### Scheme of Instruction and Evaluation

I Semester of 4-Year B.Tech. Degree Programme

#### Information Technology

<table>
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<tr>
<th>S. No.</th>
<th>Course Category</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Periods</th>
<th>Credits (C)</th>
<th>Evaluation Scheme</th>
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**Note:**
- L = Lectures; T = Tutorials; P = Practicals; CIE = Continuous Internal Evaluation; TA = Teachers Assessment; MSE = Mid Semester Examination; ESE = End Semester Examination; EAA = Extra Academic Activity; # indicates Mandatory Course
- Student Contact Hours/Week: Stream-I = 33 (periods/week); Stream-II = 35 (periods/week)
- Total Credits (C): Stream-I = 28 Credits; Stream-II = 30 Credits
U14MH101  ENGINEERING MATHEMATICS- I

Class: B.Tech. I-Semester  Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:
Continuous Internal Evaluation  40 marks
End Semester Examination  60 marks

Course Learning Objectives (LO):

LO1: To enable the student to acquire fundamental knowledge of mathematical concepts and mathematical methods and apply in engineering disciplines.

LO2: To introduce the basic concepts such as convergence and divergence of series, tests for convergence of series; limit, continuity, differentiability of a function, mean value theorems, expansion of a function in series.

LO3: To introduce the concept of partial differentiation and total differentiation, and maxima & minima of functions of two/several variables.

LO4: To introduce the concept of double integral and triple integral.

LO5: To introduce differential equations of first order along with simple applications.

UNIT - I (9+3)

Infinite Series:
Sequences & Series, General properties of series, Series of positive terms, Comparison test, Limit comparison test, Integral test, D’Alembert’s Ratio test, Cauchy’s nth root test; Alternating series-absolute convergence.

Differential Calculus (Functions of One variable):
Limits, Continuity, Differentiability, Rolle’s theorem (Physical and algebraic interpretations), Lagrange’s mean value theorem (Geometrical interpretation), Cauchy’s mean value theorem. Taylor’s theorem and Power series representation of functions, Maclaurin’s series, Asymptotes and Tracing of Simple Curves.

UNIT - II (9+3)

Differential Calculus (Functions of Several variables):
Partial differentiation, Total differentiation, Change of variables, Jacobians, Application to find Tangent plane and Normal to a surface. Taylor’s theorem for function of two variables (without proof), Maximum and minimum values of functions of two variables. Lagrange’s method of undetermined multipliers. Differentiation under integral sign.

UNIT - III (9+3)

Multiple Integrals and Applications:
Double integral, Change of order of integration, Double integration in polar coordinates, Triple integrals, Applications: Area enclosed by plane curves, Volumes of solids, Calculation of mass, Center of gravity, Moment of Inertia of plane lamina.
Beta and Gama functions and their relations. Evaluation of improper integrals in terms of Beta and Gamma functions.

UNIT - IV (9+3)

Differential Equations of first order:
Practical approach to differential equations. Formation and solution of differential equation. Solution of first order and first degree differential equation, variables separable form, homogeneous form, reducible to homogeneous form, First order linear equations, Equations
reducible to linear equation (Bernoulli’s equation), Exact differential equations, Equations reducible to exact form.

**Applications of first order differential equations:** Simple examples of Physical applications (Orthogonal trajectories, RL series circuit problem)

**Text Books:**

**Reference Books:**

<table>
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<th>Course Learning Outcomes (CO):</th>
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<tr>
<td>After completion of the course, the student will be able to</td>
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<tr>
<td>CO1: test the convergence/divergence of a given series by Comparison test, Limit comparison test, Integral test, D’Alembert’s Ratio test, Cauchy’s nth root test</td>
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<td>CO2: understand the basic concepts of limit, continuity, differentiability of a function, and will be able to expand a given function in series</td>
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<td>CO3: trace a given curve</td>
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<td>CO4: apply the technique of differentiation under integral sign to solve an integral</td>
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<td>CO5: find maxima &amp; minima of functions of two/several variables</td>
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<td>CO6: find double integral and triple integral and apply them to find moment of inertia, centre of gravity of plane lamina</td>
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<td>CO7: understand Beta and Gama functions and their relations and evaluate an improper integral in terms of Beta and Gamma functions</td>
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<td>CO8: solve a given differential equations of first order and understand the application of differential equations of first order</td>
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U14CS102  PROGRAMMING IN C

Class: B.Tech. I-Semester  Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

LO1: To expose the students to the concepts of problem solving using structured programming language
LO2: To improve students capability in applying logical skills in problem solving
LO3: To improve students expertise in C Programming concepts.
LO4: To make students capable of using memory management techniques like pointers, files, dynamic memory allocation in C programming

UNIT-I (9+3)

Introduction:
Definition of a computer, Types of computers, Operating system functions, Computer languages, Problem solving and Program development steps, Algorithm, Flowchart.

C Language Preliminaries:
History, Character set, Identifiers, Keywords, Data types, Variable declarations, Expressions, Symbolic constants, Input-Output statements. Operators: Arithmetic, Relational, Increment, Decrement, Conditional, Logical, Bit-wise and Special operators.

UNIT-II (9+3)

Flow Control Statements: Simple if, If-Else, Nested-if, Else-If ladder, Switch and Goto.
Iterative Statements: While, Do-While and For statements, Nested loops, Break, Continue.
Arrays: One dimensional, Two dimensional arrays. Linear search, Binary search, Bubble sort.

UNIT - III (9+3)

Functions: Definition, Function prototypes, Types of arguments, Parameter passing mechanisms, Recursion, Storage classes.
Strings: Operations on strings, String-Handling functions.
Structures and Unions: Definition, Declaration of structure and union variables, Memory allocation, Nested structures, Array of structures

UNIT - IV (9+3)

Pointers: Pointer declaration, pointers arithmetic, Pointer to arrays, Array of pointers, Pointer to strings, Pointer to function, and Pointer to Structures, Dynamic memory allocation.
Files: File operations, File handling functions, Random access files

Text Books:
Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: know the fundamentals of computers
CO2: understand applying logical skills for problem solving
CO3: learn C programming language concepts
CO4: apply C programming language concepts for problem solving
CO5: gain knowledge in using memory management techniques in C programming
CO6: develop modular programming using functions
U14PH103  ENGINEERING PHYSICS

Class:  B.Tech. I-Semester  Branch:  Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

LO1:  To make the bridge between physics in intermediate level and its applications in engineering by giving proper inputs

LO2:  To introduce the basic concepts of all types of oscillations with illustrations by mechanical examples. To introduce the basic concepts of coherence and polarized nature (interference, diffraction & polarization) of light waves and their applications

LO3:  To introduce and explore the knowledge of high frequency sound waves & their application in different fields

LO4:  To introduce the basic concepts of modern physics by introducing the fundamental elements of quantum mechanics, which are essential to understand the mechanics of microscopic particles

LO5:  To introduce the basic concepts of modern science like Photonics (lasers, Fiber optics, etc.), modern materials (magnetic materials, superconductors, nano material etc.)

UNIT - I (9+3)


UNIT - II (9+3)

Diffraction: Fraunhofer diffraction at a single slit, measurement of slit width – Fraunhofer diffraction at a circular aperture – Rayleigh’s criterion for resolution - Diffraction grating (Qualitative) – Experimental determination of wavelength using a plane transmission grating – Dispersion and Resolving power of a grating.


UNIT - III (9+3)


UNIT - IV (9+3)

Elements of Quantum Mechanics: De-Broglie concept of matter waves – De-Broglie wavelength, Properties of matter waves – Schrodinger’s wave equation – Time independent wave equation (one dimension), Particle in a box (one dimension), energy quantization, Wave functions.


Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to

CO1: understand the basic concepts of physics for its applications to Engineering

CO2: understand the basic principles of oscillations that can be applied to all types of oscillatory phenomena like acoustic, mechanical, electromagnetic, atomic, nuclear etc.

CO3: appreciate the knowledge acquired in studying interference, diffraction and polarization in the application of thickness measurement of thin films, refractive indices and wavelength determinations using interferometric techniques, fringe pattern etc.

CO4: appreciate the knowledge gained in studying ultrasonics and their multi dimensional applications in various fields like industrial, engineering (like NDT etc..) and medical etc.

CO5: understand the fundamental principles and applications of lasers and Optical fibers

CO6: exposed to various material properties which are used in engineering applications and devices
ENGINEERING CHEMISTRY

Class: B.Tech. I-Semester

Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

- Continuous Internal Evaluation: 40 marks
- End Semester Examination: 60 marks

Course Learning Objectives (LO):

LO1: To understand the fundamental principles and applications of chemistry
LO2: To identify the significance of electro chemistry
LO3: To introduce and explore the knowledge of corrosion and its prevention
LO4: To impart and inculcate proper understandings of energy sources, phase rule, organic and polymer chemistry
LO5: To acquire the techniques of water analysis and treatment
LO6: To understand the role of chemistry in the field of engineering

UNIT - I (9+3)

Electrochemistry:
Specific and equivalent conductance, Conductometric titrations, Electrode potential, Nernst equation, Electrochemical series, Reference electrodes: Calomel electrode, Ag/AgCl electrode, Ion-selective electrode: glass electrode, Determination of pH using Glass, Quinhydrone and Hydrogen electrodes, Potentiometric titrations, Commercial cells: Hydrogen-Oxygen fuel cell, Lead-acid storage cell.

UNIT - II (9+3)

Corrosion:

Phase Rule:
Description of the terms: 'Phase', 'Component' and 'Degrees of freedom'. Gibbs Phase rule equation. Application of the phase rule to one-component system (Water system) and two-component system (silver-lead system).

Energy Sources:
Characteristics of fuels for internal combustion (IC) engines, Knocking, Octane number. Unleaded petrol, Cetane number, Power alcohol, Compressed Natural gas (CNG), Liquified petroleum gas (LPG).

UNIT - III (9+3)

Introduction to Methods of Chemical Analysis:
Water Analysis and Treatment:
Hardness of Water, determination of hardness of water by using EDTA, determination of Alkalinity, determination of Chloride by argentometry, determination of Fluoride by spectrophotometry, determination of Dissolved Oxygen, Biochemical Oxygen Demand and Chemical Oxygen Demand, Softening of water by Zeolite process and Ion-exchange process, Reverse Osmosis, Electrodialysis.

UNIT - IV (9+3)

Organic Chemistry:
Fission of a covalent bond, Types of electron effects: Inductive effect, Mesomeric effect and Hyperconjugation, Reaction intermediates and their stabilities, Types of reagents: Electrophilic, Nucleophilic and Free radical reagents. Study of the mechanisms of substitution (SN1 and SN2) and Addition (Electrophilic, Nucleophilic and Free radical) reactions, Role of inductive effect, mesomeric effect and hybridazation on the dissociation constant of carboxylic acids.

Polymers:
Introduction : Types of Polymerization reactions (Addition and Condensations), Mechanism of free radical, cationic and anionic addition polymerization, Condensation polymerization, Thermo setting and thermo plastic resins, Silicone rubber, Conducting polymers, Laminated plastics.

Text Books:

Reference Books:
2. Suba Ramesh, Vairam et. al “Engineering Chemistry”, Wiley India.

Course Learning Outcomes (CO):
After completion of the course, the student will be able to

CO1: understand basic principles and role of chemistry in the field of engineering
CO2: gain the knowledge of interrelationship between electrical and chemical energy
CO3: make a judicious selection of materials in the field of engineering
CO4: understand the phase rule and its application in the study of material science
CO5: understand the methods of chemical analysis of water and its treatment
CO6: know the synthetic methods and versatile applications of polymers
CO7: understand the advantage of spectrometric methods of chemical analysis over the conventional methods
U14MH104  ENGLISH FOR COMMUNICATION

Class: B.Tech. I-Semester  Branch: Common to all branches

Teaching Scheme :

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Examination Scheme :

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<tr>
<td>End Semester Examination</td>
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Course Learning Objectives (LO):

LO1: To acquire writing skills with a focus on accuracy avoiding common errors in English.
LO2: To acquire word power enabling to use them in speaking and writing.
LO3: To develop reading comprehension skills with local and global comprehension.
LO4: To acquire listening and speaking skills using language laboratory.

UNIT - I (6)

Grammar
1. Clause Analysis
2. Tenses
3. Reported Speech

UNIT - II (6)

Vocabulary
1. Collocations
2. Idioms & Phrasal verbs

UNIT - III (6)

Reading Comprehension
1. “Stopping by Woods on a Snowy Evening” by Robert Frost
2. “Adivasis” by Kancha Ilaiah

UNIT - IV (6)

Writing Devices
1. Application for jobs and preparing a curriculum vitae
2. Report writing
3. Project Writing

Text Books:

Reference Book:
English Language Lab:
*(Teacher Assessment (TA) is done through English Language Lab)*

Listening Skills (6x2)

1. Listening to sounds, stress and intonation
2. Listening for information

Speaking Skills (6x2)

   a. Presentation Techniques
      - Group Discussions
      - Interview Skills

   b. Assignment
      Students have to prepare and present an assignment on the following through PPT in the communication skills laboratory.
      - Presentation of Oneself

Course Learning Outcomes (CO):

After completion of the course, the student will be able to

**CO1:** develop writing skills with a focus on accuracy to develop error free English
**CO2:** develop word power to enable to use them in speaking and writing
**CO3:** develop reading skills with a focus on developing reading comprehension skills
**CO4:** enhance listening and speaking skills

Note:

- Teacher Assessment : 15 marks
- Assignment : 05 marks
- Lab Performance : 05 marks
- Lab Attendance : 05 marks
- **Total** : **15** marks
U14ME104  ENGINEERING DRAWING

Class: B.Tech. I-Semester  Branch: Common to all branches

Teaching Scheme :  Examination Scheme :

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Continuous Internal Evaluation 40 marks
End Semester Examination 60 marks

Course Learning Objectives (LO):
LO1: To understand the importance of Engineering Drawing
LO2: To communicate effectively through Engineering Drawing
LO3: To impart and inculcate proper understanding of theory of projections
LO4: To identify the significance and application of the orthographic and isometric drawings

UNIT – I (6+12)

Introduction:
Importance of Engineering Drawing, instruments- uses; Conventions - ISO and BIS, Layout of drawing sheets, Types of Lines, Lettering and dimensioning.

Geometrical Constructions:
Bisection of a line, arc and angle; division of a line, Construction of polygons- triangle, square, pentagon and hexagon.

Projection of Points:
Introduction to orthographic projections-Vertical Plane, Horizontal plane; Views-Front view, Top view and Side view; Projection of Points.

Projection of Straight lines – I:
Line parallel to both the planes, Line parallel to one plane and perpendicular to the other reference plane, Line parallel to one plane and inclined to the other reference plane.

UNIT – II (6+12)

Projection of Straight lines – II:
Line- inclined to both the planes-Traces.

Projection of Planes:
Planes - Perpendicular and Oblique planes; Projections of planes - parallel to one of the reference plane, inclined to one of the reference plane and perpendicular to the other; Projections of oblique planes.

UNIT – III (6+12)

Projection of Solids:
Types-prisms, pyramids, cylinder and cone; Simple Positions-axis parallel to a reference plane and perpendicular to the other plane, axis parallel to one plane and inclined to other reference plane; axis inclined to both the reference planes.

Sections of Solids:
Types-prisms and pyramids; Section planes, Sectional views and true shape of a section.
UNIT – IV (6+12)

Isometric Projections:
Terminology; difference between isometric projection and view; Construction of isometric projection of different solids-box method and offset method.
Orthographic projections: Conversion of isometric views into orthographic views.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: develop concepts on Engineering Drawing in order to become professionally efficient
CO2: understand the theory of projections
CO3: improve their spatial imagination skills to develop new products
U14EI105    BASIC ELECTRONICS ENGINEERING

Class: B.Tech. I-Semester  Branch: Common to all branches

Teaching Scheme:  Examination Scheme:

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<tr>
<td>Continuous Internal Evaluation</td>
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<tr>
<td>End Semester Examination</td>
<td>60 Marks</td>
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Course Learning Objectives (LO):
LO1: To introduce basic concepts of semiconductors and conductivity in semiconductors
LO2: To introduce the operation and applications of semiconductor diodes
LO3: To introduce the basic concepts of BJT & its DC biasing concepts and FET
LO4: To introduce the fundamental concepts and basic principles of Electronic Measuring instruments

UNIT - I (9)

Introduction to Electronics:
Analog Signals (DC & AC), Sources (DC & AC), Digital Signals

Semiconductors:
Energy bands in solids, Concept of forbidden gap, Insulator, Metals and Semiconductors, Transport phenomenon in semiconductors: Mobility and conductivity, Intrinsic semiconductor, Donor and Acceptor impurities, Fermi level, Recombination and Minority carrier Injection, Drift currents and Diffusion currents, Temperature dependence of conductivity, Hall Effect

Semiconductor Diode:
P-N Junction, Band diagram, Depletion layer, V-I characteristics of P-N Diode, Diode resistance and capacitance, Avalanche and Zener breakdown mechanisms

UNIT - II (9)

Diode Circuits:
Rectifier circuits – Half wave, Full wave & Bridge rectifiers, Ripple voltage and Diode current with and without filters, Voltage regulation using Zener diode, Block diagram of DC adapter, Operation of LED & Photodiode

Bipolar Junction Transistor:
Physical structure, Transistor current components, CE, CB & CC configurations and their Input & Output characteristics

UNIT - III (9)

DC Analysis of BJT Circuits:
DC load line, Need for biasing, Transistor biasing methods for CE configuration, Basic transistor applications: Switch and Amplifier, Block diagram of a Public Address system

Field Effect Transistor:
Physical structure, Operation and Characteristics of a Junction Field Effect Transistor (JFET)
UNIT - IV (9)

Measurement Systems:
Block diagram of Measurement system, Ideal requirements of Measurement system, Performance characteristics of Measurement system, Errors in Measurement system

Electronic Instruments:
PMMC Mechanism, Ammeter, Voltmeter & Ohmmeter, Loading effects of Ammeter & Voltmeter, Block diagram of Digital Multimeter (DMM), Block Diagram of Cathode Ray Oscilloscope (CRO), Expression for deflection sensitivity, CRT Screens, Measurement of time period and amplitude

Text Books:
1. David.A.Bell, “Electronic Devices and Circuits”, Oxford University Press, New Delhi, India.

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: learn the concepts of conductivity in semi conductors
CO2: learn the operation of basic semi conductor devices and their V-I characteristics
CO3: get familiarized with the concepts of BJT& FET
CO4: use basic electronic measuring instruments like DMM and CRO
U14EE105  BASIC ELECTRICAL ENGINEERING

Class:  B.Tech. I-Semester

Teaching Scheme:

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Branch:  Common to all branches

Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

LO1:  To impart basic knowledge about the Electrical & Magnetic Circuits

LO2:  To apply Kirchhoff’s laws and Equivalent circuit models to analyze voltage & current relationship in passive circuit

LO3:  To inculcate the understanding about A.C. fundamentals and transformers

LO4:  To understand the working principles and applications of DC and AC Machines

UNIT – I (9)

D.C. Circuits:

Magnetic Circuits:

UNIT – II (9)

D.C. Machines:

1-Φ A.C. Circuits:
Phasor representation of sinusoidal quantities, Average, R.M.S. values and Form factor, A.C. through Resistor, Inductor and Capacitor, Analysis of R-L-C series and Power factor, Power triangle, Series Resonance.

Measurements:
Working principle of Moving coil, Moving Iron Ammeters and Voltmeters Dynamometer type Wattmeter.

UNIT – III (9)

3-Φ A.C. Circuits:
Production of 3-Φ Voltages, Voltage & Current relationships of Line and Phase values for Star and Delta connections, 3-Φ Power Measurement by two-wattmeter method.

1-Φ Transformers:
UNIT – IV (9)

3–φ Induction Motor:

1–φ Induction Motors:
Production of Rotating Field in various type of 1– Phase Motors Split Phase, Capacitor Start, Capacitor run, Shaded Pole motors and Applications.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the students will be able to
CO1: predict the behavior of any Electrical & Magnetic Circuits
CO2: solve Electrical Networks by mesh & nodal analysis
CO3: analyze 1–φ & 3–φ AC Basic network and measure the 3–φ power
CO4: identify the type of Electrical Machines used for that particular application
U14ME106  BASIC MECHANICAL ENGINEERING

**Class:** B.Tech. I-Semester  
**Branch:** Common to all branches

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**Teaching Scheme:**

**Examination Scheme:**

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

**Course Learning Objectives (LO):**

- **LO1:** To identify various engineering materials and applications
- **LO2:** To understand the basic elements of power transmission
- **LO3:** To know the basic manufacturing processes
- **LO4:** To understand fundamental principles and applications of thermodynamics
- **LO5:** To know working principles of SI and CI engines

**UNIT - I (9)**

**Engineering Materials:** Classification; properties and applications.

**Power Transmission:** Classification; Flat belt drives - open and cross belts; Introduction to Gears.

**Bearings:** Types - Sliding and rolling contact; Lubricants - Objectives, types, properties and applications.

**UNIT - II (9)**

**Manufacturing Processes:** Classification and their applications.

**Sand Casting:** Terminology; Mould cross section; Moulding sand-types and properties; Patterns-types, materials and allowances.

**Welding:** Principle and applications of gas and arc welding.

**Machining:** Classification; Lathe machine-line diagram and functions of various parts.

**UNIT - III (9)**


**First Law Of Thermodynamics:** First law- Applications to Closed system, Internal energy, Enthalpy; Processes of Closed systems- Isobaric, Isochoric, Isothermal, Adiabatic and Polytropic.

**UNIT - IV (9)**

**Second Law Of Thermodynamics:** First law limitations, Second law Statements and their equivalence, Carnot Cycle, Carnot Theorem, Heat engine, Heat pump and Refrigerator.

**IC Engines:** Classification; Working principle of two and four stroke SI and CI engines.

**Text Books:**

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: know the properties and applications of various engineering materials
CO2: learn the basic concepts of power transmission
CO3: follow the principles and operations of manufacturing technology
CO4: understand the laws of thermodynamics and their applications
CO5: know the working principle of Heat engine, Heat pump and Refrigerator
U14CE106  

**BASIC ENGINEERING MECHANICS**

**Class:** B.Tech. I-Semester  

**Branch:** Common to all branches

**Teaching Scheme:**

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**Examination Scheme:**

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LO):**

- **LO1:** Study the concept of force, principles of force and their application on engineering structures and machines
- **LO2:** To expose the students various kinds of statically determinate pin jointed structures and methods of analyzing the truss
- **LO3:** To know the importance of geometric centre, cross sectional areas of plane bodies through centre of gravity and moment of inertia respectively
- **LO4:** Study the dynamic behavior of particles in motion subjected to force system

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**UNIT – I (9+3)**

**Introduction:**

**Force Systems:**

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**UNIT – II (9+3)**

**Friction:**
Introduction, Classification, Laws of Friction, Coefficient of Friction, Angle of Friction, Angle of Repose, Ladder Friction, Wedge Friction.

**Plane Trusses and Frames:**
Basic Definitions, Stability and Determinacy Conditions, Rigid truss, Basic assumptions for a perfect truss, Assumptions in the Analysis of Trusses, Methods of Analysis of Trusses: Method of Joints and method of Sections of a Cantilever and simply supported statically determinate trusses.
Frames: Analysis of a Frames using Method of Members

**UNIT – III (9+3)**

**Centroid and Centre of Gravity:**
Introduction, Computation of Centroid, Centre of gravity of one dimensional and two dimensional figures- centroids of composite line, simple sections, composite sections-Centre of gravity of composite areas and composite bodies.

**Moment of Inertia:**
Introduction to Moment of Inertia, Transfer theorems of Moment of Inertia – Parallel Axis theorem and Perpendicular Axis theorem.
UNIT - IV (9+3)

Kinematics:
Introduction to Dynamics, Rectilinear Motion of a particle - Displacement, Velocity and Acceleration, Motion with uniform Acceleration and Motion with variable Acceleration. Curvilinear Motion- Components of motion, Rectangular Components, Components of Normal and Tangential Acceleration.

Kinetics:

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: understand the physical action of forces on the bodies through free body diagrams and analyse the forces using principles of force
CO2: determine the axial forces in members of pin jointed structures subjected to various types of loading
CO3: understand the technical importance of geometrical shapes and centre of various cross sections
CO4: understand equilibrium condition of particles in dynamic condition and can analyse the problems using various applications such as conservation of work energy principle
U14CS107  PROGRAMMING IN C LABORATORY

Class:  B.Tech. I-Semester  Branch:  Common to all branches

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

LO1: To expose the undergraduate students to the practical implementation of C Programming concepts
LO2: To improve students capability in applying C Programming for problem solving
LO3: To make students use effective memory management techniques in programming
LO4: To expose students to modular programming concepts in problem solving

List of Experiments

1. Programs using input output functions, operators (arithmetic, relational, conditional etc).
2. Programs using operators (bit-wise, logical, increment and decrement etc).
3. Programs using conditional control structures: if, if-else, nested if.
4. Programs using else if ladder, switch and goto.
5. Programs using loop control structures: while, do-while, for.
6. Programs on one dimensional array and two dimensional arrays.
8. Programs using strings: one dimensional array, two dimensional array, string handling functions.
9. Programs using pointers, string pointers.
11. Programs using dynamic memory allocation.
12. Programs using file operations and file handling functions.

Course Learning Outcomes (CO):

After completion of the course, the student will be able to

CO1: learn practical implementation of C programming language concepts
CO2: debug and document programs in C
CO3: know usage of logical skills in developing C programs.
CO4: apply effective memory management techniques for problem solving
CO5: understand the file management techniques
U14PH108  ENGINEERING PHYSICS LABORATORY

**Class:** B.Tech. I-Semester  
**Branch:** Common to all branches

**Teaching Scheme:**

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**Examination Scheme:**

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**Course Learning Objectives (LO):**

- **LO1:** To understand the oscillatory phenomena in determining the various properties like rigidity modulus, moment of inertia, acceleration due to gravity and other elastic properties.
- **LO2:** To determine the wavelengths, slit widths, diameters of thin wires etc., with high degree of accuracy using interference and diffraction techniques.
- **LO3:** To study the optical activity of some substances.
- **LO4:** To determine the optical fiber characteristics.

**List of Experiments**

2. Determination of slit width using He-Ne Laser.
3. To find dispersive power of a prism using Spectrometer.
6. To determine resolving Power of a Telescope.
7. To find the acceleration due to gravity \((g)\) by Compound pendulum.
9. Photo Cell: To study the characteristics of a photo cell.
11. Spiral spring: Determination of force constant of spiral spring.

**Course Learning Outcomes (CO):**

After completion of the course, the student will be able to

- **CO1:** handle and apply the powerful radiations like lasers and radioactive rays
- **CO2:** know the interference and diffraction patterns and apply them in precise measurements
- **CO3:** make preferential selection of optical fibers
- **CO4:** determine the various optical, mechanical and magnetic properties
U14CH108  ENGINEERING CHEMISTRY LABORATORY

Class: B.Tech. I-Semester  Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):

LO1: To gain hands-on experience of conventional and instrumental methods of chemical analysis
LO2: To introduce water analysis techniques
LO3: To understand the principles involved in the polymerization reactions
LO4: To gain the knowledge of estimation of metals from their ores
LO5: To expose the experiments such as estimation of metal ion by using ion-exchange resin, instrumental methods of chemical analysis, adsorption
LO6: To introduce a photo chemical reduction

List of Experiments

1. Determination of Alkalinity of test sample of water.
2. Estimation of Available Chlorine in test sample of Bleaching powder.
5. Estimation of Cupric ions in the test solution.
6. Adsorption of an acid on a charcoal - Applicability of adsorption Isotherm.
7. Photochemical reduction of Ferric salt.
12. Estimation of Metal ion using ion-exchange resin.

