th>
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</thead>
<tbody>
<tr>
<td>Pre-requisite Course</td>
<td>NIL</td>
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<tr>
<td>Contact Hours/Week</td>
<td>Lecture : 3, Tutorial : 1, Practical: 0</td>
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<tr>
<td>Number of Credits</td>
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<tr>
<td>Course Assessment</td>
<td>Continuous Assessment through Tutorials, Assignments, Methods</td>
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<td></td>
<td>One Mid Term Examination and Final Theory Examination</td>
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<tr>
<td>Course Outcomes</td>
<td>The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.</td>
</tr>
<tr>
<td>1.</td>
<td>Understand the most important features of .NET Framework technology</td>
</tr>
<tr>
<td>2.</td>
<td>Use Visual Studio .NET and .NET Framework SDK to design, run and debug simple C# console applications</td>
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<tr>
<td>3.</td>
<td>Write programs that use fundamental C# programming tools.</td>
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<tr>
<td>4.</td>
<td>Use advanced OOP tools when designing C# programs.</td>
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<tr>
<td>5.</td>
<td>Design web forms using ASP.Net</td>
</tr>
</tbody>
</table>

**Topics Covered**

**UNIT-I**


C -Sharp Language (C#): Introduction, Data Types, Identifiers, Variables, Constants, Literals, Array And Strings, Object And Classes.

**UNIT-II**

C -Sharp Language (C#) (Cont.): Inheritance and Polymorphism, Operator Overloading, Interfaces, Delegates and Events. Type Conversion.
C# Using Libraries: Namespace- System, Input-Output, Multi-Threading UNIT-III

Managing Console I/O Operations, Windows Forms, Error Handling.

Advanced Features Using C#: Web Services, Window Services, Unsafe Mode, Graphical Device Interface With C#, Introduction About Generic.

UNIT-IV


Textbooks

Reference books
1. Wrox, Beginning Visual C# 2008, Wiley
2. Fergal Grimes, Microsoft .Net for Programmers. SPI
3. Balaguruswamy, Programming with C#. TMH
4. Mark Michaelis, Essential C# 3.0: For .NET Framework 3.5, 2/e, Pearson Education
5. Shibi Parikkar, C# with .Net Frame Work, Firewall Media
6. Wrox, Beginning ASP.NET 4.5 in C# and VB, 2012
7. Lippman, Stanley B. C# Primer - A Practical Approach Addison-Wesley, 2012

CPE-473 LAMP TECHNOLOGY

Course Category : Program Elective (PE1&PE2)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Use Open Source Operating system and its distributions like Fedora, Google chrome OS, Ubuntu.
2. To comprehend framework of BSD (Berkley System Distribution) and its installation
3. Study of Web technologies based on open Software’s LAMP (Linux Apache MySql and PHP/Python)
4. To Learn HTML, XHTML, PHP and JAVA Script

Topics Covered

UNIT-I

Introduction to LAMP Terminologies, Two Tier and Three Tier Web based Application Architecture; Advantages of using LAMP based Technologies, Linux: Distributions – Fedora and Ubuntu; Installation – Disk Partitioning, Boot Loader, Etc; Using Linux – Shell, File System Familiarity; Linux Administration – Managing Users, Services
and Software; Network Connectivity and Configurations; Security.

UNIT-II

Apache: Web Server Conceptual Working, Web Browser, HTTP, Installation and Configuration; *Httpd. Conf* File; Logging; Security; Running Website

UNIT-III

Mysql: Database Management System, ER Diagram, Relational Database, Installation Configuration, Administration, Common SQL Queries – Create, Describe, Select, Insert, Delete, Update, Etc.

UNIT-IV

PHP: Dynamic Content, Server Side Scripting, Installation, Configuration, Administration, Language Syntax, Built-in Functions, PHP and Mysql Connectivity, Installation, Configuration and Administration of All Four LAMP Components Namely Linux, Apache Web Server, Mysql and PHP, Testing with Any Project Example.

Textbooks
2. James Lee, Brent Ware, Open Source Development with LAMP, Addison-Wesley Professional.

Reference books
2. Paul DuBois, MySQL, Addison-Wesley.
3. Rasmus L Erdorf, Kevin Tatroe, Programming PHP, O'Reilly Publications.

CPE-474 NETWORK PROGRAMMING

Course Category

Pre-requisite Course Program Elective (PE1&PE2) NIL

Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. To write socket API based programs
2. To design and implement client-server applications using TCP and UDP sockets
3. To analyze network programs

Topics Covered

UNIT-1

UNIT-II

**Elementary TCP Sockets**- Introduction to Socket Programming: Introduction to Sockets, 9 Socket Address Structures, Byte Ordering Functions, Address Conversion Functions, Elementary TCP Sockets, socket, connect, bind, listen, accept, read, write, close functions, Iterative Server, Concurrent Server.

UNIT-III

TCP Echo Server, TCP Echo Client, Posix Signal Handling, Server with Multiple Clients, 9 Boundary Conditions: Server Process Crashes, Server Host Crashes, Server Crashes and Reboots,

Server Shutdown, I/O Multiplexing, I/O Models, Select Function, Shutdown Function, TCP Echo Server (with Multiplexing), Poll Function, TCP Echo Client (with Multiplexing).

UNIT-IV

Socket Options, Getsocket and Setsocket Functions, Generic Socket Options, IP Socket options, 9 ICMP Socket Options ,TCP Socket Options, Elementary UDP Sockets, UDP Echo Server, UDP Echo Client, Multiplexing TCP and UDP Sockets, Domain Name System, Gethos by name Function, Ipv6 Support in DNS, Gethostbyadr Function, Getserv by name and Getserv by port Functions.

Textbooks


Reference books


CPE-475 MOBILE APPLICATION PROGRAMMING

<table>
<thead>
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<td>4</td>
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<tr>
<td>Course Assessment</td>
<td>Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination</td>
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<td>Methods</td>
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<tr>
<td>Course Outcomes</td>
<td>The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.</td>
</tr>
</tbody>
</table>

1. Know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
2. Understand how to work with various mobile application development frameworks.
3. Learn the basic and important design concepts and issues of development of mobile applications.
4. Understand the capabilities and limitations of mobile devices.
Topics Covered

UNIT-I  

UNIT-II  
Introduction to Windows Phone 7, Type of applications that can be built- using Silverlight and XNA, Developer tools to be used for building apps

UNIT-III  
Introduction to App Makr, Creating a Developer Account on App Hub: using a Dream Spark Account, App Certification Guidelines for the Windows Phone Marketplace

UNIT-IV  
iOS overview, iOS Application Life Cycle, Design, Develop and Deploy Applications for iPhone, iPad and iPod Touch, Human Interface and use of Sensors for App Development.

Textbooks
1. Jeff Mcwherter, Scott Gowell, Professional Mobile Application Development, Wrox Publisher (2012), 1e

Reference books
1. Lauren Darcy, Shane Conder, Sams Teach Yourself Android Application Development in 24 Hrs, 1e

CPE-476 DATABASE ADMINISTRATION WITH ORACLE

Course Category : Program Elective (PE1&PE2)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4
Course Assessment : Continuous Assessment through Tutorials, Assignments, Quizzes and Three Minor Tests and One Major Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Gain a conceptual understanding of the Oracle database architecture and how its components work and interact with one another.
2. will also learn how to create an operational database and properly manage the various structures in an effective and efficient manner including performance monitoring, database security, user management, and backup/recovery techniques
3. Establish and in depth understanding of Database Administration using the DBMS Interfaces
4. Create and understand the application of user rolls, privileges, and the security of the database.
5. Discuss and understand the concepts of Backup and Recovery Procedures

**Topics Covered**

**UNIT-I**

9

Introduction: DBMS Architecture and Data Independence, DBA Roles and Responsibilities, SQL *PLUS Overview: SQL Plus Fundamentals, Producing More Readable Outputs, Accepting Values At Runtime, Using Isql *Plus, Modifying Data: Introduction to DML Statements, Truncating A Table, Transaction Control Language, Managing Constraints: Creating Constraints, Dropping Constraints, Enabling and Disabling Constraints, Deferring Constraints Checks

