KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-15
(*An Autonomous Institute under Kakatiya University*)
SCHEME OF INSTRUCTION AND EVALUATION
I SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME
INFORMATION TECHNOLOGY

S. No.	Course Category	Course Code	Course Name	Periods L	Periods T	Periods P	Credits (C)	CIE TA	CIE MSE	CIE Total	ESE	Total Marks
1	BS	U14MH101	Engineering Mathematics-I	3	1	-	4	15	25	40	60	100
2	ES	U14CS102	Programming in C	3	1	-	4	15	25	40	60	100
3	BS	U14PH103	Engg. Physics /	3	1	-	4	15	25	40	60	100
	BS	U14CH103	Engg. Chemistry	3	1	-	4	15	25	40	60	100
4	BS	U14MH104	English for Communication /	2	2	-	3	15	25	40	60	100
	ES	U14ME104	Engineering Drawing	2	4	-	4	15	25	40	60	100
5	ES	U14EI105	Basic Electronics Engg./	3	-	-	3	15	25	40	60	100
	ES	U14EE105	Basic Electrical Engg.	3	-	-	3	15	25	40	60	100
6	ES	U14ME106	Basic Mechanical Engg./	3	-	-	3	15	25	40	60	100
	ES	U14CE106	Basic Engg. Mechanics	3	1	-	4	15	25	40	60	100
7	ES	U14CS107	Programming in "C" Lab	-	-	3	2	40	-	40	60	100
8	BS	U14PH108	Engg. Physics Lab /	-	-	3	2	40	-	40	60	100
	BS	U14CH108	Engg. Chemistry Lab	-	-	3	2	40	-	40	60	100
9	ES	U14ME109	Engg. Workshop Practice /	-	-	3	2	40	-	40	60	100
	MC	U14CH109	Environmental Studies #	2	-	-	2	15	25	40	60	100
10	MC	U14EA110	EAA: Physical Education & NSS #	-	-	2	1	100	-	100	-	100
			Total	17/ 19	5/ 8	11/ 8	28/ 30					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 = 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 :

L	T	P	C
3	1	-	4

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. Langrage'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:
1. Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi
2. Shanti Narayan, "Differential Calculus", *S. Chand & Co.,* New Delhi

Reference Books:
1. Jain R.K.& Iyengar SRK , "Advanced Engineering Mathematics", *Narosa Publishers*
2. Kreyszig E., "Advanced Engineering Mathematics", *New Age International*
3. Sastry S.S., "Engineering Mathematics - Vol. I & II", *Prentice Hall of India*

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

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*

CO2:   *understand the basic concepts of limit, continuity, differentiability of a function, and will be able to expand a given function in series*

CO3:   *trace a given curve*

CO4:   *apply the technique of differentiation under integral sign to solve an integral*

CO5:   *find maxima & minima of functions of two/several variables*

CO6:   *find double integral and triple integral and apply them to find moment of inertia, centre of gravity of plane lamina*

CO7:   *understand Beta and Gama functions and their relations and evaluate an improper integral in terms of Beta and Gamma functions*

CO8:   *solve a given differential equations of first order and understand the application of differential equations of first order*

U14CS102   PROGRAMMING IN C

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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:
  1. E.Balagurusamy, **"**Programming in ANSIC**",** *Tata McGraw Hill*, 6th Edn, ISBN-13: 978-1-25- 90046-2, 2012
  2. Herbert Schildt, "Complete Reference with C"**,** *Tata McGraw Hill,* 4th Edn., ISBN-13: 9780070411838, 2000

Reference Books:
1. Kerninghan and Ritchie, "The C Programming Language", *Prentice Hall of India*, 2nd Edn., ISBN-13:007-6092003106, 1988
2. Yaswanth Kkanetkar, "Let Us C", *BPB Publications*, 13th Edn., ISBN-13: 9788183331630, 2012

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 :   **Examination Scheme :**

L	T	P	C
3	1	-	4

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)

Oscillations: Physical examples of simple harmonic motion –Torsional pendulum, Physical pendulum, Spring - Mass systems and Loaded beams - Two body oscillations – Qualitative treatment of Free, Damped & Forced Oscillations and Resonance.

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.

Lasers (Qualitative): Absorption, Spontaneous and Stimulated emission – Relation among Einstein coefficients –Difference between conventional and laser light – Population inversion, Methods of achieving population inversion – Types of Lasers – Ruby Laser, Helium-Neon Laser, Carbon dioxide Laser and Nd-YAG Laser – Applications of lasers.

Holography: Introduction – Formation and Reconstruction of a Hologram – Applications of Holography.

Fiber Optics (Qualitative): Introduction – Total internal reflection – Fiber construction – Numerical aperture and Acceptance angle – Types of Optical fibers (Step and Graded index) – Power losses in Optical fibers –Attenuation, Dispersion, Bending – Light wave Communication using Optical fibers – Applications of Optical fibers - Fiber optic Sensors (Temperature and Displacement), Endoscope.

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): Magnetic materials: Introduction –Permeability   - Magnetization –Classification of magnetic materials . Applications of magnetic materials – magnetic recording, magnetic memories.

Superconducting materials: Superconductivity – Meissner effect –Transition temperature – Isotope effect. Types of Superconductors - Soft and Hard Superconductors – Applications of Superconductors.

Nanomaterials: Introduction – Classification of nanomaterials – Properties of nanomaterials – Physical, Chemical, Electrical, Optical, Magnetic and Mechanical properties (in brief) - Applications of nanomaterials (in brief).

Text Books:
1. Bhattacharya and Bhaskaran, "Engineering Physics", *Oxford University Press.*
2. V.Rajendran, "Engineering Physics", *McGraw Hill Education*.

Reference Books:
1. David Halliday and Robert Resnick, "Physics Part I & II", *Wiley Eastern Limited.*
2. R.K. Gaur and S.L.Gupta, "Engineering Physics", *Dhanpath Rai and Sons.*
3. P.K. Palanisamy, "Engineering Physics**", *Scitech Publishers.*

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

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U14CH103   ENGINEERING CHEMISTRY

Class: B.Tech. I-Semester

Branch: Common to all branches

Teaching Scheme :

L	T	P	C
3	1	-	4

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:
Introduction: Corrosion by pure chemical reaction, Electrochemical theory of corrosion, Galvanic corrosion, Differential aeration corrosion, Factors influencing corrosion, Prevention of corrosion: Cathodic Protection, Hot Dipping, Cementation, Cladding, Electroplating, Corrosion inhibitors, Anodized coatings.

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:
 Introduction to spectroscopy, Microwave spectra: Theory, Application of microwave spectra in the determination of bond length of a diatomic molecule. Infra-Red spectra: Theory, Applications: Calculation of force constant and identification of functional groups in organic compounds. UV-Visible spectra: Lambert-Beer's law and its applications, Types of electronic transitions.

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 (SN_1 and SN_2) 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:
1. Jain and Jain, "Engineering Chemistry", *Dhanpat Rai Publishers.*
2. Shashi Chawla, "Text book of Engineering Chemistry", *Dhanpat Rai Publishers.*

Reference Books:
1. J C Kuriacose and J.Rajaram, "Chemistry in Engineering and Technology (Vol .I&II)", *Tata McGraw Hill Publishers.*
2. Suba Ramesh, Vairam et. al "Engineering Chemistry", *Wiley India.*
3. O P Agarwal, "Engineering Chemistry", *Khanna Publishers.*
4. S.S.Dara, "A Text book of Engineering Chemistry", *S.Chand & Company Ltd.*

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

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U14MH104   ENGLISH FOR COMMUNICATION

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

Teaching Scheme :

L	T	P	C
2	2	-	3

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:
1. Damodar G., & Surender Kumar M., "English for Communication", *KGA Publications,* Warangal.
2. Purushotham K., "English for fluency", *Orient Blackmen*, Hyderabad.

Reference Book:
1. Krishna Swamy N., "Modern English Grammar"*, MacMillan India Ltd.*

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 :

L	T	P	C
2	4	-	4

Examination Scheme :

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:
1. Bhatt N.D., "Elementary Engineering Drawing", *Charotar Publishing House,* Anand.

Reference Books:
1. Dhananjay A Jolhe, "Engineering Drawing", *TMH,* 2008.
2. Venugopal K. "Engineering Graphics with Auto CAD", *New Age International Publishers Ltd.*, Hyderabad.
3. K. L. Narayana & P. Kannaiah, "Engineering Drawing'', *SciTech Publications,* Chennai
4. W J Luzadder and J M Duff, "Fundamentals of Engineering Drawing", *Prentice-Hall of India*, 1995.

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:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LO):
LO1:   To introduce basic concepts of semi conductors 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 **s**tructure, 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.
2. Neil storey, "Electronics: A systems Approach", *4/e-Pearson Education Publishing company Pvt. Ltd*, India.
3. Helfrick. A.D and Cooper W.D., "Modern Electronic Instrumentation and Measurement Techniques", *PHI,* India.

Reference Books:
1. Jacob Millman, Christos C Halkias, "Electronic Devices and Circuits", 3/e, *TMH,* India.
2. Bhargava and Kulashresta, "Basic Electronics and Linear Circuits", *TTTI, TMH,* India.
3. Sawhney A.K, "Electrical and Electronic Measurements and Instrumentation", *Dhanpat Rai & Sons,* New Delhi, India.

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   **Branch:** Common to all branches

Teaching Scheme:

L	T	P	C
3	-	-	3

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:
Ohm's Law, Network Elements, Kirchhoff's Laws, Source Transformation, Mesh and Nodal Analysis, Power in D.C. Circuits, Series, Parallel and Series Parallel combination of Resistances, network reduction by Star – Delta Transformation.

Magnetic Circuits:
Introduction, Magnetic Circuits, Magnetic Field Strength, Magnetomotive Force, Permeability, Relative Permeability, Analogy between Electric and Magnetic Circuits, Series Magnetic Circuit, Parallel Magnetic Circuit, Self-Inductance and Mutual Inductance.

UNIT – II (9)

D.C. Machines:
Constructional features, Methods of Excitation, E.M.F. Equation, Torque development in D.C motor, Characteristics of Series, Shunt and Compound motors and Applications.

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 **-**ϕVoltages, Voltage & Current relationships of Line and Phase values for Star and Delta connections , 3-ϕ Power Measurement by two-wattmeter method.

1-ϕ Transformers:
Construction and operation principle, Development of No Load & On Load Phasor diagrams, Equivalent circuit, O.C. and S.C. tests, Losses and Efficiency, Voltage regulation.

<u>UNIT – IV</u> (9)

3-ϕ Induction Motor:
Constructional features, Principle of Operation, Production of Rotating Magnetic Field, Torque – Slip Characteristics, Applications.

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:
1. Edward Hughes, "Electrical & Electronics Technology", 10th edn., *Pearson Education,*2010

Reference Books:
1. M.S. Naidu & S.Kamakshaiah, "Introduction to Electrical Engineering", *Tata McGraw Hill Ltd*, New Delhi.
2. B.L.Thereja, A.K.Thereja, "Electrical Technology Vol. I & II"*, S.Chand & Company Ltd,* 2005 Edn.
3. Chakravarthy A, Sudhipanath and Chandan Kumar, "Basic Electrical Engg.", *Tata McGraw Hill Ltd*, New Delhi.

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

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U14ME106   BASIC MECHANICAL ENGINEERING

Class: B.Tech. I-Semester

Branch: Common to all branches

Teaching Scheme :

L	T	P	C
3	-	-	3

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)

Fundamental Concepts: Introduction to SI units, System, Thermodynamic state, Property, Process and Cycle; Energy, Work and Heat; Thermodynamic Equilibrium, Zeroth law of Thermodynamics, Laws of perfect gases.
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:
1. Basant Agrawal and C M Agrawal, "Basic Mechanical Engineering", *Wiley India Pvt. Ltd,* New Delhi
2. Mathur, Mehta and Tiwari, "Elements of Mechanical Engineering", *Jain Brothers*, New Delhi
3. Hazra Chowdary. S. K and Bose, "Basic Mechanical Engineering", *Media Promoters and Publishers Pvt. Ltd,* India.

Reference Books:
1. P. K. Nag, "Engineering Thermodynamics", *Tata McGraw Hill*, New Delhi.
2. Hazra Chowdary. S. K and Bose, "Workshop Technology, Vol. I & II", *Media Promoters and publishers Pvt Ltd*, India.

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 :

L	T	P	C
3	1	-	4

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

UNIT – I (9+3)

Introduction:
Basic Definitions – Mass, Particles, Rigid Body, Time, Space, Force, Branches of Mechanics, Fundamental principles of Mechanics – Parallelogram and Triangle laws of Forces, Newton's laws of Gravitation and Motion, Laws of superposition and Transmissibility of Forces.

Force Systems:
Types of Forces – Co-planar, Concurrent and Parallel Forces, Moment and Couple, Free Body Diagram, Types of Supports, Resultant of Force Systems, Resolution of Forces, Composition of Forces, Equilibrium equations of Forces, Lami's Theorem, Varignon's Theorem, Moment Equilibrium Equations, Distributed Forces, Resultant and Equilibrium of General Force System.

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:

Rectilinear motion-Equations of Rectilinear motion, Equations of Dynamic Equilibrium, D'Alembert's Principle.

Curvilinear Motion-Equations of Motion in Rectangular components, Tangential and Normal Components, Equations of Dynamic Equilibrium.

Applications of Work-Energy, Impulse –Momentum principles of Rectilinear Motion and Curvilinear Motion.

Text Books:
1. Tayal A.K., "Engineering Mechanics: Statics and Dynamics", *Umesh Publishers,* New Delhi, 40th edn., 2014.
2. Timoshenko S., Young D.H., Rao J.V., and Sukumar Pati, "Engineering Mechanics in SI units", *McGraw Hill Education Pvt. Ltd.,* New Delhi, 5th edn., 2013.
3. Basudeb Bhattacharyya, "Engineering Mechanics", *Oxford University Press*, 9th edn., 2013.

Reference Books:
1. Singer F.L., "Engineering Mechanics: Statics and Dynamics", *Harper and Row Publishers,* 3rd edn., 1975.
2. Bhavikatti S.S., "Engineering Mechanics", *New Age International,* New Delhi, 4th edn., 2013 (reprint).