Course Learning Outcomes (CO):

After completion of the course, the student will be able to

CO1: handle analytical instruments for chemical analysis
CO2: determine alkaline species, temporary and permanent hardness of a water sample
CO3: estimate some metals from their ores
CO4: understand the advantages of instrumental methods of chemical analysis over conventional methods
CO5: understand the principles involved in photo chemical and polymerization reaction
U14ME109     ENGINEERING WORKSHOP PRACTICE

Class:  B.Tech. I-Semester
Branch:  Common to all branches

Teaching Scheme:

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Examination Scheme:

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Course Learning Objectives (LO):

LO1: To understand the importance of workshop practice in Engineering
LO2: To acquire proper understanding of various manufacturing processes
LO3: To identify the significance and application of various tools and equipment used in workshop

List of Experiments

Foundry:
1. Prepare a Sand Mould using bracket pattern
2. Prepare a Sand Mould using dumbbell pattern

Fitting:
3. Prepare a Square fit using Mild Steel Plates
4. Prepare a Half round fit using Mild Steel Plates

Welding:
5. Prepare a Lap joint on Mild Steel Plates using Arc Welding
6. Prepare a Single V – Butt Joint on Mild Steel Plates using Arc Welding

Carpentry:
7. Prepare a Half lap joint of a given Wooden pieces
8. Prepare a Bridle joint of a given Wooden pieces

Plumbing:
9. Prepare a Pipe joint with elbows & tee using PVC pipes
10. Prepare a Pipe joint with union & coupling using PVC pipes

Machine Shop:
11. Perform a Step turning operation on mild steel bar
12. Perform a Taper turning operation on mild steel bar

Text Books:

Course Learning Outcomes (CO):

After completion of the course, the student will be able to
CO1: know and understand the types of trades in engineering
CO2: improve their practical skills to develop new products
### Course Learning Objectives (LO):

**LO1:** To incorporate the basic knowledge of the environmental studies

**LO2:** To understand the need to use resources more equitably

**LO3:** To understand the knowledge of conservation of biodiversity

**LO4:** To introduce the causes, effects and control measures of environmental pollution

**LO5:** To know the issues involved in enforcement of environmental legislation

### UNIT - I (6)

**Introduction:**
The Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance.

**Natural Resources:**
- **Forest Resources:** Use and over-exploitation of forests, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people.
- **Water Resources:** Use and over-utilization of surface and ground water, floods, drought; conflicts over water.
- **Mineral Resources:** Environmental effects of extracting and using mineral resources.
- **Agricultural Land:** Land as a resource, land degradation, soil erosion and desertification.
- **Food Resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
- **Energy Resources:** Renewable and non-renewable energy sources, use of alternate energy sources.

### UNIT - II (6)

**Ecosystem and Biodiversity:**
- **Ecosystem:** Concepts of an ecosystem: Food chain, food webs and ecological pyramids: Energy flow in the ecosystem: ecological succession.
- **Biodiversity and its conservation:** Introduction: Definition, genetic, species and ecosystem diversity; value of biodiversity. Biodiversity in India, Hot spots of biodiversity, Man-wildlife conflicts, Endangered and endemic species of India, In-situ and Ex-situ conservation

### UNIT - III (6)

**Environmental Pollution:**
Global climatic change, Green house gases, Acid rain.

Causes and effects of Air, Water, Soil, Marine and Noise pollution with case studies.

Solid and Hazardous waste management, effects of urban, industrial and nuclear waste.

Natural disaster management: flood, earthquake, cyclone and landslides.
UNIT - IV (6)

**Environment Protection and Society:**

**Role of Individual and Society:** Role of individual in prevention of pollution, Water conservation, Rain water harvesting, Watershed management, wasteland reclamation.

**Environmental Protection / Control Acts:** Environmental legislation with respect to Air, Water, Forest and Wildlife, Enforcement of environmental legislations, Population growth, Role of Information Technology in Environment and Human Health.

**Text Books:**

**Reference Books:**

**Course Learning Outcomes (CO):**

After completion of the course, the student will be able to

CO1: understand human interaction with the environment
CO2: understand utmost importance of the sustainable use of natural resources
CO3: get acquainted with ecosystem and conservation of biodiversity
CO4: gain the knowledge of control measures of environmental pollution and natural disaster management
CO5: understand the conflict between the existing development strategies and need for environmental conservation
CO6: understand various environmental protection / control acts
CO7: understand the role of individual in the environment protection
U14EA110  EAA: PHYSICAL EDUCATION & NSS

Class: B.Tech. I-Semester  Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 100 marks |
| End Semester Examination | - |

I. PHYSICAL EDUCATION

Course Learning Objectives & Outcomes:
- To perform and engage in a variety of physical activities
- To develop and maintain physical health and fitness through regular participation in physical activities
- To demonstrate positive self esteem, mental health and physiological balance through body awareness and control
- To exhibit the spirit of fair play, team work and sportsmanship

Activities related to:
1. Physical Fitness
2. Games & Sports

II. NATIONAL SERVICE SCHEME (NSS)

Course Learning Objectives (LO):
The objectives of the NSS is to
LO1: arouse the social consciousness of the students
LO2: provide them with opportunity to work with people in villages and slums
LO3: expose them to the reality of life
LO4: bring about a change in their social perceptions
LO5: develop competence required for responsibility sharing and team work

List of Activities:
1. Shramadanam
2. Tree Plantation
3. General Medical Camps in Villages
4. Awareness on Eye Donation
5. Awareness on “Child Labour and Child Marriages”
6. Awareness programs on “Literacy, Good Health Practices, etc.”
7. Safe Riding Program
8. Awareness program on “RTI Act”
9. Awareness on Blood Donation

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: develop his / her personality through community service rendered
CO2: apply their education to find solutions to individual and community problems
CO3: acquire capacity to meet emergencies and natural disasters
CO4: acquire a democratic attitude, leadership qualities and practice national integration
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**Evaluation Scheme**

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**Total**: 19/17, 8/5, 8/11, 30/28, 1000

**Note**: L - Lectures; T - Tutorials; P - Practicals; CIE - Continuous Internal Evaluation; TA - Teachers Assessment; MSE - Mid Semester Examination; ESE - End Semester Examination; EAA - Extra Academic Activity; # indicates Mandatory Course

**Student Contact Hours/Week**: Stream-I = 35 (periods/week); Stream-II = 33 (periods/week)

**Total Credits(C)**: Stream-I = 30 Credits; Stream-II = 28 Credits

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U14MH201  ENGINEERING MATHEMATICS-II

Class:  B.Tech. II-Semester  Branch:  Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LO):**

LO1: To enable the student to acquire fundamental knowledge of mathematical concepts and methods and apply in engineering disciplines

LO2: To introduce the methods of solving higher order linear differential equations with constant coefficients and introduce simple applications

LO3: To introduce the concept of vector function and vector differential calculus

LO4: To introduce integration of vector valued functions

LO5: To introduce functions of complex variables and the property of analyticity of a function of complex variable

**UNIT - I (9+3)**

**Higher order linear differential equations with constant coefficients:**

Liner differential Equations of higher order with constant coefficients, General solution, Complementary function, Particular Integral. Methods of evaluation of particular Integrals.

Simple examples of Physical applications (Free oscillations of Spring - Mass system, RLC series circuit problem)

Wronskian, Linear dependence of solutions, Method of Variation of parameters.

Cauchy’s homogenous linear equation.

**UNIT - II (9+3)**

**Vector Differential Calculus:**

Vector functions - Derivative of a vector function of a scalar variable, Velocity and acceleration, Curves in Space, Tangent, Principal normal, Binormal, Curvature, Torsion of a given curve and Frenet -Serret Formulae.

Scalar and vector point functions, Vector operators – Gradient of a scalar field, Divergence of a vector field, Curl of a vector field and their physical interpretations. Directional derivative, Application to find angle between two surfaces and to find scalar potential of a vector field, Irrotational fields & Solenoidal fields.

**UNIT - III (9+3)**

**Vector Integration:**

Integration of vector valued functions of a scalar variable, Application to find velocity and displacement of a particle;

Line integral of scalar point and vector point functions, Applications: Work done by a force, Circulation; Surface Integral & Volume integral.

Green’s theorem in plane, and area of a plane region using Green’s theorem, Stokes theorem & Gauss divergence theorems (without proof).
UNIT - IV (9+3)

Complex Variables:

Text Book:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: solve a given higher order linear differential equation with constant coefficients
CO2: understand few simple applications
CO3: understand the concept of a vector function and vector differentiation and will be able to find the characteristics of a space curve such as tangent, normal, binormal, curvature and torsion
CO4: understand the concept of gradient, divergence and curl of a vector point function and will be able to apply them to find angle between two surfaces, scalar potential
CO5: find line, surface and volume integrals of vector valued functions and understand Green’s theorem, Stokes theorem and Gauss theorem
CO6: understand the concept of a function of complex variable and verify whether a function is analytic or not construct analytic function when real/imaginary part of the function is known
CO7: find velocity potential and stream function of a fluid flow using complex analytical methods
U14CS202  OBJECT ORIENTED PROGRAMMING THROUGH C++

**Class:** B.Tech. II-Semester  **Branch:** Common to all branches

**Teaching Scheme :**

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**Examination Scheme :**

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

**Course Learning Objectives (LO):**

**LO1:** To expose the students to the concepts of Object-Oriented Paradigm

**LO2:** To improve students capability in applying object oriented programming concepts in problem solving

**LO3:** To improve students expertise in implementing object oriented concepts using C++ Programming

**LO4:** To enable students to understand concepts of templates and exceptional handling

**UNIT – I (9+3)**

**Programming Paradigms:** Procedural Programming, Modular Programming, Object-Oriented Programming and Generic Programming.

**Introduction to C++:** Structure of C++ program, Basic I/O, Tokens, Data types, Reference variables, Operators, Manipulators, Expressions, Control Structures, Name Spaces.

**Functions in C++:** Inline function, Default arguments, Overloading, Parameter passing mechanisms, Name Spaces.

**UNIT – II (9+3)**

**Classes and objects:** Structures, Access Control, Specifying a Class, Defining member functions, Making an outside function inline, Nesting of member functions, Arrays within class, Arrays of objects, Static data members, Static member functions, Friend functions, Objects as arguments, Returning objects, Pointers to members, Constructors and Destructors.

**Operator Overloading:** Overloading of Unary and Binary operators, Overloading of Unary and Binary operators using friend functions, String operations, Type conversions.

**UNIT – III (9+3)**

**Inheritance:** Single inheritance, Multilevel inheritance, Multiple inheritance, Hierarchical inheritance, Hybrid inheritance, Making private member inheritable, Virtual Base class, Abstract class, Constructors in derived classes.

**Polymorphism:** Pointers to objects, Pointers to derived classes, This pointer, Virtual Functions, Pure virtual functions.

**Managing Console I/O operations:** Introduction, C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted I/O Operations, Managing output with manipulators.
UNIT – IV (9+3)

Files: Classes for file stream operations, Opening and closing a file, Detecting EOF, File Modes, File pointers and their manipulators, Sequential input and output operations, Random access files, Command line arguments.

Templates: Class templates, Class templates with multiple parameters, Function templates, Function templates with multiple parameters, Overloading of template functions.

Exception Handling: Exception handling mechanism, Throwing mechanism, Catching mechanism, Rethrowing of exception, Specifying the exceptions.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: know the differences between procedural language and object-oriented languages
CO2: gain knowledge of Object-Oriented Paradigm for problem solving
CO3: will be able to gain practical knowledge of OOP concepts using C++
CO4: apply reusability concepts like inheritance, polymorphism in application development
CO5: use generic programming concepts
CO6: develop modular programming using classes
U14CH203  ENGINEERING CHEMISTRY

Class: B.Tech. II-Semester  Branch: Common to all branches

Teaching Scheme :  Examination Scheme :

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Continuous Internal Evaluation  40 marks
End Semester Examination  60 marks

Course Learning Objectives (LO):

LO1: To understand the fundamental principles and applications of chemistry
LO2: To identify the significance of electro chemistry
LO3: To introduce and explore the knowledge of corrosion and its prevention
LO4: To impart and inculcate proper understandings of energy sources, phase rule, organic and polymer chemistry
LO5: To acquire the techniques of water analysis and treatment
LO6: To understand the role of chemistry in the field of engineering

UNIT - I (9+3)

Electrochemistry:
Specific and equivalent conductance, Conductometric titrations, Electrode potential, Nernst equation, Electrochemical series, Reference electrodes: Calomel electrode, Ag/AgCl electrode, Ion-selective electrode: glass electrode, Determination of pH using Glass, Quinhydrone and Hydrogen electrodes, Potentiometric titrations, Commercial cells: Hydrogen-Oxygen fuel cell, Lead-acid storage cell.

UNIT - II (9+3)

Corrosion:

Phase Rule:
Description of the terms: ‘Phase’, ‘Component’ and ‘Degrees of freedom’. Gibbs Phase rule equation. Application of the phase rule to one-component system (Water system) and two-component system (silver-lead system).

Energy Sources:
Characteristics of fuels for internal combustion (IC) engines, Knocking, Octane number. Unleaded petrol, Cetane number, Power alcohol, Compressed Natural gas (CNG), Liquified petroleum gas (LPG).

UNIT - III (9+3)

Introduction to Methods of Chemical Analysis:
Water Analysis and Treatment:
Hardness of Water, determination of hardness of water by using EDTA, determination of Alkalinity, determination of Chloride by argentometry, determination of Fluoride by spectrophotometry, determination of Dissolved Oxygen, Biochemical Oxygen Demand and Chemical Oxygen Demand, Softening of water by Zeolite process and Ion-exchange process, Reverse Osmosis, Electrodialysis.

UNIT - IV (9+3)

Organic Chemistry:
Fission of a covalent bond, Types of electron effects: Inductive effect, Mesomeric effect and Hyperconjugation, Reaction intermediates and their stabilities, Types of reagents: Electrophilic, Nucleophilic and Free radical reagents. Study of the mechanisms of substitution (SN1 and SN2) and Addition (Electrophilic, Nucleophilic and Free radical) reactions, Role of inductive effect, mesomeric effect and hybridazation on the dissociation constant of carboxylic acids.

Polymers:
Introduction : Types of Polymerization reactions (Addition and Condensations), Mechanism of free radical, cationic and anionic addition polymerization, Condensation polymerization, Thermo setting and thermo plastic resins, Silicone rubber, Conducting polymers, Laminated plastics.

Text Books:

Reference Books:
2. Suba Ramesh, Vairam et. al “Engineering Chemistry”, Wiley India.

Course Learning Outcomes (CO):
After completion of the course, the student will be able to

CO1: understand basic principles and role of chemistry in the field of engineering
CO2: gain the knowledge of interrelationship between electrical and chemical energy
CO3: make a judicious selection of materials in the field of engineering
CO4: understand the phase rule and its application in the study of material science
CO5: understand the methods of chemical analysis of water and its treatment
CO6: know the synthetic methods and versatile applications of polymers
CO7: understand the advantage of spectrometric methods of chemical analysis over the conventional methods
U14PH203 ENGINEERING PHYSICS

Class: B.Tech. II-Semester

Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):

LO1: To make the bridge between physics in intermediate level and its applications in engineering by giving proper inputs

LO2: To introduce the basic concepts of all types of oscillations with illustrations by mechanical examples

LO3: To introduce the basic concepts of coherence and polarized nature (interference, diffraction & polarization) of light waves and their applications

LO4: To introduce and explore the knowledge of high frequency sound waves & their application in different fields

LO5: To introduce the basic concepts of modern physics by introducing the fundamental elements of quantum mechanics, which are essential to understand the mechanics of microscopic particles

LO6: To introduce the basic concepts of modern science like Photonics (lasers, fiber optic, etc.) modern materials (magnetic materials, superconductors, nano material etc.)

UNIT - I (9+3)

Oscillations:

Interference:
The Superposition principle - Coherence - Phasor method of adding wave disturbances - Phase changes on reflection - Anti reflection coating - Interference of reflected light from uniform and wedge shaped film - Newton’s rings in reflected light - Determination of wavelength of monochromatic light using Newton’s rings experiment - Michelson’s Interferometer, Types of fringes, Determination of wavelength of monochromatic light, thickness and refractive index of a thin transparent sheet using Michelson’s Interferometer.

UNIT - II (9+3)

Diffraction:
Fraunhofer diffraction at a single slit, measurement of slit width - Fraunhofer diffraction at a circular aperture - Rayleigh’s criterion for resolution - Diffraction grating (Qualitative) - Experimental determination of wavelength using a plane transmission grating - Dispersion and Resolving power of a grating.

Polarization:
Polarized light - Double refraction, Geometry of calcite crystal, Construction and working of a Nicol prism - Theory of polarized light - Production and Detection of plane, circularly and elliptically polarized light - Quarter and Half-wave plates - Optical activity - Laurent’s half-shade Polarimeter - Application of polarization in LCDs.

Ultrasonics:
Ultrasonic waves - Properties - Production of Ultrasonic waves - Magnetostriction method, Piezo-electric method - Detection of Ultrasonics - Determination of wavelength (Acoustic grating) - Application of ultrasonic waves.
UNIT - III (9+3)
Lasers (Qualitative):

Fiber Optics (Qualitative):

UNIT - IV (9+3)
Elements of Quantum Mechanics:
De-Broglie concept of matter waves – De-Broglie wavelength, Properties of matter waves – Schrodinger’s wave equation – Time independent wave equation (one dimension), Particle in a box (one dimension), energy quantization, Wave functions.

Modern Materials (Qualitative):

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: understand the basic concepts of physics for its applications to Engineering
CO2: understand the basic principles of oscillations that can be applied to all types of oscillatory phenomena like acoustic, mechanical, electromagnetic, atomic, nuclear etc.
CO3: appreciate the knowledge acquired in studying interference, diffraction and polarization in the application of thickness measurement of thin films, refractive indices and wavelength determinations using interferometric techniques, fringe pattern etc.
CO4: appreciate the knowledge gained in studying ultrasonics and their multi dimensional applications in various fields like industrial, engineering (like NDT etc.,) and medical etc.
CO5: understand the fundamental principles and applications of lasers and optical fibers
CO6: exposed to various material properties which are used in engineering applications and devices
U14ME204  ENGINEERING DRAWING

Class: B.Tech. II-Semester  Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

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Course Learning Objectives (LO):

LO1: To understand the importance of Engineering Drawing
LO2: To communicate effectively through Engineering Drawing
LO3: To impart and inculcate proper understanding of theory of projections
LO4: To identify the significance and application of the orthographic and isometric drawings

UNIT – I (6+12)

Introduction:
Importance of Engineering Drawing, instruments- uses; Conventions - ISO and BIS, Layout of drawing sheets, Types of Lines, Lettering and dimensioning.

Geometrical Constructions:
Bisection of a line, arc and angle; division of a line, Construction of polygons- triangle, square, pentagon and hexagon.

Projection of Points:
Introduction to orthographic projections-Vertical Plane, Horizontal plane; Views-Front view, Top view and Side view; Projection of Points.

Projection of Straight lines - I:
Line parallel to both the planes, Line parallel to one plane and perpendicular to the other reference plane, Line parallel to one plane and inclined to the other reference plane.

UNIT – II (6+12)

Projection of Straight lines – II: Line- inclined to both the planes-Traces.

Projection of Planes:
Planes - Perpendicular and Oblique planes; Projections of planes - parallel to one of the reference plane, inclined to one of the reference plane and perpendicular to the other; Projections of oblique planes.

UNIT – III (6+12)

Projection of Solids:
Types-prisms, pyramids, cylinder and cone; Simple Positions-axis parallel to a reference plane and perpendicular to the other plane, axis parallel to one plane and inclined to other reference plane; axis inclined to both the reference planes.

Sections of Solids:
Types-prisms and pyramids; Section planes, Sectional views and true shape of a section.
UNIT – IV (6+12)

Isometric Projections:
Terminology; difference between isometric projection and view; Construction of isometric projection of different solids-box method and offset method.
Orthographic projections: Conversion of isometric views into orthographic views.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: develop concepts on Engineering Drawing in order to become professionally efficient
CO2: understand the theory of projections
CO3: improve their spatial imagination skills to develop new products
U14MH204 ENGLISH FOR COMMUNICATION

Class: B.Tech. II-Semester  Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):

LO1: To acquire writing skills with a focus on accuracy avoiding common errors in English
LO2: To acquire word power enabling to use them in speaking and writing
LO3: To develop reading comprehension skills with local and global comprehension
LO4: To acquire listening and speaking skills using language laboratory

UNIT - I (6)
Grammar
1. Clause Analysis
2. Tenses
3. Reported Speech

UNIT - II (6)
Vocabulary
1. Collocations
2. Idioms & Phrasal verbs

UNIT - III (6)
Reading Comprehension
1. “Stopping by Woods on a Snowy Evening” by Robert Frost
2. “Adivasis” by Kancha Ilaiah

UNIT - IV (6)
Writing Devices
1. Application for jobs and preparing a curriculum vitae
2. Report writing
3. Project Writing

Text Books:

Reference Book:
English Language Lab:
{Teacher Assessment (TA) is done through English Language Lab}

Listening Skills (6x2)

1. Listening to sounds, stress and intonation
2. Listening for information

Speaking Skills (6x2)

a. Presentation Techniques
   • Group Discussions
   • Interview Skills

b. Assignment
   Students have to prepare and present an assignment on the following through PPT in the communication skills laboratory.
   • Presentation of Oneself

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: develop writing skills with a focus on accuracy to develop error free English
CO2: develop word power to enable to use them in speaking and writing
CO3: develop reading skills with a focus on developing reading comprehension skills
CO4: enhance listening and speaking skills

Note:
Teacher Assessment : 15 marks
   • Assignment : 05 marks
   • Lab Performance : 05 marks
   • Lab Attendance : 05 marks
   Total : 15 marks
U14EE205    BASIC ELECTRICAL ENGINEERING

Class:  B.Tech. II-Semester                       Branch:  Common to all branches

Teaching Scheme:              Examination Scheme:

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Continuous Internal Evaluation  40 marks
End Semester Examination       60 marks

Course Learning Objectives (LO):
LO1:  To impart basic knowledge about the Electrical & Magnetic Circuits
LO2:  To apply Kirchhoff’s laws and Equivalent circuit models to analyze voltage & current relationship in passive circuit
LO3:  To inculcate the understanding about A.C. fundamentals and transformers
LO4:  To understand the working principles and applications of DC and AC Machines

UNIT – I (9)

D.C. Circuits:

Magnetic Circuits:

UNIT – II (9)

D.C. Machines:

1-φ A.C. Circuits:
Phasor representation of sinusoidal quantities, Average, R.M.S. values and Form factor, A.C. through Resistor, Inductor and Capacitor, Analysis of R-L-C series and Power factor, Power triangle, Series Resonance.

Measurements:
Working principle of Moving coil, Moving Iron Ammeters and Voltmeters Dynamometer type Wattmeter.

UNIT – III (9)

3-φ A.C. Circuits:
Production of 3-φ Voltages, Voltage & Current relationships of Line and Phase values for Star and Delta connections, 3-φ Power Measurement by two-wattmeter method.

1-φ Transformers:
UNIT - IV (9)

3-ϕ Induction Motor:

1-ϕ Induction Motors:
Production of Rotating Field in various type of 1 – Phase Motors Split Phase, Capacitor Start, Capacitor run, Shaded Pole motors and Applications.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the students will be able to
CO1: predict the behavior of any Electrical & Magnetic Circuits
CO2: solve Electrical Networks by mesh & nodal analysis
CO3: analyze 1-ϕ & 3-ϕ AC Basic network and measure the 3-ϕ power
CO4: identify the type of Electrical Machines used for that particular application
U14EI205 BASIC ELECTRONICS ENGINEERING

Class: B.Tech. II-Semester

Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 Marks |
| End Semester Examination       | 60 Marks  |

Course Learning Objectives (LO):

LO1: To introduce basic concepts of semiconductors and conductivity in semiconductors
LO2: To introduce the operation and applications of semiconductor diodes
LO3: To introduce the basic concepts of BJT & its DC biasing concepts and FET
LO4: To introduce the fundamental concepts and basic principles of Electronic Measuring instruments

UNIT - I (9)

Introduction to Electronics:
Analog Signals (DC & AC), Sources (DC & AC), Digital Signals

Semiconductors:
Energy bands in solids, Concept of forbidden gap, Insulator, Metals and Semiconductors, Transport phenomenon in semiconductors: Mobility and conductivity, Intrinsic semiconductor, Donor and Acceptor impurities, Fermi level, Recombination and Minority carrier Injection, Drift currents and Diffusion currents, Temperature dependence of conductivity, Hall Effect

Semiconductor Diode:
P-N Junction, Band diagram, Depletion layer, V-I characteristics of P-N Diode, Diode resistance and capacitance, Avalanche and Zener breakdown mechanisms

UNIT - II (9)

Diode Circuits:
Rectifier circuits – Half wave, Full wave & Bridge rectifiers, Ripple voltage and Diode current with and without filters, Voltage regulation using Zener diode, Block diagram of DC adapter, Operation of LED & Photodiode

Bipolar Junction Transistor:
Physical structure, Transistor current components, CE, CB & CC configurations and their Input & Output characteristics

UNIT - III (9)

DC Analysis of BJT Circuits:
DC load line, Need for biasing, Transistor biasing methods for CE configuration, Basic transistor applications: Switch and Amplifier, Block diagram of a Public Address system

Field Effect Transistor:
Physical structure, Operation and Characteristics of a Junction Field Effect Transistor (JFET)
UNIT - IV (9)

Measurement Systems:
Block diagram of Measurement system, Ideal requirements of Measurement system, Performance characteristics of Measurement system, Errors in Measurement system

Electronic Instruments:
PMMC Mechanism, Ammeter, Voltmeter & Ohmmeter, Loading effects of Ammeter & Voltmeter, Block diagram of Digital Multimeter (DMM), Block Diagram of Cathode Ray Oscilloscope (CRO), Expression for deflection sensitivity, CRT Screens, Measurement of time period and amplitude

Text Books:
1. David.A.Bell, “Electronic Devices and Circuits”, Oxford University Press, New Delhi, India.

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: learn the concepts of conductivity in semi conductors
CO2: learn the operation of basic semi conductor devices and their V-I characteristics
CO3: get familiarized with the concepts of BJT& FET
CO4: use basic electronic measuring instruments like DMM and CRO
U14CE206  BASIC ENGINEERING MECHANICS

Class:  B.Tech. II-Semester  Branch: Common to all branches

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

LO1: Study the concept of force, principles of force and their application on engineering structures and machines

LO2: To expose the students various kinds of statically determinate pin jointed structures and methods of analysing the truss

LO3: To know the importance of geometric centre, cross sectional areas of plane bodies through centre of gravity and moment of inertia respectively

LO4: Study the dynamic behavior of particles in motion subjected to force system

UNIT – I (9+3)

Introduction:

Force Systems:

UNIT – II (9+3)

Friction:
Introduction, Classification, Laws of Friction, Coefficient of Friction, Angle of Friction, Angle of Repose, Ladder Friction, Wedge Friction.

Plane Trusses and Frames:
Basic Definitions, Stability and Determinacy Conditions, Rigid truss, Basic assumptions for a perfect truss, Assumptions in the Analysis of Trusses, Methods of Analysis of Trusses: Method of Joints and method of Sections of a Cantilever and simply supported statically determinate trusses.
Frames: Analysis of a Frames using Method of Members

UNIT – III (9+3)

Centroid and Centre of Gravity:
Introduction, Computation of Centroid, Centre of gravity of one dimensional and two dimensional figures- centroids of composite line, simple sections, composite sections-Centre of gravity of composite areas and composite bodies.

Moment of Inertia:
Introduction to Moment of Inertia, Transfer theorems of Moment of Inertia – Parallel Axis theorem and Perpendicular Axis theorem.
UNIT - IV (9+3)

Kinematics:
Introduction to Dynamics, Rectilinear Motion of a particle – Displacement, Velocity and Acceleration, Motion with uniform Acceleration and Motion with variable Acceleration. Curvilinear Motion- Components of motion, Rectangular Components, Components of Normal and Tangential Acceleration.