**UNIT-II**

9


**UNIT-III**

9

Control and Redo Log Files: Managing the Control Files, Maintaining and Monitoring Redo Log Files, Managing Tables, Indexes and Constraints: Storing Data (Create, Alter, Analyzing, Querying Table Information), Managing Indexes, Managing Constraints, Managing Users and Security: Profiles, Managing Users, Managing Privileges, Managing Roles, Querying Role Information, Introduction to Network Administration: Network Design Considerations, Network Responsibilities for the DBA, Network Configuration, Overview of Oracle Net Features, Oracle Net Stack Architecture

**UNIT-IV**

9

Backup and Recovery Overview: Database Backup, Restoration and Recovery, Types of Failure in Oracle Environment, Defining A Backup and Recovery Strategy, Testing the Backup and Recovery Plan, Introduction to Performance Tuning: Brief Overview of Tuning Methodology, General Tuning Concepts

**Textbooks**

1. C.J. Date, Database Systems, Addison Wesley, 2000
CPE-477 DATA WAREHOUSING & DATA MINING

Course Category: Program Elective (PE1&PE2)
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits: 4
Course Assessment: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Approach business problems data-analytically by identifying opportunities to derive business value from data.
2. know the basics of data mining techniques and how they can be applied to extract relevant business intelligence

Topics Covered

UNIT-I

Introduction to Data Mining: Motivation for Data Mining, Data Mining-Definition &Functionalities, Classification of DM Systems, DM Task Primitives, Integration of a Data Mining System with A Database or A Data Warehouse, Major Issues in Data Mining, Data Warehousing Overview of Concepts Like Star Schema, Fact and Dimension Tables, OLAP Operations, from OLAP to Data Mining, Data Pre Processing: Why? Descriptive Data Summarization, Data Cleaning: Missing Values, Noisy Data, Data Integration and Transformation, Data Reduction: Data Cube Aggregation, Dimensionality Reduction, Data Compression, Numerosity Reduction, Data Discretization and Concept Hierarchy Generation for Numerical and Categorical Data.

UNIT-II

Mining Frequent Patterns, Associations and Correlations: Market Basket Analysis, Frequent Item Sets, Closed Item Sets, and Association Rules, Frequent Pattern Mining, Efficient and Scalable Frequent Item Set Mining Methods, The Apriori Algorithm for Finding Frequent Item Sets Using Candidate Generation, Generating Association Rules from FrequentItem Sets, Improving the Efficiency of Apriori, Frequent Item sets without Candidate Generation using FP Tree, Mining Multilevel Association Rules, Mining
Multidimensional Association Rules, from Association Mining to Correlation Analysis, Constraint-Based Association Mining. Issues Regarding Classification and Prediction: Classification Methods: Decision Tree, Bayesian Classification, Rule Based Prediction: Linear and Non Linear Regression Accuracy and Error Measures, Evaluating the Accuracy of A Classifier or Predictor.

UNIT-III

Cluster Analysis: Types of Data in Cluster Analysis, Categories of Clustering Methods, Partitioning Methods K-Means, K-Mediods Hierarchical Clustering-Agglomerative and Divisive Clustering, BIRCH and ROCK Methods, DBSCAN, Outlier Analysis Stream Data Classification, Clustering Association Mining in Stream Data. Mining Sequence Patterns in Transactional Databases

UNIT-IV

Spatial Data and Text Mining: Spatial Data Cube Construction and Spatial OLAP, Mining Spatial Association and Co-location Patterns, Spatial Clustering Methods, Spatial Classification and Spatial Trend Analysis. Text Data Analysis and Information Retrieval, Dimensionality Reduction for Text, Text Mining Approaches Web Mining Introduction, Web Content Mining, Web Structure Mining, Web Usage Mining, Automatic Classification of Web Documents. Data Mining for Business Applications like Balanced Scorecard, Fraud Detection, Click Stream Mining, Market Segmentation, Retail Industry, Telecommunications Industry, Banking & Finance and CRM etc.

Textbooks

1. Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann 2nd Edition
2. P. N. Tan, M. Steinbach, Vipin Kumar, 'Introduction to Data Mining.', Pearson Education

Reference books

2. G. Shmueli, N.R. Patel, P.C. Bruce, .Data Mining for Business Intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XL Miner, Wiley India.
7. Arijay Chaudhary & P. S. Deshpande, Multidimensional Data Analysis and Data Mining Dreamtech Press

CPE-478 ANALYTICS AND SYSTEMS OF BIG DATA

Course Category: Program Elective (PE1&PE2)
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits: 4
Course Assessment: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Demonstrate the knowledge of big data, data science, data analytics, distributed file systems, parallel Map Reduce paradigm, NoSQL, machine learning, etc
2. Program and implement examples of big data and NoSQL applications using open source Hadoop, HDFS, Map Reduce, Hive, Pig, Mahout, etc
3. Read current research papers and implement example research group project in big data

Topics Covered

UNIT-I 9


UNIT-II 9


UNIT-III 9


UNIT-IV 9


Textbooks


Reference books

3. Eric Sammer, Hadoop Operation, O'Reilly 2012
4. Donald Miner, Adam Shook, MapReduce Design Patterns: Building Effective Algorithms and Analytics for Hadoop and Other Systems, O'Reilly 2012

PROGRAMME ELECTIVE 3 &4) VIIIth Semester

CPE-481 ADVANCE PROGRAMMING TECHNIQUES

Course Category : Program Elective (PE3 & PE4)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical : 0
Number of Credits : 4
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Develop algorithms from user problem statements.
2. Express the solutions to computer oriented problems using pseudo code.
3. Proficiently transform designs of problem solutions into a standard programming language.
4. Use an integrated programming environment to write, compile, and execute programs involving a small number of source files.
5. Apply debugging and testing techniques to locate and resolve errors, and to determine the effectiveness of a program.
6. Apply standard/structured programming techniques including design approaches, use of functions/methods, use of documentation, and avoidance of excessive branching.
7. Proficiently use fundamental programming elements including: variable declaration, use of data types and simple data structures (arrays and objects), decision structures, loop structures, input and output for console and text files, and functions/methods.

Topics Covered

UNIT-I

Introduction-History of Computers, Components of a Computer, Programming Languages, Compilation vs. Interpretation, Basic Program Structure and the Integrated Development Environment-Essential Program Structure, Documentation and Standard Programming Practices, Integrated Development Environment(IDE) Overview, Editing (with the IDE), Compilation (with the IDE), Execution (with the IDE), Debugging (with the IDE)
UNIT-II


UNIT-III


UNIT-IV


Textbooks


Reference books


CPE-482 SOFTWARE REUSE

Course Category : Program Elective (PE3 & PE4)  
Pre-requisite Course : NIL  
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0  
Number of Credits : 4  
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination  
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. To provide a solid background knowledge about software Reuse.
2. To educate Metrics used in software reuse.
3. To provide Knowledge about various frameworks and COTS.

Topics Covered

UNIT-I


UNIT-II

UNIT-III

FRAMEWORKS AND APPLICATION ENGINEERING-Application Frameworks:

UNIT-IV


Textbooks


Reference books


CPE-483 SOFTWARE VERIFICATION & VALIDATION

Course Category : Program Elective (PE3 & PE4)

Pre-requisite Course : NIL

Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4
Course Assessment Methods : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Understand the concepts and theory related to software testing.
2. Understand different testing techniques used in designing test plans, developing test suites, and evaluating test suite coverage
3. Understand the relationship between black-box and white-box testing and know how to apply as appropriate.

4. Learn to use automated testing tools in order to measure code coverage.
5. Understand how software developers can integrate a testing framework into code development in order to incrementally develop and test code.
UNIT-I
An Introduction to Software Verification and Validation/Basic Concepts, Methods for Evaluating Software for Correctness and Reliability including Code, Inspections, Program Proofs, System Test Categories, Code inspections and their role in software verification.