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

<u>Class:</u> B.Tech. I-Semester   <u>Branch:</u> Common to all branches

Teaching Scheme :

L	T	P	C
-	-	3	2

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.
7. Programs using functions: different types, parameter passing using call-by-value, call-by-reference, recursion and storage classes.
8. Programs using strings: one dimensional array, two dimensional array, string handling functions.
9. Programs using pointers, string pointers.
10. Programs using, structure pointers, functions 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 :

L	T	P	C
-	-	3	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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

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List of Experiments

1   Newton's Rings: Determination of wavelength of a monochromatic light.
2   Determination of slit width using He-Ne Laser.
3   To find dispersive power of a prism using Spectrometer
4   Torsional pendulum: Determination of rigidity modulus of given wire and moment of inertia of ring.
5   Diffraction Grating: Determination of wave lengths of white light using normal incidence method.
6   To determine resolving Power of a Telescope.
7   To find the acceleration due to gravity (g) by Compound pendulum.
8   Polarimeter (Saccharimeter): Determination of specific rotation of sugar solution.
9   Photo Cell: To study the characteristics of a photo cell.
10   Determination of wavelength of He-Ne Laser.
11   Spiral spring: Determination of force constant of spiral spring.
12   Determination of Numerical Aperture of an Optical fiber.
13   Determination of diameter of a thin wire using Interference method.

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 :

L	T	P	C
-	-	3	2

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.
3   Determination of Hardness of water using complexometric method.
4   Determination of Calcium in Lime Stone / Dolomite.
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.
8   Synthesis of a polymer.
9   Conductometric Titrations.
10   Potentiometric Titrations.
11   Colorimetric analysis – Verification of Lambert-Beer's Law.
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 :

L	T	P	C
-	-	3	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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:
1. Hazra Chowdary. S.K and Bose, "Elements of Workshop Technology, Vol-I &II", *Media Promoters and publishers Pvt. Ltd,* India.
2. W.A.J.Chapman, "Workshop Technology, Vol-I", *Edward Arnold*

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

U14CH109   ENVIRONMENTAL STUDIES

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

Teaching Scheme :

L	T	P	C
2	-	-	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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 conversation 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.

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:
1. Erach Bharucha, "Text Book of Environmental Studies for Under Graduate Courses – 2nd edn., *Universities Press (India) Private Limited*
2. Anjaneyulu Y., "Environmental Studies", *B.S. Publications*.

Reference Books:
1. Bharucha Erach, "The Biodiversity of India" *Mapin Publishing Pvt. Ltd.*
2. Odum, E.P. 1971, "Fundamental of Ecology", *W.B. Saunders Co.,* USA, 574p.
3. Trivedi R.K. and P.K. Goel, "Introduction to Air Pollution", *Technoscience Publications.*
4. Gilbert M. Masters, **"Introduction to Environmental Engineering & Science",** 1991, *PHI*
5. A.S. Chauhan, "Environmental Studies", *Jain Brothers* (New Delhi) 3rd revised and enlarged edition.
6. R.Rajagopalan, "Environmental Studies from crisis to cure", *Oxford University Press.*

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 :

L	T	P	C
-	-	2	1

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

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-15
(*An Autonomous Institute under Kakatiya University*)
SCHEME OF INSTRUCTION AND EVALUATION
II SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME
INFORMATION TECHNOLOGY

S. No.	Course Category	Course Code	Course Name	Periods			Credits (C)	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	BS	U14MH201	Engineering Mathematics-II	3	1	-	4	15	25	40	60	100
2	ES	U14CS202	Object Oriented Programming through C++	3	1	-	4	15	25	40	60	100
3	BS BS	U14CH203 U14PH203	Engg. Chemistry / Engg. Physics	3 3	1 1	- -	4 4	15 15	25 25	40 40	60 60	100 100
4	ES BS	U14ME204 U14MH204	Engineering Drawing / English for Communication	2 2	4 2	- -	4 3	15 15	25 25	40 40	60 60	100 100
5	ES ES	U14EE205 U14EI205	Basic Electrical Engg. / Basic Electronics Engg.	3 3	- -	- -	3 3	15 15	25 25	40 40	60 60	100 100
6	ES ES	U14CE206 U14ME206	Basic Engg. Mechanics Basic Mechanical Engg.	3 3	1 -	- -	4 3	15 15	25 25	40 40	60 60	100 100
7	ES	U14CS207	Object Oriented Programming (OOP) Lab	-	-	3	2	40	-	40	60	100
8	BS BS	U14CH208 U14PH208	Engg. Chemistry Lab / Engg. Physics Lab	- -	- -	3 3	2 2	40 40	- -	40 40	60 60	100 100
9	MC ES	U14CH209 U14ME209	Environmental Studies #/ Engg. Workshop Practice	2 -	- -	- 3	2 2	40 15	- 25	40 40	60 60	100 100
10	MC	U14EA210	EAA: Physical Education & NSS #	-	-	2	1	100	-	100	-	100
			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

U14MH201   ENGINEERING MATHEMATICS-II

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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).

Complex Variables:

Functions of complex variables, Limit, Continuity, Differentiability, Analytic Functions, Cauchy-Riemann Equations in Cartesian and Polar coordinates. Elementary functions, Harmonic Functions, Construction of Analytic functions.

Applications to find velocity potential and stream function of a fluid flow.

Conformal mapping and bilinear transformation.

Text Book:

    1. Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi,

Reference Books:

    1. Churchill R.V., "Complex Variable and its Applications", *McGraw Hill*

    2. Kreyszig E., "Advanced Engineering Mathematics", *New Age International*

    3. Spiegel M., "Vector Analysis -Schaum Series", *McGraw Hill*

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 :

L	T	P	C
3	1	-	4

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, Un formatted 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:

1. E.Balagurusamy, "Object-Oriented Programming with C++", *McGraw-Hill Education India Pvt. Ltd*, Sixth Edition, ISBN-13:978-1-25-902993-6, 2012.
2. Bjarne Stroustrup, "The C++ Programming Language", *Addison-Wesley Publications*, Second Edition, ISBN No. 81-7808-126-1, 1991.

Reference Books:

1. K.R. Venugopal, Rajkumar, T.Ravishankar, "Mastering C++", *McGraw-Hill Education India Pvt.Ltd*, Second Edition, ISBN: 0-07-463454-2, 1997.
2. Timothy Bud, "An Introduction to Object Oriented Programming", *Pearson Education,* Second Edition, ISBN 81-7808-228-4, 2004.

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 :

L	T	P	C
3	1	-	4

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:
Introduction: Corrosion by pure chemical reaction, Electrochemical theory of corrosion, Galvanic corrosion, Differential aeration corrosion, Factors influencing corrosion, Prevention of corrosion: Cathodic Protection, Hot Dipping, Cementation, Cladding, Electroplating, Corrosion inhibitors, Anodized coatings.

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:
Introduction to spectroscopy, Microwave spectra: Theory, Application of microwave spectra in the determination of bond length of a diatomic molecule. Infra-Red spectra: Theory, Applications: Calculation of force constant and identification of functional groups in organic compounds. UV-Visible spectra: Lambert-Beer's law and its applications, Types of electronic transitions.

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 (SN^1 and SN^2) 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:
   1. Jain and Jain, "Engineering Chemistry", *Dhanpat Rai Publishers.*
   2. Shashi Chawla, "Text book of Engineering Chemistry", *Dhanpat Rai Publishers.*

Reference Books:
   1. J C Kuriacose and J.Rajaram, "Chemistry in Engineering and Technology (Vol .I&II)", *Tata McGraw Hill Publishers.*
   2. Suba Ramesh, Vairam et. al "Engineering Chemistry", *Wiley India.*
   3. O P Agarwal, "Engineering Chemistry", *Khanna Publishers.*
   4. S.S.Dara, "A Text book of Engineering Chemistry", *S.Chand & Company Ltd.*

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 :

L	T	P	C
3	1	-	4

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:
Physical examples of simple harmonic motion –Torsional pendulum, Physical pendulum, Spring - Mass systems and Loaded beams - Two body oscillations – Qualitative treatment of Free, Damped & Forced Oscillations and Resonance.

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.

Lasers (Qualitative):

Absorption, Spontaneous and Stimulated emission – Relation among Einstein coefficients – Difference between conventional and laser light – Population inversion, Methods of achieving population inversion – Types of Lasers – Ruby Laser, Helium-Neon Laser, Carbon dioxide Laser and Nd-YAG Laser – Applications of lasers. Holography: Introduction – Formation and Reconstruction of a Hologram – Applications of Holography.

Fiber Optics (Qualitative):

Introduction – Total internal reflection – Fiber construction – Numerical aperture and Acceptance angle – Types of Optical fibers (Step and Graded index) – Power losses in Optical fibers –Attenuation, Dispersion, Bending – Light wave Communication using Optical fibers – Applications of Optical fibers - Fiber optic Sensors (Temperature and Displacement), Endoscope.

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):

Magnetic materials: Introduction –Permeability - Magnetization –Classification of magnetic materials . Applications of magnetic materials – magnetic recording, magnetic memories.

Superconducting materials: Superconductivity – Meissner effect –Transition temperature – Isotope effect. Types of Superconductors - Soft and Hard Superconductors – Applications of Superconductors. Nanomaterials: Introduction – Classification of nanomaterials – Properties of nanomaterials – Physical, Chemical, Electrical, Optical, Magnetic and Mechanical properties (in brief) - Applications of nanomaterials (in brief).

Text Books:

1. Bhattacharya and Bhaskaran, "Engineering Physics", *Oxford University Press.*
2. V.Rajendran, "Engineering Physics", *McGraw Hill Education.*

Reference Books:

1. David Halliday and Robert Resnick, "Physics Part I & II", *Wiley Eastern Limited.*
2. R.K. Gaur and S.L.Gupta, "Engineering Physics", *Dhanpath Rai and Sons.*
3. P.K. Palanisamy, "Engineering Physics", *Scitech Publishers.*

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

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U14ME204   ENGINEERING DRAWING

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

Teaching Scheme :

L	T	P	C
2	4	-	4

Examination Scheme :

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.

<div align="center"><u>UNIT – IV</u> (6+12)</div>

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:
1. Bhatt N.D., "Elementary Engineering Drawing", *Charotar Publishing House,* Anand.

Reference Books:
1. Dhananjay A Jolhe, "Engineering Drawing", *TMH,* 2008.
2. Venugopal K. "Engineering Graphics with Auto CAD", *New Age International Publishers Ltd.*, Hyderabad.
3. K. L. Narayana & P. Kannaiah, "Engineering Drawing'', *SciTech Publications,* Chennai
4. W J Luzadder and J M Duff, "Fundamentals of Engineering Drawing", *Prentice-Hall of India*, 1995.

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 :

L	T	P	C
2	2	-	3

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:
1. Damodar G., & Surender Kumar M., "English for Communication", *KGA Publications,* Warangal.
2. Purushotham K., "English for fluency", *Orient Blackmen*, Hyderabad.

Reference Book:
1. Krishna Swamy N., "Modern English Grammar"**,** *MacMillan India Ltd.*

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:

L	T	P	C
3	-	-	3

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:
Ohm's Law, Network Elements, Kirchhoff's Laws, Source Transformation, Mesh and Nodal Analysis, Power in D.C. Circuits, Series, Parallel and Series Parallel combination of Resistances network reduction by Star – Delta Transformation.
Magnetic Circuits:
Introduction, Magnetic Circuits, Magnetic Field Strength, Magnetomotive Force, Permeability, Relative Permeability, Analogy between Electric and Magnetic Circuits, Series Magnetic Circuit, Parallel Magnetic Circuit, Self-Inductance and Mutual Inductance.

UNIT – II (9)

D.C. Machines:
Constructional features, Methods of Excitation, E.M.F. Equation, Torque development in D.C motor, Characteristics of Series, Shunt and Compound motors and Applications.
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 -ϕVoltages, Voltage & Current relationships of Line and Phase values for Star and Delta connections , 3-ϕ Power Measurement by two-wattmeter method.
1-ϕ Transformers:
Construction and operation principle, Development of No Load & On Load Phasor diagrams, Equivalent circuit, O.C. and S.C. tests, Losses and Efficiency, Voltage regulation.

3-ϕ Induction Motor:
Constructional features, Principle of Operation, Production of Rotating Magnetic Field, Torque – Slip Characteristics, Applications.

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:
1. Edward Hughes, "Electrical & Electronics Technology", 10th edn., *Pearson Education,*2010

Reference Books:
1. M.S. Naidu & S.Kamakshaiah, "Introduction to Electrical Engineering", *Tata McGraw Hill Ltd*, New Delhi.
2. B.L.Thereja, A.K.Thereja, "Electrical Technology Vol. I & II", *S.Chand & Company Ltd,* 2005 Edn.
3. Chakravarthy A, Sudhipanath and Chandan Kumar, "Basic Electrical Engg.", *Tata McGraw Hill Ltd*, New Delhi.

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:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LO):
LO1:   To introduce basic concepts of semi conductors 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 **s**tructure, Operation and Characteristics of a Junction Field Effect Transistor (JFET)

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.
2. Neil storey, "Electronics: A systems Approach", *4/e-Pearson Education Publishing company Pvt. Ltd*, India.
3. Helfrick. A.D and Cooper W.D., "Modern Electronic Instrumentation and Measurement Techniques", *PHI,* India.

Reference Books:
1. Jacob Millman, Christos C Halkias, "Electronic Devices and Circuits", 3/e, *TMH,* India.
2. Bhargava and Kulashresta, "Basic Electronics and Linear Circuits", *TTTI, TMH,* India.
3. Sawhney A.K, "Electrical and Electronic Measurements and Instrumentation", *Dhanpat Rai & Sons,* New Delhi, India.

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 :

L	T	P	C
3	1	-	4

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:
Basic Definitions – Mass, Particles, Rigid Body, Time, Space, Force, Branches of Mechanics, Fundamental principles of Mechanics – Parallelogram and Triangle laws of Forces, Newton's laws of Gravitation and Motion, Laws of superposition and Transmissibility of Forces.