Kinetics:

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: understand the physical action of forces on the bodies through free body diagrams and analyse the forces using principles of force
CO2: determine the axial forces in members of pin jointed structures subjected to various types of loadings
CO3: understand the technical importance of geometrical shapes and centre of various cross sections
CO4: understand equilibrium condition of particles in dynamic condition and can analyse the problems using various applications such as conservation of work energy principle
U14ME206  BASIC MECHANICAL ENGINEERING

Class: B.Tech. II-Semester  Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

- Continuous Internal Evaluation: 40 marks
- End Semester Examination: 60 marks

Course Learning Objectives (LO):

- **LO1:** To identify various engineering materials and applications
- **LO2:** To understand the basic elements of power transmission
- **LO3:** To know the basic manufacturing processes
- **LO4:** To understand fundamental principles and applications of thermodynamics
- **LO5:** To know working principles of SI and CI engines

UNIT - I (9)

**Engineering Materials:** Classification; properties and applications.

**Power Transmission:** Classification; Flat belt drives - open and cross belts; Introduction to Gears.

**Bearings:** Types - Sliding and rolling contact; Lubricants - Objectives, types, properties and applications.

UNIT - II (9)

**Manufacturing Processes:** Classification and their applications.

**Sand Casting:** Terminology; Mould cross section; Moulding sand-types and properties; Patterns-types, materials and allowances.

**Welding:** Principle and applications of gas and arc welding

**Machining:** Classification; Lathe machine-line diagram and functions of various parts.

UNIT - III (9)


**First Law Of Thermodynamics:** First law- Applications to Closed system, Internal energy, Enthalpy; Processes of Closed systems- Isobaric, Isochoric, Isothermal, Adiabatic and Polytropic.

UNIT - IV (9)

**Second Law Of Thermodynamics:** First law limitations, Second law Statements and their equivalence, Carnot Cycle, Carnot Theorem, Heat engine, Heat pump and Refrigerator.

**IC Engines:** Classification; Working principle of two and four stroke SI and CI engines.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: know the properties and applications of various engineering materials
CO2: learn the basic concepts of power transmission
CO3: follow the principles and operations of manufacturing technology
CO4: understand the laws of thermodynamics and their applications
CO5: know the working principle of Heat engine, Heat pump and Refrigerator
OBJECT ORIENTED PROGRAMMING LABORATORY

Class: B.Tech. II-Semester
Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):

LO1: To expose the students to the practical implementation of Object-Oriented concepts using C++ programming language
LO2: To improve students capability of object oriented programming for problem solving
LO3: To make students capable of using reusability and generic programming concepts in developing applications

List of Experiments

Experiment-I
1. Read 10 numbers and displays them in sorted order.
2. Write functions to swap two numbers using pointers and references.
3. Write a program that prints the sizes of the fundamental types, a few pointer types and a few enumeration of your choice. Use the size of operator.

Experiment-II
4. Write a function that counts the number of occurrences of pair of letters in a string, for example the pair “ab” appears twice in “xabaabaxabb”.
5. Find LCM of two, three and four numbers using function overloading.
6. Create a structure for storing students details (sno, sname, course, Array of five subject’s marks) provide the functions for printing the total marks, calculating percentage and the result. (Note: Include the functions within the structure).

Experiment-III
7. Write a macro to find square (A+B)-square (C+D).
8. Create a class for complex number and provide methods for addition, subtraction, multiplication and division. Display the output in “a+ib” form.
9. Create a Distance class and provide methods for addition and subtraction of two distances.

Experiment-IV
10. Create a complex number class with default, parameterized, copy constructors and a destructor.
11. Create a class which provides a method to count the number of objects that are created for that class. (Use static method).
12. Create a class INT that behaves exactly like an int. (Note: overload +, -, *, /, %).

Experiment-V
13. Create a string class and overload + to concatenate two Strings, overload () to print substring and overload <, <=, >, >=, = = operators to compare two string objects.
14. Create Date class and overload ++ to print next date and overload -- to print previous date.

Experiment-VI
15. Create a user defined array class Array and overload + to add two arrays, overload * to multiply two arrays, overload [] to access given position element and also to use left side of an assignment operator.
16. Create a complex number class and overload +, -, * operators using friend functions.
17. Program to perform Matrix operations using operator overloading with friend functions.
Experiment-VII
18. Programs to demonstrate Single, Multiple, Multilevel, Hierarchical, Hybrid and Multipath inheritance.
19. Programs to demonstrate constructors in inheritance.

Experiment-VIII
20. Create a Shape class with methods perimeter, area. Derive classes Circle, Square and Triangle from Shape class. Provide implementation for perimeter, area in the derived classes. (Declare perimeter, area as pure virtual functions).
21. Implement Multipath inheritance by declaring pointers to base class and access the derived class methods using base class pointers.
22. Program to demonstrate of manipulators

Experiment-IX
23. Write a function template to overload max method, which can find maximum of any data type.
24. Create function template to sort an array, which can sort array of any type.
25. Create a Generic calculator class to perform \(+, -, *, /\) operations on any type.
26. Create a Generic class for array of variable size and provide sorting, searching on any type.

Experiment-X
27. Find the roots of a quadratic equation. Handle exception for divide by zero.
28. Handle the Array Index out of Bounds Exception when accessing the elements of Arrays.
29. Create a text file of student information and display the contents of file.

Experiment-XI
30. Write a program to read a text file and remove all white space characters and replace each alphanumeric character with next character in the alphabet (Replace z by a and 9 by 0).
31. Copy the contents of one file into another except the blank lines using command line arguments.
32. Create a file with floating point numbers. Read pair of floating numbers from the file and write into another file.

Experiment-XII
33. Read the contents of three files, concatenate them and display it.
34. Write complex numbers into a file in binary format and in character format.
35. Create a class with integers and overload \(<<\) to place integer into a file and overload \(>>\) to read an integer.

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: gain knowledge of implementing Object-Oriented Programming concepts using C++
CO2: know the application of Object-Oriented Programming concepts for developing applications
CO3: debug and document programs in C++
CO4: develop applications using modularization technique
CO5: apply reusability and generic programming concepts in application development
U14CH208  ENGINEERING CHEMISTRY LABORATORY

Class: B.Tech. II-Semester  Branch: Common to all branches

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

LO1: To gain hands-on experience of conventional and instrumental methods of chemical analysis
LO2: To introduce water analysis techniques
LO3: To understand the principles involved in the polymerization reactions
LO4: To gain the knowledge of estimation of metals from their ores
LO5: To expose the experiments such as estimation of metal ion by using ion-exchange resin, instrumental methods of chemical analysis, adsorption
LO6: To introduce a photo chemical reduction

List of Experiments

1. Determination of Alkalinity of test sample of water.
2. Estimation of Available Chlorine in test sample of Bleaching powder.
5. Estimation of Cupric ions in the test solution.
6. Adsorption of an acid on a charcoal - Applicability of adsorption Isotherm.
7. Photochemical reduction of Ferric salt.
12. Estimation of Metal ion using ion-exchange resin.

Course Learning Outcomes (CO):

After completion of the course, the student will be able to

CO1: handle analytical instruments for chemical analysis
CO2: determine alkaline species, temporary and permanent hardness of a water sample
CO3: estimate some metals from their ores
CO4: understand the advantages of instrumental methods of chemical analysis over conventional methods
CO5: understand the principles involved in photo chemical and polymerization reaction
U14PH208  ENGINEERING PHYSICS LABORATORY

**Class:** B.Tech. II-Semester  
**Branch:** Common to all branches

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<td>End Semester Examination</td>
<td>60 marks</td>
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**Course Learning Objectives (LO):**

**LO1:** To understand the oscillatory phenomena in determining the various properties like rigidity modulus, moment of inertia, acceleration due to gravity and other elastic properties.

**LO2:** To determine the wavelengths, slit widths, diameters of thin wires etc., with high degree of accuracy using interference and diffraction techniques.

**LO3:** To study the optical activity of some substances.

**LO4:** To determine the optical fiber characteristics.

**List of Experiments**

2. Determination of slit width using He-Ne Laser.
3. To find dispersive power of a prism using Spectrometer.
6. To determine resolving Power of a Telescope.
7. To find the acceleration due to gravity (g) by Compound pendulum.
9. Photo Cell: To study the characteristics of a photo cell.
11. Spiral spring: Determination of force constant of spiral spring.

**Course Learning Outcomes (CO):**

After completion of the course, the student will be able to

**CO1:** handle and apply the powerful radiations like lasers and radioactive rays.

**CO2:** know the interference and diffraction patterns and apply them in precise measurements.

**CO3:** make preferential selection of Optical fibers.

**CO4:** determine the various optical, mechanical and magnetic properties.
Course Learning Objectives (LO):

LO1: To incorporate the basic knowledge of the environmental studies
LO2: To understand the need to use resources more equitably
LO3: To understand the knowledge of conservation of biodiversity
LO4: To introduce the causes, effects and control measures of environmental pollution
LO5: To know the issues involved in enforcement of environmental legislation

UNIT - I (6)

Introduction:
The Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance.

Natural Resources:
- Forest Resources: Use and over-exploitation of forests, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people.
- Water Resources: Use and over-utilization of surface and ground water, floods; drought; conflicts over water.
- Mineral Resources: Environmental effects of extracting and using mineral resources.
- Agricultural Land: Land as a resource, land degradation, soil erosion and desertification.
- Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
- Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources.

UNIT - II (6)

Ecosystem and Biodiversity:
- Biodiversity and its conservation: Introduction: Definition, genetic, species and ecosystem diversity; value of biodiversity. Biodiversity in India, Hot spots of biodiversity, Man-wildlife conflicts, Endangered and endemic species of India, In-situ and Ex-situ conservation

UNIT - III (6)

Environmental Pollution:
- Global climatic change, Green house gases, Acid rain.
- Solid and Hazardous waste management, effects of urban, industrial and nuclear waste.
- Natural disaster management: flood, earthquake, cyclone and landslides.
UNIT - IV (6)

Environment Protection and Society:

Text Books:

Reference Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to
CO1: understand human interaction with the environment
CO2: understand utmost importance of the sustainable use of natural resources
CO3: get acquainted with ecosystem and conservation of biodiversity
CO4: gain the knowledge of control measures of environmental pollution and natural disaster management
CO5: understand the conflict between the existing development strategies and need for environmental conservation
CO6: understand various environmental protection / control acts
CO7: understand the role of individual in the environment protection
U14ME209  ENGINEERING WORKSHOP PRACTICE

Class: B.Tech. II-Semester  Branch: Common to all branches

Teaching Scheme :

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Examination Scheme :

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<tr>
<td>End Semester Examination</td>
<td>60 marks</td>
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Course Learning Objectives (LO):

LO1: To understand the importance of workshop practice in Engineering
LO2: To acquire proper understanding of various manufacturing processes
LO3: To identify the significance and application of various tools and equipment used in workshop

List of Experiments

Foundry:
1. Prepare a Sand Mould using bracket pattern
2. Prepare a Sand Mould using dumbbell pattern

Fitting:
3. Prepare a Square fit using Mild Steel Plates
4. Prepare a Half round fit using Mild Steel Plates

Welding:
5. Prepare a Lap joint on Mild Steel Plates using Arc Welding
6. Prepare a Single V – Butt Joint on Mild Steel Plates using Arc Welding

Carpentry:
7. Prepare a Half lap joint of a given Wooden pieces
8. Prepare a Bridle joint of a given Wooden pieces

Plumbing:
9. Prepare a Pipe joint with elbows & tee using PVC pipes
10. Prepare a Pipe joint with union & coupling using PVC pipes

Machine Shop:
11. Perform a Step turning operation on mild steel bar
12. Perform a Taper turning operation on mild steel bar

Text Books:

Course Learning Outcomes (CO):
After completion of the course, the student will be able to

CO1: know and understand the types of trades in engineering
CO2: improve their practical skills to develop new products
U14EA210  EAA: PHYSICAL EDUCATION & NSS

Class: B.Tech. II-Semester  Branch: Common to all branches

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 100 marks |
| End Semester Examination | - |

I. PHYSICAL EDUCATION

Course Learning Objectives & Outcomes:
- To perform and engage in a variety of physical activities
- To develop and maintain physical health and fitness through regular participation in physical activities
- To demonstrate positive self esteem, mental health and physiological balance through body awareness and control
- To exhibit the spirit of fair play, team work and sportsmanship

Activities related to:
- Physical Fitness
- Games & Sports

II. NATIONAL SERVICE SCHEME (NSS)

Course Learning Objectives (LO):
The objectives of the NSS is to
LO1: arouse the social consciousness of the students
LO2: provide them with opportunity to work with people in villages and slums
LO3: expose them to the reality of life
LO4: bring about a change in their social perceptions
LO5: develop competence required for responsibility sharing and team work

List of Activities:
1. Shramadanam
2. Tree Plantation
3. General Medical Camps in Villages
4. Awareness on Eye Donation
5. Awareness on “Child Labour and Child Marriages”
6. Awareness programs on “Literacy, Good Health Practices, etc.”
7. Safe Riding Program
8. Awareness program on “RTI Act”
9. Awareness on Blood Donation

Course Learning Outcomes (CO)
After completion of the course, the student will be able to
CO1: develop his / her personality through community service rendered
CO2: apply their education to find solutions to individual and community problems
CO3: acquire capacity to meet emergencies and natural disasters
CO4: acquire a democratic attitude, leadership qualities and practice national integration
### KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-15

(An Autonomous Institute under Kakatiya University)

**SCHEME OF INSTRUCTION AND EVALUATION**

**III SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME**

**INFORMATION TECHNOLOGY**

<table>
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**Student Contact Hours / Week:** 32

**Total Credits:** 28
U14MH301  ENGINEERING MATHEMATICS-III

Class:  B.Tech. III-Semester  Branch: Common to all

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: laplace transform and its use to find the solutions of certain initial and boundary value problems occur in engineering
LO2: fourier series and its importance
LO3: application of Fourier series to a few partial differential equations of specific importance like wave equation, heat conduction equation, etc. which arise in engineering
LO4: integration of a function of complex variable, and evaluation of certain real integrals using complex analysis

UNIT - I (9+3)

Laplace Transforms: Integral transforms, Kernel of a transform, Laplace transform of a function; Inverse Transform, Existence and uniqueness of Laplace Transforms, S-plane and region of convergence (ROC); Laplace Transform of some commonly used signals-Dirac-delta (impulse) function \( \mathcal{L} \{ u \} \), Step \( \mathcal{L} \{ u \} \), Ramp \( \mathcal{L} \{ u \} \), Parabolic \( \mathcal{L} \{ u \} \), Real exponential \( \mathcal{L} \{ e^{at} \} \), Complex exponential \( \mathcal{L} \{ e^{j\omega t} \} \), Sine & cosine functions, Damped sine & cosine functions, Hyperbolic sine & cosine functions, Damped hyperbolic sine & cosine functions, Rectangular pulse & triangle; Properties of Laplace Transforms- Linearity, First shifting theorem (Frequency shift property), Multiplication by ‘t’ and division by ‘t’, Laplace transforms of derivatives and integrals, Time scaling property, Time reversal property, Laplace transform of Heaviside unit step function, Second shifting theorem (time shift property); Initial value and final value theorems; Laplace transform of periodic functions, Convolution theorem.

Operational Calculus: Transfer functions, Solution of ordinary differential equations with constant coefficients and system of ordinary differential equations with constant coefficients using Laplace transforms, Application of Laplace transforms to the first order and second order systems subjected to impulse, Step, Periodic, Rectangular, Square, Ramp, Triangular and Sinusoidal functions.

UNIT - II (9+3)

Fourier Series: Periodic functions, Orthogonal and orthonormal functions and systems of orthogonal functions, Representation of a function as trigonometric Fourier series (FS) in a range of length 2\( \pi \), Euler formulae, Conditions for the existence of Fourier series (Dirichlet’s conditions), FS for typical wave forms - Square wave, Pulse train, Impulse train(comb function), Periodic rectangular wave, Triangle, Saw-tooth, Half-wave rectified signal, Full-wave rectified signal; Plotting FS coefficients - Line spectrum (magnitude and phase spectra); Effects of symmetry of function on FS coefficients, Exponential FS, Fourier series of Sin\( \theta \) and Cos\( \theta \) and combination of Sinusoids, Fourier series on an arbitrary period; Half range series – Half range cosine and sine series expansions.
UNIT - III (9+3)


Vibrating string: Wave equation and its solution by the method of separation of variables, D’Alembert’s solution of wave equation, solutions of various boundary value problems based on vibrating string.

One dimensional heat flow: Transient heat flow equation, Heat flow through a bar of finite length with homogeneous and non homogeneous boundary conditions, Heat flow through a bar with insulated ends.

Two dimensional heat flow: Equation of two dimensional heat flow (Laplace’s equation) under steady state/the electrostatic potential of electrical charges in any region that is free of these charges (problems based on Trigonometric FS only), Solution of Laplace’s equation in cartesian and polar form, Heat flow through infinite rectangular plates, Finite square plate and semi circular and circular plates.

UNIT - IV (9+3)

Complex Integration: Line integration in complex plane, Integral of a non analytic function, Dependence on path of integration, Bounds for integrals, ML-Inequality, Cauchy’s integral theorem, Cauchy’s integral formula; Series expansion of complex functions - Taylor’s series and Laurent’s series; Zeros and singularities, Residues; Residue Theorem - Applications of Residue theorem to the properly chosen integrals around a unit circle and semi circle.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, the students will be able to

CO1: find Laplace transform of a given function and apply Laplace transforms to solve certain differential equations

CO2: express given function as a Fourier series in an interval

CO3: find solutions of partial differential equations by the method of separation of variables and apply the same to wave equations, equation of heat flow and Laplace’s equation (cartesian & polar forms)

CO4: represent a given function in Taylor’s & Laurent’s series along a given path and evaluate certain real integrals using integral theorems
U14MH302   DISCRETE MATHEMATICS

Class:   B.Tech. III-Semester  Branch: Common to CSE and IT

Teaching Scheme:

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Examination Scheme:

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<th>Continuous Internal Evaluation</th>
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<tr>
<td>End Semester Examination</td>
<td>60 marks</td>
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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: necessary mathematical concepts that are prerequisite for computer related subjects namely
database management systems, knowledge based systems and artificial intelligence
LO2: first-order logic, quantifier logic and predicate logic
LO3: elementary combinations and permutations with repetitions, different methods of solving
recurrence relations
LO4: concepts and algorithms related to various types of graphs, trees and applications to real life
problems

UNIT - I (9+3)

Foundation: Sets and operations on sets, Relations and functions, Binary relations, Equivalence
relations, Partial order relations, Hassee diagram and lattices, transitive closure of a relation,
paths and closures, digraphs, adjacency matrices of binary relations, Warshall algorithm.

UNIT - II (9+3)

Fundamentals of Logic: Propositions and connectives, truth tables, propositional functions,
logical inferences, first order logic, predicate calculus and quantified logic, pigeonhole principle,
mathematical induction.

UNIT - III (9+3)

Elementary combinations and recurrence Relations: Basic concepts of permutations and combinations,
enumeration with unlimited repetition and applications, enumeration with constrained repetitions and applications, principle of inclusion and exclusion.
Generating function of sequences: Coefficients of generating function, recurrence relations and
its applications, solutions of recurrence relations by method of substitution, characteristic roots
and generating functions, solving non-linear recurrence relations.

UNIT - IV (9+3)

Graphs: Basic concepts, isomorphism, sub graphs, trees and their properties, spanning trees,
binary trees, planner graphs, Euler’s formula, multi graphs and Eulerian circuits, Hamiltonian
graphs, chromatic number, four color problem.

Text Book:
| Reference Books:                                                                                     |

| Course Learning Outcomes (CO):                                                                 |
| Upon completion of this course, the students will be able to                                    |
| CO1:  apply concepts of sets & relations to lattice problems and determine all the possible paths available in directed paths |
| CO2:  analyze the different types of logic in order to establish knowledge based systems and verify numerical statements using induction |
| CO3:  solve different type of enumeration and apply to real life problems                        |
| CO4:  find the shortest path & the chromatic number of a given graph and solve Konigsberg’s seven bridge problem using Euler graphs |
U14EC303 DIGITAL CIRCUITS AND LOGIC DESIGN

Class: B.Tech. III-Semester  Branch: Common to EIE, EEE, CSE and IT

Teaching Scheme :

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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: switching algebra and various minimization techniques of switching functions.
LO2: various Combinational Circuits and their applications.
LO3: types of Flip Flops and their use in the design of Sequential Circuits.
LO4: different Logic Family Circuits and their performance.

UNIT – I (9+3)

Number Systems and Codes: Review of Number Systems, Binary Arithmetic, Binary Weighted and Non Weighted Codes, Error Detecting and Error Correcting Codes.

Boolean Algebra: Postulates and Theorems; Logic Gates and truth tables; Representation, Minimization and Realization of Switching Functions, SOP & POS forms, Minimization using Karnaugh Map and Quine - McClusky Techniques

UNIT – II (9+3)

Combinational Circuits: Design of Combinational Circuits using Logic Gates - Half Adder, Full Adder, Half Subtractor, Full Subtractor, Parallel Adder, Serial Adder, Carry Look Ahead Adder, BCD Adder, 1’s and 2’s Complement Adder/Subtractors, Decoders - BCD to 7 Segment, BCD to Decimal Decoders; Encoders- Priority Encoders; Multiplexers, Demultiplexers, Realization of Switching Functions using Multiplexers and Decoders; Parity Generators, Comparators.

UNIT – III (9+3)


Synchronous Sequential Circuits: State Table, State Diagram, State Assignment, Sequence Detectors, Binary Counters.

UNIT – IV (9+3)

Logic Families: Introduction to logic families, Characteristics- Fan in, Fan out, Noise Margin, Propagation Delay, Current Sourcing, Current Sinking; Study of RTL, DCTL, DTL, HTL, TTL, ECL and MOS Families, their Characteristics and comparison.
Text Books:


Reference Books:


Course Learning Outcomes (CO):
Upon completion of the Course, students will be able to
CO1: apply various minimization techniques to obtain minimal SOP/POS forms of Switching Functions
CO2: design different Combinational Circuits and implement logic functions
CO3: explain the operation of Flip Flops and their application in the design of Sequential Circuits like counters, Shift Registers, Sequence Detectors.
CO4: analyze the operation of various Logic Family Circuits and compare their Performance characteristics
U14IT304  COMPUTER ARCHITECTURE AND ORGANIZATION

Class: B.Tech. III-Semester  Branch: Information Technology

Teaching Scheme :

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Examination Scheme :

- Continuous Internal Evaluation: 40 marks
- End Semester Examination: 60 marks

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: understanding basic operations of computer system, byte addressability in memory location, addressing modes and instruction formats

LO2: logical representation of central processing unit and memory unit

LO3: computer arithmetic operations, interface unit for I/O devices communication and various modes of data transfer

LO4: priority interrupts, computer peripherals, pipelining and superscalar operations

UNIT - I (9+3)


Memory Location and Address: Byte addressability, Big endian and Little endian assignments, Word alignment, Accessing numbers, Characters and character strings, Addressing modes.

Instruction Format: Three, Two, One, Zero address instructions, Risk instructions, Modes of instructions, Instruction sequencing, Assembly language, Stacks and queues, Subroutines.

UNIT - II (9+3)

Central Processing Unit: Fundamental concepts, Execution of complete instruction, Control unit, Micro programming control unit, Hardwired control unit, Study of 8088, Power PC processor.

Memory Unit: Basic concepts of memory, Memory hierarchy, Technology-RAM, ROM, Flash memory, EPROM. Cache memory- Different mapping functions, Replacement algorithms, Performance considerations- Interleaving, Hit rate, Miss penalty, Caches on processor chip, Virtual memory- Address translation, Associative memory, Page replacement algorithms, Secondary storage devices- Magnetic hard disk, Optical disk.

UNIT - III (9+3)

Computer Arithmetic: Fixed and floating point representation, IEEE 754 representation, Addition and subtraction of signed numbers, Carry look ahead adder, Multiplication of positive numbers, Booth’s algorithm, Fast multiplication, Integer division, and Floating point arithmetic operation-Addition, Subtraction, Multiplication and Division.

I/O Interface: I/O Bus and interface modules, I/O versus Memory bus, Isolated I/O, Memory mapped I/O, Synchronous and asynchronous data transfer, Modes of data transfer-Programmed I/O, Interrupt initiated I/O.
UNIT - IV (9+3)

**Priority Interrupt:** Daisy chaining priority, Parallel priority interrupt, Priority encoder, Interrupt cycle, Software routine, DMA, Interface circuit-Parallel port, Serial port, Standard I/O interfaces-PCI Bus, SCSI Bus, Universal serial bus.

**Computer Peripherals:** Input devices- Keyboard, Mouse, Touch pad, Scanners. Output devices- Video displays, Flat panel display, Printers, Graphics accelerators.

**Advanced Concepts:** Pipelining-Basic concepts, Data and instruction hazards, Influence on instruction sets, Data path and control considerations and Super scalar operations, Introduction to RISC and CISC.

**Text Books:**

**Reference Books:**

**Course Learning Outcomes (CO):**
Upon completion of this course, students will be able to

**CO1:** analyze functional units of computer and organize instructions for execution

**CO2:** describe functionality of control unit and reduce memory access time to fetch instructions from main memory

**CO3:** implement computer arithmetic operations, identify working procedure of interface unit and various modes of data transfer

**CO4:** explain polling mechanism in priority interrupts, functionality of I/O devices and categorize high performance processors
U14IT305 DATA STRUCTURES AND ALGORITHMS

Class: B.Tech. III-Semester Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 Marks |
| End Semester Examination | 60 Marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: basics of data structure, its role in application development and operations of linear data structures
LO2: understanding concepts and operations of linked lists and trees
LO3: graphs representations, traversal techniques, spanning trees and importance of balanced trees
LO4: sorting, searching mechanisms and the importance of hashing techniques

UNIT - I (9+3)

Basic Concepts: Algorithm specification- Introduction, Performance analysis and measurement- Performance analysis, Performance measurement.


Stacks and Queues: The stack abstract data type, The queue abstract data type,
Evaluation of expressions - Expressions, Postfix notations, Infix to postfix, Infix to prefix.

UNIT - II (9+3)

Linked Lists: Singly linked lists and chains, Representing chains, Circular lists, Linked stacks and Queues, Polynomials, Doubly linked lists.


UNIT - III (9+3)

Graphs: The graph abstract data type - Introduction, Definition, Graph representation, Elementary graph operations- Depth first search, Breadth first search, Connected components, Spanning trees, Minimum cost spanning trees - Kruskal’s algorithm, Prim’s algorithms, Shortest paths- All pairs shortest paths.


Multiway Search Trees: M-way search trees, B-trees, B+trees.
UNIT - IV (9+3)

**Sorting and Searching:** Searching, Search techniques- Binary search, Fibonacci search, Sorting-Types of sorting, General sort concepts, Bubble sort, Insertion sort, Selection sort, Quick sort, Heap sort, Merge sort, Comparison of all sorting methods.

**Hashing:** Introduction, Key terms and issues, Hash functions, Collision resolution strategies, Hash table overflow, Extendible hashing.

**Text Books:**

**Reference Books:**

**Course Learning Outcomes (CO):**
Upon completion of this course, students will be able to

- **CO1:** identify the importance of data structures and implement operations of linear data structures
- **CO2:** differentiate linear and non linear data structures and implement different operations on linked lists and trees
- **CO3:** implement graph traversal techniques and describe various search trees
- **CO4:** measure the performance of various sorting, searching and hashing techniques


### Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

**LO1:** core concepts and principles of existing programming languages
**LO2:** methods for structuring and organizing data values
**LO3:** analyzing features of C, C++ and Java for developing complex application programs
**LO4:** understanding principles and features of functional, logic and rule based languages

### UNIT - I (9+3)

#### Preliminaries of Programming Languages:
Software development process, Languages and software development environment, Languages and software design methods, Languages and computer architecture, Programming language qualities, A brief historical perspective, The bird’s eye view of programming language concepts, A simple program, Syntax and semantics, Semantic elements, Program organization, Program data and algorithms, Data, Computation, External environment.

#### Syntax and Semantics:
Language definition, Syntax, An introduction to formal semantics, Language processing, Variables, Generic routines, Aliasing and overloading, An abstract semantic processor, Run time structures - C1, C2, C3, C4, C5 languages, The structure of dynamic languages, Parameter passing.

### UNIT - II (9+3)

#### Structuring the Data:
Built-in types and primitive types, Data aggregates and type constructors, User-defined types and abstract data types, Abstract data types in C++, Type systems- Static versus dynamic program checking, Strong typing and type checking, Type compatibility, Type conversions, Types and subtypes, Generic types, Monomorphic versus Polymorphic type systems, The type structure of representative languages - Pascal, C++, Implementation models, Built-in primitive types and enumerations, Pointers and garbage collection.