UNIT-II
Review of Software Engineering Methods and Challenges, Role of Verification and Validation. Economics of Verification and Validation, Software Reviews and Inspections, Conducting Reviews and Inspection, Software Quality Metrics

UNIT-III

UNIT-IV
Software validation metrics, Assessing and Improving the Validation Process, Improving the development Process

Textbooks
1. Stephen H Kan, Metric and Model in Software Quality Engineering, Pearson Education
2. William Perry, Effective methods for Software Testing, Wiley Publication
3. Dorotmy Graham, Erik Van Veenendaal, Foundation of Software Testing By: CENGAGE learning,
4. Dr. K.V.K. Prasad, Software Testing Tools, Dreamtech Press
6. Rajib Mall, Fundamentals of Software Testing, PHI Publication

Reference books
1. Steven R. Raktitin, Software Verification and Validation for Practitioners and Managers, ed. Artech House, 2nd Edition

CPE-484 SOFTWARE DESIGN & CONSTRUCTION
Course Category: Program Elective (PE3 & PE4)
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits: 4
Course Assessment: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Understand Architectural styles and Quality Attributes.
2. Understand common tools and terminology related to software design and construction.
3. Understand the role of the Software Architect with a development project.
4. Use methods for constructing and evaluating architectures.
5. Understand Advance Concepts in design and construction.

Topics Covered

UNIT-I


UNIT-II


UNIT-III


UNIT-IV


Textbooks


Reference books


CPE-485 SOFTWARE QUALITY MANAGEMENT

Course Category : Program Elective (PE3 & PE4)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture: 3, Tutorial: 1, Practical: 0
Number of Credits : 4
Course Assessment Methods : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Define quality assurance plans
2. Apply quality assurance tools & techniques
3. To learn about standards and certifications
4. To describe procedures and work instructions in software organizations

Topics Covered
UNIT-I

UNIT-II

UNIT-III
SOFTWARE QUALITY INFRASTRUCTURE COMPONENTS: Procedures and Work Instructions - Supporting Quality Devices - Staff Training, Instructing and Certification - Preventive and Corrective Actions - Configuration Management - Documentation and Quality Records Controls.

UNIT-IV

Textbooks
2. Jeff Tian, Software Quality Engineering (SQE), Wiley-Interscience, 2005
Reference books

CPE-486  FUNDAMENTALS OF CLOUD COMPUTING

Course Category : Program Elective (PE3 & PE4)
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 0
Number of Credits : 4
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Understand the concept of Existing Hosting Platforms and computing paradigms currently being used in industry and academia
2. Identify the issues related to Cloud Computing. To analyse IASS/ PAAS and SAAS services along with Cloud models.
3. Understand the concepts of various Cloud Platforms with comparative analysis and the concepts of virtualization with the advantages in Cloud.

Topics Covered

UNIT-I


Cloud Computing Architecture: Cloud Architecture Model, Types of Clouds: Public Private & Hybrid Clouds, Resource Management and Scheduling, QOS (Quality Of Service) and Resource Allocation, Clustering

UNIT-II

Classification of Cloud Implementations- Amazon Web Services - IaaS, Elastic Compute Cloud (EC2), Simple Storage Service (S3), Simple Queuing Services (SQS), VMware vCloud - IaaS, vCloud Express, Google AppEngine - PaaS, JAVA Runtime Environment

UNIT-III

Data Center: Classic Data Center, Virtualized Data Center (Compute, Storage, Networking and Application), Business Continuity in VDC

Virtualization: Virtualization, Advantages and disadvantages of Virtualization, Types of Virtualization: Resource Virtualization i.e. Server, Storage and Network virtualization, Migration of processes, VMware vCloud – IaaS

UNIT-IV

**Textbooks**
1. Dr. Kumar Saurabh, Cloud Computing, Wiley
3. Tim Mather, Subra Kumaraswamy, Shahed Latif, Cloud Security and Privacy, O'Reilly Media

**Reference books**

**CPE-487 CRYPTOGRAPHY AND INFORMATION SECURITY**

**Course Category**: Program Elective (PE3 & PE4)
**Pre-requisite Course**: NIL
**Contact Hours/Week**: Lecture : 3, Tutorial : 1 , Practical: 0
**Number of Credits**: 4
**Course Assessment**: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination.

**Course Outcomes**: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Encryption techniques and key generation techniques.
2. Authentication and security measures.
3. Intrusion and filtering analysis.

**Topics Covered**

**UNIT-I**

Introduction to Cryptography, Attacks, Services and Mechanism, Conventional Encryption Model, Classical Encryption Techniques- Substitution Ciphers and Transposition Ciphers, Cryptanalysis, Steganography, Stream and Block Ciphers, Modern Block Ciphers: Block Ciphers Principals, Data Encryption Standard (DES), Strength of DES, Differential and Linear Crypt Analysis of DES, Block Cipher Modes of Operations, Triple DES, IDEA Encryption and Decryption, Strength of IDEA, Confidentiality using Conventional
Encryption, Traffic Confidentiality, Key Distribution, Random Number Generation.

UNIT-II


UNIT-III


UNIT-IV


Textbooks
5. Bruce Schiener, Applied Cryptography, John Wiley & Sons

Reference books

CPE-488 INTRODUCTION TO REAL TIME SYSTEM

Course Category : Program Elective (PE3 & PE4)
Pre-requisite Course : NIL.
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 0
Number of Credits : 4
Course Assessment : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Real-time scheduling and schedulability analysis
2. Formal specification and verification of timing constraints and properties
3. Design methods for real-time systems
4. Development and implementation of new techniques to advance the state-of-the-art real-time systems research

Topics Covered

UNIT-I


UNIT-II


UNIT-III

Real Time Databases - Basic Definition, Real Time vs General Purpose Databases, Main Memory Databases, Transaction Priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Two-Phase Approach to Improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time Systems.

UNIT-IV


Textbooks

1. Alan C. Shaw, Real - Time Systems and software; John Wiley & Sons Inc

Reference books
7. Other materials required for the class will be made available during the course.

CPE-489 NEURAL NETWORK & FUZZY SYSTEM

Course Category : Program Elective (PE3 & PE4)
Pre-requisite Subject : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 0
Number of Credits : 4
Course Assessment Methods : Continuous assessment through tutorials, attendance, home assignments, quizzes and Three Minor tests and One Major Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

2. Fuzzy principles and relations.
3. Genetic algorithms and its applications.
4. Hybrid systems and usage of MATLAB toolbox

Topics Covered
UNIT-I

UNIT-II

UNIT-III

UNIT-IV

Textbooks
2. N. P. Padhy, Artificial Intelligence and Intelligent Systems, Oxford University Press.
3. Siman Haykin, Neural Networks, Prentice Hall of India
4. Timothy J. Ross, Fuzzy Logic with Engineering Applications, Wiley India.

Reference books

OPEN ELECTIVE (OE)
COE-481 DATABASE MANAGEMENT SYSTEM, DATA MINING & WAREHOUSING

Course Category : For Other Department
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4

Course Assessment Methods : Continuous assessment through tutorials, attendance, home assignments, midterm examination and Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
1. To educate students with fundamental concepts of Database Management System, Data Models, Different Data Base Languages.
2. To analyze Database design methodology.
3. To understand the basic principles, concepts and applications of data warehousing and data mining
4. To introduce the task of data mining as an important phase of knowledge recovery process
5. Ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
6. Have a good knowledge of the fundamental concepts that provide the foundation of data mining

Topics Covered

UNIT-I
**Introduction**: An Overview of Database Management System, 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 Entity Relationship Model**: ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ER Model, Relationship of Higher Degree.

**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**


**Distributed Database**: Distributed Data Storage, Concurrency Control, Directory System.

**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.

**UNIT-IV**

**Data Mining & Warehousing**: Introduction to Data Warehouse, Building A Data Warehouse, Data Warehouse Architecture, OLAP Technology, Introduction to Data Mining, Data Pre-Processing, Mining Association Rules, Classification and Prediction, Cluster Analysis, Advanced Techniques of Data Mining and its Applications.