Force Systems:
Types of Forces – Co-planar, Concurrent and Parallel Forces, Moment and Couple, Free Body Diagram, Types of Supports, Resultant of Force Systems, Resolution of Forces, Composition of Forces, Equilibrium equations of Forces, Lami's Theorem, Varignon's Theorem, Moment Equilibrium Equations, Distributed Forces, Resultant and Equilibrium of General Force System.

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.

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:
Rectilinear motion-Equations of Rectilinear motion, Equations of Dynamic Equilibrium, D'Alembert's Principle.
Curvilinear Motion-Equations of Motion in Rectangular components, Tangential and Normal Components, Equations of Dynamic Equilibrium.
Applications of Work-Energy, Impulse –Momentum principles of Rectilinear Motion and Curvilinear Motion.

Text Books:
1. Tayal A.K., "Engineering Mechanics: Statics and Dynamics", *Umesh Publishers,* New Delhi, 40th Edition, 2014.
2. Timoshenko S., Young D.H., Rao J.V., and Sukumar Pati, "Engineering Mechanics in SI units", *McGraw Hill Education Pvt. Ltd.,* New Delhi, 5th Edition, 2013.
3. Basudeb Bhattacharyya, "Engineering Mechanics", *Oxford University Press*, 9th Edition, 2013.

Reference Books:
1. Singer F.L., "Engineering Mechanics: Statics and Dynamics", *Harper and Row Publishers,* 3rd Edition, 1975.
2. Bhavikatti S.S., "Engineering Mechanics", *New Age International,* New Delhi, 4th Edition., 2013 (reprint).

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 :

L	T	P	C
3	-	-	3

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)
Fundamental Concepts: Introduction to SI units, System, Thermodynamic state, Property, Process and Cycle; Energy, Work and Heat; Thermodynamic Equilibrium, Zeroth law of Thermodynamics, Laws of perfect gases.
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:
1. Basant Agrawal and C M Agrawal, "Basic Mechanical Engineering", *Wiley India Pvt. Ltd,* New Delhi.
2. Mathur, Mehta and Tiwari, "Elements of Mechanical Engineering", *Jain Brothers*, New Delhi.
3. Hazra Chowdary. S. K and Bose, "Basic Mechanical Engineering", *Media Promoters and Publishers Pvt. Ltd,* India.

Reference Books:
1. P. K. Nag, "Engineering Thermodynamics", *Tata McGraw Hill*, New Delhi.
2. Hazra Chowdary. S. K and Bose, "Workshop Technology, Vol. I & II", *Media Promoters and publishers Pvt Ltd*, India.

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*

U14CS207   OBJECT ORIENTED PROGRAMMING LABORATORY

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

Teaching Scheme :

L	T	P	C
-	-	3	2

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 "xabaacbaxabb".
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*

<div align="center">

U14CH208   ENGINEERING CHEMISTRY LABORATORY

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

Teaching Scheme :

L	T	P	C
-	-	3	2

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

<div align="center">

List of Experiments

</div>

1   Determination of Alkalinity of test sample of water.
2   Estimation of Available Chlorine in test sample of Bleaching powder.
3   Determination of Hardness of water using complexometric method.
4   Determination of Calcium in Lime Stone / Dolomite.
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.
8   Synthesis of a polymer.
9   Conductometric Titrations.
10   Potentiometric Titrations.
11   Colorimetric analysis – Verification of Lambert-Beer's Law.
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

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U14PH208   ENGINEERING PHYSICS LABORATORY

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

Teaching Scheme :

L	T	P	C
-	-	3	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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*

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List of Experiments

1   Newton's Rings: Determination of wavelength of a monochromatic light.
2   Determination of slit width using He-Ne Laser.
3   To find dispersive power of a prism using Spectrometer
4   Torsional pendulum: Determination of rigidity modulus of given wire and moment of inertia of ring.
5   Diffraction Grating: Determination of wave lengths of white light using normal incidence method.
6   To determine resolving Power of a Telescope.
7   To find the acceleration due to gravity (g) by Compound pendulum.
8   Polarimeter (Saccharimeter): Determination of specific rotation of sugar solution.
9   Photo Cell: To study the characteristics of a photo cell.
10   Determination of wavelength of He-Ne Laser.
11   Spiral spring: Determination of force constant of spiral spring.
12   Determination of Numerical Aperture of an Optical fiber.
13   Determination of diameter of a thin wire using Interference method.

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*

U14CH209   ENVIRONMENTAL STUDIES

Class: B.Tech. II-Semester

Branch: Common to all branches

Teaching Scheme :

L	T	P	C
2	-	-	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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 conversation 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.

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:
1. Erach Bharucha, "Text Book of Environmental Studies for Under Graduate Courses – 2nd Edition., *Universities Press (India) Private Limited*
2. Anjaneyulu Y., "Environmental Studies", *B.S.Publications.*

Reference Books:
1. Bharucha Erach, "The Biodiversity of India" *Mapin Publishing Pvt. Ltd.*
2. Odum, E.P. 1971, "Fundamental of Ecology", *W.B. Saunders Co.,* USA, 574p.
3. Trivedi R.K. and P.K. Goel, "Introduction to Air Pollution", *Technoscience Publications.*
4. Gilbert M. Masters, "Introduction to Environmental Engineering & Science", 1991, *PHI.*
5. A.S. Chauhan, "Environmental Studies", *Jain Brothers* (New Delhi) 3rd revised and enlarged edition.
6. R.Rajagopalan, "Environmental Studies from crisis to cure", *Oxford University Press.*

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

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U14ME209   ENGINEERING WORKSHOP PRACTICE

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

Teaching Scheme :

L	T	P	C
-	-	3	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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:
1. Hazra Chowdary. S.K and Bose, "Elements of Workshop Technology, Vol-I &II", *MediaPromoters and publishers Pvt. Ltd,* India.
2. W.A.J.Chapman, "Workshop Technology, Vol-I", *Edward Arnold.*

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 :

L	T	P	C
-	-	2	1

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:
> a. Physical Fitness
> b. 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

S. No.	Course Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme				
								CIE			ESE	Total Marks
				L	T	P		TA	MSE	Total		
1	BS	U14MH301	Engineering Mathematics-III	3	1	-	4	15	25	40	60	100
2	BS	U14MH302	Discrete Mathematics	3	1	-	4	15	25	40	60	100
3	ES	U14EC303	Digital Circuits and Logic Design	3	1	-	4	15	25	40	60	100
4	PC	U14IT304	Computer Architecture and Organization	3	1	-	4	15	25	40	60	100
5	PC	U14IT305	Data Structures and Algorithms	3	1	-	4	15	25	40	60	100
6	PC	U14IT306	Principles of Programming Languages	3	1	-	4	15	25	40	60	100
7	PC	U14IT307	Data Structures and Algorithms Laboratory	-	-	3	2	40	-	40	60	100
8	ES	U14EE312	Basic Electrical and Electronics Engineering Laboratory	-	-	3	2	40	-	40	60	100
			Total	**18**	**6**	**6**	**28**	**170**	**150**	**320**	**480**	**800**
9	MC	U14MH309	Compliance with Current English	-	-	2	1	100	-	100	-	100

Student Contact Hours / Week: 32   **Total Credits:** 28

U14MH301   ENGINEERING MATHEMATICS-III

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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

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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 $\delta(t)$ Step $u(t)$, Ramp $t\,u(t)$ Parabolic $t^2 u(t)$, Real exponential $e^{at} u(t)$ Complex exponential $e^{j\Omega t} u(t)$ 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 2π, 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 $Sin\omega t$, $Cos\omega t$ and combination of Sinusoids, Fourier series on an arbitrary period; Half range series – Half range cosine and sine series expansions.

<div align="center">**UNIT - III (9+3)**</div>

Applications of Partial Differential Equations: Basic concepts of partial differential equations, Classification of second order partial differential equations, Solution of a partial differential equation, Solution through the method of separation of variables.

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.

<div align="center">**UNIT - IV (9+3)**</div>

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 **s**ingularities, Residues; Residue Theorem - Applications of Residue theorem to the properly chosen integrals around a unit circle and semi circle.

Text Book:
1. Grewal. B.S., "Higher Engineering Mathematics", *Khanna Publishers,* New Delhi, 43rd Edition, 2014.

Reference Books:
1. Kreyszig E., "Advanced Engineering Mathematics", *John Wiley & Sons, Inc.,* U.K 9th Edition, 2013.
2. R.V.Churchill, "Complex Variables and its Applications", *McGraw-Hill*, New York, 9th Edition, 2013.
3. S.S.Sastry, "Engineering Mathematics", Vol. II ,*Prentice Hall of India*, 3rd Edition, 2014.

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 :

L	T	P	C
3	1	-	4

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:   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 predicator 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:
1. J.L.Mott, A.Kandel and T.P.Baker – "Discrete Mathematics for Computer   Scientists", *Prentice- Hall of India,* New Delhi, 2nd Edition, 1999.

Reference Books:
1. J.P.Tremblay, R.Manohar, "Discrete Mathematics Structures with Application to Computer Science", Tata McGraw- Hill Edition,1997, 37th reprint 2009.
2. Zohar Manna, "Mathematical Theory of Computation", *MGH*, New Delhi.
3. C.L. Liu,"Elements of Discrete mathematics", *Tata Mc. Graw Hill*, 3rd Edition, 2008.

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 :

L	T	P	C
3	1	-	4

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:   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)
Sequential Circuits: Flip Flops – SR, JK, D and T Flip Flops, Truth tables, Excitation tables, Race Around Condition, Master Slave Flip Flop; Binary Counters – Design of Synchronous and Asynchronous Counters; Shift Registers – Modes of Operation, Bidirectional Shift Registers, Ring Counter and Johnson Counter.
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:

1   Zvi. Kohavi, "Switching And Finite Automata Theory", 2nd Edition *Tata McGraw-Hill* 2008, New Delhi. (Chapter 3, 4, 5 & 9).
2   R.P. Jain, "Modern Digital Electronics", 3rd Edition *Tata McGraw-Hill* 2003, New Delhi, (Chapter 1, 2, 4 to 8).

Reference Books:

1   Moris Mano," Digital Design", 3rd Edition *PHI* 2003, New Delhi,.
2   A.Anand Kumar, "Switching Theory And Logic Design", 1st Edition *PHI* 2013, New Delhi , (Reprint) .
3   Herbert Taub and Donald Schilling, "Digital Integrated Circuits", *Tata McGraw-Hill* 2008, NewDelhi.

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 :

L	T	P	C
3	1	-	4

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

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UNIT - I (9+3)

Review of Computer Systems: Basic functional units and operation of digital computers, Performance measures.

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:
1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, "Computer Organization", *McGraw-Hill Education*, 5th Edition, ISBN: 0-07-120411-3, 2002. (Chapters 1 to 6, 8 & 10)
2. M. Morris Mano, "Computer System Architecture", *Pearson Education*, 3rd Edition, ISBN: 978-81-317-0070-9, 2007. (Chapters 9, 10 & 11)

Reference Books:
1. W.Stallings, "Computer Organization and Architecture - Designing for Performance", *Pearson Education*, 7th Edition, ISBN: 978-81-7758-993-1, 2009.
2. John P Hays, "Computer System Architecture and Organization", *McGraw-Hill Education*, 3rd Edition, ISBN: 0-07-115997-5, 1998.

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:

L	T	P	C
3	1	-	4

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.
Arrays: The arrays as an abstract data type, The polynomial abstract data type, Sparse matrices- Introduction, Sparse matrix representation, Transposing a matrix.
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.
Trees: Introduction, Binary trees- The abstract data type, Properties of binary trees, Binary tree representations, Binary tree traversals and Tree iterator - Introduction, Inorder traversal, Preorder traversal, Postorder traversal, Iterative traversals. Threaded binary trees, Heaps, Binary search trees - Definition, Searching a binary search tree, Insertion into a binary search tree, Deletion from a binary search tree, Joining and splitting binary search trees, Height of a binary search tree.

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.
Efficient Binary Search Trees: Optimal binary search trees, AVL trees.
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:
1. Ellis Horowitz, Sartaj Sahani, Dinesh Metha, "Fundamentals of Data Structures in C++", *Universities Press*, 2nd Edition, ISBN-978 81 7371 606 5, 2008.
2. Varsha H.Patil, "Data Structures Using C++", *Oxford University Press*, 1st Edition, ISBN-10: 0-19-806623-6, ISBN-13: 978-0-19-806623-1, 2012. (Chapters 9 & 11)

Reference Books:
1. D. Samanta, "Classic Data Structures", *Prentice Hall India*, 2nd Edition, ISBN- 978-203-3731-2, 2009.
2. Mark Allen Weiss, "Data Structure & Algorithm Analysis in C++", *Pearson Education*, 3rd Edition, ISBN-10: 81-3171-474-8, ISBN-13:97-8813-1714-744, 2007.

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

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U14IT306   PRINCIPLES OF PROGRAMMING LANGUAGES

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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:   *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.

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:
1. C. Ghezzi and M. Jazayeri, "Programming Language Concepts", *John Wiley & Sons*, 3rd Edition, ISBN: 9971-51-225-4, 2003.

Reference Books:
1. T.W. Pratt and M.V. Zelkowitz, "Programming Languages-Design and Implementation", *PHI*, 3rdEdition, ISBN: 81-203-1038-1, 2000.
2. Robert W. Sebesta, "Concepts of Programming languages", *Pearson Education*, 4th Edition, ISBN: 10-0321193628, 1999.
3. Ravi Sethi, "Programming Language Concepts", *Addison Wesley*, 2nd Edition, ISBN: 81-7808-104-0, 2002.

