DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech. CSE - AUTONOMOUS - SCHEME & SYLLABI
(*w.e.f. 2015-16)*

of

(I to VIII SEMESTERS)

Estd. 1980

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE WARANGAL-15
(*An Autonomous Institution under Kakatiya University*)

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(An Autonomous Institute under Kakatiya University)

SCHEME OF INSTRUCTION AND EVALUATION
I- SEMESTER OF 4-YEAR B.TECH. DEGREE PROGRAMME
COMMON FOR ALL BRANCHES OF ENGINEERING

S.No.	Course category	Course code	Course Name	Periods			Credits	Evaluation Scheme				
								CIE			ESE	Total Marks
				L	T	P		TA	MSE	Total		
1	BS	14MH101	Engg. Mathematics – I	3	1	-	4	15	25	40	60	100
2	ES	14CS102	Programming in 'C'	3	1	-	4	15	25	40	60	100
3	BS	U14PH103	Engineering Physics	3	1	-	4	15	25	40	60	100
4	HS	14MH104	English for communication	2	-	4	3	15	25	40	60	100
5	ES	U14EI105	Basic Electronics Engineering	3	-	-	3	15	25	40	60	100
6	ES	U14ME106	Basic Mechanical Engineering	3	1	-	3	15	25	40	60	100
7	ES	U14CS107	Programming in 'C' Laboratory	-	-	3	2	15	25	40	60	100
8	BS	U14PH108	Engineering Physics Lab	-	-	3	2	40	-	40	60	100
9	ES	U14ME109	Engineering Workshop Practice	-	-	-	2	40	-	40	60	100
			Total	17	4	10	27	-		460	540	1000
10	MC	U14EA110	EAA. Physical Education and NSS	-	-	2	1	100	-	100	-	100

MC – Mandatory Course

Student Contact hours/week   : 33

Total Credits   : 27

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(LOs):
  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(COs):
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

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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(LOs):

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(COs):

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 :

L	T	P	C
3	1	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

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 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.

UNIT-III (9+3)

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:
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.

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(LOs):

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(LOs):
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**

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 (LOs):
  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 structure, Operation and Characteristics of a Junction Field Effect Transistor (JFET)

UNIT-IV (9)

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

Text Books:
1. David.A.Bell, "Electronic Devices and Circuits", *Oxford University Press*, New Delhi, India.
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(COs):
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*

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 (LOs):
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 (COs):

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.*

U14CS107 PROGRAMMING IN C 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 (LOs):

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(COs):

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(LOs):

- *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*
- *LO3. accuracy using interference and diffraction techniques.*
- *LO4. To study the optical activity of some substances.*
- *LO5. To determine the optical fiber characteristics.*

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LIST OF EXPERMENTS

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 (COs):

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*

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 (LOs):
- 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(COs):
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

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	40 marks
End Semester Examination	60 marks

I. PHYSICAL EDUCATION

Course Learning Objectives (LOs):
   LO1. To perform and engage in a variety of physical activities
   LO2. To develop and maintain physical health and fitness through regular participation in
   LO3.   physical activities
   LO4. To demonstrate positive self esteem, mental health and physiological balance through body
   LO5.   awareness and control
   LO6. 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 (LOs):
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 (COs):
   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
COMMON FOR ALL BRANCHES OF ENGINEERING

S.No.	Course category	Course code	Course Name	Periods			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	BS	MH201	Engg. Mathematics – II	3	1	-	4	15	25	40	60	100
2	ES	CS202	Object Oriented Programming (OOP)	3	1	-	4	15	25	40	60	100
3	BS	CH203	Engineering Chemistry	3	1	-	4	15	25	40	60	100
4	ES	ME204	Engineering graphics	2	-	4	4	15	25	40	60	100
5	ES	EE205	Basic Electrical Engineering	3	-	-	3	15	25	40	60	100
6	ES	CE206	Basic Engineering Mechanics	3	1	-	4	15	25	40	60	100
7	ES	CS207	Object Oriented Programming (OOP) Laboratory	-	-	3	2	40	-	40	60	100
8	BS	CH208	Engineering Chemistry Laboratory	-	-	3	2	40	-	40	60	100
			Total	17	4	10	27	-	-	320	480	800
9	MC	CH209	Environmental Studies	2	-	-	2	15	25	40	60	100
10	MC	EA210	EAA: Physical Education and NSS	-	-	2	1	100	-	100	-	100