**Textbooks**
2. Jiawei Han, Micheline Kamber, Data Mining Concepts & Techniques, Elsevier

**Reference books**
1. Date C J, An Introduction to Database Systems, Addison Wesley
3. M. H. Dunham, Data Mining: Introductory and Advanced Topics. Pearson Education

**COE-482 OBJECT ORIENTED TECHNIQUES & JAVA PROGRAMMING**

<table>
<thead>
<tr>
<th>Course Category</th>
<th>Program Elective (EC) Electrical Engineering</th>
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<tbody>
<tr>
<td>Pre-requisite Course</td>
<td>NIL</td>
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<tr>
<td>Contact Hours/Week</td>
<td>Lecture : 3, Tutorial : 1 , Practical: 0</td>
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<tr>
<td>Number of Credits</td>
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</tbody>
</table>
Course Assessment Methods: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Knowledge of how to develop and deploy applications and applets in JAVA.
2. Knowledge of how to develop and deploy GUI using JAVA Swing and AWT.
3. Design, develop and implement interactive web applications.
4. Be able to implement, compile, test and run JAVA programs comprising more than one class and to address a particular software problem.
5. Develop programs using the JAVA Collection API as well as the JAVA standard class library.

Topics Covered

UNIT-I

UNIT-II

UNIT-III
JAVA Swing: Creating a Swing Applet and Application, Programming using Panels, Pluggable Look and Feel, Labels, Text Fields, Buttons, Tabbed Panes.

UNIT-IV

Textbooks
1. Naughton, Schildt, The Complete Reference JAVA2, TMH Publication
2. Balaguruswamy E, Programming in JAVA, TMH Publication

Reference books
1. Margaret Levine Young, The Complete Reference Internet, TMH Publication
2. Dustin R. Callway, Inside Servlets, Addison Wesley.

COE-483 INTRODUCTION TO WEB TECHNOLOGY
Course Category: Program Elective (EC) Computer Science Engineering
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits: 4
Course Assessment: Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

Topics Covered

UNIT-I


UNIT-II


UNIT-III

Scripting: 8 Java script: Introduction, documents, forms, statements, functions, objects; introduction to AJAX, VB Script, Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API.

UNIT- IV

Server Site Programming: 8 . Introduction to active server pages (ASP), Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, Sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, development of java beans in JSP, Introduction to Servelets, Lifecycle, JSDK, Servlet API, Servlet Packages, Introduction to COM/DCOM/CORBA.

UNIT-V

PHP (Hypertext Preprocessor): 8 Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, mail, file upload, session, error, exception, filter, PHP-ODBC.

Text books:

1. Burdman, Jessica, “Collaborative Web Development” Addison Wesley
2. Xavier, C, “Web Technology and Design” , New Age International
3. Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication
4. Bhave, “Programming with Java”, Pearson Education
7. Margaret Levine Young, “The Complete Reference Internet”, TMH
# Audit Course (AC)

## BSH-114 ENVIRONMENT & ECOLOGY

<table>
<thead>
<tr>
<th>Course category</th>
<th>Basic Sciences &amp; Maths (BSM)</th>
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<tr>
<td>Pre-requisite Course</td>
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<td>Contact hours/week</td>
<td>Lecture : 2, Tutorial : 1 , Practical: 0</td>
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<td>Number of Credits</td>
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<td>Course Assessment</td>
<td>Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination</td>
</tr>
<tr>
<td>Course Outcomes</td>
<td>The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course</td>
</tr>
</tbody>
</table>

1. Students will acquire basic knowledge in Environment and Ecology, which allows students to gain qualitative and quantitative skills.
2. Students will aware of environmental pollution and control methods along with quality standards of air, water etc along with waste management.
3. Students will able to give systematic account of natural resources uses and their exploitation.
4. How to achieve sustainable development through strategies and its threats.

## Topics Covered

### UNIT-I

The Multidisciplinary nature of environmental studies, Definition, scope and importance, Need for public awareness. Natural Resources, Renewable and non-renewable resources, Natural resources and associated problems

(a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining.
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources,
(d) Food resources: World food problem, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
(e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources.

### UNIT-II

6
Ecosystems
Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids

Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland Ecosystem (c) Aquatic ecosystems (ponds, rivers, oceans)

Biodiversity
Introduction- Definition : genetic, species and ecosystem diversity, Biogeographically classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, Endangered and endemic species of India, Conservation of biodiversity:

UNIT-III
Environmental Pollution Causes, effects and control measures of-
(a) Air Pollution. (b) Water Pollution. (c) Soli Pollution (d) Marine Pollution. (e) Noise Pollution. (f) Thermal Pollution.
Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution
Global warming and green house effect, Acid Rain, Ozone Layer depletion

UNIT-IV
Population Growth and the Environment

Books & References
1. Environmental Studies - J Krishnaswamy , R J Ranjit Daniels, Wiley India
3. Environment and Ecology - R K Khandal, 978-81-265-4277-2, Wiley India
4. Environmental Science – 8th edition ISV, Botkin and Keller, 9788126534142, Wiley India

BSH-127  FUNDAMENTALS OF ELECTRONICS ENGINEERING
Course category : Engineering Fundamentals (EF)
Pre-requisite Course : NIL
Contact hours/week : Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits : 5
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, Midterm Examination , practical work, record, viva voce & Final Practical and theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
1. Able to identify schematic symbols and understand the working principles of electronic devices, e.g., Diode, Zener Diode, LED, BJT, JFET and MOSFET etc.
2. Able to understand the working principles of electronic circuits e.g. Rectifiers, Clipper, Clamper, Filters, Amplifiers and Operational Amplifiers etc. also understand methods to analyse and characterize these circuits.
3. Able to understand the functioning and purposes of Power Supplies, Test and Measuring equipments such as multimeters, CROs and function generators etc.
4. Able to rig up and test small electronics circuits.

Topics Covered
UNIT-I
Semiconductor materials and properties: electron-hole concepts, Basic concepts of energy bands in materials, concept of forbidden gap, Intrinsic and extrinsic semiconductors, donors and acceptors, impurities, Junction diode, p-n junction, depletion layer, v-i characteristics, diode resistance, capacitance, diode ratings (average current, repetitive peak current, non-repetitive current, peak- inverse voltage). Diode Applications in rectifier, filters, voltage multipliers, load regulators, clipper and clamper circuits, Breakdown mechanism (Zener and avalanche), breakdown characteristics, Zener resistance, Zener diode ratings, Zener diode application as shunt regulator.

UNIT-II
Transistors (BJT and FET): Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, Biasing of transistors-fixed bias, emitter bias, potential divider bias, comparison of biasing circuits. Transistor Amplifier: Graphical analysis of CE amplifier, concept of voltage gain, current gain, h-parameter model (low frequency), computation of Ai, Av, Ri, Ro of single transistor CE and CC amplifier configurations. Field Effect Transistors (JFET and MOSFET): Basic construction, transistor action, concept of pinch off, maximum drain saturation current, input and transfer characteristics, characteristic equation CG, CS and CD configurations, fixed & self-biasing. MOSFET: depletion and enhancement type MOSFET- construction, operation and characteristics. Computation of Av, Ri, Ro, of single FET amplifiers using all the three configurations.

UNIT-III
Switching theory and logic design: Number systems, conversion of bases, Boolean algebra, logic gates, concept of universal gate, canonical forms, Minimization using K-map. Operational Amplifiers
Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and unity gain amplifiers, adders, difference amplifiers, integrators.

REE-231 Management of Canal Irrigation System 3 (2+1)
Theory
Purpose benefits and ill effects of irrigation; typical network of canal irrigation system and its different physical components; canal classification based on source of water, financial output, purpose, discharge and alignment; canal alignment: general considerations for alignment; performance indicators for canal irrigation system evaluation, Estimation of water requirements for canal command areas and determination of canal capacity; water duty and delta, relationship between duty, base period and delta, factors affecting duty and method of improving duty; silt theory: Kennedy’s theory, design of channels by Kennedy’s theory, Lacey’s theory and basic regime equations, design of channels by Lacey’s theory, maintenance of unlined irrigation canals, measurement of discharge in canals, rostering (canal running schedule) and warabandhi, necessity of canal lining: advantages and disadvantages, types of canal lining and desirable characteristics for the suitability of lining materials; design of lined canals; functions of distributary head and cross regulators; canal falls, their necessity and factors affecting canal fall; sources of surplus water in
Practical
Estimation of water requirement of canal commands; determination of canal capacity; layout of canal alignments on topographic maps, drawing of canal sections in cutting, full banking and partial cutting and partial banking; determination of longitudinal section of canals; design of irrigation canals based on silt theories; design of lined canals; formulation of warabandhi; Study of canal outlets, regulators, escapes and canal falls.