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:

L	T	P	C
-	-	3	2

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:   *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

21. Implementation of binary tree and its traversal techniques.
     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:

1. Ellis Horowitz, Sartaj Sahani, Dinesh Metha, "Fundamentals of Data Structures in C++", *Universities Press*, 2nd Edition, ISBN-978 81 7371 606 5, 2008.
2. Varsha H.Patil, "Data Structures Using C++", *Oxford University Press*, 1st Edition, ISBN-10: 0-19-806623-6, ISBN-13: 978-0-19-806623-1, 2012. (Chapters 9 & 11)

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

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U14EE312   BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

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

Teaching Scheme: **Examination Scheme:**

L	T	P	C
-	-	3	2

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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.
7. Frequency response of a series RLC network.
8. Determination of Parameter of a choke coil.
9. Predetermination of efficiency and regulation of a transformer by O.C & S.C test.
10. Determination of efficiency and regulation of a transformer by direct load test.
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 :

L	T	P	C
-	-	2	1

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:
   1.   John Sinclair, "Collins Cobuld English Grammar," *Collins Cobuild*,1990

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

S. No.	Course Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	BS	U14MH401	Engineering Mathematics-IV	3	1	-	4	15	25	40	60	100
2	PC	U14IT402	Design and Analysis of Algorithms	3	1	-	4	15	25	40	60	100
3	PC	U14IT403	Database Management Systems	3	1	-	4	15	25	40	60	100
4	PC	U14IT404	Java Programming	3	1	-	4	15	25	40	60	100
5	ES	U14EC410	Microprocessors	3	1	-	4	15	25	40	60	100
6	PC	U14IT405	Java Programming Laboratory	-	-	3	2	40	-	40	60	100
7	PC	U14IT406	Database Management Systems Laboratory	-	-	3	2	40	-	40	60	100
8	ES	U14EC411	Microprocessors Laboratory	-	-	3	2	40	-	40	60	100
			Total	**15**	**5**	**9**	**26**	**195**	**125**	**320**	**480**	**800**
9	MC	U14MH409	Soft and Interpersonal Skills	-	-	2	1	100	-	100	-	100
10	MC#	U14CH209	Environmental Studies	2	-	-	2	15	25	40	60	100

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

U14MH401   ENGINEERING MATHEMATICS-IV

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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)

Numerical Analysis: Finite differences and difference operators.
Interpolation: Lagrange interpolation, Newton's forward and backward interpolation formulae.
Numerical differentiation: First and second derivatives using forward and backward interpolation polynomials at the tabulated points.
Numerical integration: Gaussian quadrature formula, Trapezoidal rule, Simpson's 1/3rd rule and Simpson's 3/8th rule.

UNIT - IV (9+3)

Solution to system of linear equations: Gaussian elimination method, Jacobi and Guass-Siedel iteration methods.
Numerical Solution of algebraic and transcendental equations: Bisection method, Regula-Falsi method and Newton Raphson's method.
Numerical solution of ordinary differential equations: Taylor's method, Picard's method, Euler's method and Runge - Kutta methods of second and fourth order**.**

Text Book:
1. Grewal. B.S., "Higher Engineering Mathematics", *Khanna Publishers,* New Delhi, 43rd Edition, 2014.

Reference Books:
1. Gupta and Kapoor, "Fundamentals of Mathematical Statistics", *Sulthan Chand and & sons,* New Delhi, 11th Edition, 2010.
2. Kreyszig E., "Advanced Engineering Mathematics", *John Wiley & Sons, Inc.,*U.K., 9th Edition, 2013.

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 :

L	T	P	C
3	1	-	4

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)

Greedy Method: General method, Knapsack problem, Job sequencing with deadlines, Minimum-cost spanning trees, Optimal storage on tapes, Optimal merge patterns, Single source shortest paths.
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 sales person problem.
Back tracking: 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.
NP-Hard and NP-Complete Problems: Basic concepts- Nondeterministic algorithms, The classes NP-Hard and NP-Complete, COOK's theorem, NP-Hard graph problems- Clique decision problem, Node cover decision problem, Traveling salesperson decision problem.

Text Book:
1. E.Horowitz, S.Sahni & S.Rajasekaran, "Fundamentals of computer algorithms*", Universities Press*, 2nd Edition, ISBN: 978-8173716126, 2008.

Reference Books:
1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest & Cliford Stein, "Introduction to algorithms", *Prentice-Hall of India,* 3rd Edition, ISBN: 978-81-203-4007-7, 2010.
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", *Addison-Wesley*, 3rd Edition, ISBN-13: 978-0132316811, 2011.
3. S. Sridhar, "Design and Analysis of Algorithms", O*xford University Press*, 1st Edition, ISBN-13: 978-0-19-809369-5, 2015.

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

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U14IT403   DATABASE MANAGEMENT SYSTEMS

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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)

Database Design Theory and Methodology: Informal design guidelines for relation schemas, Functional dependencies, Normal forms based on primary keys, General definitions of second and third normal forms, Boyce-Codd normal form, Algorithms for relational database schema design, Multivalued dependencies and fourth normal form , Join dependencies and fifth normal form, Inclusion dependencies, Other dependencies and normal forms, EF-Codd rules.

Query Processing and Optimization: Translating SQL queries into relational algebra, Using heuristics in query optimization, Using selectivity and cost estimates in query optimization, Overview of query optimization in ORACLE, Semantic query optimization.

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:
1. Ramez Elmasri and Shamkanth B. Navathe, "Fundamentals of Database Systems", *Pearson Education*, 3rd Edition, ISBN: 81-7808-137-7, 2003.

Reference Books:
1. Thomas Connolly and Carolyn Begg, "Database Systems", *Pearson Education*, 3rd Edition, ISBN: 81-7808-861-4, 2003.
2. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, "Database System Concepts", *McGraw-Hill Education*, 3rd Edition, ISBN: 0-07-114810-8, 1997.
3. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", *McGraw-Hill Education*, 3rd Edition, ISBN-13: 978-0072465631, 2002.

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

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U14IT404   JAVA PROGRAMMING

<u>**Class**</u>: B.Tech. IV-Semester   <u>**Branch:**</u> Information Technology

Teaching Scheme:

L	T	P	C
3	1	-	4

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 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

<u>UNIT – I (9+3)</u>

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.

<u>UNIT – II (9+3)</u>

Inheritance: Basic concepts, Forms of inheritance, Member access rules, Usage of super key word, 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.

<u>UNIT – III (9+3)</u>

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:
1. Herbert Schildt, Dale Skrien,"Java Fundamentals (A Comprehensive Introduction)", *McGraw Hill Education*, 1st Edition, ISBN-13: 978-1-25-900659-3, 2012.(Chapters 1 to 10, 12, 15, 17 to 22).
2. Sachin Malhotra, Saurabh Choudhary, "Programming in JAVA", *Oxford Publications*, 2nd Edition, ISBN-13: 978-0-19-809485-2, 2013. (Chapter 16)

Reference Books:
1. Herbert Schildt,"JAVA The Complete Reference", *McGraw-Hill Education India Pvt.Ltd*, 9th Edition, ISBN: 9781259002465, 2011.
2. Kathy Sierra, Bert Bates, "Head First Java" *O'Reilly Publictions*, 2nd Edition, ISBN-13: 978-0596009205, 2005.
3. K. Somasundaram, "Advanced Programming in Java 2", *Jaico Publishing House*, 1st Edition, ISBN-13: 978-8179928882, 2008.
4. George Reese, "Database Programming With JDBC And JAVA", *O'Reilly Publications*, 2nd Edition, ISBN-13: 978-8173662898, 2000.

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 :

L	T	P	C
3	1	-	4

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)

Assembly Language Programming: Assembler Directives, Simple Programming of 8086, Arithmetic, Logical and Data Processing Programs; Implementation of Control Loops, Structures, Strings, Procedures, Macros.

Pin Configuration, Minimum / Maximum Modes, Timing Diagrams, Delay Subroutines.

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.

Serial Data Communication through 8086: Types of Serial Communication, Synchronous and Asynchronous Communication, Serial Data Communication through USART 8251, Serial Data Communication Standards, RS,232, IEEE 488 Bus (GPIB).

Text Books:

1   D.V.Hall, "Microprocessors and Interfacing: Programming & Hardware", 2nd Edition, *Tata McGraw Hill*, New Delhi, 1992. (Chapter 3 to 10)

2   Yuchang Liu, Glen A. Gibson, "Microcomputer Systems. The 8086/8088 Family, Architecture, Programming and Design*", 2nd Edition, PHI*, New Delhi, 1995. (Chapter 2 to 11)

Reference Books:
1   Kenneth J. Ayala, Ayala Kenneth," The 8086 Microprocessor: Programming and Interfacing The PC", *West Pub.*, 1994.
2   Barry B. Brey," The Intel Microprocessors: Architecture, Programming and Interfacing", 2nd Edition, *PHI, New Delhi,* 1998.

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

<u>Class</u>: B.Tech. IV-Semester   **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
-	-	3	2

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:   core programming features of Java
LO2:   utilizing inheritance, exceptional handling, packages and interfaces
LO3:   the concepts of multithreading and Java Data Base 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 read *N* number of strings from keyboard and display in sorted order.

Experiment-III
8. Write a program to accept the string from keybord, 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:

1. Herbert Schildt, Dale Skrien,"Java Fundamentals (A Comprehensive Introduction)", *McGraw Hill Education*, 1st Edition, ISBN-13: 978-1-25-900659-3, 2012 (Chapters 1 to 10, 12, 15, 17 to 22).
2. Sachin Malhotra, Saurabh Choudhary, "Programming in JAVA", *Oxford Publications*, 2nd Edition, ISBN-13: 978-0-19-809485-2, 2013. (Chapter 16)

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 :

L	T	P	C
-	-	3	2

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:

1. Ivan Bayross, "SQL, PL/SQL: The Programming Language of Oracle", *BPB publications,* 4th Edition, ISBN: 978-8176569644, 2010.

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 :

L	T	P	C
-	-	3	2

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
3. Design and Realization of Adder/Subtractor using Multiplexer and Decoder.
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:
1. D.V. Hall, ''Microprocessors and Interfacing: Programming & Hardware", 2nd Edition, *Tata McGraw Hill,* New Delhi, 1992. (Chapter 3 to 10)

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/Dissembler Software*
CO4:   *program 8086 MP for implementing Arithmetic, Logic and Data Processing Algorithms*

U14MH409   SOFT AND INTERPERSONAL SKILLS

Class: B.Tech. IV-Semester   **Branch:**   Common to EIE, EEE, IT and ECE

Teaching Scheme :

L	T	P	C
-	-	2	1

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:
1. Robert.T.Kiyosaki and Sharon L.Lechter, "Rich Dad Poor Dad"**,** *Warmer Books,*1997.
2. Shiv Khera, "You can Win" *New Dawn Press, 2004.*
3. APJ Abdul Kalam, "Wings of Fire: An Autobiography of APJ Abdul Kalam**",** *University Press,1999.*
4. David Joseph Schwartz, "The magic of thinking big", *Simon & Schuster Inc.,* 1/e, 1987.
5. Stephen Covey, "The 7 Habits of Highly Effective People", *Free Press,* 1989.

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*

U14CH209   ENVIRONMENTAL STUDIES

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

Teaching Scheme :

L	T	P	C
2	-	-	2

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 conversation 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:
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:
1. Erach Bharucha, "Text Book of Environmental Studies for Under Graduate Courses – 2nd Edition, *Universities Press (India) Private Limited.*
2. Anjaneyulu Y., "Environmental Studies", *B.S. Publications.*

Reference Books:
1. Bharucha Erach, "The Biodiversity of India" *Mapin Publishing Pvt. Ltd.*
2. Odum, E.P. 1971, "Fundamental of Ecology", *W.B. Saunders Co.,* USA, 574p.
3. Trivedi R.K. and P.K. Goel, "Introduction to Air Pollution", *Technoscience Publications.*
4. Gilbert M. Masters, **"**Introduction to Environmental Engineering & Science**",** 1991, *PHI.*
5. A.S. Chauhan, "Environmental Studies", *Jain Brothers* (New Delhi) 3rd revised and enlarged Edition.
6. R.Rajagopalan, "Environmental Studies from crisis to cure", *Oxford University Press.*

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

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*** Note: To be offered to the Lateral Entry students in the IV semester*

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-15
(*An Autonomous Institute under Kakatiya University*)
SCHEME OF INSTRUCTION AND EVALUATION
V SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME
INFORMATION TECHNOLOGY

S. No.	Course Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme				Total Marks
				L	T	P		CIE			ESE	
								TA	MSE	Total		
1	PC	U14IT501	Computer Networks	3	1	-	4	15	25	40	60	100
2	PC	U14IT502	Software Engineering	3	1	-	4	15	25	40	60	100
3	PC	U14IT503	Theory of Computation	3	1	-	4	15	25	40	60	100
4	PC	U14IT504	Operating Systems	3	1	-	4	15	25	40	60	100
5	PC	U14IT505	Web Technologies	3	1	-	4	15	25	40	60	100
6	PC	U14IT506	Cryptography and Network Security	3	1	-	4	15	25	40	60	100
7	PC	U14IT507	Web Technologies Laboratory	-	-	3	2	40	-	40	60	100
8	PC	U14IT508	Operating Systems Laboratory	-	-	3	2	40	-	40	60	100
9	PR	U14IT509	Seminar	-	-	-	1	100	-	100	-	100
			Total	**18**	**6**	**6**	**29**	**270**	**150**	**420**	**480**	**900**

Student Contact Hours / Week: 30   **Total Credits:** 29

U14IT501   COMPUTER NETWORKS

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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.
Reference models: OSI Reference model, TCP/IP Reference model, Comparison of OSI and TCP/IP reference models.
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.
Congestion Control Algorithms: Approaches to congestion control, Traffic-aware routing, Admission control, Traffic throttling, Load shedding.
Internetworking: How networks differ, How networks can be connected, Tunneling, Internetwork routing, Packet fragmentation.
The Network Layer in The Internet: The IP Version 4 Protocol, IP Addresses, IP Version 6, Internet control protocols, OSPF- Interior gateway routing protocol, BGP- Exterior gateway routing protocol, Internet multicasting.

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:

1. Andrew S.Tanenbaum , David J. Wetherall, "Computer Networks", *Pearson Education*, 5th Edition, ISBN-13: 978-0-13-212695-3, 2011.

Reference Books:

1. William Stallings, "Data and Computer Communications", *Prentice-Hall India*, 9th Edition, ISBN-81-203-1240-6, 2011.
2. Forouzan, "Data Communication and Networking", *TMH*, 5th Edition, *ISBN*978-0-07-296775-3, 2012.