### UNIT - III (9+3)

#### Structuring the Computation:
Expressions and statements-Conditional execution, Iteration, Routines, Style issues, Side effects and aliasing, Exceptions-Exceptions handling in C++, Pattern matching, Non determinism and backtracking, Event driven computations, Concurrent computations - Process, Synchronization and communication, Semaphores, Monitors and signals, Rendezvous.

#### Structuring the Program:
Software design methods, Concepts in support of modularity, Language features for programming in large - C, C++ - Abstract data types, Classes and modules, Generic units, Generic data structures, Generic algorithms, Generic modules, Higher levels of genericity.

#### Object Oriented Languages:
Concepts of object-oriented programming, Inheritance and the type system, Object-oriented features in programming languages - C++, Java.
UNIT - IV (9+3)

**Functional Programming:** Characteristics of imperative languages, Mathematical and programming functions, Principles of functional programming, Representative functional languages - LISP, APL, Functional programming in C++.

**Logic and rule-based languages:** Specification versus Implementation, Principles of logic programming, PROLOG, Functional programming versus Logic programming, Rule-based languages.

**Text Book:**

**Reference Books:**

**Course Learning Outcomes (CO):**
Upon completion of this course, students will be able to

- **CO1:** Outline the features of existing programming language and describe issues in designing a new language
- **CO2:** Identify properties of data types, implement and use data types of a language effectively while developing a program
- **CO3:** Compare major features of C, C++ and Java and develop well structured application programs
- **CO4:** Compare functional, logic and rule based languages and choose suitable language for application development
U14IT307 DATA STRUCTURES AND ALGORITHMS LABORATORY

Class: B.Tech. III-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

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<tr>
<th>Continuous Internal Evaluation</th>
<th>40 Marks</th>
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<td>End Semester Examination</td>
<td>60 Marks</td>
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Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: describing basic concepts of data structures, illustrating concepts and operations of linear data structures

LO2: implementing linked list operations

LO3: trees, graphs and implementation of its traversal techniques

LO4: implementing different types of sorting and searching techniques

List of Experiments

Experiment-I
1. Program to implement array operations.
2. Program to display sparse representation for a given m*n matrix.
3. Program to read a sparse matrix and display its transpose.

Experiment-II
4. Program to perform addition of two sparse matrices.
5. Program to implement stack operations using arrays.

Experiment-III
6. Program to implement multiple stack operations.
7. Program to convert infix expression into postfix.
8. Program to convert given infix expression into prefix notation.

Experiment-IV
9. Program to evaluate given postfix expression.
10. Program to implement queue operations using arrays.

Experiment-V
11. Program to implement circular queue operations using arrays.
12. Program to create single linked list and insert an element at desired position.

Experiment-VI
13. Implement the following operations on linked list.
   a) Delete  b) Concatenation  c) Reverse.
14. Program to implement double linked list operations. (Insertions and Deletions).

Experiment-VII
15. Program to implement circular single linked list and its operations.
16. Program to implement circular double linked list and its operations.
17. Program to create and display single linked list using header node.
18. Program to create and display double linked list using header node.

Experiment-VIII
19. Program to implement stack operations using linked list.
20. Program to implement queue operations using linked list.
Experiment-IX
   a) Inorder  b) Preorder  c) Postorder.
22. Program to create a binary search tree and perform the tree operations.
   a) Insertion of a node  b) Deleting a node.

Experiment-X
23. Implement the following graph traversal techniques.
   a) Depth first search  b) Breadth first search.

Experiment-XI
24. Program to implement insertion sort technique.
25. Program to implement selection sort technique.
26. Program to implement quick sort technique.

Experiment-XII
27. Program to implement merge sort technique.
28. Program to implement heap sort technique

Laboratory Manual:
1. Data Structures and Algorithms Laboratory Manual, prepared by the faculty of Dept. of IT.

Text Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: apply the practical knowledge in implementing operations of various linear data structures
CO2: analyze operations of linked list
CO3: implement programs on trees and graphs
CO4: implement sorting and searching techniques to solve real time problems
U14EE312  BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

Class: B.Tech. III-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

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<td>End Semester Examination</td>
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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: performance of diode & Zener diode
LO2: self biasing of transistor
LO3: use of Kirchhoff’s laws
LO4: determination of parameters of a transformer

List of Experiments

1. Static Characteristics of PN-Junction diode
2. Static Characteristics of a Zener diode
3. Input-output Characteristics of a transistor in CE configuration.
4. Static characteristics of JFET.
5. Biasing of a transistor.
6. Verification of Kirchhoff’s laws in a given network.
8. Determination of Parameter of a choke coil.
11. Determination of Self and Mutual inductance of a coupled coil.

Laboratory Manual:

1. Basic Electrical and Electronics Engineering Laboratory Manual, prepared by the faculty of Department of EEE.

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: decide the application of diode & Zener diode
CO2: validate Kirchhoff’s laws
CO3: determine parameters of a coil
CO4: distinguish the predetermination & determination of efficiency & regulation of transformer
U14MH309  COMPLIANCE WITH CURRENT ENGLISH

Class: B.Tech. III-Semester  Branch: EIE, EEE, IT and ECE

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 100 marks |
| End Semester Examination | -- |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: rudiments of grammar and accuracy in spoken English
LO2: introducing themselves, making new introductions, preparing scripts of simple dialogues, playing the assigned roles and speaking extempore and making public discourses
LO3: vocabulary to attribute quality to language
LO4: correct use of language and techniques to write an essay, a report, an official letter, to precise the given text and to prepare CV/resume

List of Activities

Activity-1: Identifying sub- tenses, structures and examples
Activity-2: Using tenses in different situations and detecting the errors
Activity-3: Matching the sentences with subject and verb
Activity-4: Making statements and questions using correct verb form that would go with the subject
Activity-5: Introducing oneself and introducing others
Activity-6: Developing dialogues on the given situations and playing the assigned roles
Activity-7: Predicting the meanings of different words, making sentences substituting a group of words, identifying the ambiguity in sentences and using foreign phrases in sentences
Activity-8: Speaking extempore on the given topic, making speeches and giving seminars
Activity-9: Preparing CV/resume and writing an official letter
Activity-10: Writing a report and an essay
Activity-11: Précising the given text
Activity-12: Correcting the errors in a sentence

Reference Book:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: use appropriate tense in proper situations and produce grammatically acceptable sentences in speech and writing
CO2: develop dialogues and conversations in English and make oral presentations effectively
CO3: use sound vocabulary in communication
CO4: write a report, an official letter, an essay, prepare CV/Resume and precise the given passage
### KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-15
(An Autonomous Institute under Kakatiya University)

**SCHEME OF INSTRUCTION AND EVALUATION**

IV SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME

INFORMATION TECHNOLOGY

<table>
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# For Lateral Entry Students Only  
Student Contact Hours / Week: 31+2#  
Total Credits: 26

*KITSW, Syllabi of B.Tech. IT 4-Year Degree Programme*  
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U14MH401 ENGINEERING MATHEMATICS-IV

Class: B.Tech. IV-Semester

Teaching Scheme:

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Branch: Common to all

Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This course will develop student’s knowledge in/on

LO1: various methods of solving system of linear equations and eigen value problem
LO2: methods of fitting curves by the method of least squares
LO3: probability distributions and applications to engineering disciplines
LO4: numerical methods to solve various problems

UNIT - I (9+3)
Matrices: Elementary transformations on a matrix to find inverse of a matrix, Rank of matrix, Normal form of a matrix, Solution of system of homogenous and non homogeneous linear equations, Linear dependence and independence of vectors. Eigen values and eigen vectors of a matrix - Cayley Hamilton theorem, Reduction of a matrix to diagonal form, Reduction of a quadratic form to canonical form.

UNIT - II (9+3)
Probability & Statistics: Statistical data: Review of measures of central tendency and measures of dispersion, Correlation coefficient, Rank correlation, Regression - Linear regression equations. Curve fitting: Method of least squares -Fitting of (i) Straight line (ii) Second degree parabola (iii) Exponential curves, Most plausible solution of a system of linear algebraic equations. Review of the concepts of probability, Random variables, Discrete and continuous probability distributions, Mean and variance of a distribution, Binomial distribution, Poisson distribution and normal distribution, Fitting of these probability distributions to the given data.

UNIT - III (9+3)

UNIT - IV (9+3)
Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, the students will be able to

**CO1:** compute rank of a matrix to solve a system of linear algebraic equations, eigen values, eigen vectors of a given square matrix and reduce a given quadratic form to canonical form

**CO2:** fitting various types of curves arising in the analysis of engineering problems, find correlation regression coefficients of given data and apply theoretical probability distributions in decision making

**CO3:** find the polynomial for the given set of data & its derivative and evaluate definite integrals using numerical methods

**CO4:** compute the solution of system of linear equations, algebraic, transcendental and ordinary differential equations
U14IT402  DESIGN AND ANALYSIS OF ALGORITHMS

Class: B.Tech. IV- Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: understanding time & space complexities of various algorithms and their asymptotic notations
LO2: key techniques for designing and analyzing algorithms, which include greedy paradigm and dynamic programming
LO3: applying the dynamic programming technique and using it in solving various problems
LO4: understanding concepts of branch & bound techniques, P, NP and NP-complete problems

UNIT - I (9+3)

Introduction: Algorithm analysis, Performance analysis, Space complexity and time complexity, Big ‘O’ notation, Omega notation and theta notation, Different mathematical approaches for solving time complexity of algorithms.
Sets and Disjoint Set Union: Introduction, Union and find operations.
Divide and Conquer: General method, Binary search, Merge sort, Quick sort, Strassen’s matrix multiplication.

UNIT - II (9+3)

Dynamic Programming: General method, Multistage graphs, All-pairs shortest paths, Single source shortest paths.

UNIT - III (9+3)

Dynamic Programming: Optimal binary search trees, String editing, 0/1 Knapsack problem, Reliability design problem, Traveling salesman problem.
Backtracking: General method, N-Queens problem, Sum of subsets, Graph coloring problem, Hamiltonian cycles.

UNIT - IV (9+3)

Branch and Bound: General method, Least cost (LC) search, The 15-puzzle problem, Control abstractions for LC-Search, 0/1 Knapsack problem, Traveling salesperson problem.
Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: evaluate, compare different algorithms using worst, average and best-case analysis and determine asymptotic expressions
CO2: apply greedy and dynamic programming techniques in solving various problems
CO3: design an algorithm to solve a new problem by choosing the appropriate algorithmic design technique, formulate the time-complexity and describe the methodologies of how to analyze an algorithm, evaluate its correctness and investigate whether the algorithm found is the most efficient
CO4: apply branch & bound techniques in identifying the basic complexity classes, such as P, NP and NP-complete
**U14IT403 DATABASE MANAGEMENT SYSTEMS**

**Class:** B.Tech. IV-Semester  
**Branch:** Information Technology

**Teaching Scheme:**

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**Examination Scheme:**

- Continuous Internal Evaluation: 40 marks
- End Semester Examination: 60 marks

**Course learning objectives (LO):**

This course will develop students’ knowledge in/on

- **LO1:** basic concepts of database system and Conceptual design using Entity Relationship(ER) model
- **LO2:** Enhanced Entity Relationship(EER) model, relational data model, Structured Query Language(SQL), relational algebra and relational calculus
- **LO3:** normalization of database, rules for database design and query optimization techniques
- **LO4:** transaction processing concepts like concurrency control, database recovery and security

**UNIT - I (9+3)**

**Databases and Database Users:** Introduction, Characteristics of the database approach, Actors on the scene, Workers behind the scene, Advantages of using a DBMS, Implications of the database approach, When not to use a DBMS.

**Database System Concepts and Architecture:** Data models, Schemas and instances, DBMS architecture and data independence, Database languages and interfaces, The database system environment, Classification of database management systems.

**Data modeling using the Entity-Relationship Model:** Using high-level conceptual data models for database design, Entity types, Entity sets, Attributes and keys, Relationships, Relationship types, Roles and structural constraints, Weak entity types, ER diagrams.

**UNIT - II (9+3)**

**Enhanced Entity-Relationship and Object Modeling:** Sub classes, Super classes and Inheritance, Specialization and generalization, Constraints and characteristics of specialization and generalization, Modeling union types using categories, Formal definitions for the EER model, Relationship types of degree higher than two.

**The Relational Data Model, Relational Constraints and the Relational Algebra:** Relational model concepts, Relational constraints and the Relational database schemas, Update operations and dealing with constraint violations, Basic relational algebra operations, Examples of queries in relational algebra.

**SQL:** Data definition, Constraints, Data manipulation, Transaction control, SQL queries, Additional features of SQL.

**ER and EER to Relational Mapping and Other Relational Languages:** Relational database design using ER-to-Relational mapping, Mapping EER model concepts to relations, The tuple relational calculus, The domain relational calculus, Overview of the QBE language.
UNIT - III (9+3)


UNIT - IV (9+3)

Transaction Processing Concepts: Introduction to transaction processing, Transaction and system concepts, Desirable properties of transactions, Schedules and recoverability, Serializability of schedules.

Concurrency Control Techniques: Locking techniques for concurrency control, Concurrency control based on timestamp ordering.

Database Recovery Techniques: Recovery concepts, Recovery techniques based on deferred update, Recovery techniques based on immediate update, Shadow paging.

Database Security and Authorization: Introduction to database security issues, Discretionary access control based on granting/revoking of privileges, Mandatory access control for multilevel security.

Text Book:

Reference Books:

Course learning outcomes (CO):
Upon completion of this course, the students will be able to
CO1: design entity-relationship model graphically to represent logical relationships of entities in order to create a database
CO2: design the database using Enhanced Entity Relationship model and evaluate queries using relational algebra and relational calculus
CO3: apply normalization to reduce redundancy and improve the performance of queries using optimization techniques
CO4: execute transactions in an interleaved fashion, manage multi-level security and control access over database by various users
U14IT404 JAVA PROGRAMMING

Class: B.Tech. IV-Semester

Branch: Information Technology

Teaching Scheme:

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<tbody>
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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: basic concepts of Java programming
LO2: utilizing inheritance, exceptional handling, packages and interfaces
LO3: exposing the concepts of multithreading and Java DataBase Connectivity (JDBC) programming
LO4: understanding concepts of Graphical User Interface (GUI) programming

UNIT – I (9+3)

Java Programming Fundamentals: History of Java, Java buzzwords, Data types, Variables, Scope and life time of variables, Operators, Expressions, Control statements, Type conversion, Arrays, Concepts of classes, Objects, Constructors, Methods, Access controls, this keyword, Garbage collection, Overloading of methods and Constructors, Parameter passing, Recursion, Variable length arguments, Nested and inner classes, String, StringBuffer, StringBuilder classes, StringTokenizer class, Understanding static- Variables, blocks and methods.

UNIT – II (9+3)

Inheritance: Basic concepts, Forms of inheritance, Member access rules, Usage of super keyword, Method overriding, Abstract classes, Dynamic method dispatch, Usage of final keyword for- variables, methods and classes, the Object class.
Exception Handling: Exception hierarchy, Benefits of Exception Handling, Classification of Exceptions- Checked and Unchecked exceptions, Usage of try, catch, throw, throws and finally, Re-throwing exceptions, Built-in exceptions, Creating user defined exceptions.
Packages and Interfaces: Defining, creating and accessing a package, Understanding CLASSPATH, Importing packages, Static import, Understanding access controls in packages, Differences between Classes and Interfaces, Defining an interface, Implementing an interface, variables in interface and extending interfaces.

UNIT – III (9+3)

Multithreading: Differences between multiple processes and multiple threads, Thread states, Creating threads, Interrupting threads, Thread priorities, Synchronizing threads, Inter thread communication, Thread groups, Daemon threads.
JDBC: Introduction to JDBC, Types of JDBC drivers, Different statement objects- Statement, PreparedStatement, CallableStatement and Batch updates.
UNIT – IV (9+3)

**Applets:** Inheritance hierarchy for applets, Differences between applets and applications, Life cycle of an applet, Developing applets and testing, Passing parameters to applets.

**Event Handling:** Events, Event sources, Event classes, Event listeners, Relationship between event sources and listeners, Event delegation model, Examples- Handling a button click, Handling mouse and keyboard events, Adapter classes.

**GUI Programming:** The AWT class hierarchy, Introduction to Swing, Swing versus AWT, MVC architecture, Hierarchy for Swing components, Containers- Top level containers, JFrame, JApplet, JWindow, JDialog, Light weight containers, JPanel, Overview of several Swing components- JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, Layout manager types- flow, border and grid layouts.

**Text Books:**

**Reference Books:**

**Course Learning Outcomes (CO):**
Upon completion of this course, students will be able to

- **CO1:** analyze the importance of object oriented programming concepts of Java and develop modular programming using classes
- **CO2:** reuse concepts like inheritance, polymorphism, packages and interfaces in application development
- **CO3:** develop multithreading and database access applications
- **CO4:** use Graphical User Interface programming concepts to develop different applications
U14EC410  MICROPROCESSORS

Class: B.Tech. IV-Semester  Branch: Information Technology

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

This Course will develop students’ knowledge on/in
LO1: architectural issues of 8086 Microprocessor
LO2: programming concepts of 8086 Microprocessor
LO3: interfacing of peripheral devices to 8086 through 8255 (PPI), 8257 (DMA), 8259 (PIC)
LO4: serial data communication types and standards RS232, IEEE 488 BUS

UNIT – I (9+3)

Review of 8085 MPU Architecture,
8086 Family Architecture: Organization of 8086 CPU, Concept of Memory Segmentation, Segment Registers, Physical and Logical Addressing, Addressing Modes and Instruction Formats, Instruction Set.

UNIT – II (9+3)


UNIT – III (9+3)

Interfacing with 8086: 8086 Interrupts, Interrupt Service Routines, Priority Interrupt Controller 8259, Programmable Peripheral Interface 8255, Interfacing of Switches, Keyboards, LEDs, Stepper Motor, ADCs and DACs.

UNIT – IV (9+3)

DMA Controller 8257, Programmable Timer/Counter 8254.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to

CO1: explain 8086 architecture and instructions
CO2: use assembler directives and write Assembly Language Programs (ALPs)
CO3: write ALPs for interfacing i/o devices with 8086 MP through PPI / PIC
CO4: discuss Serial Communication Modes and Standards
U14IT405     JAVA PROGRAMMING LABORATORY

Class: B.Tech. IV-Semester     Branch: Information Technology

Teaching Scheme: | Examination Scheme:
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<td>End Semester Examination</td>
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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: core programming features of Java
LO2: utilizing inheritance, exceptional handling, packages and interfaces
LO3: the concepts of multithreading and Java Database Connectivity (JDBC) programming
LO4: understanding Graphical User Interface (GUI) programming using AWT and Swings

List of Experiments

Experiment-I
1. Print all Fibonacci numbers which lies between given two numbers a and b.
2. Write a program to read an array and display them using foreach loop. Finally display the sum of array elements.
3. Write a program to read a matrix and display whether it is an identical matrix or not. Use civilized form of break statement.

Experiment-II
4. Write a program to demonstrate garbage collector by invoking it explicitly.
5. Write a program to define a two dimensional array where each row contains different number of columns. Display the 2D-array using foreach.
6. Write a program to accept the string from keyboard, count number of vowels and remove all vowels from the string and display it.
7. Write a program to accept N number of strings from keyboard and display in sorted order.

Experiment-III
8. Write a program to accept the string from keyboard, count number of vowels and remove all vowels from string using StringBuffer class and display it.
9. Write a program to accept a line of text, tokenize the line using StringTokenizer class and print the tokens in reverse order.
10. Write a program to define a single function which can receive any number of integer values and display the sum of them.

Experiment-IV
11. Write program to demonstrate dynamic method dispatch.
12. Write a program to demonstrate use of abstract class.
13. Write a program to demonstrate the use of overriding equals() method which is defined in Object class.
Experiment-V
14. Write a program to read two integer numbers using command line argument and display the coefficient. Handle ArrayIndexOutOfBoundsException, NumberFormatException, and DivideByZeroException using multiple catch blocks.
15. Write a program to demonstrate re-throw of exception and finally block.
16. Find the average of n numbers where n to be input from the keyboard. If the n is zero or negative then a suitable user defined exception must be thrown. If it is not possible to convert input to integer then NumberFormatException must be caught.

Experiment-VI
17. Write a program to create a package, and import that package into our class.
18. Write a program to implement multiple interfaces into a single class.

Experiment-VII
19. Create two threads. One thread displays “Hello” for every half second and another thread displays “Hai” for every second.
20. Give a solution for producer and consumer problem using thread synchronization and communication, where a producer produces a set of integers and consumer consumes those integers.

Experiment-VIII
21. Create an account class which implements all account operations. Provide locking such that account details are consistent when the debit or credit operations invoked by the account holders simultaneously who have shared account.
22. Write a program display the contents of employee table in a tabular format.
23. Write a program to insert N number of records into Employee table using PreparedStatement.

Experiment-IX
24. Write a program to enhance the salaries of Employee by 10% who are earning salary greater than 5000 using CallableStatement.
25. Write a program delete all students whose marks are below 50% and also display the count.
26. Write a program to execute given SQL statements on the database and also display the results using BatchUpdate.

Experiment-X
27. Develop an applet that draws different geometric shapes and fill them with different colors.
28. Design an applet to display “good Morning” if current time is between “6 AM and 12 PM” and “Good Afternoon” if the current time is between 12 PM and 6PM, and “Good Evening” if the current time is between 6PM and 12AM.
29. Design an applet to demonstrate mouse events and key events.

Experiment-XI
30. Design a calculator applet.
31. Design an applet to accept two numbers and perform addition, subtraction, multiplication, division and modulus using button event.
32. Design an applet to implement Scrollbar.
Experiment-XII
33. Design a frame which accepts table name and displays the contents in tabular format.
34. Design a frame and provide implementations for insert, delete, edit buttons to perform appropriate operations in an employee table.
35. Create a frame to add a MenuBar with submenu items.

Laboratory Manual:
1. Java Programming Laboratory Manual, prepared by the faculty of Dept. of IT.

Text Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: implement Object Oriented Programming concepts using Java
CO2: reuse concepts like inheritance, polymorphism, packages and interfaces in application development
CO3: develop multithreading and database access applications
CO4: use Graphical User Interface programming concepts to develop different Java applications
**U14IT406 DATABASE MANAGEMENT SYSTEMS LABORATORY**

**Class:** B.Tech. IV-Semester  
**Branch:** Information Technology

**Teaching Scheme :**

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**Examination Scheme :**

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination   | 60 marks |

**Course Learning Objectives (LO):**

This laboratory will develop students’ knowledge in/on

**LO1:** Data Definition Language (DDL) commands, Data Manipulation Language (DML) commands and Structured Query Language (SQL) functions

**LO2:** sub queries, indexes, user defined data types, views, sequences and Data control language commands

**LO3:** basic Procedural Structured Query Language (PL/SQL) programs and Cursors

**LO4:** stored procedures/functions, exception handling, packages and triggers

**List of Experiments**

**Structured Query Language (SQL)**

**Experiment-I**
1. Queries on DDL (Create, Alter, Drop) and DML (Insert, Update, Delete) statements.
2. Queries on column level and table level constraints.

**Experiment -II**
3. Queries using built-in functions of NUMBER, CHARACTER, DATE Data types.
4. Queries on Data type conversion functions.

**Experiment -III**
5. Queries on single row functions and operators.

**Experiment -IV**
6. Queries on aggregate functions.

**Experiment -V**
7. Queries on joins and nested queries.

**Experiment -VI**
8. Write SQL statements to create simple, composite indexes, user-defined data types, views, sequences.
9. Queries on TCL and DCL commands.

**PL/SQL Programs**

**Experiment -VII**
10. Write sample PL/SQL programs using conditional and iterative statements.

**Experiment -VIII**
11. Write PL/SQL programs using cursors.

**Experiment -IX**
12. Write PL/SQL programs using parameterized cursors.
Experiment-X
13. Write PL/SQL programs to handle exceptions.
14. Write PL/SQL program using stored procedures and functions.

Experiment –XI
15. Create a package which contains stored procedure/function for adding, deleting, updating and calculating total salary (sal+comm) of employees.
16. Create a package with stored procedure/function to debit an A/C, credit an A/C and find the balance for a given A/C no. Use a table BANK (ACC_NO, AH_NAME, BALANCE).

Experiment -XII
17. Write PL/SQL programs for creating triggers.

Laboratory Manual:
1. Database Management Systems Laboratory Manual, Prepared by the faculty of Department of IT.

Text Book:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: evaluate SQL queries using DDL/DML commands to create and manipulate data in database by enforcing constraints
CO2: demonstrate various database objects using SQL queries
CO3: implement block structured programming with cursors to enable traversal over the records of the database
CO4: implement pre-compiled stored programs, run-time errors checking, database objects collection in PL/SQL packages and high-level security using triggers
U14EC411   MICROPROCESSORS LABORATORY

Class: B.Tech. IV-Semester

Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This Course will develop students' knowledge on/in

LO1: implementation of Combinational Circuits using Digital ICs
LO2: implementation of Sequential Circuits using Digital ICs
LO3: implementation of simple arithmetic, Logical and Data Processing Algorithms using Assembly Language Programs
LO4: implementation of simple Data Conversion and String Manipulation algorithms using Assembly Language Programs

List of Experiments

1. Design and Implementation of Logic Functions/Adder/ Subtractor using Logic Gates.
2. Design and Implementation of Binary to Gray and Gray to Binary code converters using XOR gates.
4. Truth Table Verification of Flip Flops: SR, JK, D & T Flip-Flop.
5. Design and Implementation of Decade Counter using IC 7490.
6. Design and Implementation of 4-bit Shift Register/Ring Counter/Johnson Counter.
7. Study of 8086 Trainer Board
8. Simple Arithmetic Operations (Addition, Subtraction, Multiplication and Division) on Single and Double Precision data
9. ALPs for
   a) Finding Largest / Smallest Number
   b) Arranging in Ascending/ Descending order
10. ALP for finding Factorial using recursive procedures
11. ALPs for String Manipulation
12. ALPs for Code conversions
Laboratory Manual:
1. Microprocessors Laboratory Manual, prepared by the faculty of department of ECE.

Text Book:

Course Learning Outcomes (CO):
Upon completion of the course, the students will be able to
CO1: implement Combinational Circuits using Digital ICs
CO2: implement Sequential Circuits using Digital ICs
CO3: use Development Boards and Assembler/Disassembler Software
CO4: program 8086 MP for implementing Arithmetic, Logic and Data Processing Algorithms
U14MH409  SOFT AND INTERPERSONAL SKILLS

Class:  B.Tech. IV-Semester

Teaching Scheme :

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Branch:  Common to EIE, EEE, IT and ECE

Examination Scheme :

- Continuous Internal Evaluation 100 marks
- End Semester Examination -

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1:  language skills and speaking with logical sequence & confidence
LO2:  knowing their skills in public speaking and practice to reveal true qualities of personality & leadership
LO3:  knowing their suitable and apt career objectives in-line with the industry expectations
LO4:  developing career goals, and strategies for gaining employability skills

List of Activities
Activity 1: Team interaction
Activity 2: JAM round
Activity 3: Extempore
Activity 4: Debate
Activity 5: GD
Activity 6: Elocution
Activity 7: Presentations through PPTs
Activity 8: Oral presentations on career planning and “my dream-career”
Activity 9: SWOT analysis presentation
Activity 10: Mock Interview
Activity 11: Hosting and anchoring an event
Activity 12: Story narration

Suggested Readings:

Course Learning Outcomes (CO):
Upon completion of this course, the students will be able to
CO1:  exhibit their verbal skills and non verbal skills
CO2:  identify clearly defined career objective and apply skills to achieve excellence in their career
CO3:  analyze and relate their competencies as per the industry requirements
CO4:  excel in interviews to attain better opportunities

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U14CH209  ENVIRONMENTAL STUDIES

Class: B.Tech. IV- Semester

Branch: Common to all branches

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: incorporate the basic knowledge of the environmental studies
LO2: understand the need to use resources more equitably
LO3: understand the knowledge of conservation of biodiversity
LO4: introduce the causes, effects and control measures of environmental pollution
LO5: know the issues involved in enforcement of environmental legislation

UNIT - I (6)

Introduction:
The Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance.