Suggested Readings
Minor Irrigation and Command Area Development 3(2+1)
Theory
Factors affecting performance of irrigation projects; types of minor irrigation systems in India; lift irrigation systems: feasibility, type of pumping stations and their site selection, design of lift irrigation systems; tank Irrigation: grouping of tanks, storage capacity, supply works and sluices; command area development (CAD) programme- components, need, scope, and development approaches, historical perspective, command area development authorities-functions and responsibilities; on farm development works, reclamation works, use of remote sensing techniques for CAD works; water productivity: concepts and measures for enhancing water productivity; Farmers’ participation in command area development;
Practical
Preparation of command area development layout plan; Irrigation water requirement of crops; Preparation of irrigation schedules; Planning and layout of water conveyance system; design of surplus weir of tanks; determination of storage capacity of tanks; design of intake pipe and pump house.
Suggested Readings

SWE-231 Information Technology for Land and Water 3(2+1)
Theory
Concept of Information Technology (IT) and its application potential. Role of IT in natural resources management. Existing system of information generation and organizations involved in the field of land and water management. Application and production of multimedia. Internet application tools and web technology. Networking system of information. Problems and prospects of new information and communication technology. Development of database concept for effective natural resources management. Application of remote sensing, geographic information system (GIS) and GPS. Rational data base management system. Object oriented approaches. Information system, decision support systems and expert systems. Agricultural information management systems - use of mathematical models and programmes. Application of decision support systems, multi sensor data loggers and overview of software packages in natural resource management. Video-conferencing of scientific information.
Practical
Multimedia production. Internet applications: E-mail, voice mail, web tools and technologies. Handling and maintenance of new information technologies and exploiting their potentials. Exercises on database management using database and spreadsheet programmes. Usage of remote sensing, GIS and GPS survey in information generation and processing. Exercises on running computer software packages dealing with water balance, crop production, land development, land and water allocation, watershed analysis etc. Exercises on simple decision support and expert systems for
management of natural resources. Multimedia production using different softwares. Exercises on development of information system on selected theme(s). Video-conferencing of scientific information.

**Suggested Readings**


**SWE-232 Wasteland Development 3(2+1)**

**Theory**


**Suggested Readings**


Company
(P) Ltd., Delhi.
Virmani, S.M. (Ed.). 2010. Degraded and Wastelands of India: Status and Spatial Distribution. ICAR,
New Delhi.

BSH-243 MICROPROCESSORS & APPLICATIONS

Course category: Department Core (DC)
Pre-requisite Course: Digital Electronics & Circuits (EPE-12)
Contact hours/week: Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits: 5
Course Assessment Methods: Continuous assessment through tutorials, attendance, home assignments,
Midterm Examination, practical work, record, viva voce and Final Theory & Practical Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Acquired knowledge about Microprocessors and its need.
2. Ability to identify basic architecture of different Microprocessors.
3. Foster ability to write the programming using 8085 microprocessor.
4. Foster ability to understand the internal architecture and interfacing of different peripheral devices with 8085 Microprocessor.
5. Foster ability to write the programming using 8086 microprocessor.
6. Foster ability to understand the internal architecture and interfacing of different peripheral devices with 8086 Microprocessor.

Topics Covered
UNIT-I

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.
16-bit Microprocessors (8086/8088): Architecture, Physical address segmentation, memory organization, Bus cycle, Addressing modes, difference between 8086 and 8088, Introduction to 80186 and 80286, Assembly Language Programming of 8086/8088.

UNIT-III
Data Transfer Schemes: Introduction, Types of transmission, 8257 (DMA), 8255 (PPI), Serial Data transfer (USART 8251), Keyboard-display controller (8279), Programmable Priority Controller (8259) Programmable Interval Timer/Counter (8253/8254): Introduction, modes, Interfacing of 8253, applications. ADC and DAC

UNIT-IV
EXPERIMENTS

1. Write a program using 8085 Microprocessor for Decimal addition and subtraction of two Numbers.
2. Write a program using 8085 Microprocessor for Hexadecimal addition and subtraction of two Numbers.
3. Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers.
4. To perform multiplication and division of two 8 bit numbers using 8085.
5. To find the largest and smallest number in an array of data using 8085 instruction set.
6. To write a program to arrange an array of data in ascending order.
7. To convert given Hexadecimal number into its equivalent ASCII number and vice versa using 8085 instruction set.
8. To write a program to initiate 8251 and to check the transmission and reception of character.
9. To interface 8253 programmable interval timer to 8085 and verify the operation of 8253 in six different modes.
10. To interface DAC with 8085 to demonstrate the generation of square, saw tooth and triangular waveforms.
11. Serial communication between two 8085 microprocessors through RS-232 C port.

Books & References

3. R. S. Gaunkar: Microprocessor Architecture, Programming and Applications with 8085/8080, Penram Publication
BSH-127  FUNDAMENTALS OF ELECTRONICS ENGINEERING

Course category : Engineering Fundamentals (EF)
Pre-requisite Course : NIL
Contact hours/week : Lecture : 3, Tutorial : 1, Practical: 2
Number of Credits : 5
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, Midterm Examination, practical work, record, viva voce and Final Theory & Practical Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Able to identify schematic symbols and understand the working principles of electronic devices, e.g., Diode, Zener Diode, LED, BJT, JFET and MOSFET etc.
2. Able to understand the working principles of electronic circuits e.g. Rectifiers, Clipper, Clamper, Filters, Amplifiers and Operational Amplifiers etc. also understand methods to analyse and characterize these circuits
3. Able to understand the functioning and purposes of Power Supplies, Test and Measuring equipments such as multimeters, CROs and function generators etc.
4. Able to rig up and test small electronics circuits.

Topics Covered
UNIT I
Semiconductor materials and properties: electron-hole concepts, Basic concepts of energy bands in materials, concept of forbidden gap, Intrinsic and extrinsic semiconductors, donors and acceptors impurities, Junction diode, p-n junction, depletion layer, v-i characteristics, diode resistance, capacitance, diode ratings (average current, repetitive peak current, non-repetitive current, peak inverse voltage). Diode Applications in rectifier, filters, voltage multipliers, load regulators, clipper and clamper circuits, Breakdown mechanism (Zener and avalanche), breakdown characteristics, Zener resistance, Zener diode ratings, Zener diode application as shunt regulator

UNIT II
Transistors (BJT and FET): Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, Biasing of transistors-fixed bias, emitter bias, potential divider bias, comparison of biasing circuits. Transistor Amplifier: Graphical analysis of CE amplifier, concept of voltage gain, current gain, h-parameter model (low frequency), computation of Ai, Av, Ri, Ro of single transistor CE and CC amplifier configurations.
Field Effect Transistors (JFET and MOSFET): Basic construction, transistor action, concept of pinch off, maximum drain saturation current, input and transfer characteristics, characteristic equation CG, CS and CD configurations, fixed & self-biasing.
MOSFET: depletion and enhancement type MOSFET-construction, operation and characteristics. Computation of Av, Ri, Ro, of single FET amplifiers using all the three configurations

UNIT III
Switching theory and logic design: Number systems, conversion of bases, Boolean algebra, logic gates, concept of universal gate, canonical forms, Minimization using K-map
Operational Amplifiers
Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and unity gain amplifiers, adders, difference amplifiers, integrators
UNIT-IV

Electronics Instruments: Working principle of digital voltmeter, digital multimeter (block diagram approach), CRO (its working with block diagram), measurement of voltage, current, phase and frequency using CRO

EXPERIMENTS

Note: Minimum Eight experiments are to be performed
1. To Plot the forward/Reverse Characteristics of SiP-N junction diode.
2. To Plot the forward/Reverse Characteristics of Zener diode
3. Study and plot the characteristic of Zener diode as voltage regulator
4. Study of half wave rectifier and draw the nature of input / output signal. Calculate the value of Idc, Irms and ripple factor.
5. Study of Full wave rectifier and draw the nature of input / output signal. Calculate the value of Idc, Irms and ripple factor.
6. Study of Bridge Rectifier and draw the nature of input / output signal. Calculate the value of Idc, Irms and ripple factor.
7. Draw input output characteristic curve of fn-p-n transistor in CE configuration
8. Draw input output characteristic curve of fn-p-n transistor in CB configuration
9. Draw the drain and transfer curve of JFET
10. Study of OP-AMP (741) and calculate the gain in (i) Inverting mode and (ii) Non inverting mode
11. Study of OP-AMP as a (i) Summer (ii) Integrator (iii) Differentiator; and plot the nature of input & output waveform