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 :

L	T	P	C
3	1	-	4

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 **.**

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 W^5HH principle.

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

Text Book:
1. Roger S. Pressman, "Software Engineering", *TATA McGraw Hill,* 7th Edition, ISBN: 978-007-126782-3, 2010.

Reference Books:
1. IAN Somerville," Software Engineering", *Pearson Education,* 6th Edition, ISBN: 81-7808-497-X, 2002.
2. Deepak Jain," Software Engineering", *OXFORD University Press*, 1st Edition, ISBN -13: 978-0-19-569484-0, 2008.

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

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U14IT503   THEORY OF COMPUTATION

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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.
Finite Automata: An informal picture of finite automata, Deterministic finite automata, Non-deterministic finite automata, Finite automata with epsilon-transitions, Finite automata with output, Equivalence and minimization of automata.
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:
1. John E. Hopcroft, Rajeev Motwani and Jeffery D. Ullman, "Introduction to Automata Theory Languages & Computation", *Pearson Education,* 3rd Edition, ISBN 978-81-317-2047-9, 2008.

Reference Books:
1. JE Hopcroft and JD Ullman, "Introduction to Automata Theory, Languages and Computation", *Addison-Wesley*, 2nd Edition, ISBN: 0-201-44124-1, 2001.
2. Mishra K.L.P., Chandrasekaran N,"Theory Of Computer Science: Automata, Languages and Computation", *PHI Learning*, 3rd, ISBN: 978-81-203-2968-3, 2006.
3. Michael Sipser, "Introduction to the Theory of Computation", *Books/Cole Thomson Learning*, 2nd Edition, ISBN-10: 8131517500, ISBN-13: 978-8131517505, 2001.

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 undecidabilty of problems and explain P , NP problems

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U14IT504   OPERATING SYSTEMS

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

Teaching Scheme:

L	T	P	C
3	1	-	4

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.

Process Concept: Process, Process states, Process control block, Threads, Process scheduling-Scheduling queues, Schedulers, Context switch, Operation on processes, Inter process communication.

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.

Process Synchronization: Critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Monitors. Classic problems of synchronization – Readers writers problem, Bounded buffer problem, Dining philosophers problem.

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)

File System: File concepts, Access methods, Directory and disk structure, File-system structure and implementation, Allocation methods, Free space management.

System Protection and Security: Goals of protection, Domain of protection, Access matrix, Implementation of access matrix, Security problem, User authentication, Program threats, System and network threats.

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:
1. Silber Schatz, Gagne & Galvin, "Operating System Concepts", *John Wiley & Sons*, 8th Edition, ISBN:13-9788126520510, 2009.

Reference Books:
1. H.M. Dietel, "An Introduction to Operating Systems", *Pearson Education*, 2nd Edition, ISBN: 81-7808-035-4, 2000.
2. Andrew S. Tanenbaum, "Operating System Design and Implementation ", *Prentice Hall*, 3rd Edition, ISBN: 0-13-142938-8, 2006.
3. William Stalling, "Operating Systems", *Maxwell, McMillan International Editions*, 1st Edition, ISBN: 81-203-1187-6, 1992.
4. Naresh Chauhan, "Principles of Operating Systems", *Oxford University Press*, 1st Edition, ISBN:13-978-0-19-808287-3, 2015.

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

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U14IT505   WEB TECHNOLOGIES

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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:   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)

Introduction to HTML: Structure of HTML document, List, Linking document, Creating table and its attributes, Images, Frames, Forms, Creating style sheet rules and properties.
Introduction to JavaScript: Embedding JavaScript in an HTML Page, Using variables in JavaScript, Using array in JavaScript, Creating objects in JavaScript, Using operators, Working with control flow statements, Working with functions, Handling events.

UNIT – II (9+3)

Introduction to XML: Basics, Syntax, Declaration, Elements, Attributes, Valid XML documents, Viewing XML, parser, Parameter entities and conditional sections, Advanced XML, Namespaces, CDATA, Encoding, XML on the server, XML application, XMLHttpRequest Object, XML technologies, Extensible HTML (XHTML), Converting HTML to XML, Extensible style sheet language transformation (XSLT), XSLT Style sheet, XSLT functions.
Servlets: Introducing servlet, Exploring the features of Java servlets, Servlet – a request and response model, Understanding session tracking, Cookies.

UNIT – III (9+3)

Introduction to JSP: Understanding JSP, Advantages of JSP over servlets, Introducing the tag-based approach, Describing the JSP architecture, Describing the JSP life cycle, The page translation stage, The compilation stage, The loading & initialization stage, The request handling stage, The destroying stage, Creating simple JSP pages, Working with JSP basic tags and implicit objects, Exploring scripting tags, Exploring implicit objects, Exploring directive tags. **Using JavaBeans and action tags in JSP**: What is JavaBean?, Action tags, Using bean in a JSP.

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:

1. Kogent Learning Solutions Inc,"Web Technologies, Black Book", *Dreamtech Press*, ISBN 13: 9788177228496, 2010. (Chapters 2 to 7, 11, 12 & 14)
2. David Geary, Cay S. Horstmann, "Core JavaServer Faces", Prentice Hall, 3rd Edition, ISBN-13: 978-0137012893 ISBN-10: 0137012896, 2010. (Chapter 5)

Reference Books:

1. Greg Buczek,"ASP.NET Developer's Guide", *McGraw Hill Education*, 1st Edition, ISBN: 9780070499171, 2002.
2. Larry Ullman,"PHP for the Web: Visual QuickStart Guide", *Pearson Education,* 4th Edition, ISBN-10: 0-321-73345-2, ISBN-13: 978-0-321-73345-0, 2008.
3. Gary Bollinger, Bharathi Natarajan," JSP: A Beginner's Guide", *McGraw-Hill Education*, 1st Edition, ISBN-10: 0072133198, ISBN-13: 978-0072133196, 2001.

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   **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	1	-	4

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 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)
Introduction: The OSI security architecture , Security attacks, Security service and mechanisms, A model for network security.
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.
Advanced Encryption Techniques: Evaluation criteria for AES, The AES cipher.

UNIT - II (9+3)
Number Theory: Prime and relatively prime numbers, Fermat's and Euler's theorem, Euclid's algorithm.
Public-Key Cryptography And RSA: Principles of public-key cryptosystems, The RSA 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)

IP Security: Overview, IP security policy, Encapsulating security payload, Combining security associations.

Web Security: Web security issues, Secure sockets layer and Transport layer security.

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

Firewalls: Firewall design principles, Trusted systems.

Text Book:
1. William Stallings, "Cryptography and Network Security: Principles and Practice ", *Pearson Education*, 5th Edition, ISBN 10: 0-13-609704-9, ISBN 13: 978-0-13-609704-4, 2011.(Chapters 1 to 3, 5, 8 to 14,16 ,18,19,21 & 22)

Reference Books:
1. Behrouz A. Forouzan, Debdeep Mukhopadhyay, "Cryptography and network security", *Mc Graw Hill Education,* 2nd Edition, ISBN-13:978-0-07-070208-0, ISBN-10: 0-07-070208-X, 2010.
2. Atul Kahate, "Cryptography and Network Security", *McGraw-Hill Education,* 1st Edition, ISBN: 0070494835, 9780070494831, 2003.
3. Denning. D, "Cryptography and Data Security", *Addison Wesley*, 1st Edition, ISBN: 0-201-10150-5, 1982.

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

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

Teaching Scheme: **Examination Scheme:**

L	T	P	C
-	-	3	2

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 Java script
 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 awebpage 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 over view 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:

1. Kogent Solutions Inc, "Web Technologies, Black Book", *DreamTech Press*, ISBN: 13-9788177228496, 2010. (Chapters 2 to 7, 11, 12 & 14)
2. David Geary, Cay S. Horstmann, "Core JavaServer Faces", Prentice Hall, 3rd Edition, ISBN-13: 978-0137012893 ISBN-10: 0137012896, 2010. (Chapter 5)

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: **Examination Scheme:**

L	T	P	C
-	-	3	2

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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

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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:
    1. Sumitabha Das, "Your Unix: The Ultimate Guide", *McGraw Hill,* 3rd Edition, ISBN: 0-07-053475-6, 2005.

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 :

L	T	P	C
-	-	-	1

Examination Scheme :

Continuous Internal Evaluation	100 marks
End Semester Examination	-

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:

Assessment	Weightage
Seminar Supervisor Assessment	20%
Seminar Report	30%
DSEC Assessment: Oral presentation (PPT) and viva-voce	50%
Total Weightage:	100%

(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

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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

S. No.	Course Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme				Total Marks
								CIE			ESE	
				L	T	P		TA	MSE	Total		
1	OE	U14OE601	Open Elective-I	4	-	-	4	15	25	40	60	100
2	PC	U14IT602	Language Processors	3	1	-	4	15	25	40	60	100
3	PC	U14IT603	Object Oriented Analysis and Design	3	1	-	4	15	25	40	60	100
4	PC	U14IT604	GUI Programming	3	1	-	4	15	25	40	60	100
5	PE	U14IT605	Professional Elective-I	4	-	-	4	15	25	40	60	100
6	PC	U14IT606	Object Oriented Analysis and Design Laboratory	-	-	3	2	40	-	40	60	100
7	PC	U14IT607	Language Processors Laboratory	-	-	3	2	40	-	40	60	100
8	PC	U14IT608	GUI Programming Laboratory	-	-	3	2	40	-	40	60	100
9	PR	U14IT609	Mini Project		-	-	2	100	-	100	-	100
			Total	**17**	**3**	**9**	**28**	**295**	**125**	**420**	**480**	**900**

Student Contact Hours / Week: 29   **Total Credits:** 28

Open Elective-I   **Professional Elective–I**

U14OE 601A : Disaster Management   U14IT 605A: Distributed Computing

U14OE 601B : Project Management   U14IT 605B: Neural Networks

U14OE 601C : Professional Ethics in Engineering   U14IT 605C: Information Retrieval Systems

U14OE 601D : Rural Technology and Community Development   U14IT 605D: Computer Graphics and Multimedia

U14OE601A   DISASTER MANAGEMENT

Class: B.Tech.VI-Semester   **Branch:** Common to All

Teaching Scheme:

L	T	P	C
4	-	-	4

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: 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

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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:
1. Rajib shah and R.R Krishnamurthy, "Disaster management – Global Challenges and local solutions" *University Press,*1st Edition, 2009.
2. Satish Modh, "Introduction to Disaster management", *Macmillan Publishers*, India, 1st Edition, 2010.

Reference Books:
1. Jagbir Singh, "Disaster Management-Future Challenges and Opportunities", *I.K Publishers*, 1st Edition, 2007.
2. H.K Gupta, "Disaster management", *Universities Press,* India, 1st Edition, 2003.
3. G.K. Ghosh, "Disaster management", *A.P.H. Publishing Corporation*, 1st Edition, 2012.

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

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U14OE601B   PROJECT MANAGEMENT

<u>Class</u>: B.Tech. VI-Semester   <u>Branch</u>: Common to all

Teaching Scheme:

L	T	P	C
4	-	-	4

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: 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

<u>UNIT – I</u> (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.

<u>UNIT – II</u> (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.

<u>UNIT – III</u> (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.

<u>UNIT – IV</u> (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:
1. Harold Kerzner, "Project Management: A Systems Approach to Planning, Scheduling and Controlling", *John Wiley & Sons Inc,* 10th Edition, 2009.

Reference Books:
1. Jack R Meredith & Samuel J mantel Jr, "Project Management : A Managerial Approach", *John Wiley & Sons Inc*, 8th Edition, 2012.
2. John M Nicholas & Herman Steyn, "Project Management for Business, Engineering and Technology", *Taylor & Francis*, 4th Edition, 2012.
3. Adedeji B. Badiru, "Project Management: Systems, Principles and Applications", *CRC Press*, 2012.

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

U14OE601C   PROFESSIONAL ETHICS IN ENGINEERING

Class: B.Tech. VI-Semester

Branch: Common to all

Teaching Scheme:

L	T	P	C
4	-	-	4

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: *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 (12)

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 (12)

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 (12)

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 (12)

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:
1. D R Kiran, "Professional Ethics and Human Values", *McGraw-Hill Education (India) Pvt. Ltd.*, 1st Edition, 2013.

Reference Books:
1. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Professional Ethics and Human Values", *Prentice Hall of India*, 1st Edition, 2013.
2. Mike Martin and Roland Schinzinger, "Ethics in Engineering", *McGraw-Hill*, 4th Edition, 2014.
3. Charles D. Fleddermann, "Engineering Ethics", *Prentice Hall,* 4th Edition, 2004

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   **Branch:** Common to all

Teaching Scheme:

L	T	P	C
4	-	-	4

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, ferro-cement 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 tradional 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:
1. M.S. Virdi, "Sustainable Rural Technology", *Daya Publishing House*, ISBN: 8170355656, 2009.
2. Asha Ramagonda Patil, "Community Organization and Development: An Indian Perspective ", *PHI Learning private ltd*, 2013.

Reference Books:
1. Punia Rd Roy, "Rural Technology", *Satya Prakashan Publishers*,2009
2. S B Verma, S K Jiloka, Kannaki Das, "Rural Education and Technology", *Deep & Deep Publications Pvt. Ltd*. 2006.
3. Edwards, Allen David and Dorothy G. Jones. "Community and Community Development". *The Hague, Netherlands: Mouton*, 1976.
4. Lean, Mary. "Bread, Bricks, and Belief: Communities in Charge of Their Future". *West Hartford, Kumarian Press*, 1995.
5. Heskin, Allen David, "The Struggle for Community", *West View Press*. 1991
6. Clinard, Marshall Barron. "Slums and Community Development: Experiments in Self-Help", *Free Press*, 1970.

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 :

L	T	P	C
3	1	-	4

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

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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.
Lexical Analysis: Role of lexical analyzer, Input buffering, Specification of tokens, Recognition of tokens, A language for specifying lexical analyzers, Finite automata, Design of a lexical analyzer, Optimization of DFA-based on pattern matchers.

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.
Intermediate Code Generation: Intermediate languages, Declarations, Assignment statements, Boolean expressions, Back patching.