Natural Resources:
Forest Resources: Use and over – exploitation of forests, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people.
Water Resources: Use and over- utilization of surface and ground water, floods, drought, conflicts over water.
Mineral Resources: Environmental effects of extracting and using mineral resources.
Agricultural Land: Land as a resource, land degradation, soil erosion and desertification.
Food Resources :World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources.

UNIT - II (6)

Ecosystem and Biodiversity:
Biodiversity and its conservation: Introduction: Definition. genetic, species and ecosystem diversity; value of biodiversity. Biodiversity in India, Hot spots of biodiversity, Man-wildlife conflicts, Endangered and endemic species of India, In-situ and Ex-situ conservation

UNIT - III (6)

Environmental Pollution:
Global climatic change, Green house gases, Acid rain.
Causes and effects of Air, Water, Soil, Marine and Noise pollution with case studies.
Solid and Hazardous waste management, effects of urban, industrial and nuclear waste.
Natural disaster management: flood, earthquake, cyclone and landslides.
UNIT - IV (6)

Environment Protection and Society:

Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, the students will be able to
CO1: understand human interaction with the environment
CO2: understand utmost importance of the sustainable use of natural resources
CO3: get acquainted with ecosystem and conservation of biodiversity
CO4: gain the knowledge of control measures of environmental pollution and natural disaster management
CO5: understand the conflict between the existing development strategies and need for environmental conservation
CO6: understand various environmental protection / control acts
CO7: understand the role of individual in the environment protection

*** Note: To be offered to the Lateral Entry students in the IV semester
## SCHEME OF INSTRUCTION AND EVALUATION

### V SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME

### INFORMATION TECHNOLOGY

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**Student Contact Hours / Week:** 30

**Total Credits:** 29
U14IT501    COMPUTER NETWORKS

Class: B.Tech. V- Semester    Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This course will develop students' knowledge in/on

LO1: network topologies, network reference models, physical layer and various modulation and switching techniques

LO2: design issues and protocols of data link layer, MAC protocols, Ethernet and Bluetooth technology

LO3: principles and design issues of network layer and Internet protocols

LO4: transport layer design issues, protocols and application layer services

UNIT - I (9+3)

Introduction: Uses of computer networks, Network hardware, Network software.
Physical layer: Theoretical basis for data communication, Transmission media- Guided transmission media, Wireless transmission, Communication satellites, Digital modulation and multiplexing.
Switching: Circuit switching, Packet switching.

UNIT - II (9+3)

Data Link Layer: Data link layer design issues, Error detection and correction, Elementary data link protocols, Sliding window protocols.
The Medium Access Control Sub layer: Channel allocation problem, Multiple access protocols: ALOHA, Carriers sense multiple access, Collision free protocols, Limited contention protocol, IEEE standard 802.3 and Ethernet, Token bus, Token ring, Distributed queue and dual bus, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, Bluetooth, Data link layer switching.

UNIT - III (9+3)

Network Layer: Network layer design issues, Routing algorithms, Optimality principle, Shortest path algorithm, Flooding, Distance vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing.
Internetworking: How networks differ, How networks can be connected, Tunneling, Internetwork routing, Packet fragmentation.
UNIT - IV (9+3)

Transport Layer: The Transport services, Elements of transport protocols: Connection establishment and release, Error control and flow Control, Multiplexing congestion control, Multiplexing, Crash recovery, Internet transport protocols- UDP, TCP.

Application Layer: DNS- Domain name system, Electronic mail, World Wide Web. Streaming audio and video.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to

CO1: describe various Network topologies and functionalities of layers in network reference models
CO2: analyze various design issues in Data link layer and develop protocols to handle Data link layer operation
CO3: analyze various design issues and develop protocols for network layer
CO4: explain various design issues, protocols of transport layer and application layer services
U14IT502 SOFTWARE ENGINEERING

Class: B.Tech. V-Semester  
Branch: Information Technology

Teaching Scheme:
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Examination Scheme:
- Continuous Internal Evaluation: 40 marks
- End Semester Examination: 60 marks

Course Learning Objectives (LO):
This course will develop students’ knowledge on/ in:
- **LO1:** software fundamentals and different software models
- **LO2:** different types of software modeling designs and patterns
- **LO3:** different testing methods for a given software
- **LO4:** estimating total time needed to complete the project using metrics

**UNIT - I (9+3)**

**Software Engineering Concepts:** The changing nature of software, Software application domains, Legacy software, Software myths, Software engineering layered technology, A process framework, The capability maturity model integration (CMMI), Agile software.

**Process Models:** Prescriptive process models, RAD model, Specialized Process models, Unified process model, Personal and team process models.

**Software Engineering Practices:** Software engineering practices, Communication practices, Planning practices, Modeling practices, Construction practices, Deployment practices, Requirements engineering tasks, Requirements analysis and modeling strategies.

**UNIT - II (9+3)**

**Design Engineering:** Design within the context of software engineering, Design process and design quality, Design concepts, The design model, Pattern based software design.

**Creating an Architectural Design:** Software architecture, Architectural styles and patterns, Architectural design, Assessing alternative architectural designs, Architectural mapping using data flow, Designing class based components, Component level design for webapps, Designing traditional components.

**UNIT - III (9+3)**

**User Interface Design:** The golden rules, User interface analysis and design, Webapp interface design.

**Testing Strategies:** Software testing fundamentals, Test strategies for conventional software, Test strategies for object-oriented software, Validation testing, System testing, Debugging process, White box testing, Basis path testing, Control structure testing, Black box testing.

*KITSW, Syllabi of B.Tech. IT 4-Year Degree Programme*
UNIT - IV (9+3)

Product Metrics: Measures, Metrics and indicators, Metrics for the requirements model, Metrics for the design model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Projects: Metrics in the process and project domains, Software measurement, Metrics for software quality, Integrating metrics within the software process, The W5HH principle.

Project Scheduling: Project scheduling, Scheduling for webapps projects, Earned value analysis.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: analyze and implement the appropriate software model for real time applications
CO2: develop different types of software modeling designs and patterns
CO3: apply the appropriate testing method for a software
CO4: evaluate and analyze the quality and completion time of a software project
Class: B.Tech. V-Semester  Branch: Information Technology

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):
This Course will develop student’s knowledge in/on
LO1: Deterministic Finite Automata (DFA), Non deterministic Finite Automata(NFA) and Regular Expressions(RE)
LO2: properties of regular languages, applications of Context Free Grammar(CFG) and normal forms
LO3: designing Push Down Automata(PDA), decision algorithms and properties of CFG
LO4: Turing Machines(TM), undecidable problems, Polynomial time(P) and Non Polynomial time(NP) problems

UNIT – I (9+3)

Automata: Introduction to mathematical preliminaries used, Introduction to finite automata, Structural representations and the central concepts of automata theory.


Regular Expressions and Languages: Regular expressions, Finite automata and regular expressions, Applications of regular expressions.

UNIT – II (9+3)

Properties of Regular Languages: Proving languages not to be regular, Closure properties of regular languages.

Context-Free Grammars and Languages: The Chomsky hierarchy, Context-free grammars, Applications of context-free grammars, Syntax trees, Derivations, Ambiguity in grammars and languages, Simplification of grammars, Normal forms for context-free grammars.

UNIT – III (9+3)

Properties of Context-Free Languages: The pumping lemma for context-free languages, Closure properties of context-free languages, Decision algorithms of CFL’s.

Pushdown Automata: Definition of the pushdown automaton, The languages of PDA, Equivalence of PDA’s and CFG’s.

UNIT – IV (9+3)

Introduction to Turing Machines: Problems that computers cannot solve, The turing machine, Programming techniques for turing machines, Extensions to the basic turing machine.

Undecidability: A language that is not recursively enumerable, An undecidable problem that is RE, Post’s correspondence problem, Undecidable problems, Overview of P and NP problems.
Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: design DFAs, NFAs and regular expressions
CO2: state the properties of RE, applications of CFG and convert the grammar to Chomsky normal form or Greibach normal form
CO3: design PDAs, state the properties of CFG and find the equivalence between PDAs and CFGs
CO4: design turing machines, assess the undecidability of problems and explain P , NP problems
U14IT504 OPERATING SYSTEMS

Class: B.Tech. V-Semester

Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 Marks |
| End Semester Examination       | 60 Marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: concepts and the underlying principles of operating systems and techniques used in operating system development

LO2: process scheduling, process synchronization methods and deadlock handling techniques

LO3: understanding the scheduling and management of various resources like memory and disk

LO4: understanding the concepts of file management, OS protection & security techniques and distributed & network OS

UNIT – I (9+3)

Introduction: What operating systems do, Computer system architecture, Operating system structure, Operating system operations, Process management, Memory management, Storage management, Protection and security, Distributed systems, Special purpose systems, Computing environments, Open source operating systems.

System Structures: Operating system services, User operating system interface, System calls, Types of system calls, Operating system structure, Virtual machines, Operating system generation, System boot.


UNIT – II (9+3)

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms – First come first served, Shortest job first, Priority, Round robin, Multilevel queue, Multilevel feedback queue, Multiple processor scheduling.


Deadlocks: System model, Deadlock characterization, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT – III (9+3)

Memory Management Strategies: Basic hardware, Address binding, Logical versus physical address space, Dynamic loading, Dynamic linking and shared libraries; Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation.

Virtual Memory Management: Background, Demand paging, Page replacement-Basic page replacement, Page replacement algorithms-FIFO, Optimal, LRU, LRU-Approximation, Counting based; Allocation of frames, Thrashing.

Secondary Storage Structure: Disk structure, Disk scheduling, Disk management, Swap space management.
UNIT - IV (9+3)


Distributed Operating Systems: Motivation, Types of network based operating systems - Remote login, Remote file transfer; Naming and transparency, Remote file access, File replication.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe the role and types of operating systems, structure and process management
CO2: apply the concepts of process scheduling algorithms and process synchronization in problem solving
CO3: describe different memory management techniques and apply them in various application developments
CO4: describe the concept of file management, protection and security methods and compare distributed & network operating system features
U14IT505  WEB TECHNOLOGIES

Class: B.Tech. V-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

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<td>End Semester Examination</td>
<td>60 marks</td>
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Course Learning Objectives (LO):
This course will develop student’s knowledge in/on

LO1: web development using HTML and Java Script
LO2: XML Technologies, XSLT, DTDs and servlet programming
LO3: developing web based applications using JSP and servlets
LO4: designing web pages using Facelets and PHP

UNIT – I (9+3)


UNIT – II (9+3)


Servlets: Introducing servlet, Exploring the features of Java servlets, Servlet – a request and response model, Understanding session tracking, Cookies.

UNIT – III (9+3)


UNIT – IV (9+3)

Facelets: Facelets tags, Templating with Facelets-Building pages from common templates, Organizing your views, Decorators, Parameters. Custom tags- Components and fragments.
Introduction to PHP: Working with variables and constants - Variables, Naming rules and conventions, Assigning values to variables, Using constants, Exploring data types in PHP, Determining variable data type, Using type casting, Exploring operators in PHP, Operators and precedence, Controlling program flow - Conditional statements, The if statement, Defining the nested if-else statements, Looping statements, Break, Continue, Exit statements, Functions, Arrays, Files, Directories.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to

CO1: design dynamic web pages using technical expertise in HTML and JavaScript
CO2: design web pages using servlets, XML and extensible style sheet language
CO3: develop web based applications using technologies like JSP and Servlet
CO4: design Java Server Face views using Facelets and develop web based applications using PHP.
U14IT506       CRYPTOGRAPHY AND NETWORK SECURITY

Class: B.Tech. V-Semester

Teaching Scheme:

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Examination Scheme:

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<td>End Semester Examination</td>
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Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: basic concepts of security attacks, services and mechanisms
LO2: number theory and public key cryptographic algorithms
LO3: analyzing cryptographic techniques, protocols, formats, standards and basic types of authentication mechanisms
LO4: understanding the concept of IP security, firewalls and various malicious software

UNIT - I (9+3)


Classical Encryption Techniques: Symmetric cipher model, Substitution techniques, Transposition techniques, Steganography.

Block Ciphers and the Data Encryption Techniques: Simplified DES, Block cipher principles, Data encryption standard, Strength of DES, Differential and linear cryptanalysis, Block cipher design principles and Block cipher operations.


UNIT - II (9+3)

Number Theory: Prime and relatively prime numbers, Fermat’s and Euler’s theorem, Euclid’s algorithm.


Other Public-Key Cryptosystems: Diffie-Hellman key exchange, Elliptic curve arithmetic and cryptography.

Cryptographic Hash functions: Applications of cryptographic hash functions, Two simple hash functions, SHA.

UNIT - III (9+3)

Message Authentication Codes: Message authentication requirements, Message authentication functions, Message authentication codes, Security of MACs, HMAC.

Digital Signature and Authentication Protocols: Digital signatures, Digital signature standard.

Key Management and Distribution: Symmetric key distribution using symmetric encryption, Symmetric key distribution using asymmetric encryption, Distribution of public keys, X.509 authentication service.

Electronic Mail Security: Pretty good privacy, S/MIME.
UNIT - IV (9+3)


Malicious Software: Viruses and related threats, Virus counter measures.

Firewalls: Firewall design principles, Trusted systems.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: analyze different security attacks, services and mechanisms
CO2: apply mathematical concepts in cryptographic algorithms
CO3: categorize the key management and message authentication techniques
CO4: defend data and systems from unauthorized persons, intruders and malicious software
U14IT507 WEB TECHNOLOGIES LABORATORY

Class: B.Tech. V-Semester                         Branch: Information Technology

Teaching Scheme:                                            Examination Scheme:

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Continuous Internal Evaluation  40 marks
End Semester Examination  60 marks

Course Learning Objectives (LO):
This course will develop student’s knowledge in/on
LO1: web development using HTML and JavaScript
LO2: XML technologies and servlet programming
LO3: developing web based systems using JSP
LO4: designing web based applications using Facelets and PHP

List of Experiments

Experiment-I
1. Create a simple webpage using HTML.
2. Design a web page, which allows user to enter his biographical details.

Experiment -II
3. Design a web page with two frames in single window, where one frame contains ordinary text and another contains image.
4. Create a web page containing row of images/logos and when you click on that image its enlarged view should appear in
   i. same window
   ii. new window.

Experiment -III
5. Design a webpage using frames to include images and videos.
6. Design a web page for student registrations (new admissions) into engineering college (use validations for checking the information entered by student).

Experiment -IV
7. Design a webpage using Cascading Style sheet features.
8. Design a dynamic web page with validations using JavaScript.

Experiment -V
9. Design a home page showing an overview of your college.
10. Design a simple application to demonstrate servlets.

Experiment -VI
11. Design a servlet for validating log-in information entered by user from remote system and the servlet has to report back to user regarding the status of connection.
12. Design a servlet which accepts information from student, for an engineering college admission and store the information entered into the database. (use the validations while student entering the information).
Experiment VII
13. Design a web page to store and display details of employee at server database.

Experiment VIII
14. Design a web page to store and display the details of student at server database using servlets.
15. Design a web page to store and display the details of employee at server database using JSP.

Experiment IX
16. Create a Facelet application to accept an SQL query and display the result of that query in another page.
17. Design a web page to upload the documents, images, media files into server database using PHP.

Experiment X
18. Design a web page to store and display the details of student at server database using PHP.

Experiment XI
19. Case Study: Design a simple online test webpage using PHP.

Experiment XII
20. Case Study: Design a simple mail server with following features.
   a. User registration.
   b. Login validation.
   c. Writing mails.
   d. Reading mails

Laboratory Manual:
1. Web Technologies Laboratory Manual, prepared by the faculty of Dept. of IT.

Text Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: design well formatted webpages using html and java script
CO2: use servlets and XML technology in developing web pages
CO3: design and develop web based systems for the enterprises using technologies like JSP
CO4: develop web based applications using Facelets and PHP
U14IT508  OPERATING SYSTEMS LABORATORY

Class: B.Tech. V- Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

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<tr>
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<td>60 marks</td>
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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: understanding and familiarizing the UNIX environment
LO2: fundamental concepts of shell programming
LO3: different CPU scheduling algorithms and deadlock avoidance algorithm
LO4: understanding different page replacement algorithms and file organization techniques

List of Experiments

Experiment-I
1. Practicing basic UNIX commands:
   a) General Utility Commands: login, cal, date, who, uname, echo, passwd, pwd, exit.
   b) File and Directory Related Commands: ls, cd, mkdir, rmdir, cat, cp, rm, mv, wc, comm, diff, split, ln, touch, chmod, chown, chgrp.
2. Practice the following examples.
   a) Display the contents of file (filenames starting with ‘a’ and ending with X )
   b) Copy the contents of directory1 to directory2.
   c) Remove the all .C files from current directory.
   d) Merge the three different files into single one.
   e) Display the list of files in given directory.
   f) Set given file as read only.

Experiment-II
3. Filters: (Data Processing Commands): more, head, tail, cut, paste, sort, uniq, nl, tr.
4. Communication Commands: write, mail, talk, finger, news.

Experiment-III
5. a) Process Related Commands: ps, kill, nice, at & batch
   b) Pattern Searching Commands: grep, egrep, fgrep.
6. Write the programs for the following:
   a) Display the details of all users those who are working on the system.
   b) Display the details of all users in an order they logged on to system (based on time) who are working on the system.
Experiment-IV
7. Practicing the Vi editor commands.
8. Shell Script Related Commands: sh, read, command line arguments ($1), $ @ & $*, set, exit, status ($?), logical operators: | |, &&, exit, if, sleep & wait, case, while & until, for, export, expr commands.

Experiment-V
9. Write programs for the following:
   a) Reading a character and displaying on the screen.
   b) Display the name and class of student in separate line.
   c) To check the given two characters are equal or not.
10. Write programs for the following:
    a) Display the given character in its binary form.
    b) To check given number is even or odd.
    c) Write a shell script to accept login name as command line argument and find out at how many terminals the user has logged in.

Experiment-VI
11. Write a shell script which gets executed at login time and displays a blinking message “Good morning/Good Afternoon / Good Evening” depending upon the time at which the user logs in.
12. Write a shell script to check the given character is vowel or not.
13. Write a shell script to perform all basic arithmetic operations using switch statement.
14. Write a menu driven program which has the following options:
    a) contents of a given file
    b) list of users who have currently logged in
    c) present working directory
    d) exit

Experiment-VII
15. Write the shell programs for the following:
    a) To print the Fibonacci series
    b) To check the given number is prime or not
    c) To print the following format:
        
        1
        1 2
        1 2 3
        1 2 3 4
        
    ......

Experiment-VIII
16. Write a shell script to display the given string in reverse order.
17. Write a shell script to find min and max elements in the given Array of integers.
18. Write a shell script function for factorial of a number.
Experiment-IX
19. Implement the following CPU scheduling algorithms.
   a) FCFS   b) RR   c) SJF   d) Priority Scheduling

Experiment-X
20. Implement the Banker’s algorithm for deadlock avoidance.

Experiment-XI
21. Implement the following page replacement algorithms.
   a) FIFO   b) LRU

Experiment-XII
22. Implement the following directory structures.
   a) Single Level Directory   b) Two Level Directory

Laboratory Manual:
1. Operating Systems Laboratory Manual, prepared by the faculty of Dept. of IT.

Text Book:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: recognize the importance of various categories of UNIX commands
CO2: apply shell programming concepts for developing applications
CO3: implement different scheduling algorithms and compare their performance and apply the Banker’s algorithm for solving the deadlock problem
CO4: implement page replacement algorithms, directory structures and compare their performance in finding optimal algorithm
U14IT509  SEMINAR

Class: B.Tech. V-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

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Course Learning Objectives (LO):

This course will develop students’ knowledge in/on
LO1: literature review and report writing
LO2: presentation skills and speaking with logical sequence & confidence
LO3: latest and current trends in technologies
LO4: critical thinking

Student has to give independent seminar on the state-of-the-art technical topics relevant to their program of study, which would supplement and complement the program assigned to each student.

Guidelines:

1. The HoD shall constitute a Department Seminar Evaluation Committee (DSEC)
2. DSEC shall allot a faculty supervisor to each student for guiding on (i) selection of topic (ii) literature survey and work to be carried out (iii) preparing a report in proper format and (iv) effective seminar presentation
3. There shall be only continuous Internal Evaluation (CIE) for seminar
4. The CIE for seminar is as follows:

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<td>Seminar Report</td>
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<td>DSEC Assessment: Oral presentation (PPT) and viva-voce</td>
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<td>Total Weightage:</td>
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(a) Report: Students are required to submit a well-documented report on the chosen seminar topic as per the prescribed format as per the dates specified by DSEC
(b) Presentation: The students are required to deliver the seminar before the DSEC as per the schedule notified by the department
(c) DSEC shall decide the course of action on the students, who fail to submit the seminar report and give oral presentation

Course Learning Outcomes (CO):

Upon completion of this course, students will be able to
CO1: analyze the technical content and prepare a well-documented report
CO2: make effective seminar presentation by exhibiting the presentation skills with confidence in a logical sequence
CO3: explain the current and upcoming technologies
CO4: propose and defend opinions and technical ideas with conviction (not as mere recipient of ideas)
### KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-15
(An Autonomous Institute under Kakatiya University)

**SCHEME OF INSTRUCTION AND EVALUATION**
**VI SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME**
**INFORMATION TECHNOLOGY**

<table>
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**Student Contact Hours / Week:** 29

**Open Elective-I**
- U14OE 601A : Disaster Management
- U14OE 601B : Project Management
- U14OE 601C : Professional Ethics in Engineering
- U14OE 601D : Rural Technology and Community Development

**Professional Elective-I**
- U14IT 605A: Distributed Computing
- U14IT 605B: Neural Networks
- U14IT 605C: Information Retrieval Systems
- U14IT 605D: Computer Graphics and Multimedia

**Total Credits:** 28
Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: nature of disaster and types of disasters
LO2: prevention, preparedness and mitigation measures for Earth Quake, floods, fire, landslides, cyclones, tsunamis, nuclear & chemical disasters
LO3: financial management of disaster and related losses
LO4: information and communication technology in disaster management and training

UNIT – I (12)
Introduction & principles of disaster management: Nature - Development, Hazards and disasters; Natural disasters - Earth quakes, Floods, Fire, Landslides, Cyclones, Tsunamis, Nuclear; Chemical dimensions and Typology of disasters - Public health disasters, National policy on disaster management.

UNIT –II (12)
Prevention and mitigation measures: Prevention, Preparedness and mitigation measures for various disasters, Post disaster reliefs and Logistics management, Emergency support functions and their coordination mechanism, Resources and material management, Management of relief camp.

UNIT – III (12)
Risk and vulnerability: Building codes and Land use planning, social vulnerability Environmental vulnerability, Macroeconomic management and sustainable development, Climate change, risk rendition, Financial management of disaster and related losses.

UNIT - IV (12)
Role of technology in disaster management: Disaster Management for Infrastructures, Taxonomy of infrastructure, Treatment plants and process facilities, electrical sub stations, roads and bridges, geo spatial information in agriculture, drought assessment, multimedia technology in disaster risk management and training.

Text Books:
Reference Books:

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<th>Course Learning Outcomes (CO):</th>
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<td>Upon completion of this course, students will be able to</td>
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<tr>
<td>CO1: <em>describe &amp; differentiate types of disasters</em></td>
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<tr>
<td>CO2: <em>identify prevention &amp; mitigation measures in case of earthquakes, floods, fire, landslides, Cyclones and tsunamis, nuclear &amp; chemical disasters and plan preparedness &amp; execute</em></td>
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<td>CO3: <em>assess financial management of disaster and related losses</em></td>
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<td>CO4: <em>apply information &amp; communication technology for disaster risk management and training the affected</em></td>
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U14OE601B  PROJECT MANAGEMENT

Class: B.Tech. VI-Semester  Branch: Common to all

Teaching Scheme:

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Examination Scheme:

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<tr>
<td>End Semester Examination</td>
<td>60 marks</td>
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Course Learning Objectives (LO):
This course will develop student’s knowledge in/on
LO1: role of project manager, organization and management functions
LO2: effective time and conflict management
LO3: project planning, scheduling and budgeting
LO4: cost control, risk management and quality control techniques

UNIT - I (12)

Project Management: Understanding project management, Role of project manager, Classification of projects; Project management growth - Definitions and Concepts; Organizational structures - Organizing and staffing the project management office and team; Management functions.

UNIT - II (12)

Time and Conflict management: Understanding time management, Time management forms, Effective time management, Stress and burnout; The conflict environment, Conflict resolution, The management of conflicts, Conflict resolution modes; Performance measurement, Financial compensation and rewards, Morality, ethics, and corporate culture, Professional responsibilities, Success variables, Working with executives.

UNIT - III (12)

Project planning: General planning, Life-cycle phases, Proposal preparation, Project planning, The statement of work, Project specifications, Milestone schedules, Work breakdown structure, Executive role in planning, The planning cycle, Handling project phase outs and transfers, Stopping projects, Scheduling techniques - CPM and PERT, Pricing and estimating.

UNIT - IV (12)

Cost and quality control: Understanding cost control, Earned value measurement system, Cost control problems, Methodology for trade-off analysis; Risk management process, Risk analysis, Risk responses, Monitoring and control of risks, Contract management; Quality management concepts, Cost of quality, Quality control techniques.

Text Book:
Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to

**CO1:** identify desirable characteristics of effective project managers

**CO2:** manage executives, use success factors and resolve conflicting environments

**CO3:** apply appropriate approaches to plan a new project in-line with project schedule and suitable budget

**CO4:** identify & explain important risks expected to be encountered in a new project and apply appropriate techniques to assess & improve ongoing project performance
Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: human values and engineering ethics
LO2: professionalism and theory of virtues
LO3: safety & risk benefit analysis, professional and intellectual property rights
LO4: environmental & computer ethics and various roles of engineers in a company

UNIT – I
Human Values: Morals, values & ethics, Integrity, Work ethic, Service learning, Civic virtue,
Respect for others, Living peacefully, caring, Sharing, Honesty, Courage, Valuing time, Co-
operation, Commitment, Empathy, Self-confidence, Character, Spirituality.

Engineering Ethics: Senses of “Engineering Ethics”, Variety of moral issues, Types of inquiry,
Moral dilemmas, Moral autonomy, Kohlberg's theory, Gilligan's theory - Consensus and
Controversy.

UNIT – II
Profession and professionalism: Profession and its attributes, models of Professional roles

Theory of Virtues: Definition of virtue and theories of virtues, self-respect, responsibility and
senses, modern theories of Virtues, uses of ethical theories

Engineering as social experimentation: Engineering as experimentation, engineers as
responsible experimenters, codes of ethics, a balanced outlook on law, the challenger case study

UNIT – III
Safety, Responsibilities and Rights: Safety and risk - assessment of safety and risk - risk
benefit analysis and reducing risk - Three Mile Island and Chernobyl case studies, collegiality
and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest
- occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) -
discrimination.

UNIT – IV
Global Issues: Multinational corporations - environmental ethics, computer ethics, weapons
development, engineers as managers, consulting engineers, engineers as expert witnesses and
advisors, moral leadership, sample Code of Ethics (specific to a particular Engineering
Discipline).

Text Book:
Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: summarize the need of human values and professional ethics
CO2: explain the concept of professionalism and theory of virtues
CO3: perform risk benefit analysis and describe professional rights & IPR
CO4: describe the various roles of engineer in a company and analyze code of ethics specific to a particular engineering discipline
U14 OE601D RURAL TECHNOLOGY AND COMMUNITY DEVELOPMENT

Class: B.Tech.VI-Semester

Teaching Scheme:

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Branch: Common to all

Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

- **LO1:** wide spectrum of technologies and processes for implementation in rural and tribal areas
- **LO2:** medicinal and aromatic plants to fulfill the needs of pharmaceuticals industries and rural energy for eradication of drudgery
- **LO3:** purification of drinking water, rain water harvesting and employment generating technologies
- **LO4:** concepts of community organization and development and other related issues in an accessible manner

UNIT - I (12)

**Technologies and Process:** Building materials and components – Micro concrete roofing tiles, water & fire proof mud walls and thatch, red mud/rice husk cement, types of bricks, ferrocement water tanks and other products, Cement blocks, Preservation of mud walls; Agricultural implements - Naveen sickle, Animal drawn digger, Grubber weeder, Self propelled reaper, Seed drill, Improved bakhar.