12. Study of CRO and multi-meter measurement voltage, frequency, phase difference using CRO along with the testing of electronics component

Books & References
1. Electronic Devices and Circuits-Boylestad and Nashelsky, 6e, PHI, 2001
2. Electronic Devices and Circuits, A Mottershead, PHI,2000, 6e

BSH-352 DIGITAL SIGNAL PROCESSING

Course category : Department Core (DC)
Pre-requisite Course : Signals and Systems (EPE-13)
Contact hours/week : Lecture : 3, Tutorial : 1, Practical: 0
Number of Credits : 4
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, Midterm Examination, record, viva voce and Final Theory Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
1. Able to analyze signals using the discrete Fourier transform (DFT).
2. Understand circular convolution, its relationship to linear convolution, and how circular convolution can be achieved via the discrete Fourier transform.
3. Able to understand the decimation in time and frequency FFT algorithms for efficient computation of the DFT.
4. Able to design digital filters on paper and implement the design by using MATLAB.
5. Able to design a digital FIR filter using Window method.
6. Able to implement digital filters in a variety of forms: Direct form I & II, Parallel, Cascade and lattice structure.

Topics Covered

UNIT-I
Realization of Digital Systems: Introduction, direct form realization of IIR systems, cascade realization of an IIR systems, parallel form realization of an IIR systems, Ladder structures: continued fraction expansion of $H(z)$, example of continued fraction, realization of a ladder structure, example of a ladder realization.

UNIT-II

UNIT-III

UNIT-IV
Discrete Fourier Transforms: Definitions, Properties of the DFT, Circular Convolution, Linear Convolution

Books & References
2. Oppenheim & Schafer, “Digital Signal Processing” PHI

CSE-366 SEMINAR

Course category: Audit Course (AC)
Pre-requisite Course: NIL
Contact hours/week: Lecture: 0, Tutorial: 0, Practical: 6
Number of Credits: 3
Course Assessment: Continuous assessment through quality of material, presentation, methods quality & extent of external response of question asked and participation in other seminars (attendance)
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
1. To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions.
2. Students will demonstrate the ability to distinguish opinions and beliefs from researched claims and evidence and recognize that kinds of evidence will vary from Course to Course.
3. Students will demonstrate the ability to evaluate, credit, and synthesize sources.
CSE-474  INDUSTRIAL / PRACTICAL TRAINING

<table>
<thead>
<tr>
<th>Course category</th>
<th>Audit Course (AC)</th>
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</thead>
<tbody>
<tr>
<td>Pre-requisite Course</td>
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</tr>
<tr>
<td>Contact hours/week</td>
<td>Lecture : 0, Tutorial : 0 , Practical: 2</td>
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<td>Number of Credits</td>
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<tr>
<td>Course Assessment methods</td>
<td>Continuous assessment through technical quality of the work, attendance, discipline, involvement and interest, project work, viva voce, project report and presentation</td>
</tr>
<tr>
<td>Course Outcomes</td>
<td>The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this Course.</td>
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</table>

1. The main objective of the Industrial Training is to experience and understand real life situations in industrial organizations and their related environments and accelerating the learning process of how student's knowledge could be used in a realistic way.

2. In addition to that, industrial training also makes one understand the formal and informal relationships in an industrial organization so as to promote favourable human relations and teamwork. Besides, it provides the exposure to practice and apply the acquired knowledge “hands-on” in the working environment.

3. Industrial training also provides a systematic introduction to the ways of industry and developing talent and attitudes, so that one can understand how Human Resource Development works. Moreover, students can gain hands-on experience that is related to the student understanding so that the student can relate to and widen the skills that have been learnt while being in university. Industrial training also exposes the students to the real career world and accustoms them to an organizational structure, business operation and administrative functions.

4. Furthermore, students implement what they have learned and learn more throughout this training. Besides, students can also gain experience to select the optimal solution in handling a situation. During industrial training students can learn the accepted safety practices in the industry.

5. Students can also develop a sense of responsibility towards society

List of Suggested Open Electives

For Interdisciplinary Courses offered by Other Departments

MECHANICAL ENGINEERING

MOE-481  FUNDAMENTALS OF MECHANICAL ENGINEERING

<table>
<thead>
<tr>
<th>Course category</th>
<th>Open Elective Courses</th>
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</thead>
<tbody>
<tr>
<td>Pre-requisite Course</td>
<td>NIL</td>
</tr>
<tr>
<td>Contact hours/week</td>
<td>Lecture : 3, Tutorial : 1 , Practical: 0</td>
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<td>Number of Credits</td>
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<td>Course Assessment methods</td>
<td>Continuous assessment through tutorials, attendance, home assignments, midterm examination, record, viva voce and Final Examination</td>
</tr>
<tr>
<td>Course Outcomes</td>
<td>The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course</td>
</tr>
</tbody>
</table>
**Topic Covered**

**UNIT-I**

**Thermodynamics**
First and second law of thermodynamics, statements of Second Law of Thermodynamics and their equivalence, Third law of thermodynamics, Steam properties, Steam processes at constant pressure, volume, enthalpy and entropy, Classification of steam boilers, Efficiency and performance analysis, Refrigeration, Vapour compression and vapour absorption cycles, Coefficient of performance (COP), Refrigerant properties

**Reciprocating Machines**
Steam engines, hypothetical and actual indicator diagrams, Carnot cycle, Otto and Diesel cycles, Working of two and four strokes petrol and diesel IC engines.

**UNIT-II**

**Measurement & Metrology**
Introduction to measurement and measuring instruments, Types of sensors, Types of transducers and their characteristics, Measurement error and uncertainty analysis, Temperature, pressure, velocity, flow, strain, force and torque measurement, Measurement by dial gauges, slip gauges and sine bar

**Engineering Materials**
Classification, Ferrous and non ferrous metals, Composition of cast iron and carbon steel, mechanical properties, alloy steel and mechanical properties, Non-ferrous metals such as Cu, Al, Zn, Cr, Ni etc. and its applications.

**UNIT-III**

**Simple Stress and Strain**
Introduction, Normal and shear stresses, Poisson’s ratio, Elastic constants and their relationships, Generalized Hooke’s law, Deflection of bars of uniform and varying cross-sections, Strain energy in members due to static loading, Statically determinate problems, Stress-strain diagrams for ductile and brittle materials

**Mechanical Properties and Testing**
Toughness, Hardness, Fracture, Fatigue and Creep, Strength and deformation testing, Bend/rebend testing, Hardness testing, Impact testing, Fatigue testing and creep testing, spring stiffness testing

**UNIT-IV**

**Beams**
Introduction, Types of supports, Beams classification, Free body diagram, Shear force and bending moment, Analysis of beams, Continuous loading and discontinuous loading, Shear force and bending moment diagrams for statically determinate beams

Pure Bending of beams
Introduction, Assumptions, Simple bending Final, Stress of beams of different cross sections

Torsion of Circular shafts
Introduction, Torsion of circular shafts, Shear stress due to torsion, Polar modulus, Power transmission

**Books & References**

2. Applied Thermodynamics-Onkar Singh (New Age International)
3. Elements of Materials science and Engineering-Van Vlash (Jhon Wiley & Sons)
4. Material Science-V. Raghvan (Prentice Hall India Limited)
6. Mechanical Measurement – Sirohi (New Age Publications)
MOE-482 MANUFACTURING PROCESSES

Course category : Open Elective Courses
Pre-requisite Course : NIL
Contact hours/week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4
Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, midterm examination and Final Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. The students will be able to understand the basic manufacturing processes and different types of mechanical properties of ferrous, non-ferrous metals and alloys.
2. The basic knowledge of different forming and casting processes and foundry tools used for the manufacturing of different products.
3. The knowledge of different machine tools and machining processes, welding processes and their applications.
4. The knowledge of sheet metal processes and their applications, powder metallurgy process, basic heat treatment processes, nonmetallic materials and features of manufacturing establishment

Topics Covered
UNIT-I
Introduction
Introduction and importance of Manufacturing processes, classification and overview of Manufacturing processes.
Mechanical Properties of Materials
Strength, elasticity, plasticity, stiffness, malleability, ductility, brittleness, malleability, toughness, hardness, resilience, hardness, machine ability, formability, weldability, Elementary ideas of fracture, fatigue & creep.
Steels and Cast Irons
Carbon steels, their classification based on percentage of carbon as low, mild, medium & high carbon steel, their properties & applications. Wrought iron, Cast iron. Alloy steels: stainless steel, tool steel.
Alloys of Non Ferrous Metals
Common uses of various non-ferrous metals (Copper, Zink, Tin, Magnesium, Lead, Aluminum etc.) & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys.