MC – Mandatory Course
Student Contact hours/week : 35
Total Credits   : 27

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(LOs):
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 function of complex variable

UNIT-I (9+3)

Higher order linear differential equations with constant coefficients: Liner differential Equations of higher order with constant coefficients, General solution, Complementary function, Particular Integral. Methods of evaluation of particular Integrals. Simple examples of Physical applications (Free oscillations of Spring - Mass system, RLC series circuit problem) Wronskian, Linear dependence of solutions, Method of Variation of parameters. Cauchy's homogenous linear equation.

UNIT-II (9+3)

Vector Differential Calculus: Vector functions - Derivative of a vector function of a scalar variable, Velocity and acceleration, Curves in Space, Tangent, Principal normal, Binormal, Curvature, Torsion of a given curve and Frenet -Serret Formulae. Scalar and vector point functions, Vector operators – Gradient of a scalar field, Divergence of a vector field, Curl of a vector field and their physical interpretations. Directional derivative, Application to find angle between two surfaces and to find scalar potential of a vector field, Irrotational fields & Solenoidal fields.

UNIT-III (9+3)

Vector integration: Integration of vector valued functions of a scalar variable, Application to find velocity and displacement of a particle; Line integral of scalar point and vector point functions, Applications: Work done by a force, Circulation; Surface Integral & Volume integral. Green's theorem in plane, and area of a plane region using Green's theorem, Stokes theorem & Gauss divergence theorems (without proof).

UNIT-IV (9+3)

Complex Variables: 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 Books:

     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 (COs):
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*
  CO4. *find the characteristics of a space curve such as tangent, normal, binormal, curvature and torsion*
  CO5. *understand the concept of gradient , divergence and curl of a vector point function and will*
  CO6. *be able to apply them to find angle between two surfaces, scalar potential*
  CO7. *find line, surface and volume integrals of vector valued functions and understand Green's theorem, Stokes theorem and Gauss theorem*
  CO8. *understand the concept of a function of complex variable and verify whether a function is analytic or not.*
  CO9. *construct analytic function when real/imaginary part of the function is known*

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 (LOs):

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 (COs):

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

<u>**Class:**</u> B.Tech. II- Semester   <u>**Branch:**</u> 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(LOs):

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
LO5. and polymer chemistry
LO6. To acquire the techniques of water analysis and treatment
LO7. To understand the role of chemistry in the field of engineering

<u>UNIT-I (9+3)</u>

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.

<u>UNIT-II (9+3)</u>

Corrosion: 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).

<u>UNIT-III (9+3)</u>

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(COs):

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*

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

UNIT – I (6+12)

Introduction: Importance of Engineering Drawing, instruments- uses; Conventions - ISO and BIS, Layout of drawing sheets, Types of Lines, Lettering and dimensioning.
Geometrical Constructions: Bisection of a line, arc and angle; division of a line, Construction of polygons- triangle, square, pentagon and hexagon.
Projection of Points: Introduction to orthographic projections-Vertical Plane, Horizontal plane; Views-Front view, Top view and Side view; Projection of Points.
Projection of Straight lines - I: Line parallel to both the planes, Line parallel to one plane and perpendicular to the other reference plane, Line parallel to one plane and inclined to the other reference plane.

UNIT – II (6+12)

Projection of Straight lines – II: Line- inclined to both the planes-Traces.
Projection of Planes: Planes - Perpendicular and Oblique planes; Projections of planes - parallel to one of the reference plane, inclined to one of the reference plane and perpendicular to the other; Projections of oblique planes.

UNIT – III (6+12)

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

UNIT – IV (6+12)

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

Text Books:

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 (COs):
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.