**Food Processing:** Introduction; Fruit and vegetable preservation – Process flow sheet, Scale of operation, Economic feasibility, Source of technology; Soya milk – Process, Economics; Dehydration of fruits and vegetables; Cultivation of oyster mushroom – Preparation of beds, Spawning, Removal of bags for production of mushrooms, Harvesting and marketing, Economics, Process flow sheet, Source of technology.

UNIT - II (12)

**Medicinal and Aromatic plants:** Introduction, Plants and its use, Aromatic plants, Cymbopogons, Geranium, Manufacturing of juice, Gel and powder; Rural energy – Cultivation of jatropha curcus and production of biodiesel, Low cost briquetted fuel, Solar cookers and oven, Solar drier, Biomass gasifier.

**Bio-fertilizers:** Introduction, Vermicompost, Improvement over traditional technology/process, Techno economics, Cost of production, Utilization of fly ash for wasteland development and agriculture.

UNIT - III (12)

**Purification of Drinking water:** Slow sand filtration unit, Iron removal, Iron removal plant connected to hand pump, Chlorine tablets, Pot chlorination of wells, Solar still, Fluoride removal; Rain water harvesting – Availability of rain water through roof top rain water harvesting, Through percolation tank, Check dams recharging of dug wells.

**Employment Generating Technologies:** Detergent powder and cake – Process, Process for liquid detergent; Carcass utilization – Improvement over traditional technology, Flow chart, Process, Capital investment; Indigo blue - Dye, Organic plant production, Dye extraction
techniques, Aspects of indigo market, Economics; Modernization of bamboo based industries - Introduction, Process for bamboo mat making, Machinery, Products; Agarbatti manufacturing; Vegetable tanning of leathers - Raw material, Soaking, Liming, Reliming, Deliming, Pretanning, Malani, Setting, Yield.

UNIT – IV (12)

Community development: Community organization – Concept, Definition, Need, Functions, Principles, Stages; Community development - Introduction, Concept, Definition, Need, Objectives, Characteristics, Elements, Indicators; Distinguish between community organization and community development;

Community Mobilization: Need, Benefits, Preparing, Initial contact with community, Coordinating, Functions of the community, Challenges, Techniques for mobilizing community, Community contributions, Leadership and capacity building, Community participation, Role of community worker in community mobilization; Models of community organization practice - Local development model, Social planning model, Social action model, Approaches to community organization.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
- CO1: describe various technologies and process which can be implemented in rural and tribal areas
- CO2: identify the major medicinal plants are required for commercial supply to Pharma companies and alternative fuel that could meet substantial oil need in the country
- CO3: analyze several cost effective technologies for purification of water which can adopted in rural areas, various rain water harvesting techniques of collection and storage of rain water
- CO4: describes in detail the process of community development, different aspects of community organization and community mobilization covering needs, benefits and challenges related to it
- CO5: explains different models of community organization for bringing social change
U14IT602 LANGUAGE PROCESSORS

Class: B.Tech. VI- Semester

Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

- Continuous Internal Evaluation 40 marks
- End Semester Examination 60 marks

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: understanding the importance of various phases of compiler and design of lexical analyzer
LO2: understanding concepts of parsing and implementation of various parsing methods
LO3: type system, storage allocation techniques and forms of intermediate code
LO4: code optimization techniques and machine code generation

UNIT - I (9+3)

Introduction to Compiling: Compilers, Analysis of the source program, Phases of a compiler, Cousins of the compiler, Grouping of phases, Compiler construction tools.


UNIT - II (9+3)

Syntax Analysis: Role of the parser, Writing grammars, Context-free grammars, Top down parsing, Bottom-up parsing, Operator precedence parsing, LR parsers, Using ambiguity grammars, Parser generators.

Syntax Directed Translation: Syntax directed definitions, Construction of syntax trees, Bottom-up evaluation of S-attributed definitions, L-attributed definitions, Top-down translation, Bottom-up evaluation of inherited attributes, Space for attribute values at compile time, Analysis of syntax-directed definition.

UNIT - III (9+3)

Type Checking: Type systems, Specification of a simple type checker, Equivalence of type expressions, Type conversions.

Runtime Environments: Source language issues, Storage organization, Storage-allocation strategies, Symbol tables, Language facilities for dynamic storage allocation, Dynamic storage allocation techniques.


UNIT - IV (9+3)

Code Generation: Issues in the design of code generator, The target machine, Runtime storage management, Basic blocks and flow graphs, Next-use information, A simple code generator, Register allocation and assignment, DAG representation of basic blocks, Peephole optimization, Generating code from DAGs, Code-generator generators.

Text Book:


Reference Books:


Course Learning Outcomes (CO):
Upon completion of this course, students will be able to

CO1: describe the significance of each phase of compiler and construct lexical analyzer
CO2: implement different parsing methods and detect syntax errors during compilation
CO3: apply type checking, determine suitable allocation strategy for implementation of activation records and explain intermediate code representation methods
CO4: implement code optimization techniques to improve the performance of a program in terms of speed, space and develop target code
U14IT603  OBJECT ORIENTED ANALYSIS AND DESIGN

Class: B.Tech. VI-Semester  Branch: Information Technology

Teaching Scheme :  Examination Scheme :

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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: basic concepts of modeling using UML and modeling of basic structural elements like classes and relationships
LO2: modeling the semantics of a class, advanced relationships, groups of elements and object structures
LO3: basic concepts of behavioral modeling, processes, interprocess communication, forward and reverse engineering
LO4: modeling the distribution of components, reifying interactions and architectural patterns

UNIT – I (9+3)


UNIT – II (9+3)

Advanced Structural Modeling: Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages, Instances and Object Diagrams.

UNIT - III (9+3)


Advanced Behavioral Modeling: Events and Signals, State Machines, Processes and Threads, Time and Space and State Chart Diagrams.

UNIT – IV (9+3)


Text Book:
Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to

CO1: draw class diagrams and identify relationships between classes
CO2: describe packages, instances to draw object diagrams with relationships
CO3: draw use case, interaction, activity, state chart diagrams and describe flow of control between processes and threads
CO4: apply object oriented modeling techniques for modeling component and deployment diagrams
U14IT604 GUI PROGRAMMING

Class: B.Tech. VI-Semester
Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

- Continuous Internal Evaluation: 40 marks
- End Semester Examination: 60 marks

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

- **LO1:** implementing OOP concepts using C#
- **LO2:** windows programming with user interface, advanced controls and WPF controls
- **LO3:** designing web pages with server controls, AJAX, master pages and deploying the web sites
- **LO4:** accessing the database from windows and web applications

**UNIT - I (9+3)**

**Introducing C#:** What is .Net framework? C# program structure, Variables and expressions, Flow control, Type conversions, Complex VARIABLE Types, String manipulation, Functions, Debugging and error handling.

**Introduction to Object Oriented Programming:** What is object oriented programming? OOP techniques, Defining classes, Defining class members, Collections, Comparisons and conversions, Events.

**UNIT - II (9+3)**

**Windows Programming:** Basic desktop programming, XAML, WPF controls, Control Layout, User interface properties and events, Data binding.

**Advanced Desktop Programming:** Menu controls, Creating and styling controls, Templates, Value converters, and WPF user controls, Deploying desktop applications.

**UNIT - III (9+3)**

**Web Programming:** ASP.NET web programming, Overview of web applications, ASP.NET runtime, Creating a simple page, Server controls, ASP.NET postback, ASP.NET AJAX postback, Input validation, State management, Styles, Master pages, Site navigation, Authentication and authorization, Deploying web applications.

**UNIT - IV (9+3)**

**Data Access Using ADO.NET:** Types of databases, Working with ADO.NET, Implementing data using data adapters, Data binding in WPF.

**File System Data:** Streams, Classes for input and output, File stream objects, Serialized objects.

**XML:** XML documents, Using XML in applications, XML document object model, Selecting nodes, Xpath.

**Introduction to LINQ:** First LINQ query, using the LINQ method syntax, using LINQ with databases, using LINQ with XML.
Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: demonstrate basic C# programs using OOP features
CO2: design user interface with WPF controls
CO3: design web pages with style sheets, master pages and AJAX
CO4: implement database connectivity in windows and web applications
U14IT605A  DISTRIBUTED COMPUTING

Class: B.Tech. VI-Semester  Branch: Information Technology

Teaching Scheme:
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Examination Scheme:

| Continuous Internal Evaluation | 40 Marks |
| End Semester Exam               | 60 Marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: understanding the issues involved in distributed systems
LO2: distributed system architecture and working of distributed systems
LO3: exposing to distributed document and coordination based systems
LO4: understanding basic concepts of net-centric computing

UNIT - I (12)

Introduction: Definition of distributed System, Characteristics of distributed systems, Goals of distributed system, Hardware concepts, Software concepts, Client-server model, Model of a distributed computation.

Communication: Layered protocols, Remote procedure call, Remote object invocation, Message oriented communication, Stream oriented communication.

UNIT - II (12)

Processes: Threads, Clients, Servers, Code migration, Software agents
Naming: Naming Entities, Name resolution, Implementation of namespace, DNS, X.500, Locating mobile entities, Naming Vs locating entities, Home-based approaches, Hierarchical approaches, Removing unreferenced entities

Distributed Object-Based Systems: CORBA processes, Naming, synchronization, caching and replication, Fault tolerance, security, Distributed COM, GLOBE and comparison.

UNIT - III (12)

Distributed Document Based Systems: WWW, Lotus notes and comparisons,
Distributed Coordination Based Systems: TIB/Rendezvous Overview, Communication, Processes, Naming, Synchronization, Caching and replication, Security; JINI, Comparisons of JINI and TIB/Rendezvous
Software Agents: Definition, Terminology, Agent Technology, Mobile Agents.

UNIT - IV (12)

Distributed Multimedia Systems: Characteristics of multimedia data, Quality of service management, Resource management, Stream adaptation.
Computing Technologies: Cluster/parallel computing, Coordination/Scheduling, Distributed object computing, Peer-to-peer computing, Service-oriented computing.
Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: analyze the issues involved in distributed systems
CO2: evaluate the effectiveness and shortcomings of different solutions in distributed systems
CO3: analyze the programming paradigms of distributed systems
CO4: implement small scale distributed systems
U14IT605B NEURAL NETWORKS

Class: B.Tech. VI- Semester  Branch: Information Technology

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: basic concepts of neural networks and learning methods
LO2: filtering and pruning techniques of neural network
LO3: concepts of probabilities and expert machines
LO4: representing information tasks using neural network concepts and self organizing map

UNIT - I (12)


UNIT - II (12)

Single layer perceptrons: Adaptive filtering problem, Unconstrained optimization techniques, Linear least-square filters, Least-mean-square algorithm, Learning curves, Learning rate annealing techniques, Perceptron, Perceptron convergence algorithm, Block diagram representation of Bayes classifier, Differences between Perceptron and Bayes classifier.

UNIT - III (12)

UNIT - IV (12)

**Self-organizing maps:** Introduction, Two basics feature- mapping models, Self-organizing map, Summary of the SOM algorithm, Properties of the feature map, Computer simulations, Learning vector quantization, Computer experiment: Adaptive pattern classification, Hierarchical vector quantization, Contextual maps.

**Information-theoretic models:** Entropy, Maximum entropy principle, Mutual information, Kullback-Leibler divergence, Mutual information as an objective function to be optimized, Maximum mutual information principle, Infomax and redundancy reduction, Spatially coherent features, Spatially incoherent features, Independent components analysis, Computer experiment, Maximum likelihood estimation, Maximum entropy method.

**Text Book:**

**Reference Books:**

**Course Learning Outcomes (CO):**
Upon completion of this course, students will be able to

- **CO1:** explain concepts of neural networks, statistical learning theory and relate them to artificial intelligence applications
- **CO2:** apply filtering and pruning techniques to design neural networks
- **CO3:** build expert machines using HME model and support vector machines
- **CO4:** correlate neural network concepts with real time applications
**U14IT605C INFORMATION RETRIEVAL SYSTEMS**

**Class:** B.Tech. VI-Semester  
**Branch:** Information Technology

**Teaching Scheme:**

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**Course Learning Objectives (LO):**

This course will develop students’ knowledge in/on

- LO1: retrieval of information based on capabilities and imprecise nature of the search algorithms
- LO2: search techniques and finding relevant items
- LO3: concept of indexing and the data structures most commonly associated with information retrieval systems and technical platforms needed for sophisticated display
- LO4: retrieval and evaluation techniques for information retrieval systems

---

**UNIT - I (12)**

**Introduction:** Domain analysis of information retrieval systems, Information retrieval, Evaluation and other types of information systems, Data structures and algorithms.

**Information Retrieval System Capabilities:** Search, Browse and miscellaneous.

**Cataloguing and Indexing:** Objectives, Indexing process, Automatic indexing and information extraction.

---

**UNIT - II (12)**

**Data Structure:** Stemming algorithms, Inverted file structures, N-gram data structure, PAT Data structure, Signature file structure and Hypertext data structure.

**Automatic Indexing:** Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

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**UNIT - III (12)**

**Document and Term Clustering:** Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

**User Search Techniques:** Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of boolean systems, Searching the internet and hypertext.

**Information Visualization:** Introduction, Cognition and perception, Information visualization technologies.

---

**UNIT - IV (12)**

**Text Search Algorithms:** Introduction, Software text search algorithms, Hardware text search systems.

**Multimedia Information Retrieval:** Spoken language audio retrieval, Non-Speech audio retrieval, Graph retrieval, Image retrieval, Video retrieval.

**Information System Evaluation:** Introduction, Measures used in system evaluation, Case study-Measurement example, TREC results.
Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO5: list all the capabilities and implement information extraction
CO6: define indexing and data structures of manual and automatic clustering
CO7: create index to define the searchable concepts that represent the items received by a system and viewing the results of a search using a hierarchical paradigm
CO8: describe search algorithm and view the measurement of TREC case study results
U14IT605D COMPUTER GRAPHICS AND MULT IMEDIA

Class: B.Tech. VI-Semester Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

- **LO1**: understanding various algorithms for line, circle generation, creation and filling of polygons and 2D transformations
- **LO2**: basic concepts of segments, windowing and clipping, 3D transformations, viewing transformation and image transformation techniques using matrix methods
- **LO3**: describing the concepts of projections with derivations, HLR algorithms and animation techniques
- **LO4**: understanding multimedia concepts, sound/audio, MIDI, multimedia applications using diagrams and its related formulae

**UNIT - I (12)**


**Polygons**: Polygon representation, Inside test methods, Seed filling and Scanline filling algorithms.

**Two Dimensional Transformations**: Scaling, Translation and Rotation transformations, Rotation about arbitrary point, Homogenous coordinates, Inverse transformations, Transformation routines, Reflection and shearing transformations, Instance transformations.

**UNIT - II (12)**

**Segments**: Segment creation algorithm, Segment closing algorithm, Segment deletion and Segment renaming algorithms, Image transformation.

**Windowing And Clipping**: Window and view port, Viewing transformation matrix, Implementation of viewing transformation, Multiple windowing, clipping, The Cohen-Sutherland Outcode algorithm, Sutherland Hodgman clipping algorithm, Midpoint subdivision clipping algorithm, Generalized clipping.

**Three Dimensional Graphics**: 3D Primitives, 3D Transformations, Rotation about arbitrary axis, 3D Viewing, Viewing parameters.

**UNIT - III (12)**

**Projections**: Parallel projection, Perspective projection, Derivation of parallel projection matrix, Derivation of perspective projection matrix.


**Animation**: Types of animations, Animation languages, Methods of controlling animation.
UNIT - IV (12)

Multimedia: Media and data streams, Main properties of multimedia systems, Traditional data stream characteristics, Asynchronous transfer mode, Synchronous transfer mode.

Sound/Audio: Basic sound concepts, Computer representation of sound, audio formats, Music.

MIDI: MIDI concepts, MIDI devices, MIDI messages, MIDI software, Music and speech, Speech generation, Speech analysis, Speech transmission.

Multimedia Applications: Media preparation, Media composition, Media integration, Media communication, Media consumption, Media entertainment.

Text Books:

Reference Books:

Course Learning Outcomes (CO):

Upon completion of this course, students will be able to

CO1: analyze basic DDA, Bresenhams line and circle generation algorithms and implement 2D transformation routines in simple c programming language using matrix methods

CO2: implement the algorithms like line clipping, conversion of window to viewport and vice versa, implement complex 3D image transformations

CO3: analyze algorithms of parallel, perspective projections, HLR algorithms related to efficiency and performance with time and space complexity

CO4: explain multimedia principles and concepts related to mp4, compression methods using the SNR method
U14IT606  OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

Class: B.Tech. VI-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This course will develop student’s knowledge in/on
LO1: creating use case documents that capture requirements for a software system
LO2: create diagrams that model the dynamic aspects of a software system and use sequence diagram in a variety of projects to model message passing to external systems and databases
LO3: providing necessary skills in using object-oriented CASE tools
LO4: transforming a designed model into code through a mapping to an implementation language and create class diagrams that model both the domain model and design model of a software system

List of Experiments

Experiment -I
1. Construct Use case diagrams for the following
   a. Diagram editor.
   b. Library information system.
   c. Banking system.

Experiment-II
2. Construct Sequence diagrams for the following.
   a. Mobile phone.
   b. Use case student register for a course.
   c. Diagram editor.

Experiment-III
3. Construct Collaboration diagrams for the following
   a. Use case librarian issues books to student.
   b. Mobile phone.
   c. Diagram editor.

Experiment-IV
4. Construct Activity diagrams for the following.
   a. ATM transaction.
   b. Ticket machine.
   c. Sales order processing.

Experiment-V
5. Construct State Chart diagrams for the following.
   a. Account.
   b. CD player.
   c. ATM machine.
Experiment-VI
6. Design forward engineer class diagrams for the following
   a. File system.
   b. Window manager.
   c. School Information System.

Experiment-VII
7. Design reverse engineering for the following class specifications
   a. Class student with attributes name, roll_no and operation study().
   b. Relationship aggregation.
   c. Relationship generalization.
   d. Interface.

Experiment-VIII
8. Case Study 1: Passport automation system.

Experiment-IX
9. Case Study 2: Credit card processing.

Experiment-X
10. Case Study 3: BPO management system.

Experiment-XI

Experiment-XII
12. Case Study 5: Recruitment system.

Laboratory Manual:
1. Object Oriented Analysis and Design Laboratory Manual, prepared by the faculty of Dept. of IT.

Text Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe user requirements using the UML notation
CO2: explain the importance of modeling and the Unified Modeling Language (UML) representation for object-oriented system using a number of modeling views
CO3: analyze forward and reverse engineering technique
CO4: show the role and function of each UML model in developing object-oriented software
U14IT607 LANGUAGE PROCESSORS LABORATORY

Class: B.Tech. VI-Semester

Branch: Information Technology

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<td>60 marks</td>
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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: understanding LEX tool
LO2: implementing parsing techniques with YACC tool
LO3: translating high level language statements to intermediate code
LO4: translating intermediate code to machine code

List of Experiments

Experiment-I
1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines.

Experiment-II
2. Implement the lexical analyzer using LEX tool.

Experiment-III
3. Write a program to compute the FIRST and FOLLOW sets.

Experiment-IV
4. Design predictive parser for the given language.

Experiment-V
5. Design a LALR bottom up parser for the given language.

Experiment-VI
6. Convert the BNF rules into YACC form and write code to generate abstract syntax tree.

Experiment-VII
7. Write a program to generate a machine code.

Experiment-VIII
8. Write a program to implement the operator precedence parsing and Infix to postfix conversion.

Experiment-IX
9. Write a LEX program to count the number of keywords and identifiers in a sentence.
10. Write a LEX program to convert an octal number to decimal number.
11. Write a LEX program to recognize strings of numbers (integers) in the input.
12. Write a LEX program to count the number of vowels and consonants in a given input string.
13. Write a LEX program to count the number of characters, words and lines in the given input.
14. Write a LEX program to count the number of positive and negative integers and fractions.
Experiment-X
15. Write a LEX program to count the number of comment lines in the given ‘C’ program.
16. Write a LEX program to count the number of scanf and printf statements in a ‘C’ program.
17. Write a LEX program to illustrate no pattern and no action concept.
18. Write a LEX program to add line numbers to the given file and displays the same onto the standard output.
19. Write a LEX program to extract only comments from a C program and display the same on standard output.

Experiment-XI
20. Write a YACC program to identify a simple and a compound statement.
21. Write a YACC program to check whether given string a^nb^n (n>=1) is accepted by the grammar.
22. Write a YACC program to check validity of logical expression.
23. Write a YACC program to check the validity of an arithmetic expression.
24. Write a YACC program to identify an input for the grammar a^nb (n>=10).

Experiment-XII
25. Write a YACC program to recognize nested if control statements and display the levels of nesting.
26. Write a YACC program to check the validity of a sentence.
27. Write a YACC program to check the validity of date.
28. Write a YACC program for testing balanced parentheses.

Laboratory Manual:
1. Language Processors Laboratory Manual, prepared by the faculty of Dept. of IT.

Text Book:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: implement scanner using LEX tool
CO2: develop parser using YACC tool and identify syntax errors using different parsing methods
CO3: develop various forms of intermediate code
CO4: translate machine code to intermediate code
U14IT608  GUI PROGRAMMING LABORATORY

Class: B.Tech. VI-Semester  
Branch: Information Technology

Teaching Scheme :

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Examination Scheme :

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<td>End Semester Examination</td>
<td>60 marks</td>
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Course Learning Objectives (LO) :

This course will develop students’ knowledge in/on

LO1: type conversions and OOP techniques

LO2: WPF controls for designing the user interface of windows programming and applications using XAML styles

LO3: server controls, AJAX, master pages and deploying the web applications

LO4: ADO.NET objects, XML documents and SQL Server

List of Experiments

Experiment-I
1. Program to demonstrate boxing and unboxing.
2. Program to implement stack operations.
3. Program to find the sum of all the elements present in a jagged array of 3 inner arrays.
4. Program to demonstrate creating, managing, synchronizing and destroying threads using multithreading concept.

Experiment-II
5. Program to demonstrate error handling using try, catch and finally blocks.
6. Program to demonstrate use of virtual and override key words.
7. Program to build a class which implements an interface which already exists.
8. Program to illustrate the use of different properties.

Experiment-III
9. Windows application to develop mini calculator.
10. Windows application to design a new form with panel, picturebox, progressbar and timer controls.

Experiment-IV
11. Design customer application which takes customer name, country, gender, hobby and status, and a preview screen that will display data entered in to the customer data entry screen.

Experiment-V
12. Develop windows application to transfer data between multiple forms, setting startup form, adding controls and setting properties at design time and run time to create login application.
13. Design windows application to create a form with button, label, textbox and listbox, checkbox, radio button and groupbox controls.

Experiment-VI
14. Develop notepad application with openfiledialog, savefiledialog, fontdialog and colordialog controls by adding menu items at design time and run time.
Experiment-VII
15. Develop student database application to create a new data connection using ADO.NET objects and to access data using data binding navigator control.
16. Develop employee database table to create data using ADO.NET components, and display data grid view control by select, insert, update and delete commands.

Experiment-VIII
17. Design simple and complex data binding application using Windows Presentation Foundation.

Experiment-IX
18. Design phonebook application to access data using OleDbDataReader.
19. Design phonebook application to access data using OleDbDataAdapter and DataSet.

Experiment-X
20. Develop ASP.NET web application to connect through SQL server using connection and command objects.

Experiment-XI
22. Develop ASP web page that has a form taking the user’s name as input, storing the name in a permanent cookie & whenever the page is opened again, then value of the name field should be attached with the cookie’s content.

Experiment-XII
23. Use ad-rotator to change advertisements on client side request.
24. Implement session tracking using user authentication.
25. Develop a program to delete all cookies of your web site that has created on the client’s computer.
26. Demonstrate web service application.

Laboratory Manual:
1. GUI Programming Laboratory Manual, prepared by the faculty of Dept. of IT.

Text Book:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: demonstrate command line arguments programs
CO2: demonstrate programs of interface with abstract classes and other class types
CO3: design windows and web applications of logic
CO4: design and demonstrate windows and web application along with databases of server type
U14IT609 MINI PROJECT

Class: B.Tech. VI-Semester

Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: mini project design in one of the selected areas of specialization with substantial multi-disciplinary component
LO2: using current technologies
LO3: problem solving, motivational and time-management skills for career and life
LO4: problem based learning

Student has to take up independent mini project on innovative ideas, innovative solutions to common problems using their knowledge relevant to courses offered in their program of study, which would supplement and complement the program assigned to each student.

Guidelines:

1. The HoD shall constitute a Department Seminar Evaluation Committee (DSEC)
2. DSEC shall allot a faculty supervisor to each student for guiding on (i) selection of topic (ii) literature survey and work to be carried out (iii) preparing a report in proper format and (iv) effective seminar presentation
3. There shall be only continuous Internal Evaluation (CIE) for seminar
4. The CIE for seminar is as follows:

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<th>Weightage</th>
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<tr>
<td>Mini project Supervisor Assessment</td>
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<td>Working model developed under mini project</td>
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<tr>
<td>Final Report on mini project</td>
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<tr>
<td>DMPEC Assessment: Oral presentation (PPT) and viva-voce</td>
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Total Weightage: 100%

Note: a) Working Model: Students are required to develop a working model on the chosen work and demonstrate before the DMPEC as per the dates specified by DMPEC

b) Report: Students are required to submit a well-documented report on the on the work carried out in the prescribed format as per the dates specified by DMPEC
c) Presentation: The students are required to deliver the seminar before the DMPEC as per the schedule notified by the department
d) DMPEC shall decide the course of action on the students, who fail to complete mini project, submit report and give oral presentation

Course Learning Outcomes (CO):

Upon completion of this course, students will be able to

CO1: identify, formulate and solve problems related to their program of study
CO2: work independently with minimal supervision
CO3: demonstrate mastery of knowledge, techniques, practical skills and use modern tools of their discipline
CO4: write concisely & convey meaning in a manner appropriate to different readers and verbally express ideas easily understood by others who are unfamiliar with the topic

KITSW, Syllabi of B.Tech. IT 4-Year Degree Programme Page 144 of 197
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-15  
(An Autonomous Institute under Kakatiya University)  
SCHEME OF INSTRUCTION AND EVALUATION  
VII SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME  
INFORMATION TECHNOLOGY

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**Total**  
17 3 13 28 255 125 380 420 800

**Student Contact Hours / Week:** 33

**Total Credits:** 28

**Professional Elective-II**  
U14IT 704A: Artificial Intelligence  
U14IT 704B: Semantic Web  
U14IT 704C: Pattern Recognition

**Professional Elective-III**  
U14IT 705A: Social Network Analysis  
U14IT 705B: Service Oriented Architecture  
U14IT 705C: Digital Image Processing
U14MH701  MANAGEMENT, ECONOMICS AND ACCOUNTANCY

Class:  B.Tech. VII semester  Branch:  E&E, EEE, ECE and IT

Teaching Scheme :  

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Examination Scheme :  

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: the concepts of management
LO2: the concepts of economics and forms of business organizations
LO3: fundamentals of accountancy
LO4: preparation of final accounts

UNIT - I (9+3)

Management: Meaning and definition, Scope of management, Principles of management; Scientific management- Definition, Characteristics.


Staffing: Meaning and functions of personnel management.

Coordination : Definition, steps to achieve effective coordination.

Controlling: Definition and process.

UNIT - II (9+3)

Economics: Meaning and definition, scope; Micro and macro-Assumptions-Methods and usefulness of economics. Laws of economics-Differences with laws of physical sciences.

Factors of Production: Meaning, definition and characteristics of Land-Labor-capital and entrepreneur. Division of Labor: Types, advantages and disadvantages.

Forms of Business Organization: Sole Proprietor ship, Partnership firm, Types of Partners Cooperative society & Joint stock company-features-Types of Joint stock companies-Merits and demerits.