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.

Code Optimization: Introduction, Principal sources of optimization, Optimization of basic blocks, Loops in flow graphs, Introduction to global data flow analysis, Code-improving transformations.

Text Book:

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", *Pearson Education*, 2nd Edition, ISBN-10: 8131721019, ISBN-13: 978-8131721018, 2008.

Reference Books:

1. C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", *Benjamin Cummings*, 1st Edition , ISBN-10: 0805321667, ISBN-13: 978-0805321661, 2003.

2. J.P. Bennet, "Introduction to Compiler Techniques", *Tata McGraw- Hill*, 2nd Edition, ISBN-10: 0077072154, ISBN-13: 978-0077072155, 2003.

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 :

L	T	P	C
3	1	-	4

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 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)

Introduction to UML: Importance of Modeling, Principles of Modeling, Object Oriented Modeling, Overview of UML, Conceptual Model of the UML, Architecture, Software Development Life Cycle.
Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams and Class Diagrams.

UNIT – II (9+3)

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

UNIT - III (9+3)

Basic Behavioral Modeling: Interactions, Use Cases, Use Case Diagrams, Interaction Diagrams and Activity Diagrams.
Advanced Behavioral Modeling: Events and Signals, State Machines, Processes and Threads, Time and Space and State Chart Diagrams.

UNIT – IV (9+3)

Architectural Modeling: Components, Deployment, Collaborations, Patterns and Frameworks, Component Diagrams, Deployment Diagrams, Systems and Models.

Text Book:
1. Grady Booch, James Rumbaugh, and Ivar Jacobson, "The Unified Modeling Language User Guide", *Addison-Wesley*, 1st Edition, ISBN: 978-81-7758-372-4, 2011.

Reference Books:
1. Grady Booch, James Rumbaugh, and Ivar Jacobson, "The Unified Modeling Language Reference Manual", *Addison-Wesley*, 2nd Edition, ISBN: 978-0321718952, 2004.
2. Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young, Jim Conallen, Kelli A. Houston, "Object Oriented Analysis and Design with Applications", *Addision-Wesley*, 3rd Edition, ISBN: 978-81-317-2287-9, 2010.
3. Meilir Page-Jones, "Fundamentals of Object-Oriented Design in UML", *Pearson Education*, 1st Edition, ISBN: 078-5342699463, 2000.
4. Brett D. McLaughlin, Gary Pollice and Dave West, "Head First Object-Oriented Analysis and Design", *O'Reilly Media*, 1st Edition, ISBN: 978-0-596-00867-3, 2006.

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

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U14IT604   GUI PROGRAMMING

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

Teaching Scheme:

L	T	P	C
3	1	-	4

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:
1. Karli Watson, Jacob Vibe Hammer, Jon D. Reid, Morgan Skinner, Daniel Kemper, Christian Nagel, "Beginning Visual C# 2012 Programming", *JohnWiley & Sons Publications,* 1st Edition, ISBN-10: 1118314417, ISBN-13: 978-1-118-31441-8, 2012. (Chapters 1 to 4, 6 to 11, 15, 16, 18 to 24)

Reference Books:
1. Imar Spaanjaars, "Beginning ASP.NET 4.5: in C# and VB", *Wrox Publications,* 1st Edition, ISBN-10: 1118311809, ISBN-13: 9781118311806, 2012.
2. Kogent Learning Solutions Inc., "ASP.NET 4.0: Covers C# 2010 and VB 2010 Codes, Black Book", *Dreamtech Press,* 1st Edition, ISBN-10: 9350040271, ISBN-13: 9789350040270, 2010
3. Herbert Schildt, "C# 4.0: The Complete Reference", *McGraw Hill Education (India) Private Limited,* 1st Edition, ISBN-10: 007174116X, ISBN-13: 9780071741163, 2010.
4. Stephen C. Perry, "Core C# and .NET: The Complete and Comprehensive Developer's Guide to C# 2.0 and .NET 2.0", *Pearson Education,* 1st Edition, ISBN-10: 8131705560, ISBN-13: 9788131705568,2005.

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

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U14IT605A   DISTRIBUTED COMPUTING

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

Teaching Scheme:

L	T	P	C
4	-	-	4

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:
1. Andrew S. Tanenbaum and Marteen Van Steen, "Distributed Systems: Principles and Paradigms", *Prentice Hall*, 1st Edition, ISBN-13: 978-0130888938, 2002 (Chapters 1 to 4, 9,11,12) .
2. Colouris G, Dollimore Jean, Kindberg Tim, "Distributed Systems Concepts and Design", *Pearson education*, 3rd Edition, ISBN-10: 0201619180, 2001(Chapter 20).

Reference Books:
1. Singhal M, Shivaratri N.G, "Advanced Concepts in Operating Systems", *McGraw-Hill*, 1st Edition, ISBN: 007057572X, 1994.
2. Eric Newcomer, "Understanding Web Services: XML, WSDL, SOAP, and UDDI", *Addison-Wesley Professional*, 1st Edition, ISBN-13: 078-5342750812, 2002.
3. James Edward Keogh, "J2EE: The complete Reference", *McGraw-Hill*, 1st Edition, ISBN:007222472X, 2002.
4. Rajkumar Buyya, "High Performance Cluster Computing: Architectures and Systems", *Pearson Education*, Vol. 1, ISBN: 9788131716939, 1999.

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 :

L	T	P	C
4	-	-	4

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:   b*asic 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)

Introduction: Human brain, Models of a neuron, Neural networks viewed as a directed graphs, Feedback, Network architectures, Knowledge representation, Artificial intelligence and neural networks.
Learning process: Error-correction learning, Memory-based learning, Hebbian learning, Competitive learning, Boltzmann learning, Credit assignment problem, Learning with a teacher, Learning without a teacher , Learning tasks, Memory, Adaption, Statistical nature of the learning process, Statistical learning theory, Probable approximately correct model of learning.

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.
Multilayer perceptrons: Some preliminaries, Back-propagation algorithm, Summary of the back-propogation algorithm, XOR Problem, Heuristics for making the back-propagation algorithm perform better, Output representation and decision rule, Computer experiment, Feature detection, Back-propogation and differentiation, Hessian matrix, Generalization, approximations of functions, Cross-validation, Network pruning techniques, Virtues and limitations of back propogation learning, Accelerated convergence of back-propagation learning, Convolutional networks.

UNIT - III (12)

Support vector machines: Optimal hyper plane for linearly separable patterns, Optimal Hyperplane for nonseperable patterns, How to build a support vector machine for pattern recognition, Example-XOR problem (revisited), Computer experiment, E-insensitive loss function, Support vector machines for nonlinear regression.
Committee machines: Ensemble averaging, Computer experiment I, Boosting, Computer experiment II, Associative Gaussian mixture model, Hierarchical mixture of experts model, Model selection using a standard decision tree, A priori and a posteriori probabilities, Maximum likelihood estimation, Learning strategies for the HME model, EM algorithm, Application of the EM algorithm to the HME model.

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:
1. Simon Haykin ,"Neural Networks" , *Prentice-Hall India*, 2nd Edition, ISBN: 81-203-2373-4, 2004.

Reference Books:
1. Mohammad H.Hassoun," Fundamentals of Artificial Neural Networks ", *Prentice-Hall India*, 1st Edition, ISBN: 81-203-1356-9,1999.
2. B.Yegnanarayana, "Artificial Neural Networks", *Prentice-Hall India,* 1st Edition, ISBN: 81-203-1253-8, 2006.

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 :

L	T	P	C
4	-	-	4

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:   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.

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:
1. Gerald J. Kowalski, Mark T.Maybury, "Information Storage and Retrieval Systems: Theory and Implementation", *Kluwer Academic Publishers (Springer Publisher)*, 2nd Edition, ISBN-10: 058532090X, ISBN-13: 9780585320908, 2002. (Chapters 1 to 11)

Reference Books:
1. Ricardo Baeza-Yates, Berthier Ribeiro-Neto, "Modern Information Retrieval", *Addison Wesley Publication*, 1st Edition, ISBN-10: 020139829X, ISBN-13: 9780321416919, 2011.
2. William B.Frakes, Ricardo Baeza-Yates, "Information Retrieval Data Structures and Algorithms", *Prentice Hall Publication*, 1st Edition, ISBN-10: 0134638379, ISBN-13: 9780134638379, 1992.
3. Robert R. Korfhage, "Information Storage & Retrieval", *John Wiley & Sons*, 1st Edition, ISBN-10: 0471143383, ISBN-13: 978-0471143383, 1997.
4. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schutze, "Introduction to Information Retrieval", *Cambridge University Press*, 1st Edition, ISBN-10: 0521865719, ISBN-13: 978-0521865715, 2008.

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 MULTIMEDIA

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

Teaching Scheme :

L	T	P	C
4	-	-	4

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

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UNIT - I (12)

Introduction to Computer Graphics: Application of computer graphics, Pixel, Frame buffer, Graphics standards, Image representation, DDA and Bresenham line generation and circle generation algorithms, Graphics primitive operations, Character generation methods, Aliasing and anti-aliasing.
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.
Hidden Surface and Lines Removal Algorithms: Z-Buffer algorithm, Painters algorithm, Wornock algorithm, Franklin algorithm and Back face removal algorithm.
Animation: Types of animations, Animation languages, Methods of controlling animation.

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:
1. Steven Harrington, "Computer Graphics", *McGraw-Hill*, 2nd Edition, ISBN: 0-07-1005472, 1987.(Chapters 1 to 6,8 & 9)
2. Ralf Steinmetz and Klara Nahrstedt, "Multimedia: Computing, Communicatons And Applications", *Addison Wesley Publications*, 1st Indian reprint, ISBN: 81-7808-319-1, 2001.(Chapters 1 to 3 & 17)

Reference Books:
1. James D.Foley Andries Van Dam Steven K. Fernier, John Hugs, "Computer Graphics Principles & Practice, *Pearson Education Asia*, 2nd Edition, ISBN: 81-7808-038-9, 2002.
2. Donald Hearn & Pauline Baker, "Computer Graphics", *Pearson Education Asia*, 2nd Edition, ISBN: 81-7808-794-4, 2001.

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 :

L	T	P	C
-	-	3	2

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

    11. Case Study 4: e-book management system.

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:

    1. G. Booch, J. Rumbaugh, and I. Jacobson, "The Unified Modeling Language User Guide", *Addison-Wesley*, 1st Edition, ISBN: 0-201-57168-4, 1998. (Chapters 17 to 27)
    2. Grady Booch,Robert A.Maksimchuk, "Object - Oriented Analysis and Design with Applications", *Addision-Wesley*, 3rd Edition, ISBN No: 9780201895513, 2007. (Chapters 8 to 12)

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

Teaching Scheme :

L	T	P	C
-	-	3	2

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 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 **p**rogram 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:

1. Allen I. Holub "Compiler Design in C", *Prentice Hall of India*, 1st Edition, ISBN-10: 812030778X, ISBN-13: 978-8120307780, 2003.

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 :

L	T	P	C
-	-	3	2

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:   *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

21. Design reading and writing XML documents with XML text reader/writer class.
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:

1. Karli Watson, Jacob Vibe Hammer, Jon D. Reid, Morgan Skinner, Daniel Kemper, Christian Nagel, "Beginning Visual C# 2012 Programming", *JohnWiley & Sons Publications*, 1st Edition, ISBN-10: 1118314417, ISBN-13: 978-1-118-31441-8, 2012. (Chapters 1 to 4, 6 to 11, 15, 16, 18 to 24)

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 :

L	T	P	C
-	-	-	2

Examination Scheme :

Continuous Internal Evaluation	100 marks
End Semester Examination	-

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:

Assessment	Weightage
Mini project Supervisor Assessment	20%
Working model developed under mini project	40%
Final Report on mini project	20%
DMPEC Assessment: *Oral presentation (PPT) and viva-voce*	20%
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

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

S. No.	Course Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	HS	U14MH701	Management, Economics and Accountancy	3	1	-	4	15	25	40	60	100
2	PC	U14IT702	Cloud Computing	3	1	-	4	15	25	40	60	100
3	PC	U14IT703	Data Warehousing and Data Mining	3	1	-	4	15	25	40	60	100
4	PE	U14IT704	Professional Elective-II	4	-	-	4	15	25	40	60	100
5	PE	U14IT705	Professional Elective -III	4	-	-	4	15	25	40	60	100
6	PC	U14IT706	Software Testing Laboratory	-	-	3	2	40	-	40	60	100
7	PC	U14IT707	Data Engineering Laboratory	-	-	3	2	40	-	40	60	100
8	PR	U14IT708	Major Project Work *Phase–I*	-	-	7	4	100	-	100	-	100
			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&I, EEE, ECE and IT

Teaching Scheme :

L	T	P	C
3	1	-	4

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.
Functions of Management: Planning-Definition, Process, Characteristics. Organizing; Definition of organization, Characteristics, Types, Principles of organization. Centralization and Decentralization; Definitions, Features, Merits and Demerits. Communication; process of communication- channels- media and barriers.
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)

Double Entry System and Book Keeping: Accounting concepts and conventions, Overview of accounting-cycle. Journal-meaning and journalisation; Ledger- meaning, Ledger posting, Balancing; Two- column-cash book (cash and bank), Preparation of trial balance.

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)
2. K.K. Dewett, Modern Economic Theory, *Pearson Edition,* 2010. (Unit II)
3. T S Grewal, Introduction to Accountancy, *Sultan Chand*. (Unit III & IV)

Reference Books:
1. Koontz and O'Donnell, Management, *Oxford* Publications,2011
2. L.M.Prasad, Principles and Practice of Management *Sultan Chand*, 2010
3. R.L.Gupta Principles of Accountancy., *Sultan and Chand* Co, 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

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U14IT702   CLOUD COMPUTING

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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:
1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, "Mastering Cloud Computing", *Tata McGraw Hill*, 1st Edition, ISBN-13: 978-1-25-902995-0, 2013.