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(LOs):
  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.

UNIT – IV (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 (COs):
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.*

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 (LOs):
- *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

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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 (COs):

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 analyze 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 analyze the problems using various applications such as conservation of work energy principle.*

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 (COs):

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(LOs):
   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

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U14CH208 ENGINEERING CHEMISTRY 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 (LOs):

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 (COs):

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.

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 (LOs):
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.

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 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 (COs):

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

U14EA210 EAA: PHYSICAL EDUCATION & NSS

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

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

I. <u>PHYSICAL EDUCATION</u>

Course Learning Objectives (LOs):

LO1. To perform and engage in a variety of physical activities
LO2. To develop and maintain physical health and fitness through regular participation in physical activities
LO3. To demonstrate positive self esteem, mental health and physiological balance through body awareness and control
LO4. To exhibit the spirit of fair play, team work and sportsmanship

<u>**Activities related to :**</u>

1. Physical Fitness
2. Games & Sports

II.   <u>NATIONAL SERVICE SCHEME (NSS)</u>

Course Learning Objectives (LOs):

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

<u>**List of Activities:**</u>
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 (COs):

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
COMPUTER SCIENCE & ENGINEERING

| S. No. | Course Category | Course Code | Course Name | Periods/Week | | | Credits | Evaluation Scheme | | | | Total Marks |
| | | | | L | T | P | | CIE | | | ESE | |
								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	U14EI303	Digital Circuits and Logic Design	3	1	-	4	15	25	40	60	100
4	PC	U14CS304	Computer Architecture and Organization	3	1	-	4	15	25	40	60	100
5	PC	U14CS305	Data Structures and Algorithms	3	1	-	4	15	25	40	60	100
6	PC	U14CS306	Object Oriented Programming through Java	3	1	-	4	40	-	40	60	100
7	PC	U14CS307	Data Structures and Algorithms Laboratory	-	-	3	2	40	-	40	60	100
8	PC	U14CS308	Java Programming Laboratory	-	-	3	2	40	-	40	60	100
			Total	**18**	**6**	**6**	**28**	**-**	**-**	**320**	**480**	**800**
9	MC	U14MH309	Soft and Interpersonal Skills	-	-	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 (LOs):
This course will develop students' knowledge in/on….
- *LO1: Laplace transform and its use to find the solutions of certain initial and boundary value problems occur in engineering*
- *LO2: Fourier series and its importance*
- *LO3: application of Fourier series to a few partial differential equations of specific importance like wave equation, heat conduction equation, etc. which arise in engineering*
- *LO4: integration of a function of complex variable, and evaluation of certain real integrals using complex analysis*

UNIT-I (9+3)

Laplace Transforms: Integral transforms, Kernel of a transform, Laplace transform of a function; Inverse Transform, Existence and uniqueness of Laplace Transforms, S- plane and region of convergence (ROC); Laplace Transform of some commonly used signals-Dirac-delta (impulse) function $[\delta(t)]$,Step $[u(t)]$,Ramp $[tu(t)]$,Parabolic $[t^2u(t)]$,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

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$Sin\omega t$, $Cos\omega t$ and combination of Sinusoids, Fourier series on an arbitrary period; Half range series – Half range cosine and sine series expansions.

UNIT-III (9+3)

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.

UNIT-IV (9+3)

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

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

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

Course Learning Outcomes (COs):
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

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U14MH302   DISCRETE MATHEMATICS

Class: B.Tech. III-Semester   **Branch:**   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 (LOs):
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 Books:
  1.   J.L.Mott, A.Kandel and T.P.Baker – "Discrete Mathematics for Compute Scientists", *Prentice- Hall of India,* New Delhi, 2nd edn., 1999.

Reference Books:

1. J.P.Tremblay, R.Manohar, "Discrete Mathematics Structures with Application to Computer Science", Tata McGraw- Hill edn.,1997, 37 th 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 edn. , 2008.