UNIT - III (9+3)


UNIT – IV (9+3)

Preparation of Final Accounts: Trading Account, profit and loss account and Balance Sheet with simple adjustments.
Text Books:
1. Y.K Bhushan, Business Organization and Mamgt, Sultan Chand, 2012. (Unit I)
3. T S Grewal, Introduction to Accountancy, Sultan Chand. (Unit III & IV)

Reference Books:
2. L.M.Prasad, Principles and Practice of Management Sultan Chand, 2010

Course Learning Outcomes (CO):
Upon completion of this course, the students will be able to
CO1: judge the differences between practical and theoretical management
CO2: associate an idea of Micro, Macro Economics and Forms of Business Organizations
CO3: distinguish between Journal and Ledger
CO4: assess the profits and losses & financial position through the Balance Sheet
U14IT702 CLOUD COMPUTING

**Class:** B.Tech. VII-Semester  
**Branch:** Information Technology

**Teaching Scheme:**

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**Examination Scheme:**

- Continuous Internal Evaluation: 40 marks
- End Semester Examination: 60 marks

**Course Learning Objectives (LO):**

This course will develop students’ knowledge in/on

- **LO1:** basic concepts of computing environments and the importance of virtualization techniques
- **LO2:** understanding cloud computing architectures and a cloud application platform-Aneka
- **LO3:** threads in concurrent computing and the basic concepts of data intensive computing
- **LO4:** cloud platforms used in industry and real time applications of cloud computing

**UNIT - I (9+3)**

**Introduction:** Cloud Computing at a glance, Historical developments, Building cloud computing Environment, Computing platforms and technologies.

**Principles of Parallel and Distributive Computing:** Eras of computing, Parallel Vs Distributive computing, Elements of parallel computing, Elements of distributive computing, Technologies for distributive computing.

**Virtualization:** Introductions, Characteristics of virtualized environments, Taxonomy of Virtualization techniques, Virtualization and Cloud computing, Pros and Cons of virtualization, Technology examples.

**UNIT - II (9+3)**

**Cloud Computing Architecture:** Introduction, Cloud reference model, Types of cloud, Economics of the cloud, Open challenges.

**Aneka- Cloud Application Platform:** Framework overview, Anatomy of the Aneka container, Building Aneka clouds, Cloud programming and Management.

**UNIT - III (9+3)**

**Concurrent Computing:** Introducing parallelism for single machine computation, Programming applications with threads, Multi threading with Aneka, Programming applications with Aneka threads.

**Data Intensive Computing:** What is data intensive computing? Technologies for data intensive computing.

**UNIT - IV (9+3)**

**Cloud Platform in Industry:** Amazon web services, Google app engine, Microsoft azure, Windows azure platform appliance.

**Cloud Applications:** Scientific applications: ECG analysis in the cloud, Protein structure prediction, Gene expression data analysis for cancer diagnosis, Satellite image processing, business and Consumer applications: CRM and ERP, Productivity, Social networking, Media application, Multiplayer online gaming.

**Advance Topics in Cloud Computing:** Federated clouds/Inter-cloud: Characterization and Definition, Cloud federation stack, Aspects of interest, Technologies for cloud federation.
Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe different computing environments and identify pros and cons of virtualization technique
CO2: summarize the features of cloud computing architectures and exposed to Aneka cloud application platform
CO3: differentiate the features of concurrent computing and data intensive computing
CO4: outline the details of cloud service providers, cloud service applications and inter cloud communication
U14IT703  DATA WAREHOUSING AND DATA MINING

Class: B.Tech. VII-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):
This course will develop students' knowledge in/on
LO1: understanding the fundamental theories and concepts of data warehouse and different data preprocessing techniques.
LO2: basic algorithms and techniques for mining frequent patterns, associations and correlations.
LO3: popular classification and prediction techniques.
LO4: different clustering techniques, web mining and application of data mining techniques in various business domains.

UNIT – I (9+3)
Data Warehouse: What is a data warehouse, Differences between operational database systems and data warehouses, Why have a separate data warehouse.
Multidimensional Data Model: Data tables to data cubes evolution, Star, Snowflake and fact constellation schemas, Concept hierarchies, OLAP operations.
Data Warehouse Architecture: Steps for the design and construction of data warehouses, Three-tier architecture, Metadata repository, Types of OLAP servers, Efficient computation of data cubes, Indexing OLAP, Efficient processing of OLAP queries.
Data Preprocessing: Data cleaning, Integration, Transformation and reduction.

UNIT – II (9+3)
Data Mining: What is data mining, Types of data, Functionalities, Classification of data mining systems, Data mining task primitives, Major issues in data mining and DMQL.
Association Rule Mining: Basic concepts, Apriori algorithm, Generating association rules from frequent itemsets, Improving the efficiency of Apriori algorithm, FP-growth algorithm, Mining frequent itemsets using vertical data format, Mining closed frequent itemsets, Mining multilevel and multidimensional association rules, Correlation analysis, Constraint-based association mining.

UNIT – III (9+3)
Predictive Data Mining: What is predictive data mining, Issues regarding classification and prediction.
Classification: Classification by decision tree induction, Bayesian classification, Classification by back propagation, Associative classification, K-Nearest neighbor classifiers, Fuzzy Set approaches.
Prediction: Linear and multiple regression, Nonlinear regression, Accuracy and error measures, Evaluating the accuracy of a classifier or predictor, Ensemble methods-increasing the Accuracy.
UNIT – IV (9+3)


Data Mining Applications: Web Mining, Financial data analysis, Retail industry, Telecommunication industry, Biological data analysis, Scientific applications, and intrusion detection.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe and utilize various techniques for designing data warehouse and data mining systems
CO2: identify associations between different data items and compare the efficiency of various association rule mining algorithms
CO3: analyze various patterns discovered by classification and prediction techniques
CO4: categorize and differentiate clustering techniques. Apply the data mining techniques in different application domains
U14IT704A  ARTIFICIAL INTELLIGENCE

Class: B.Tech. VII-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

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<td>End Semester Examination</td>
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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: understanding the basic concepts of artificial intelligence and applying different search techniques in AI problem solving

LO2: understanding types of knowledge, its representations and different reasoning approaches

LO3: different knowledge representation schemes and expert systems technology

LO4: understanding statistical reasoning methods, non-monotonic reasoning techniques and natural language processing (NLP)

UNIT – I (12)


Problems, Problem Spaces and Search: Defining the problem as a state space search, Production systems, Problem characteristics, Production system characteristics, Issues in the design of search programs, Additional problems.


UNIT – II (12)


Using Predicate Logic: Representing simple facts in logic, Representing instance and isa relationships, Computable functions and predicates, Resolution, Natural deduction.


UNIT – III (12)

Weak Slot and Filler Structures: Semantic nets, Frames.

Strong Slot and Filler Structures: Conceptual dependencies, Scripts, CYC.


Strong Method Problem Solving: Overview of expert system technology, Rule-based expert systems.

UNIT – IV (12)

Reasoning in Uncertain Situations: Introduction to non-monotonic reasoning, Logic-based abductive inference, Abduction - Alternative to logic.

Understanding Natural Language: Role of knowledge in language understanding, Deconstructing language: A symbolic analysis, Syntax, Syntax and knowledge with ATN parsers, Natural language applications.

Statistical Reasoning: Bayesian networks, Dempster-Shafer theory, Fuzzy logic.
Text Books:

Reference Books:

**Course Learning Outcomes (CO):**
Upon completion of this course, the students will be able to

- **CO1:** explain knowledge about artificial intelligence and learn the application of “Search” techniques to solve different AI problems.
- **CO2:** explain the schemes of knowledge representation methods
- **CO3:** summarize the knowledge representation techniques and search techniques in solving various AI problems
- **CO4:** apply the non-monotonic reasoning techniques, NLP and statistical methods in solving AI problems
U14IT704B  SEMANTIC WEB

Class: B.Tech. VII-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

- Continuous Internal Evaluation: 40 marks
- End Semester Examination: 60 marks

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on:

LO1: basic concepts of semantic web, ontology and knowledge representation in description logic
LO2: resource description framework (RDF) and web ontology language (OWL)
LO3: rule languages and ontology development methods
LO4: semantic web software tools, architecture details of software agents and semantic desktop

UNIT - I (12)


Ontology in Computer Science: Defining the term ontology, Differences among taxonomies, Thesauri, and Ontologies, Classifying ontologies, Web ontologies, Web ontology description languages, Ontology, Categories and Intelligence.

Knowledge Representation in Description Logic: Introduction, An informal example, The family of attributive languages, Inference problems.

UNIT - II (12)


OWL: Introduction, Requirements for web ontology description languages, Header information, Versioning and Annotation Properties, Properties, Classes, Individuals, Data types, A Summary of the OWL Vocabulary.

UNIT - III (12)


UNIT - IV (12)

Semantic Web Software Tools: Introduction, Metadata and ontology editors, Reasoners, Other tools.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: *analyze the concepts of semantic web and role of ontologies in semantic web*
CO2: *summarize RDF, RDF schema vocabulary and web ontology description language vocabulary*
CO3: *describe the semantic web services and identify different ontology development methods*
CO4: *utilize different semantic web software tools and software agents in various application developments*
U14IT704C  PATTERN RECOGNITION

Class: B.Tech. VII-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Exam               | 60 marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: identifying information from patterns using statistical and syntactic approaches
LO2: developing patterns using different classification and clustering methods
LO3: syntactic recognition using parsing, graph based approach, grammatical inference and constrained grammars
LO4: learning methods of neural network based pattern recognition

UNIT - I (12)

Pattern recognition Overview: Pattern recognition, Classification and description, Patterns and feature extraction with examples, Training and learning in PR systems, Pattern recognition approaches, Statistical pattern recognition, Syntactic pattern recognition, Neural pattern recognition

Introduction to statistical Pattern Recognition: Approaches to developing StatPR classifiers, Simple examples of statistical models and applications. The Gaussian case and Class dependence, Discriminant functions, Additional examples.

UNIT - II (12)


Linear Discriminant Functions and the Discrete and Binary Feature Cases: Introduction, Discrete and binary classification problems, Techniques to directly obtain linear classifiers, Formulation of unsupervised learning problems, Clustering for unsupervised learning and classification.

UNIT - III (12)

Syntactic Pattern Recognition: Overview of syntactic pattern recognition, Quantifying structure in pattern description and recognition, Grammar based approach and applications, Elements of formal grammars, Examples of string generation as pattern description.

Syntactic Recognition via Parsing and Other Grammars: Recognition of syntactic descriptions, Parsing, The cocke-younger-kasami(CYK) parsing algorithm.

Graphical Approaches to syntactic pattern recognition: Graph based structural representation, Graph isomorphism, Structured strategy to compare attribute graphs.

Learning Via Grammatical Inference: Learning grammars, Problem formulation, Grammatical inference approaches, Procedures to generate constrained grammars.
UNIT - IV (12)

Introduction to Neural networks: Neurons and neural nets, Neural network structures for PR Applications, Physical neural networks

Introduction to Neural Pattern Associators and Matrix Approaches: Neural network based pattern associators.

Feedforward Networks and training by Back Propagation: Multilayer, Feedforward network structure, Training the feedforward network, The delta rule (DR) and generalized delta rule(GDR),Extension of DR for units in the hidden layers, Pattern associators for character classification.


Text Book:


Reference Books:


Course Learning Outcomes (CO):
Upon completion of this course, students will be able to

CO1: extract information from patterns using statistical and syntactic approaches

CO2: classify data and develop representations for a given sample data

CO3: develop formulated grammars by identifying patterns and applying grammar based approach

CO4: train feed forward networks for identifying various patterns and determine natural clusters from unlabelled samples
Class:  B.Tech. VII- Semester
Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: evolution of social networks and analyzing relational data
LO2: graph theory and its role in social network analysis, various subgroups and cycles
LO3: structural equivalence, modeling change in network structure, network dimensions and network visualization
LO4: similarity measures, various types of equivalences and multiple relations among actors

UNIT - I (12)

Networks and Relations: Relations and attributes, Analysis of network data, Interpretation of network data.
The Development of Social Network Analysis: Sociometric analysis and graph theory, Interpersonal configurations and cliques, Towards formal models of structure, The Harvard breakthrough, Entry of the social physicists.
Analysing Relational Data: Collecting relational data, Selection and sampling of relational data, Preparation of relational data, Organizing relational data.

UNIT - II (12)

Lines, Neighbourhoods and Densities: Sociograms and graph theory, Density, ego-centric and socio-centric, A digression on absolute density, Community structure and density.
Centrality, Peripherality and Centralization: Centrality, local and global, Centralization and graph centres, Bank centrality in corporate networks.
Components, Cores and Cliques: Components, cycles and knots, The contours of components, Cliques and their intersections, Components and citation circles.

UNIT - III (12)

Positions, Sets and Clusters: The structural equivalence of points, Clusters, combining and dividing points, Block modelling with CONCOURSE, Towards regular structural equivalence, Corporate interlocks and participations.
Network Dynamics and Change Over Time: Modelling change in network structure, Testing explanations.
Dimensions and Displays: Distance, space and metrics, Principal components and factors, Non-metric methods, Advances in network visualization, Elites, Communities and influence.
UNIT - IV (12)

**Measures of Similarity:** Measuring similarity/dissimilarity, Visualizing similarity and distance.

**Automorphic Equivalence:** Defining automorphic equivalence, Uses of the concept, Finding equivalence Sets.

**Regular Equivalence:** Defining regular equivalence, Uses of the concept, Finding equivalence sets.

**Multiplex relations:** Multiple relations among actors, Multiplex data basics, Role algebras for multiplex data.

**Two-mode networks:** Bi-partite data structures, Visualizing two-mode data, Quantitative analysis, Qualitative analysis.

**Text Books:**

**Reference Books:**

**Course Learning Outcomes (CO):**
Upon completion of this course, students will be able to

**CO1:** describe the evolution of social networks and prepare relational data for analysis

**CO2:** apply graph theory concepts to represent social network data

**CO3:** analyze structural equivalence using CONCOR and REGE algorithms, modeling change in network structure, network dimensions and network visualization

**CO4:** compare various equivalences using similarity measures and identify multiple relations in a network
U14IT705B SERVICE ORIENTED ARCHITECTURE

Class: B.Tech. VII-Semester Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

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<th>Continuous Internal Evaluation</th>
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<tr>
<td>End Semester Examination</td>
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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: core characteristics, evolution and web services of SOA
LO2: concepts of activity management, advanced messaging, metadata security and service-orientation
LO3: understanding the concepts of service layers, SOA delivery strategies and service-oriented analysis
LO4: SOA composition guidelines, service-oriented design approaches and SOA service designs

UNIT - I (12)

Introducing SOA: Fundamental SOA, Common misperceptions about SOA, Common tangible benefits of SOA, Common pitfalls of adopting SOA.
The Evolution of SOA: An SOA timeline (from XML to web services to SOA), The continuing evolution of SOA, The roots of SOA.
Web Services and Primitive SOA: The Web services framework - Services, Service descriptions, Messaging with SOAP.

UNIT - II (12)

SOA and Service-Orientaion: Principles of service-orientation - Service orientation and the enterprise, Anatomy of a service oriented architecture, Common principles of service orientation.

UNIT - III (12)

Service Layers: Service orientation and contemporary SOA.
Building SOA and SOA Delivery Strategies: SOA delivery lifecycle phases.
Service-Oriented Analysis: Introduction to service-oriented analysis, Benefits of a business-centric SOA, Deriving business services.
Service-Oriented Analysis: Service modeling, Service modeling guidelines, Classifying service model logic, Contrasting service modeling approaches.
UNIT - IV (12)

Service-Oriented Design: Introduction to service-oriented design, WSDL related XML schema language basics, WSDL language basics, SOAP language basics, Service interface, Design tools.

SOA Composition Guidelines: Steps to composing SOA, Considerations for choosing service layers, Positioning of core SOA standards and SOA extensions.

SOA Service Design: Overview, Entity-centric business service, Application service design, Task centric service design and guidelines.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe the basics of SOA, messaging and web service technologies
CO2: explain the management of different activities, security of metadata, reliable messaging and service-orientation
CO3: explain different service layers, delivery strategies, business work flow and service-oriented analysis
CO4: list the guidelines for composition of SOA and service-oriented designs
U14IT705C  DIGITAL IMAGE PROCESSING

Class: B.Tech., VII- Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: understanding the basic concepts, principles and methods of digital image processing
LO2: various filters used in frequency domain and spatial domains for image smoothing and sharpening
LO3: color image processing, image compression techniques and image morphing methods
LO4: basic concepts of image segmentation, representation and object identification techniques

UNIT - I (12)

Introduction: The origins of digital image processing. Fundamental steps in digital image processing, Components of an image processing system.

Digital Image Fundamentals: Elements of visual perception, Light and the electromagnetic spectrum, Image sensing and acquisition, Image sampling and quantization, Some basic relationships between pixels, An introduction to the mathematical tools used in digital image processing.

UNIT - II (12)

Intensity Transformations & Spatial Filtering: Some basic intensity transformation functions, Histogram processing, Fundamentals of spatial filtering, Smoothing spatial filters, Sharpening Spatial filters, Combining spatial enhancement methods.

Filtering in the Frequency Domain: Introduction to the Fourier transform and basics of filtering in the frequency domain, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters.

Image Restoration: A model of the image degradation/restoration process, Noise models, Restoration in the presence of noise only-spatial filtering.

UNIT - III (12)

Color Image Processing: Color fundamentals, Color models, Pseudo color image processing, Basics of full-color image processing, Color transformations, Noise in color images.

Image Compression: Fundamentals, Some basic compression methods, Digital image water marking.

Morphological Image Processing: Preliminaries, Dilation and erosion, Opening and closing, The Hit-or-Miss transformation, Some basic morphological algorithms.

UNIT - IV (12)

Image Segmentation: Point, Line and edge detection, Thresholding, Region-based segmentation, Segmentation using morphological watersheds.

Representation and Description: Representation, Boundary descriptors, Regional descriptors, Use of principal components for description, Relational descriptors.

Object Recognition: Recognition based on decision-theoretic methods, Structural methods.
Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: explain fundamental concepts used in digital image processing
CO2: implement frequency domain and spatial domains filters for image smoothing and sharpening in any software
CO3: describe the color image processing and apply image compression techniques, image morphing methods on digital images
CO4: analyze the techniques used for image segmentation, image representation and object identification
**U14IT706  SOFTWARE TESTING LABORATORY**

**Class:** B.Tech. VII-Semester  
**Branch:** Information Technology

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**Course Learning Objectives (LO):**
This course will develop students’ knowledge in/on

LO1: understanding the features of Manual Testing, developing the test case templates and test plan documents

LO2: automated testing using WinRunner Tool

LO3: automated testing using Quick Test Professional Tool

LO4: bug reporting using BUGZILLA Tool

**List of Experiments**

**Experiment-I**
1. Introduction to test cases.
2. Working with the test case template.
3. Write programs in “C” Language to demonstrate the working of the following constructs and write possible test cases.
   - i) do...while ii) while….do iii) if…else iv) switch v) for

**Experiment-II**
4. Write the test cases for any known application (e.g. Banking Application).
5. Take any system (e.g. ATM system) and study its system specifications and report the various Bugs.

**Experiment-III**
6. Create a test plan document for any application (e.g. Library Management System)
7. Write the functional test cases for flight reservation application.

**Experiment-IV**
8. Exploring automated testing tool using Win Runner 7.0 tool.
9. Working with GUI Spy and GUI map Editor.

**Experiment-V**
10. Working with recording modes.
11. Working with checkpoints.

**Experiment-VI**
12. Creating data driven tests.
13. Creating batch tests.

**Experiment-VII**
14. Exploring automated testing tool QuickTestProfessional 10.0.
15. Working with the objects & object repository.
16. Working with the object spy & object identification.

**Experiment-VIII**
17. Inserting checkpoints.
18. Working with recording modes in QTP.
19. Inserting output values.
Experiment-IX
20. Implement data driven tests using data from
   - Data tables
   - Excel files
   - Text files etc.,

Experiment-X
21. Working with function libraries.
22. Inserting synchronization points in test script.
23. Inserting transactions points in test script.

Experiment-XI
24. Parameterising the test.
25. Creating shared repositories.

Experiment-XII
26. Export and import environment variables.
27. Recovery scenarios.

Laboratory Manual:
1. Software Testing Laboratory Manual, prepared by the faculty of Department of IT.

Text Book:

<table>
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<tr>
<th>Course Learning Outcomes(CO):</th>
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<tbody>
<tr>
<td>Upon completion of this course, students will be able to</td>
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<tr>
<td><strong>CO1:</strong> distinguish between validation testing, defect testing and describe strategies for generating system test cases</td>
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<tr>
<td><strong>CO2:</strong> identify the essential characteristics of WinRunner to speed up testing for accelerated releases</td>
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<tr>
<td><strong>CO3:</strong> explore Quick Test Professional tool to improve the quality of the project/product</td>
</tr>
<tr>
<td><strong>CO4:</strong> prepare defect test report and report the problem using BUGZILLA tool</td>
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U14IT707   DATA ENGINEERING LABORATORY

Class: B.Tech., VII-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:
Continuous Internal Evaluation  40 marks
End Semester Examination  60 marks

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: building data warehouse and implementation of OLAP operations
LO2: Weka machine learning toolkit environment
LO3: implementation of data preprocessing techniques using Weka tool
LO4: implementing data mining algorithms

List of Experiments

Experiment-I
1. Write a program to perform multidimensional data model using SQL queries (Star, snowflake and fact constellation schemes).

Experiment-II
2. Design data warehouse for student attendance analysis.

Experiment-III
3. Write a program to perform various OLAP operations.

Experiment-IV
4. Introduction to the Weka machine learning toolkit.

Experiment-V
5. Introduction to Weka Explorer.

Experiment-VI

Experiment-VII
7. Write a program in any programming language to create a file in ARFF format consisting of at least 10,000 transactions with at least three items.

Experiment-VIII
8. Write a program to implement Apriori algorithm.

Experiment-IX
9. Generate association rules from frequent itemsets.

Experiment-X
10. To implement ID3 classification algorithm.

Experiment-XI

Experiment-XII
12. To visualize the generated patterns using Weka tool.
Laboratory Manual:
1. Data Engineering Laboratory Manual, prepared by the faculty of Department of IT.

Text Book:

<table>
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<th>Course Learning Outcomes (CO):</th>
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<tr>
<td>Upon completion of this course, students will be able to</td>
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<tr>
<td>CO1: perform online analytic processing to analyze data</td>
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<tr>
<td>CO2: explore the features of Weka tool</td>
</tr>
<tr>
<td>CO3: implement data preprocessing techniques using Weka tool</td>
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<tr>
<td>CO4: apply data mining techniques for classification, clustering of data and present results using various visualization techniques</td>
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U14IT708 MAJOR PROJECT WORK PHASE-I

Class: B.Tech. VII-Semester Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 100 marks |
| End Semester Examination | - |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: problem based & project based learning
LO2: major project design in one of the selected areas of specialization with substantial multi-disciplinary component
LO3: analytical and research skills
LO4: team work, leadership and interpersonal skills

Student has to take up Major project on innovative ideas, innovative solutions to common problems using their knowledge relevant to courses offered in their program of study, which would supplement and complement the program assigned to each student.

- The major project work is a practical, in-depth study of a selected problem and showing an implementable solution the problem
- Major project work enables the student to synthesize and integrate knowledge, connect theory and practice as well as demonstrate holistic achievement of program learning outcomes

Guidelines:
1. The HoD shall constitute a Department Project Evaluation Committee (DPEC)
2. Major project work shall be normally conducted in two stages: Major project work Phase-I in seventh semester and Major project work Phase-II in eighth semester
3. There shall be only continuous Internal Evaluation (CIE) for Major project Phase-I
4. CIE for the Major project Phase-I in seventh semester is as follows:

<table>
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<tr>
<th>Assessment</th>
<th>Weightage</th>
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<tr>
<td>Project Supervisor Assessment</td>
<td>50%</td>
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<tr>
<td>DPEC Assessment: Registration Presentation, Progress presentation-I, Report submission, oral (PPT) presentation &amp; viva-voce</td>
<td>50%</td>
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</table>

Total Weightage: 100%

DPEC shall decide the course of action on the students, who fail to complete the Major project Phase-I, submission of preliminary report and oral (PPT) presentation.
Course Learning Outcomes (CO):
Upon completion of this course, the students will be able to
CO1: demonstrate creativity in the design of components, systems or processes of their program of study
CO2: design an innovative product by applying current knowledge and adopt to emerging applications of engineering & technology
CO3: work cooperatively with others to achieve shared goal by motivating team-mates with a clear sense of direction, values and ethics
CO4: write concisely & convey meaning in a manner appropriate to different readers and verbally express ideas easily understood by others who are unfamiliar with the topic
### KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-15
(An Autonomous Institute under Kakatiya University)

**SCHEME OF INSTRUCTION AND EVALUATION**

**VIII SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME**

**INFORMATION TECHNOLOGY**

<table>
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<tr>
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<td>OE</td>
<td>U14OE801</td>
<td>Open Elective-II</td>
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<td>2</td>
<td>PC</td>
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<td>Wireless Communications</td>
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<td>Professional Elective-V</td>
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<td>Networks Simulation Laboratory</td>
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<td>6</td>
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<td>U14IT806</td>
<td>Mobile Applications Development Laboratory</td>
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<td>PR</td>
<td>U14IT807</td>
<td>Major Project Work Phase-II</td>
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**Student Contact Hours / Week: 35**

**Total Credits: 27**

**Open Elective-II**
- U14OE 801A: Operations Research
- U14OE 801B: Management Information Systems
- U14OE 801C: Entrepreneurship Development
- U14OE 801D: Forex and Foreign Trade

**Professional Elective-IV**
- U14IT 803A: Scripting Languages
- U14IT 803B: Machine Learning
- U14IT 803C: Software Project Management

**Professional Elective-V**
- U14IT 804A: Big Data Analytics
- U14IT 804B: Embedded Systems
- U14IT 804C: Design Patterns
U14OE801A OPEARTIONS RESEARCH

Class: B.Tech. VIII-Semester
Branch: Common to E&I, EEE, IT and ECE

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: concepts to solve linear programming problems arise in real life situations involving several parameters using various methods and their advantages

LO2: applications of linear programming namely transportation, assignment and travelling salesman problem which arise in different situations in all engineering branches

LO3: non-linearity in optimization problems, direct search techniques and iterative methods

LO4: applications of optimization techniques in the problem of queuing systems under several situations and their practical relevance

UNIT - I (12)


UNIT - II (12)

Special type of LPPs: Mathematical model of transportation problem, Methods of finding initial basic feasible solution to find the optimal solution of transportation problem, Exceptional cases in transportation problem, Degenerate solution of transportation problem, Assignment problem as a special case of transportation problem, Hungarian algorithm to solve an assignment problem, Special cases in assignment problem.

The travelling salesman problem, Formulation of travelling salesman problem as an assignment problem.

UNIT - III (12)


UNIT - IV (12)

Queuing Theory: Elements of operating characteristics of a queuing system, Probability distribution of arrivals and services system, Generalized model (Birth-Death process), Poisson queuing system, Study of various queuing models with single server and multiple servers having finite and infinite populations.
Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, the students will be able to

CO1: develop the mathematical model of an optimization problem and identify particular case of activities among the several alternatives and solve a given linear programming problem using suitable method

CO2: obtain solution for a special type linear programming problem namely transportation, assignment & travelling salesman problem and infer their practical relevance

CO3: analyze the characteristics of non-linearity in optimization and solve certain NLPP using searching and iterative techniques

CO4: state the importance of queuing system and solve the problems of Poisson queuing models of different types
U14OE801B  MANAGEMENT INFORMATION SYSTEMS

Class:  B. Tech. VIII-Semester  Branch: Common to EEE, ECE, EIE and IT

Teaching Scheme :  Examination Scheme :

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<tr>
<td>Continuous Internal Evaluation</td>
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<tr>
<td>End Semester Examination</td>
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Course Learning Objectives(LO):
This course will develop students’ knowledge in/on
LO1: essentials and strategies of managing information systems
LO2: information technology impacts on society and decision making
LO3: information system applications in manufacturing and service sectors
LO4: information systems in enterprise and supply chain management

UNIT - I (12)
Management information systems: Concepts, Role of the management information system, Impact of the management information system.
Strategic management of business: The concept of corporate planning, Essentiality of strategic planning, Development of the business strategies, Types of strategies, Short-range planning, Tools of planning, Strategic analysis of business.