Reference Books:
1. Anthony T.Velte ,Toby J Velte and Robert Elsenpeter, "Cloud Computing A practical Approach ", *McGraw Hill,* 1st Edition, ISBN: 978-0-07-162695-8, 2010.
2. Barrie Sosinsky, "Cloud Computing Bible", *Wiley Publications*, 1st Edition, ISBN: 978-0-470-90356-8, 2011.
3. Dr.Kumar Saurabh, "Cloud Computing Insights into New-Era Infrastructure", *Wiley India Publications,* 1st Edition , ISBN:978-81-265-2883-7, 2011.

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

<u>Class:</u> B.Tech. VII-Semester   <u>Branch:</u> Information Technology

Teaching Scheme :

L	T	P	C
3	1	-	4

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)

Cluster Analysis: Introduction, Types of data in cluster analysis, Partitioning methods: K-Means, K-Medoids, CLARANS, Hierarchical method with BIRCH, Density-based method with DBSCAN algorithm, Grid based method with STING, Clustering high dimensional data with CLIQUE, Outlier analysis.

Data Mining Applications: Web Mining, Financial data analysis, Retail industry, Telecommunication industry, Biological data analysis, Scientific applications, and intrusion detection.

Text Book:

1. Jiawei Han, Micheline Kambler, "Data Mining Concepts and Techniques", *Morgan Kaufmann Publishers,* 2nd Edition*,* ISBN: 978-81-312-0535-8, 2006.

Reference Books:

1. Sam Anahory, Dennis Murray, "Data Warehousing in the real world", *Pearson Education*, 1st Edition, ISBN: 81-7808-387-6, 2003.
2. C.S.R. Prabhu, "Data Warehousing Concepts, Techniques, Products and Applications", *Prentice-Hall of India*, 2nd Edition, ISBN: 81-203-2068-9, 2002
3. Arun K. Pujari, "Data Mining Techniques", *Universities Press*, 2nd Edition, ISBN-13: 9788173716720, 2010.

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

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U14IT704A   ARTIFICIAL INTELLIGENCE

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

Teaching Scheme :

L	T	P	C
4	-	-	4

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 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)
Introduction to Artificial Intelligence: The AI problem domains, The underlying assumption, An AI technique, The level of the model, Criteria for success.
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.
Heuristic Search Techniques: Generate-and-Test, Hill climbing, Best-first-search, Problem reduction, Constraint satisfaction, Means-Ends Analysis.

UNIT – II (12)
Knowledge Representation Issues: Knowledge representations and mappings, Approaches to knowledge representation, Issues in knowledge representation, The frame problem.
Using Predicate Logic: Representing simple facts in logic, Representing instance and isa relationships, Computable functions and predicates, Resolution, Natural deduction.
Representing Knowledge Using Rules: Procedural versus declarative knowledge, Forward versus backward reasoning.

UNIT – III (12)
Weak Slot and Filler Structures: Semantic nets, Frames.
Strong Slot and Filler Structures: Conceptual dependencies, Scripts, CYC.
Game Playing: The MinMax search procedure, Adding alpha-beta cutoffs, Iterative deepening.
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:
1. Elaine Rich, Kevin Knight and Shivashankar B Nair, "Artificial Intelligence", *Tata McGraw-Hill*, 3rd Edition, ISBN-13: 978-0-07-008770-5, 2009. (Chapters 1 to 6, 8 to 10 & 12)
2. George F Luger, "Artificial Intelligence", *Pearson Education Asia*, 4th Edition, ISBN: 81-7808-491-0, 2003. (Chapters 8, 9 & 15)

Reference Books:
1. Stuart Russell and Peter Norvig, "Artificial Intelligence (A Modern Approach)", *Pearson Education*, 3rd Edition, ISBN: 81-7808-554-2, 2002.
2. Eugene Charniak and Drew Mc Dermott, "Introduction to Artificial Intelligence", *Pearson Education*, 3rd Edition, ISBN: 81-7808-033-8, 2000.
3. S.S. Vinod Chandra, S. Anand Hareendran, "Artificial Intelligence and Machine Learning", *PHI Learning*, 1st Edition, ISBN-13: 978-8120349346, 2014.

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 :

L	T	P	C
4	-	-	4

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)

The Future of the Internet: Introduction, The syntactic web, The semantic web, How the semantic web will work.

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)

RDF and RDF Schema: Introduction, XML Essentials, RDF, RDF schema, A summary of the RDF/RDF Schema vocabulary.

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)

Rule Languages: Introduction, Usage scenarios for rule languages, Datalog, RuleML, SWRL, TRIPLE. Semantic Web Services-Introduction, Web service essentials, OWL-S Service ontology, An OWL-S Example.

Methods for Ontology Development: Introduction, Uschold and King ontology development Method, Toronto virtual enterprise method, Methontology, KACTUS Project ontology development method, Lexicon based ontology development method, Simplified methods. Ontology sources- Introduction, Metadata, Upper ontologies, Other ontologic of interest, Ontology libraries.

UNIT - IV (12)

Semantic Web Software Tools: Introduction, Metadata and ontology editors, Reasoners, Other tools.

Software Agents: Introduction, Agent forms, Agent architecture, Agents in the semantic web context. Semantic desktop- Introduction, Semantic desktop metadata, Semantic desktop ontologies, Semantic Desktop Architecture, Semantic desktop related applications. Ontology application in art- Introduction, Ontologies for the description of works of art, Metadata schemas for the Description of works of art, Semantic annotation of art images.

Text Book:
1. Karin K.Breitman, Macro Antonio Casanova Walter Truzowski, "Semantic Web Concepts, Technologies and Applications", *Springer*,1st Edition, ISBN-13:978-8184893977, 2009.

Reference Books:
1. Liyang Yu, "Introduction to Semantic Web and Semantic Web Services" *Chapman and Hall/CRC*, 1st Edition, ISBN-13:978-1584889335, 2007.
2. Grigoris Antoniou ,Frank Van Harmelen "A Semantic Web Primer", *MIT Press,* 2nd Edition, ISBN-13:9788120340541, 2004.

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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

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U14IT704C   PATTERN RECOGNITION

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

Teaching Scheme :

L	T	P	C
4	-	-	4

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

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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)
Supervised Learning using Parametric and Non Parametric Approaches: Parametric estimation and supervised learning, Maximum likelihood(ML) estimation, The Bayesian parameter estimation approach , Supervised learning using non parametric approaches, Parzen windows, k-NN non parametric estimation, Examples of non parametric learning.
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.

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.

Content Addressable Memory Approaches and Unsupervised Learning in NeurPR: Introduction, The hopfield approach to neural computing, Additional examples of CAM applications in PR, Unsupervised learning in NeurPR- self-organizing networks.

Text Book:

1. Robert Schalkoff, "Pattern Recognition: Statistical, Structural and Neural Approaches", *John Wiley and Sons*, 1st Edition, ISBN: 9812-53-164-5, 2005.

Reference Books:

1. Earl Gose, Richard Johnsonbaugh, Steve Jost, "Pattern Recognition and Image Analysis", *Prentice Hall of India, Pvt Ltd,*1st Edition, ISBN: 81-203-1484-0, 2006.
2. R.O. Duda, P.E. Hart, D.G Stork, "Pattern Classification", *John Wiley and Sons*, 2nd Edition, ISBN:978-0-471-05669-0, 2001.

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*

U14IT705A   SOCIAL NETWORK ANALYSIS

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

Teaching Scheme :

L	T	P	C
4	-	-	4

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 CONCORE, 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.

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:
1. John Scott, "Social Network Analysis", *SAGE Publications,* 3rd Edition, ISBN: 978-1-4462-0904-2, 2013.
2. Robert A. Hanneman and Mark Riddle, "Introduction to social network methods", *University of California*, Riverside 2005. (Chapters: 13 to 17 from http://faculty.ucr.edu/~hanneman/nettext/Introduction_to_Social_Network_Methods.pdf)

Reference Books:
1. Hansen, Derek, Ben Sheiderman, Marc Smith, "Analyzing Social Media Networks with NodeXL: Insights from a Connected World", *Morgan Kaufmann*, 1st Edition, ISBN: 978-0-12-382229-1, 2011.
2. Stanley Wasserman and Katherine Faust, "Social Network Analysis: Methods and Applications (Structural Analysis in the Social Sciences)", *Cambridge University Press,* 1st Edition, ISBN: 0-521-38707-8, 1999.

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

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U14IT705B   SERVICE ORIENTED ARCHITECTURE

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

Teaching Scheme :

L	T	P	C
4	-	-	4

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: 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

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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)

Web Services and Contemporary SOA *(Activity management and composition)***:** Message exchange patterns, Service activity, Coordination, Atomic transactions, Business activities, Orchestration, Choreography.
Web Services and Contemporary SOA *(Advanced Messaging, Metadata & Security)***:** Addressing, Reliable messaging, Correlation, Policies, Metadata exchange, Security, Notification and eventing.
SOA and Service-Orientation: 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.

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:
1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology & Design", *Pearson Education Inc,* 2nd Impression, ISBN: 978-81-317-1490-4, 2008.

Reference Books:
1. Thomas Erl, "SOA Principles of Service Design", *Pearson Education*, 1st Edition, Second Impression, ISBN: 978-81-317-2309-8, 2009.
2. Thomas Erl and Grady Booch, "SOA Design Patterns", *Prentice Hall Publication,* 1st Edition, ISBN: 0-13-613516-1, 2008.
3. Michael Rosen, Boris Lublinsky, Kevin T. Smith, Marc J. Balcer, "Applied SOA: Service Oriented Architecture and Design Strategies", *Wiley Publishing Inc,* 1st Edition, ISBN: 978-0-470-22365-9, 2010.

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

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U14IT705C   DIGITAL IMAGE PROCESSING

Class: B.Tech., VII- Semester   **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
4	-	-	4

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:

1. Rafael C. Gonzalez and Richard E. Woods "Digital Image Processing", *Prentice Hall*, 3rd Edition, ISBN-10: 013168728, ISBN-13: 9780131687288, 2010.

Reference Books:

1. Anil K. Jain," Fundamentals of Image Processing", *Prentice-Hall of India*, 1st Edition, ISBN: 81-203- 0929-4, 1995.
2. B.Chanda & D.Dutta Majunder, "Digital Image Processing & Analysis", *Prentice Hall of India*, 1st Edition, ISBN: 81-203-1618-5, 2002.

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

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U14IT706   SOFTWARE TESTING LABORATORY

<u>Class:</u> B.Tech. VII-Semester   <u>Branch:</u> Information Technology

Teaching Scheme :

L	T	P	C
-	-	3	2

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 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.
28. Bug reporting using BUGZILLA tool.

Laboratory Manual:

1. Software Testing Laboratory Manual, *prepared by the faculty of Department of IT.*

Text Book:

1. Dr. K.V.K.K. Prasad, "Software Testing Tools", *Dreamtech Press*, 1st Edition,
   ISBN: 817722532, 2009.

Course Learning Outcomes(CO):

Upon completion of this course, students will be able to

CO1: *distinguish between validation testing, defect testing and describe strategies for generating system test cases*

CO2: *identify the essential characteristics of WinRunner to speed up testing for accelerated releases*

CO3: *explore Quick Test Professional tool to improve the quality of the project/product*

CO4: *prepare defect test report and report the problem using BUGZILLA tool*

U14IT707   DATA ENGINEERING LABORATORY

Class: B.Tech., VII-Semester   **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
-	-	3	2

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
6. Perform data preprocessing tasks using Weka tool.
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
11. To implement simple K-means clustering algorithm.
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:
1. Bostjan Kaluza, "Weka How-to", *O'Reilly,* 1st Edition, ISBN 10:1-78216-387-5, 2013.

Course Learning Outcomes (CO):
Upon completion of this course, students will be able to
CO1: perform online analytic processing to analyze data
CO2: explore the features of Weka tool
CO3: implement data preprocessing techniques using Weka tool
CO4: apply data mining techniques for classification, clustering of data and present results using various visualization techniques

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U14IT708   MAJOR PROJECT WORK *PHASE-I*

<u>Class</u>: B.Tech. VII-Semester   <u>Branch:</u> Information Technology

Teaching Scheme :

L	T	P	C
-	-	7	4

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:

Assessment	Weightage
Project Supervisor Assessment	50%
DPEC Assessment: Registration Presentation, Progress presentation-I, Report submission, oral (PPT) presentation & viva-voce	50%
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

S. No.	Course Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme				Total Marks
				L	T	P		CIE			ESE	
								TA	MSE	Total		
1	OE	U14OE801	Open Elective-II	4	-	-	4	15	25	40	60	100
2	PC	U14IT802	Wireless Communications	3	1	-	4	15	25	40	60	100
3	PE	U14IT803	Professional Elective–IV	4	-	-	4	15	25	40	60	100
4	PE	U14IT804	Professional Elective–V	4	-	-	4	15	25	40	60	100
5	PC	U14IT805	Networks Simulation Laboratory	-	-	3	2	40	-	40	60	100
6	PC	U14IT806	Mobile Applications Development Laboratory	-	-	3	2	40	-	40	60	100
7	PR	U14IT807	Major Project Work *Phase–II*	-	-	13	7	40	-	40	60	100
			Total	15	1	19	27	180	100	280	420	700

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 :

L	T	P	C
4	-	-	4

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)
Linear Programming Problems (LPP): Mathematical models and basic concepts of linear programming problem; Solution of linear programming problems - Graphical method, Analytical method, Simplex method, Artificial variable technique (Big-M and Two-phase methods), Duality principle and dual simplex method.

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)
Non-linear Programming Problems (NLPP): Classical method of optimization using Hessian matrix, Iterative methods - Random search methods, Steepest decent method and Conjugate gradient method; Direct methods - Lagrange's method, Kuhn-Tucker conditions, Penalty function approach.

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:
1. Kanti swarp,P.K.Gupta, Man Mohan, "Operations Research", *S. Chand & Sons*, New Delhi. 16th Edition, 2013. (*Unit I,II,IV*)
2. S.S. Rao, "Optimization Techniques", *New Age International*, New Delhi, 3rd Edition, 2013. (*Unit III*)

Reference Books:
1. Hamdy. A. Taha, Operations Research, *Prentice Hall of India Ltd,* New Delhi, 7th Edition, 2002.
2. J.C. Pant, "Introduction to Optimization", *Jain Brothers*, New Delhi, 7th Edition, 2012.