UNIT-II
Forming Processes
Hot-working & cold-working. Basic metal forming operations & uses of such as: Forging, Rolling, Wire & Tube drawing and Extrusion, and their uses.
Press-work: Die & Punch assembly, cutting and forming, its applications.
Casting

UNIT-III
Machining
Lathe-machine: principle, types, main parts, specifications and operations performed on it., Basic description of machines and operations of Shaper-Planer, Drilling, Milling & Grinding.
Welding
UNIT-IV

Sheet Metal Work
Tools and equipments used in sheet metal work, metals used for sheets, standard specification for sheets, Types of sheet metal operations: shearing, drawing, bending

Powder Metallurgy
Introduction of powder metallurgy process: powder production, blending, compaction, Sintering

Heat Treatment Processes

Non-Metallic Materials
Common types & uses of Wood, Cement-concrete, Ceramics, Rubber, Plastics and Composite-materials

Manufacturing Establishment

Books & References

1. Workshop Technology Vol-I-B. S. Raghubanshi (Dhanpat Rai and Sons)
2. Workshop Technology Vol-II-B. S. Raghubanshi (Dhanpat Rai and Sons)
3. Production Technology - R.K. Jain (Khanna publication
5. Manufacturing Science -Ghosh and Mallik (EWP)
6. Manufacturing processes – Santosh Bhatnagar (B S publication)
7. Production Technology – P. C. Sharma (S. Chand)
10. Manufacturing Engineering & Technology- Kalpakjian (Pearson)

MOE-483 ENGINEERING MATERIAL

Course Category: Open Elective Courses
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits: 4
Course Assessment: Continuous assessment through tutorials, attendance, home assignments and Final Examination

Course Outcomes:
The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. The importance of numerous materials with their basic concepts including crystallography and imperfections.
2. The understanding about the advanced materials testing by different mechanical testing methods such as strength testing, hardness, fatigue, NDT, etc.
3. Different surface behavior studies of engineering materials including heat treatment processes, TTT diagram and other related processes.
4. Different concepts regarding materials and electrical, magnetic, electronic, etc. properties.
### Topics Covered

**UNIT-I**

**Introduction**
Importance of materials, Brief review of modern & atomic concepts in Physics and Chemistry, Atomic models

**Crystalline nature of solids**
Crystal system unit cell space lattice, Bravais lattices, common crystal structures, Atomic packing factor and density. Miller indices, Imperfections, Defects & Dislocations in solids

**UNIT-II**

**Ferrous & Non-ferrous material**
Various types of carbon steels, alloy steels and cast irons, its properties, uses and applications, Heat Treatment: Various types of heat treatment processes such as Annealing, Normalizing, Quenching, Tempering, and various case hardening processes. Time Temperature Transformation (TTT) diagrams. Diffusion: Diffusion of Solids, Fick's I and II law.

**Non-Ferrous metals and alloys**
Non-ferrous metals such as Cu, Al, Zn, Cr, Ni etc. and its applications

**UNIT-III**

**Dielectric & Magnetic properties**
Dielectric Materials and their applications, Concept of magnetism- Dia, para, ferro magnetic materials, Hysteresis, Soft and hard magnetic materials, Magnetic Storages

**Electronic Properties**
Energy band, concept of conductor, insulator and semi conductor. Intrinsic and extrinsic semi conductors, P-n junction and transistors, Basic devices and their applications. Bragg’s law, Messier effect. Type I & II superconductors. High Temp. superconductors. Brief description of other material such as optical and thermal materials, Composite Materials and its uses, Smart materials & Nano-materials and their potential applications

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**COE-483 INTRODUCTION TO WEB TECHNOLOGY**

**Course Category**: Open Elective Courses

**Pre-requisite Course**: NIL

**Contact Hours/Week**: Lecture : 3, Tutorial : 1, Practical: 0

**Number of Credits**: 4

**Course Assessment**
Continuous assessment through tutorials, attendance, home assignments, Final Examination

**Course Outcomes**: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

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**Topics Covered**

**UNIT-I**


**UNIT-II**

UNIT-III
**Scripting:** 8 Java script: Introduction, documents, forms, statements, functions, objects; introduction to AJAX, VB Script, Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API.

UNIT-IV
**Server Site Programming:** 8. Introduction to active server pages (ASP), Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, Sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, development of java beans in JSP, Introduction to Servelets, Lifecycle, JSDK, Servlet API, Servlet Packages, Introduction to COM/DCOM/CORBA.

UNIT-V
**PHP (Hypertext Preprocessor):** 8 Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, mail, file upload, session, error, exception, filter, PHP-ODBC.

**Text books:**
1. Burdman, Jessica, “Collaborative Web Development” Addison Wesley
3. Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication
4. Bhave, “Programming with Java”, Pearson Education
7. Margaret Levine Young, “The Complete Reference Internet”, TMH

**References:**
1. Ramesh Bangia, “Internet and Web Design”, New Age International
2. Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication
3. Deitel, “Java for programmers”, Pearson Education
5. Joel Sklar , “Principal of web Design” Vikash and Thomas Learning
6. Horstmann, “CoreJava”, Addison Wesley

ECTRONICS AND COMMUNICATION ENGINEERING

EOE-481 NON-CONVENTIONAL ENERGY RESOURCES

**Course Category:** Open Elective Courses

**Pre-requisite Course:** NIL

**Contact Hours/Week:** Lecture : 3, Tutorial : 1, Practical: 0

**Number of Credits:** 4

**Course Assessment Methods:** Continuous assessment through tutorials, attendance, home assignments, Final Examination

**Course Outcomes:** The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

UNIT-I

**Introduction**

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

UNIT-II


UNIT-III

Geothermal Energy: Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations.


UNIT-IV

Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations.

Wind Energy: Wind power and its sources, site selection, criterion, momentum Final, 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 Final.


Text/References Books:


EOE-482  INDUSTRIAL ELECTRONICS
Course Category: Open Elective Courses
Pre-requisite Course: NIL
Contact Hours/Week: Lecture : 3, Tutorial : 1, Practical: 0
Number of Credits: 4
Course Assessment Methods: Continuous assessment through tutorials, attendance, home assignments, Final Examination

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

Thyristor Commutation Techniques

Natural Commutation, Forced Commutation, Self Commutation, Impulse Commutation, resonant pulse commutation, complementary commutation, External Pulse commutation, Load side commutation, line side commutation.

Controlled rectifiers

Introduction, principle of phase controlled converter operation, single-phase semiconverters, single phase full converters, single phase dual converters, single—phase series converters, three phase half wave converters three phase semiconverters, three phase full converters, three phase dual converters.

AC Voltage Controllers

Introduction, principle of on—of control, principle of phase control, single-phase bidirectional controllers A S with resistive loads, single phase controllers with Inductive loads. Three phase half wave controllers, three phase full wave controllers, three phase bi—directional delta connected controllers, single phase transformer tap changers, cycloconverters, single phase cycloconverters, three phase cycloconverters, reduction of output harmonics.

DC Choppers


Inverters

Introduction, principle of operation, performance parameters, single phase bridge Inverters, three phase inverters, voltage control of three phase inverter, Harmonic Reductions.