UNIT - II (12)
Decision making: Decision-making concepts, Decision-making process, Decision analysis by analytical modeling, Behavioral concepts in Decision-making, Organizational Decision-making, MIS and Decision-making.
Information and knowledge: Information concepts, Information - a quality product, Classification of the information, Methods of data and information collection, Value of the information, General model of a human as an information processor, Knowledge, MIS for knowledge.

UNIT - III (12)
Development of MIS: Development of long range plans of the MIS, Determining the information requirement, Development and implementation of the MIS, Management of information quality in the MIS, MIS - Development process model.
Applications in service sector: Introduction to service sector, Service concept, Service process cycle and analysis, Customer service design, Service management system, MIS applications in service industry.
UNIT - IV (12)

Business processing Re-engineering (BPR): Introduction, Business process, Process model of the organization, Value stream model of the organization, What delays the business process, Relevance of information technology, MIS and BPR.

Decision support system and Knowledge management: Decision support systems (DSS) concepts and philosophy, DSS application in E-enterprise, Knowledge management, Knowledge management systems, Knowledge based expert system.

Enterprise management systems: Enterprise resource planning (ERP) systems, ERP model and modules, Benefits of the ERP, ERP product evaluation, ERP implementation, Supply chain management (SCM), Information management in SCM.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to

CO1: describe concepts of managing information systems in e-business enterprises

CO2: evaluate privacy, security and quality of information management and decision making systems

CO3: analyze systems for managing information in manufacturing and service sector

CO4: assess effective of information systems which can be adopted in enterprise and supply chain management
U14OE801C  ENTREPRENEURSHIP DEVELOPMENT

**Class:** B. Tech. VIII-Semester

**Teaching Scheme:**

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**Examination Scheme:**

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

**Course Learning Objectives (LO):**

This course will develop students’ knowledge in/on

**LO1:** various characteristics of entrepreneur and his role in development of the nation

**LO2:** market survey and demand survey

**LO3:** functions of various managements/managers in industry

**LO4:** legal issues in entrepreneurship and intellectual property rights

**UNIT – I (12)**

**Entrepreneurship:** Definition, Significance of entrepreneurship, Role of entrepreneurship in development of nation, Characteristics of an entrepreneur, Motivation theories, Role of women entrepreneurship, Types of business organizations, Agencies dealing with entrepreneurship and small scale Industries; Case studies of successful entrepreneurs-Identification of business opportunity.

**UNIT - II (12)**

**Business opportunity:** Definition, selection, opportunities in various branches of engineering, Sources of new ideas and screening of ideas

**Planning and Launching of an entrepreneurial activity:** Market survey and demand survey.

**Feasibility studies:** Technical feasibility, financial viability and social acceptability.

**Break even analysis:** Graphical and analytical methods, Preparation of preliminary and bankable project reports, Factors influencing site selection.

**UNIT - III (12)**

**Project Planning:** Product planning and development process, Definition of a project, Sequential steps in executing the project.

**Plant layout:** Principles, types and factors influencing layouts.

**Material Management:** Purchase procedures, procurement of material.

**Fundamentals of Production Management:** Production Planning and Control (PPC)-Concepts and Functions, Long & short run problems.

**Marketing Management:** Definition, Functions and market segmentation.

**Financial Management:** Objectives & Functions; Sources of finance-internal and external.

**UNIT - IV (12)**

**Human Resource Management:** Introduction, Importance, Selection, Recruitment, Training, Placement, Development, Performance appraisal systems.

Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe characteristics of entrepreneur and his role in development of the nation
CO2: apply market survey and demand survey methods to real time situations
CO3: explain the functions of production, marketing and financial managements
CO4: identify the legal issues in entrepreneurship and explain intellectual property rights
U14OE801D  FOREX & FOREIGN TRADE

Class:  B.Tech. VIII-Semester  Branch:  Common to EIE, EEE, IT and ECE

Teaching Scheme:

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Examination Scheme:

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<td>End Semester Examination</td>
<td>60 marks</td>
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Course Learning Objectives (LOs):
This course will develop students’ knowledge in/on
LO1: business, business system and its objectives
LO2: fundamentals of foreign trade, procedure and documents required in all the clearances of foreign trade
LO3: foreign exchange market, exchange rate and its determination under various monetary systems
LO4: exchange control objectives, features and methods of exchange control

UNIT - I (12)

Business: Nature and scope, Classification of business activities, Functions of commerce & trade.
Business System: Characteristics and components of business system.
Objectives of Business: Concept, Significance and classification of objectives, Objections against profit maximization.

UNIT - II (12)

Foreign Trade: Introduction of international trade, Basic of external trade, special problems of foreign trade, stages in import procedure, stages in export procedure-bill of lading, mate’s receipt, certificate of origin.
Corporations assisting foreign trade: state trading corporation of India, export credit and guarantee corporation, minerals and metals trading corporation of India.

UNIT - III (12)

Foreign Exchange: meaning and importance of exchange rate, methods of foreign payments, the demand and supply of foreign exchange, the equilibrium rate of foreign exchange, functions of foreign exchange market, determination of foreign exchange rate under different monetary systems, mint policy theory, balance of payment theory.

UNIT - IV (12)

Objectives of Exchange Control: characteristics, advantages and disadvantages of exchange control, methods of exchange controls-intervention, exchange restriction, multiple exchange rates, exchange clearing agreements, method of operation, exchange clearing agreements in practice, payments agreements, transfer moratoria; indirect methods.
Text books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe business, business system and classify the business objectives
CO2: outline the foreign trade procedure and explain the special problems involved in foreign trade
CO3: describe the foreign exchange market, determine exchange rate and explain theories of exchange rate determination
CO4: state objectives and illustrate methods of exchange control
U14IT802     WIRELESS COMMUNICATIONS

Class: B.Tech. VIII-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: understanding cellular principles, signal propagation and data transmission for reliable communication

LO2: channel capacity allocation for satellite communication and various generations of cellular wireless networks

LO3: fixed wireless service, mobile wireless network and different wireless LAN technologies

LO4: wireless LAN standard for reliable communication and Bluetooth technology

UNIT-I (9+3)


Coding and Error Control: Error detection, Block error correction codes, Convolutional codes, Automatic repeat request.

UNIT-II (9+3)

Satellite Communication: Satellite parameters and configurations, Capacity allocation-Frequency division, Time division.


UNIT-III (9+3)

Cordless Systems and Wireless Local Loop: Cordless systems, wireless local loop, IEEE 802.16 Fixed broad band wireless access standard.


Wireless LAN Technology: Infrared LANs, Spread spectrum LANs, Narrow band microwave LANs.

UNIT-IV (9+3)

IEEE802.11Wireless LAN Standard: IEEE802 protocol architecture, IEEE802.11- architecture and services, Medium access control, Physical layer.

Bluetooth: Radio specification, Baseband specification, Link manager specification, Logical link control and adaptation protocol.
Course Learning Outcomes (CO):
Upon completion of the course, the students will be able to

CO1: describe cellular standards in mobile environment, two-way communication of antenna and apply error detection and control methods for reliable digital data communication

CO2: differentiate frequency and time division channel allocation methods used in satellite communication and compare the generations of cellular wireless networks

CO3: analyze radio based telecommunication technologies, information access over a mobile wireless network and use of wireless LANs

CO4: describe media access control layer and physical layer specifications of IEEE 802.11 wireless LAN and apply Bluetooth wireless technology in exchange of data over short distances
U14IT803A SCRIPTING LANGUAGES

Class: B.Tech. VIII-Semester Branch: Information Technology

Teaching Scheme :

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Examination Scheme :

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Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: basics of scripting languages and Perl
LO2: advanced Perl concepts and Taylor Control Language (TCL) sequences using fundamental language features
LO3: writing sequences in Tk and TCL using advanced language features
LO4: programming concepts of Python language

UNIT - I (12)
Introduction to Scripting and Perl: Scripts and programs, Origin of scripting, Scripting today, Characteristics of scripting languages, Web scripting, and the universe of scripting languages.
Perl: Introducing Perl, Names and values, Variables and assignment, Scalar expressions, Control structures, Built-in functions, Arrays, Lists, Hashes, Strings, Pattern and regular expressions, Subroutines, Scripts with arguments.

UNIT - II (12)
Advanced Perl: Finer points of looping and sub routines, pack and unpack, File system, eval, Data structures, Packages, Libraries and modules, Objects, Tied variables, Interfacing to the operating system, Creating Internet-aware applications, Dirty hands Internet programming, Security issues.
TCL: Introduction to TCL, TCL structure, syntax, TCL parser, Variables and data in TCL, Control flow, Data structures, Input/output, Procedures, Strings, Patterns, Files.

UNIT - III (12)
Advanced TCL: eval, source, exec and up level commands, Name spaces, Trapping errors, Event driven programs, Making applications Internet aware, Nuts and bolts in Internet programming, Security issues, C interface.
Tk: Visual tool kits, Fundamental concepts of Tk, Tk by example, Events and binding, Perl-Tk.

UNIT - IV (12)
Python: Introduction to Python language, Py ingredients- Numbers, Strings, and variables, Py filling- Lists, Tuples, Dictionaries and sets, Code structures- Compare with if, elif, and else, Repeat with while, Iterate with for, Comprehensions, Functions, Generators, Decorators, Namespaces and scope, Exception handling, Py Boxes- Modules, Packages, Programs, Objects and classes.
Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: outline different scripting languages and develop programs in Perl
CO2: design Perl scripts by using advanced concepts and develop TCL codes with various features
CO3: demonstrate the programming skills of TCL scripting language and the Tk widget library
CO4: develop object oriented programs using Python, a powerful scripting and programming language
U14IT803B MACHINE LEARNING

Class: B.Tech. VIII- Semester
Branch: Information Technology

Teaching Scheme:                                                                 Examination Scheme:
L    T    P    C                              Continuous Internal Evaluation  40 marks
     -    -    -                                                                 End Semester Examination  60 marks

Course Learning Objectives(LO):
This course will develop students’ knowledge in/on
LO1: machine learning fundamentals, binary classification and advanced classification techniques
LO2: different learning algorithms
LO3: different models to classify training data
LO4: improving and measuring the classifiers’ accuracy by using different methods

UNIT – I (12)
Introduction: Tasks: the problems that can be solved with machine learning, Models-the output
of machine, Features-the workhorses of machine.
Binary Classification and Related Tasks: Classification, Scoring and ranking, Class probability
estimation.
Beyond Binary Classification: Handling more than two classes, Regression, Unsupervised and
descriptive learning.

UNIT – II (12)
Concept Learning: The hypothesis space, Paths through the hypothesis space, Beyond
conjunctive concepts, Learnability.
Tree Models: Decision trees, Ranking and probability estimation trees, Tree learning as
variance reduction.
Rule Models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule
learning, First-order rule learning.

UNIT – III (12)
Linear Models: The least-squares method, The perceptron, Support vector machines, Obtaining
probabilities from linear classifiers, Going beyond linearity with kernel methods.
Probabilistic Models: The normal distribution and its geometric interpretations, Probabilistic
models for categorical data, Discriminative learning by optimizing conditional likelihood,
Probabilistic models with hidden variables, Compression-based models.

UNIT – IV (12)
Features: Kinds of feature, Feature transformations, Feature construction and selection.
Model Ensembles: Bagging and random forests, Boosting, Mapping the ensemble landscape.
Machine Learning Experiments: What to measure, How to measure it, How to interpret it.
Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe basic concepts of machine learning and differentiate learning models
CO2: compare different algorithms according to the properties of their inputs and outputs
CO3: choose appropriate classifier suitable for training data
CO4: implement ensemble algorithms to improve the accuracy of classifiers
U14IT803C  SOFTWARE PROJECT MANAGEMENT

Class:  B.Tech. VIII-Semester  Branch:  Information Technology

Teaching Scheme :

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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: fundamentals of software project management and various steps involved in project planning
LO2: understanding the software Effort Estimation methods and planning activities in the software development process
LO3: basic concepts of Risk Management Techniques, Resource allocation methods, Monitoring and controlling of software projects
LO4: managing the people involved in software project development and understanding the concepts of software quality

UNIT – I (12)
Introduction to Software Project Management: Why is software project management important?, What is project?, Software projects versus other types of project, Contract management and technical project management, Activities covered by software project management, Plans-Methods and methodologies, Some ways of categorizing software projects, Stakeholders, Setting objectives, What is management?, Problems with software projects, Requirement specification, Management control.


An Overview of Project Planning: Introduction to step wise project planning, Select project, Identify project scope and objectives, Identify project infrastructure, Analyze project characteristics, Identify project products and activities, Estimate effort for each activity, Identify activity risks, Allocate resources, Review and publicize plan, Execute plan and lower levels of planning.

UNIT – II (12)

Activity Planning: The objectives of activity planning, When to plan, Project schedules, Projects and activities, Sequencing and scheduling activities, Network planning models, Formulating a network model, Adding the time dimension, The forward pass, The backward pass, Identifying the critical path, Activity float, Shortening the project duration, Identifying critical activities, Activity-on-arrow networks.
UNIT – III (12)
Risk Management: Risk, Categories of risk, A Framework for dealing with risk, Risk identification, Risk assessment, Risk planning, Risk management, Evaluating risks to the schedule, Applying the pert technique, Monte Carlo simulation, Critical chain concepts.
Resource Allocation: The nature of resources, Identifying resource requirement, Scheduling resources, Creating critical paths, Counting the cost, Being specific, Publishing the resource schedule, Cost schedules, The scheduling sequence.
Monitoring and Control: Creating the framework, Collecting the data, Project termination review, Visualizing process, Cost monitoring, Earned value analysis, Prioritizing monitoring, Getting the project back to target, Charge control, Software configuration management.

UNIT – IV (12)
Working in Teams: Becoming a team, Decision making, Leadership, Organization and team structures, Coordination dependencies, Dispersed and virtual teams, Communication genres, Communication plans, Leadership.
Software Quality: The place of the software quality in project planning, The importance of software quality, Defining software quality, ISO 9126, Product and process metrics, Product versus process quality management, Quality management systems, Techniques to help enhance software quality, Testing, Software reliability, Quality plans.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: describe the activities involved in software project management and stepwise project planning
CO2: apply different software estimation methods for a project and draw the project activities planning charts to identify critical paths
CO3: calculate different types of risks involved in project development, identify most appropriate method of resource allocation, monitor and control methods of a project
CO4: apply the various steps involved in the progress of the project; develop the software quality measures and concepts of organizational behaviors
U14IT804A  BIG DATA ANALYTICS

Class: B.Tech. VIII-Semester  Branch: Information Technology

Teaching Scheme:

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Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: essentials of big data management and technologies
LO2: understanding the limitations of traditional Data Warehouse architecture
LO3: creating enterprise repository to handle big data
LO4: implementing big data and Data Warehouse in real life situations

UNIT - I (12)

Working with big data: Introduction, Data explosion, Data volume, Data velocity, Data variety.
Big Data Processing Architectures: Introduction, Data processing revisited, Data processing techniques, Data processing infrastructure challenges, Shared-everything and shared-nothing architectures, Big data processing, Telco big data study.
Introducing Big Data Technologies: Introduction, Distributed data processing, Big data processing requirements, Technologies for big data processing, Hadoop, NoSQL, Textual ETL processing.

UNIT - II (12)

Data Warehousing Revisited: Introduction, Traditional data warehousing, data warehousing 1.0, Data warehouse 2.0.
Reengineering the Data Warehouse: Introduction, Enterprise data warehouse platform, Choices for reengineering the data warehouse, Modernizing the data warehouse, Case study of data warehouse modernization.
Workload Management in the Data Warehouse: Introduction, Current state, Defining workloads, Understanding workloads, Query classification, ETL and CDC workloads, Measurement, Current system design limitations, Technology choices.

UNIT - III (12)

New Technologies Applied to Data Warehousing: Introduction, Data warehouse challenges revisited, Data warehouse appliance, Cloud computing, Data virtualization.
Integration of Big Data and Data Warehousing: Introduction, Components of the new data warehouse, Integration strategies, Hadoop & RDBMS, Big data appliances, Data virtualization, Semantic framework.
Case study: Streaming data.

UNIT - IV (12)

**Big data Analytics, Visualization, and Data Scientists**: Introduction, Big data analytics, Data discovery, Visualization, The evolving role of data scientists.

**Implementing the big data – Data Warehouse – Real-Life Situations**: Introduction-Building the big data – Data warehouse, Customer-centric business transformation, Hadoop and MySQL drives innovation, Integrating big data into the data warehouse.

**Case Study**: Streamlining healthcare connectivity with big data.

**Text Book**:

**Reference Books**:

**Course Learning Outcomes (CO):**
Upon completion of this course, students will be able to

**CO1**: describe about the world of big data; its complexities, processing techniques and technologies

**CO2**: identify the need for reengineering and modernization of traditional DW

**CO3**: integrate different components to design enterprise repository

**CO4**: analyze the big data to deduce useful knowledge
U14IT804B      EMBEDDED SYSTEMS

Class: B.Tech. VIII-Semester        Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course learning Objectives (LO):
This course will develop students’ knowledge in/on
LO1: essentials of embedded systems and 8051 micro controller architecture
LO2: different types of ports, I/O devices and interrupt service handling in embedded systems
LO3: developing and testing embedded system software
LO4: designing embedded systems using a real-time operating system

UNIT – I (12)

Introduction to Embedded Systems: Definition, Characteristics, Processor embedded into a system, Embedded hardware units and devices, Embedded software’s, Examples of embedded systems, Design process in embedded systems, Design examples, Classification of embedded systems.

8051 Architecture: Microcontroller architecture, Instruction set, Input/output ports and circuits, External memory interfacing circuits, Counter and timers, Serial data communication input / output, Interrupts, Real world interfacing, Advanced architectures, Processor and memory organization, Instruction level parallelism and performance metrics.

UNIT – II (12)

Devices and Communication Buses: IO types, Serial communication devices, Parallel device ports, Timer and counting devices, Watchdog timer, Real time clock, Serial bus communication protocols and parallel bus device protocols.

Interrupt Service Handling: Interrupt service routine concept, Interrupt sources, Interrupt servicing mechanism, Multiple interrupts, Context switching, Interrupt latency and deadline, Classification of interrupt servicing mechanism, Device driver programming.

UNIT – III (12)

Embedded Programming in C: Include directives for inclusion of files, Macros and functions, use of data structures, modifiers, Loops and function calls, Multiple function calls in cyclic order, Function pointers, Queuing of functions.

Program Modeling Concepts: Program models, DFG models, State machine programming models, Modeling multiprocessor systems.

UNIT – IV (12)

Real – Time Operating Systems: Interrupt routines in RTOS environment. Principles for design using a real-time operating system, Encapsulation using semaphores and queues, Hard real-time considerations, Saving memory and power.

RTOS Task Scheduling Models: Cooperative scheduling model, Time slicing scheduling models, Preemptive scheduling model, Earliest deadline first and Rate monotonic schedulers and fixed real-time scheduling models, Performance metrics, Security issues.

Case Studies: Case study of embedded hardware and software architectures of Chocolate vending machine, Digital camera and Smart card design example.

Text Book:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: explain essentials of embedded systems and 8051 micro controller
CO2: analyze advances in memory management and interrupt services in embedded systems
CO3: develop and test embedded system software
CO4: describe real-time operating system environment and develop embedded systems for real time applications
U14IT804C  DESIGN PATTERNS

Class: B.Tech. VIII-Semester  Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

Course Learning Objectives (LO):
This course will develop students’ knowledge in/on

LO1: basic concepts of design patterns and application of design patterns in a case study
LO2: creational, Structural and Behavioral patterns
LO3: specification of design patterns with idioms and styles in programming languages
LO4: different design patterns to keep code quality high without overdesign

UNIT - I (12)

Introduction: What is a design pattern, Design patterns in smalltalk MVC, Describing design patterns, The catalog of design patterns, Organizing the catalog, How design patterns solve design problems, How to select a design pattern, How to use a design pattern.

A case study for designing a document editor: Design problems, Document structure, Formatting, Embellishing the user interface, Supporting multiple look-and-feel standards, Supporting multiple window systems, User operations, Spelling checking and Hyphenation, Summary.

UNIT - II (12)

Design pattern catalog: Introduction, Categories.
Creational patterns: Abstract factory, Builder, Factory method, Prototype, Singleton, Discussion of creational patterns.
Structural patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy, Discussion of structural patterns.

UNIT - III (12)

Idioms: Introduction, What can idioms provides, Idioms and Style; Where to find idioms; Counted pointer example, Management patterns, Examples of simple idioms- Incrementing a counter, Swapping values between variables, Infinite loop, Set as associative array, Pimpl idiom, Idioms in C++, Java, C# and JavaScript.

UNIT - IV (12)

Text Books:

Reference Books:

Course Learning Outcomes (CO):
Upon completion of this course, the students will be able to
CO1: identify reusable solution to a commonly occurring problem within a given context in software design
CO2: apply the benefits of different design patterns in software development
CO3: apply design patterns with idioms and styles in software design and development
CO4: verify the quality of design patterns using various methods
U14IT805 NETWORKS SIMULATION LABORATORY

Class: B.Tech. VIII-Semester
Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

This laboratory will develop students’ knowledge in/on:

- **LO1:** Java network programming, client/server application using TCP/IP and simulation of network topology using Tcl script
- **LO2:** open source network simulator NS2 for analyzing TCP/UDP traffic analysis and routing protocols
- **LO3:** different types of queues, behavior of variants in TCP wired network and wireless network consisting of TCP/IP traffic
- **LO4:** performance evaluation of Dynamic Source Routing (DSR), Destination-Sequenced Distance-Vector (DSDV) and Ad hoc On-Demand Distance Vector Routing (AODV)

List of Experiments

**Experiment-I**
1. Java network programming:
   a. Processing internet address.
   b. Applications with TCP and UDP sockets.

**Experiment-II**
2. Implement TCP/IP client and server technology using JAVA network programming.

**Experiment-III**
3. Simulate a sample network topology using Tcl script.

**Experiment-IV**
4. Familiarizing network simulator–2(NS2) environment.

**Experiment-V**
5. Simulate a wired network consisting of TCP and UDP traffic using NS2 and then calculate their respective throughput using AWK script.

**Experiment-VI**

**Experiment-VII**
7. Performance evaluation of different queues, effect of queues and buffers in wired network environment using NS2.

**Experiment-VIII**
8. Compare the behavior of different variants of TCP (Tahoe, Reno, Vegas etc.) in wired network using NS2. Compare the congestion window behavior by plotting graph.

**Experiment-IX**
Experiment-X

Experiment-XI

Experiment-XII

Laboratory Manual:
1. Wireless communications laboratory manual, prepared by the faculty of Department of IT.

Text Book:

Course Learning Outcomes (CO):
Upon completion of this laboratory, students will be able to
CO1: develop Java network programming for client/server networking and use Tcl script for network topology
CO2: implement working procedure of TCP/UDP agents using ACK packets and construct route with various nodes in wired network environment
CO3: simulate wired network and wireless network using NS2 tool and describe different queues, buffer types supported in NS2 tool
CO4: compare the performance of DSR, DSDV and AODV algorithms
U14IT806 MOBILE APPLICATIONS DEVELOPMENT LABORATORY

Class: B.Tech. VIII-Semester

Branch: Information Technology

Teaching Scheme:

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Examination Scheme:

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):
This laboratory will develop students’ knowledge in/on

LO1: understanding user interfaces on multimedia-capable mobile device to provide wireless access
LO2: developing mobile applications on iOS platform
LO3: understanding basic Android programming
LO4: programming mobile applications on Android platform

List of Experiments

Experiment-I
1. Write a J2ME program to show how to change the font size and color.
2. Write a J2ME program to create the following menu.
   (i) cut, (ii) copy, (iii) paste, (iv) delete, (v) select all, (vi) unselect all.

Experiment-II
3. Write a J2ME program to create a select menu with the following options and provide the specified event handling.
   (i) Cut, Copy, Paste, Delete --can be on/off.
   (ii) Select all -- put all four options on.
   (iii) Unselect all -- put all four options off.
4. Create a MIDP slideshow application with different slides having only text and the application should change to the new slide after every 5 seconds.
5. Create a MIDP application, which draws a bar graph to display data values given in an integer array.

Experiment-III
6. Create a MIDP application, which examines, that a phone number, which a user Has entered is in the given format (Input Validations).
   (i) Area code should be one of the following: 091, 040, 041, 050, and 0400,044
   (ii) There should 6-8 numbers in telephone number (+area code).
7. Write a J2ME program to demonstrate MIDlet life cycle methods.
   (Note: startApp(), destroyApp(), and pauseApp() methods).

Experiment-IV
8. Develop a single view application using iOS simulator.
9. Develop an iOS application to demonstrate actions and outlets.

Experiment-V
10. Develop an iOS application to demonstrate Delegates.
11. Develop an iOS application “Accelerometer”-- is used for detecting the changes in the position of the device in the three directions x, y and z.
Experiment-VI
12. Develop an iOS application to create the following menu.
   (i) cut, (ii) copy, (iii) paste, (iv) delete, (v) select all, (vi) unselect all.
13. Develop an iOS application for handling data using SQLite queries.

Experiment-VII
14. Write an Android application program that displays hello world using terminal.
15. Write an Android application program that displays hello world using eclipse.
16. Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using eclipse.

Experiment-VIII
17. Write an Android application program that demonstrates the following:
   (i) Linear layout.
   (ii) Relative layout.
   (iii) Table layout.
   (iv) Grid view layout.

Experiment-IX
18. Write an Android application program that converts the temperature in Celsius to Fahrenheit.
19. Write an Android application program that demonstrates intent in mobile application development.

Experiment-X
20. Java Android program to demonstrate a match filter.
21. Java Android program to demonstrate a transform filter.

Experiment-XI
22. Write an Android application program to demonstrate basic calculator.
23. Write an Android application Utility program for slide down and slide up.

Experiment-XII
24. Write an Android application to develop Snake game.

Laboratory Manual:
1. Mobile Applications Development laboratory manual, prepared by the faculty of Department of IT.

Text Books:

Course Learning Outcomes (CO):
Upon completion of this laboratory, students will be able to
CO1: design user interfaces for mobile applications using J2ME technology
CO2: design and develop various iOS applications
CO3: develop various Android mobile applications
CO4: implement filters, utility program and games in Android programming
U14IT807  MAJOR PROJECT WORK PHASE-II

Class:  B.Tech. VIII-Semester  Branch:  Information Technology

Teaching Scheme :

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<td>7</td>
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Examination Scheme :

| Continuous Internal Evaluation | 40 marks |
| End Semester Examination       | 60 marks |

Course Learning Objectives (LO):

This course will develop students’ knowledge in/on

LO1: problem based and project based learning

LO2: major project design in one of the selected areas of specialization with substantial multi-disciplinary component

LO3: analytical and research skills

LO4: team work, leadership and interpersonal skills

Student has to continue the major project work in eighth semester as Major Project Work Phase-II.

The evaluation for Major project work Phase-II is as follows:

<table>
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<tr>
<th>Assessment</th>
<th>Weightage</th>
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<tr>
<td>Project Supervisor Assessment</td>
<td>20%</td>
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<tr>
<td>DPEC Assessment : Progress presentation-II, Final presentation &amp; Viva-voce and Final Project Report</td>
<td>20%</td>
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<tr>
<td>End Semester Examination: Oral (PPT) Presentation &amp; Viva Voce</td>
<td>60%</td>
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<tr>
<td>Total Weightage</td>
<td>100%</td>
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DPEC shall decide the course of action on the students, who fail to complete the Major project work Phase-II, submit final project report and give oral (PPT) presentation.

Course Learning Outcomes (CO):

Upon completion of this course, students will be able to

CO1: demonstrate creativity in the design of components, systems or processes of their program of study

CO2: design an innovative product by applying current knowledge and adopt to emerging applications of engineering & technology

CO3: work cooperatively with others to achieve shared goal by motivating team-mates with a clear sense of direction, values and ethics,

CO4: write concisely & convey meaning in a manner appropriate to different readers and verbally express ideas easily understood by others who are unfamiliar with the topic