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 :

L	T	P	C
4	-	-	4

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 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.
E-Business enterprise: Introduction, Organization of business in an E-enterprise, E-business, E-commerce, E-communication, E-collaboration.
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.
Information security challenges in E-enterprises: Introduction, Security threats and vulnerability, Controlling security threat and vulnerability, Management security threat in E-business, Disaster management, MIS and security challenges.

UNIT - II (12)

Information technology impact on society: Introduction, Impact of IT on privacy, Ethics, Technical solutions for privacy protection, Intellectual property, Copyright and patents, Impact of information technology on the workplace, Information system quality and impact, Impact on quality of life.
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 manufacturing sector: Introduction, Personal management, Financial management, Production management, Raw materials management, Marketing management, Corporate overview.
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.

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:
1. Waman S Jawadekar, "Management Information Systems", *Tata McGraw Hill*, 3rd Edition, ISBN 0-07-061634-5, 2007.

Reference Books:
1. Ken Laudon, Jane Laudon, Rajnish Dass, "Management information system", *Pearson,* 11th *Edition,* ISBN 978-81-317-3064-5, 2010.
2. Robert Schultheis, Mary Sumner, "Management Information Systems – The Manager's View", *Tata McGraw Hill*, 4th   Edition, ISBN: 0 – 07 – 463879 – 3, 2003.
3. Robert G.Murdick, Joel E.Ross, James R.Clagget, "Information Systems for Modern Management", *Prentice Hall of India,* 3rd Edition, ISBN: 81 – 203 – 0397 – 0, 2002.
4. Gordon B.Davis, Margrethe H.Olson, "Management Information Systems", *Tata McGraw Hill,* 2nd Edition, ISBN: 0 – 07 – 040267 – 1, 2000.

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: asses effective of information systems which can be adopted in enterprise and supply chain management

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U14OE801C   ENTREPRENEURSHIP DEVELOPMENT

Class: B. Tech. VIII-Semester   **Branch:** Common to E&I, EEE, IT and ECE

Teaching Scheme:

L	T	P	C
4	-	-	4

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.
Legal Issues in Entrepreneurship: Mechanisms for resolving conflicts; Industrial laws- Indian Factories Act, Workmen Compensation Act; Intellectual Property Rights.

Text Books:
1. Robert D.Hisrich, Michael P. Peters, "Entrepreneurship", *Tata McGraw-Hill*, 5th Edition 2002.
2. David H. Holt, "Entrepreneurship New venture creation" *Prentice Hall of India*.2004.

Reference Books:
1. Handbook for "New Entrepreneurs", *Entrepreneurship Development Institute of India*, Ahmadabad.
2. T.R. Banga, "Project Planning and Entrepreneurship Development", *CBS Publishers*, New Delhi, 1984.
3. Personnel efficiency in Entrepreneurship Development-"A Practical Guide to Industrial Entrepreneurs", *S. Chand & Co.*, New Delhi.

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

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U14OE801D   FOREX & FOREIGN TRADE

Class: B.Tech. VIII-Semester   **Branch:** Common to EIE, EEE, IT and ECE

Teaching Scheme :

L	T	P	C
4	-	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

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:
1. C.B. Guptha, "Business Organization & Management" *Sultan & Sons Publishers,* New Delhi 14th Edition, 2012.
2. M.L. Seth, "Macro Economics " *Lakshmi Narayan Agarwal, Publishers, New Delhi ,* 22nd Edition 2014.
3. M.C. Vaish, Ratan Prakashan Mandir, "Monetary Theory "*Vikas Publications,* New Delhi 16th Edition, 2014.

Reference Books:
1. Y.K.Bhushan, "Business Organization and Modern Management" *Sultan & Sons Publishers,* New Delhi. 15th Edition, 2014.
2. S.A. Sherlekhar "Business Organization and Management", *Himalaya Publishing House,* 2000.
3. K.P.M. Sundaram, "Money Banking, Trade & Finance ", *Sultan & Sons Publishers,* New Delhi.
4. P.N.Chopra, "Macro Economics", *Kalyani Pubnlishers,* 1st Edition, Ludhiana.

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

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U14IT802   WIRELESS COMMUNICATIONS

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

Teaching Scheme :

L	T	P	C
3	1	-	4

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)
Introduction: The cellular revolution, Global cellular network, Broadband, The trouble with wireless.
Antennas and Propagation: Antennas, Propagation modes, Line of sight transmission, Fading in the mobile environment.
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.
Cellular Wireless Networks: Principles, First generation analog, Second generation TDMA, CDMA, Third generation systems.

UNIT-III (9+3)
Cordless Systems and Wireless Local Loop: Cordless systems, wireless local loop, IEEE 802.16 Fixed broad band wireless access standard.
Mobile IP and Wireless Access Protocol: Mobile IP and wireless application protocol.
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.

TextBook:
1. William Stallings, "Wireless Communications and Networks", *Pearson Education*, 2nd Edition, ISBN: 81-7808-560-7, 2002.

Reference Books:
1. Jochen Schiller, "Mobile Computing", *Pearson education*, 2nd Edition, ISBN:81-297-0350-5,2004.
2. T.L.Singal, "Wireless Communications", *McGraw-Hill Education (India),* 1st Edition, ISBN-13:978-0070681781, 2010.

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

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U14IT803A   SCRIPTING LANGUAGES

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

Teaching Scheme :

L	T	P	C
4	-	-	4

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 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:
1. David Barron, "The World of Scripting Languages", *Wiley Publications*, 1st Edition, ISBN: 0-471-99886-9, 2000. (Chapters 1 to 6)
2. Bill Lubanovic, "Introducing Python", *O'Reilly Media*, 1st Edition, ISBN: 978-1-4493-5936-2, ISBN 10: 1-4493-5936-1, 2014. (Chapters 1 to 6)

Reference Books:
1. Steven Holzner, "PERL-Black Book", *Dreamtech Press*, 2nd Edition, ISBN-10: 8177221957, ISBN-13: 978-8177221954, 2004.
2. Kurt Wall,"Tcl/Tk Programming for the Absolute Beginner", *Delmar Cengage Learning,* 1st Edition, ISBN-10:1598634380, ISBN-13:978-1598634389, 2007.
3. Allen B. Downey, "Think Python", *O'Reilly Media*, 1st Edition, ISBN-10:144933072X, ISBN-13:978-1449330729, 2012.

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

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U14IT803B MACHINE LEARNING

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

Teaching Scheme:

L	T	P	C
4	-	-	4

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: 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:
1. Peter Flach, "Machine Learning: The Art and Science of Algorithms that Make Sense of Data", *Cambridge University Press*, 1st Edition, ISBN: 978-1 -107-09639-4, 2012.

Reference Books:
1. Jason Bell,"Machine Learning: Hands-On for Developers and Technical Professionals", *John Wiley & Sons*, 1st Edition, ISBN-13: 978-1118889060, 2014.
2. Tom M. Mitchell, Jaime G. Carbonell,Ryszard S. Michalski, "Machine Learning: A Guide to Current Research", *Kluwer Academic Publishers*, 1st Edition, ISBN-13: 978-1461294061, 2011.
3. Tom M. Mitchell, "Machine Learning", *McGraw Hill*, 1st Edition, ISBN 0070428077, 1997.
4. Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", *MIT Press*, 1st Edition, ISBN: 9780262018029, 2012.

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 :

L	T	P	C
4	-	-	4

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.

Project Evaluation: A Business case, Project portfolio management, Evaluation of individual projects, Cost-Benefit evaluation techniques and risk evaluation.

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)

Software Effort Estimation: Where are estimates done? Problems with over-and under-estimates, The basis for software estimating, Software effort estimating techniques, Bottom-Up estimating, The top-down approach and parametric models, Expert judgment, Estimating by analogy, Albrecht function point analysis, Function points mark ii, COSMIC full function points, COCOMO II: A Parametric productivity model, cost estimation, Staffing pattern, Effect of schedule compression, Capers Jones estimating rules of thumb.

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.

<div align="center">**UNIT – III (12)**</div>

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.

Managing Contracts: Types of contract, Stages in contract placement, Typical terms of a contract, Contract management, Acceptance.

<div align="center">**UNIT – IV (12)**</div>

Managing People in Software Environments: Understanding behavior, Organizational Behavior: A Background, Selecting the right person for the job, Instruction in the best methods, Motivation, The Oldham-Hack man job characteristics model, Stress, Health and safety.

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:
1. Bole Hughes, Mike Cottrell and Rajib Mall "Software Project Management", *Tata McGraw-Hill Edition 2010,* 5th Edition, ISBN-13:978-0-07-070653-8.

Reference Books:
1. Robert T.Futrell, Donald F.Shafer, Linda I. Shafer," Quality Software Project Management", *Pearson Education, Inc.* ISBN: 0-13-091297-2, 2002.
2. Akansha Singh, K.K. Singh," Software Project Management", *Umesh Publications,* 1st Edition, ISBN: 978-93-80117-45-4, 2011.

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 :

L	T	P	C
4	-	-	4

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 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)

Introduction to Big Data: Introduction, Big data, Defining big data, Why big data and why now? Big data example.
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)

Data-Driven Architecture for big data: Introduction, Metadata, Master data management, Processing data in the data warehouse, Processing complexity of big data, Machine learning.
Information Management and Life Cycle for Big data: Introduction, Information life-cycle management, Information life-cycle management for big data.

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:
1. Krish Krishnan "Data Warehousing in the Age of big data", *Morgan Kaufmann,* 1st Edition, ISBN 978-0-12-405891-0, 2013.

Reference Books:
1. Dr. Arvind Sathi, "Big data Analytics: Disruptive Technologies for Changing the Game" , *IBM Corporation*, 1st Edition, ISBN: 978-1-58347-380-1, 2012.
2. Eric Sammer, "Hadoop Operations", *O'Reilley*, 1st Edition, ISBN: 9350239264, 2012.
3. Anand Rajarama, Jure Leskovec, Jeffrey D. Ullman. "Mining of Massive Datasets", *Prime*, 1st Edition, ISBN-13: 978-1107015357, 2013.
4. Tom White, "Hadoop: The Definitive Guide", *O'Reilley*, 3rd Edition, ISBN: 9350237563, 2012.

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 :

L	T	P	C
4	-	-	4

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.

Embedded Software Development Process: Introduction, Host and target machines, Linking and locating software, getting embedded software into the target system, Testing on host machine.

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:
1. Raj Kamal, "Embedded Systems", *McGraw Hill Education India Pvt. Ltd.*, 2nd Edition, ISBN: 978-0-07-066764-8, 2008.

Reference Books:
1. David E.Simon, "An Embedded Software Primer", *Pearson Education*, 1st Edition, ISBN: 020161569X, 1999.
2. Frank Vahid and Tony Givargis, "Embedded System Design: A Unified Hardware/Software Introduction", *John Wiley& Sons*, 2nd Edition, ISBN: 0471386782, 2002.
3. Muhammad Ali Mazidi and Janice Gillispiemazidi, "The 8051 Microcontrollers and Embedded Systems", *Pearson Education*, 1st Edition, ISBN: 81-7808-574-7, 2005.

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

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U14IT804C   DESIGN PATTERNS

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

Teaching Scheme:

L	T	P	C
4	-	-	4

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

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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.
Behavioral patterns: Chain of responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method, Visitor, Discussion of behavioral 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)

Design patterns quality attributes: What to expect from design patterns, The pattern community, An invitation, A parting thought, Programming world without design patterns, Asynchronous update approach, Polling mechanism, GUI usage in multiple observers, Object oriented development in design patterns, Risk associated with code changes, Value chain.

Text Books:
1. Erich Gamma, "Design Patterns", *Pearson Education*, 1st Edition, ISBN: 0-471-79854-1, 1995. (Chapters 1 to 6)
2. Len Bass, Paul Clements & Rick Kazman, "Software Architecture in Practice", *Pearson Education*, 2nd Edition, ISBN-10: 0321154959, 2003. (Chapter 4)

Reference Books:
1. Jason Smith, "Elemental Design Patterns", *Addison Wesley*, 1st Edition, ISBN-13:9780321711922, 2012.
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal, "Pattern-Oriented Software Architecture: A System of Patterns", *John Wiley and Sons*, 1st Edition, ISBN: 9780471958697, 1996.

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 :

L	T	P	C
-	-	3	2

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
6. Performance evaluation of different routing protocols in wired network environment using NS2.
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
9. Simulation of wireless ad hoc networks using NS2.

Experiment-X
10. Performance evaluation of DSR ad-hoc wireless routing protocols using NS2.
Experiment-XI
11. Performance evaluation of DSDV ad-hoc wireless routing protocols using NS2.
Experiment-XII
12. Performance evaluation of AODV ad-hoc wireless routing protocols using NS2.

Laboratory Manual:
1. Wireless communications laboratory manual, *prepared by the faculty of Department of IT.*

Text Book:
1. Teerawat Issariyakul, Ekram Hossain, "Introduction to Networks Simulator NS2", *Springer US* , 2nd Edition, ISBN-13:978-1461414056, 2012.

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

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U14IT806   MOBILE APPLICATIONS DEVELOPMENT LABORATORY

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

Teaching Scheme :

L	T	P	C
-	-	3	2

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 examine, 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 appilication 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:

1. Jeff McWherter , Scott Gowell , "Professional Mobile Application Development", John Wiley & Sons, 1st Edition, ISBN-13: 978-1118203903, 2012.
2. David Mark, Jack Nutting, Jeff LaMarche, Fredrik Olsson "Beginning iOS 6 Development: Exploring the iOS SDK", 1st Edition, ISBN: 1430245131, 2013.

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

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U14IT807   MAJOR PROJECT WORK *PHASE-II*

<u>Class</u>: B.Tech. VIII-Semester   **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
-	-	13	7

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:

Assessment	Weightage
Project Supervisor Assessment	20%
DPEC Assessment *: Progress presentation-II, Final presentation & Viva-voce and Final Project Report*	20%
End Semester Examination: *Oral (PPT) Presentation & Viva Voce*	60%
Total Weightage:	100%

      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

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