Suggested Text Books & References

- Rasid , "Power Electronics", Prentice Hall
- Dubey, G.K., "Thermistor Engineering", Prentice Hall

EOE-483 PRODUCT DEVELOPMENT

Course Category : Open Elective Courses
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 0
Number of Credits : 4
Course Assessment Methods : Continuous assessment through tutorials, attendance, home assignments, Final Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

UNIT-1

Concept of Product, definition and scope. Design definitions, old and new design methods, design by evolution, examples such as evolution of sewing M/C, bicycle, safety razor etc., need based developments, technology based developments physical reliability & economic feasibility of design concepts.

UNIT-II

Murphology of design, divergent, transformation and convergent phases of product design, identification of need. Analysis of need. Design criteria; functional, aesthetics, ergonomics, form, shape, size, colour. Mental blocks, Removal blocs, Ideation techniques, Creativity, Check list.
UNIT – III
Transformations, Brainstorming& Synetics, Morephological techniques. Utility Concept, Utility Valaue, Utility Index, Decision making under Multiple Criteria. Economic aspects, Fixed and variable costs, Break- even analysis.

UNIT- IV

UNIT- V
Existing techniques, such as work- study, SQC etc. for improving method & quality of product. Innovation versus Invention. Technological Forecasting. Use of Standards for Design.

Text/Reference Books:
1. A.K. Chitab& R.C. Gupta “Product design & Manufacturing” – Prentice Hall (EE)

BOE-481 ENTREPRENEURSHIP DEVELOPMENT
Course Category : Open Elective Courses
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits : 4
Course Assessment Methods : Continuous assessment through tutorials, attendance, home assignments, Final Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

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. 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. Role of various national and state agencies which render assistance to small scale industries.

Text / Reference Books:


BOE-482 ENTERPRISE RESOURCE PLANNING
Course Category : Open Elective Courses
Pre-requisite Course : NIL
Contact Hours/Week : Lecture : 3, Tutorial : 1, Practical: 0
Number of Credits : 4
Course Assessment Methods : Continuous assessment through tutorials, attendance, home assignments, Final Examination
Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

Unit I
Manufacturing Industry-Management Characteristics and Information Requirements
Industry classification, Product/Market/process Characteristics, Manufacturing planning and control techniques, ERP Concept & Evaluation History: MRP-I, MRP-II, EPR. Information Technology Advancement: Client server technology, RDBMS.

Unit II
Sales, Purchase & Inventory Control, Concepts
Classification/coding of material & finished goods, sales enquire, quotation, order, invoicing, delivery, finished good valuation, purchase requisition, enquiry, supplier quotation, purchase order, Material receipts, Material issues, methods of issue valuation (FIFO/LIFO/Weighted Average Cost/Std. Cost ), Returns from operations, Returns of supplier, Stock Adjustments, Physical Stock verification, ABC analysis. Lot and Locations control, Replenishment order control (safety stocks, report point, economic order quantity)

Manufacturing
Product configuration, Bill of material, Master Production Scheduling, Material Requirement planning, capacity Requirement Planning, Loading and Scheduling. An over view of man power planning and customer manufacturing planning.

Unit III
Financial and Cost Accounting
Basic accounting principles, Day book-Cash, Bank, Journal, Purchase and Sales. Ledger-General, Supplier, Customer, Advances, etc. Bank Reconciliation, Trial Balance, Profit & Loss/Income & Expenditure account and Balance Unit IV
Introduction to A Typical ERP Software
Overview of ERP modules and tools of a software like BaaN.

Unit V
Distribution Module
Module architecture—an overview, item data, Purchase ordering/control, Sales ordering/control, Replenishment order control, Electronic Data Interchange.

Manufacturing Module
Module architecture—an overview, Capacity Requirement, Planning, Engineering change control, Engineering data Management, Master Production Scheduling Material requirement Planning, Product Classification/configuration, Production Planning/control, Repetitive Manufacturing.

Finance Module
Module architecture—an overview, Accounts payable, Accounts receivable, General ledger, Cost allocation, Cash management, Activity based costing, fixed assets, Financial budgeting system.

Suggested Text Books and References

BOE-483 E-COMMERCE & IT
Course Category: Open Elective Courses
Pre-requisite Course: NIL
Contact Hours/Week: Lecture: 3, Tutorial: 1, Practical: 0
Number of Credits: 4
Course Assessment: Continuous assessment through tutorials, attendance, home assignments, Final Examination
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

Topic Covered
UNIT I
Introduction

UNIT-II
Mobile Commerce

UNIT-III
Encryption
World Wide Web & Security, Encryption, Transaction security, Secret Key Encryption,
Public Key Encryption, Virtual Private Network (VPN), Implementation Management Issues.
UNIT-IV

Electronic Payments

Overview of Electronics payments, Digital Token Based Electronics payment System, Smart Cards, Credit 1 Debit Card based EPS, Emerging Financial Instruments, Home Banking online Banking.

Reference books:


1. Respective”, Pearson education 2006


AOE-481 : Photovoltaic Technology and Systems 3(2+1)

Theory


Practical

Study of V-I characteristics of solar PV system, smart grid technology and application, manufacturing technique of solar array, different DC to DC and DC to AC converter, domestic solar lighting system, various solar module technologies, safe measurement of PV modules electrical characteristics and Commissioning of complete solar PV system.

Suggested Readings

Derrick, Francis and Bokalders, Solar Photo-voltaic Products.
AOE-482: Remote Sensing and GIS Applications 3(2+1)

Theory
Basic component of remote sensing (RS), advantages and limitations of RS, possible use of RS techniques in assessment and monitoring of land and water resources; electromagnetic spectrum, energy interactions in the atmosphere and with the Earth’s surface; major atmospheric windows; principal applications of different wavelength regions; typical spectral reflectance curve for vegetation, soil and water; spectral signatures; different types of sensors and platforms; contrast ratio and possible causes of low contrast; aerial photography; types of aerial photographs, scale of aerial photographs, planning aerial photography - end lap and side lap; stereoscopic vision, requirements of stereoscopic photographs; air-photo interpretation- interpretation elements; photogrammetry-measurements on a single vertical aerial photograph, measurements on a stereo-pair- vertical measurements by the parallax method; ground control for aerial photography; satellite remote sensing, multispectral scanner- whiskbroom and push-broom scanner; different types of resolutions; analysis of digital data- image restoration; image enhancement; information extraction, image classification, unsupervised classification, supervised classification, important consideration in the identification of training areas, vegetation indices; microwave remote sensing. GI Sand basic components, different sources of spatial data, basic spatial entities, major components of spatial data, Basic classes of map projections and their properties, Methods of data input into GIS, Data editing, spatial data models and structures, Attribute data management, integrating data (map overlay) in GIS, Application of remote sensing and GIS for the management of land and water resources.

Practical
Familiarization with remote sensing and GIS hardware; use of software for image interpretation; interpretation of aerial photographs and satellite imagery; basic GIS operations such as image display; study of various features of GIS software package; scanning, digitization of maps and data editing; data base query and map algebra. GIS supported case studies in water resources management.

Suggested Readings

AOE-483: Human Engineering and Safety 3(2+1)

Theory
Human factors in system development – concept of systems; basic processes in system development, performance reliability, human performance. Information input process, visual displays, major types and use of displays, auditory and factual displays. Speech communications. Biomechanics of motion, types of movements, Range of movements, strength and endurance, speed and accuracy, human control of systems. Human motor activities, controls, tools and related devices. Anthropometry: arrangement and utilization of work space, atmospheric conditions, heat exchange process and performance, air pollution. Dangerous machine (Regulation) act, Rehabilitation and compensation to accident victims, Safety gadgets for spraying, threshing, Chaff cutting and tractor & trailer operation etc.
Practical
Calibration of the subject in the laboratory using bi-cycle ergo-meter. Study and calibration of the subject in the laboratory using mechanical treadmill; Use of respiration gas meter from human energy point of view. Use of Heart Rate Monitor. Study of general fatigue of the subject using Blink ratio method, Familiarization with electro-myograph equipment, anthropometric measurements of a selected subjects. Optimum work space layout and locations of controls for different tractors. Familiarization with the noise and vibration equipment. Familiarization with safety gadgets for various farm machines.
Suggested Readings