Course Learning Outcomes (COs):

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

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U14EI303   DIGITAL CIRCUITS AND LOGIC DESIGN

Class: B. Tech III-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme:

L	T	P	C
3	1	-	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: 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, 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*, *New Delhi,* 2008 (Chapter 3, 4, 5, 9)
2. R.P. Jain, "Modern Digital Electronics", 3rd Edition, *Tata McGraw-Hill*, *New Delhi*, 2003, (Chapter 1, 2, 4 to 8)

Reference Books:

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

Course Learning Outcomes(COs):

Upon completion of this 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 etc

CO4: analyze the operation of various logic family circuits and compare their performance characteristics

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U14CS304   COMPUTER ARCHITECTURE AND ORGANIZATION

Class: B. Tech III-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :   **Examination Scheme :**

L	T	P	C
3	1	-	4

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

LO1: construction of computers out of a set of functional units and how the functional units operate, interact, and communicate

LO2: representation of data at the machine level and how computations are performed at the machine level

LO3: working procedure of various input/output devices and transfer of data from different modes

LO4: advanced concepts like parallelism and pipelining

UNIT-I (9+3)

Review of computer systems: Basic functional units and operation of digital computers, Performance measures.

Instructions: Memory locations and addresses - 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, 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 - 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; Floating point arithmetic operations - Addition, Subtraction, Multiplication and Division.

Input / Output: I/O interface - I/O bus and interface modules, I/O vs 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", *5th Edition, Mc-Graw Hill,* ISBN: 0-07-120411-3, 2002. (Chapters 1 to 6, 8,10)
2. M. Morris Mano, "Computer System Architecture", *3rd Edition, Pearson Education*, ISBN: 978-81-317-0070-9, 2007. (Chapters 9, 10,11)

Reference Books:

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

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

CO1: identify the basic organization of modern computer systems

CO2: recognize how the computer programs are organized, stored, and executed at the machine level

CO3: interpret the exact working procedure of input/output device

CO4: use instruction level parallelism and pipelining for high performance processor design

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U14CS305   DATA STRUCTURES AND ALGORITHMS

Class: B. Tech III-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: basic data structures and its usage in handling real world applications

LO2: representing the data using linear data structures such as queues, circular queues, dequeue, priority queue, and using non-linear data structures such as trees

LO3: representing and retrieving the data in the form of various types of trees and graph data structures

LO4: searching of data with the help of various search methods, to sort data using various sorting methods, and to effectively store and retrieve data, using various hashing methods

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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 Book:

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(COs):

Upon completion of this course, students will be able to…

CO1: implement the basics of data structures in handling real world applications

CO2: represent data using linear data structures such as queues, circular queues, dequeue, priority queue, and using non-linear data structures such as trees and graphs

CO3: represent and retrieve the data in the form of various non-linear data structures like trees and graphs

CO4: search for data with the help of various searching techniques

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U14CS306   OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Class: B. Tech III-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme:

L	T	P	C
3	1	-	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: the basic concepts of java programming
LO2: inheritance, exceptional handling, packages and interfaces
LO3: the concepts of I/O, multithreading and applets
LO4: event Handling and GUI programming in Java

UNIT-I (9+3)

Java basics: Creation of Java, Java buzzwords, Data types, Variables and Arrays, Operators, Control statements, Introducing classes, Overloading methods, Passing and returning objects, Recursion, Variable length arguments, Nested and inner classes, *static* - variables, Blocks and methods.
String: Exploring String , StringBuffer, StringBuilder and StringTokenizer classes.

UNIT-II (9+3)

Inheritance: Basic concepts, Using super, Creating multilevel inheritance, Method Overriding, Dynamic method dispatch, Using abstract classes, Using final with inheritance, The Object class.
Packages and interfaces: Packages, Access Protection, Importing packages, Interfaces – Defining an interface, Implementing interfaces, Nested interfaces, Applying interfaces, Variables in interfaces, Interfaces can be extended.
Exception handling: Fundamentals, Exception types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try statements, *throw*, *throws*, *finally*, Built-in exceptions, Creating your own exception sub classes, Chained exceptions.

UNIT-III (9+3)

Using I/O: The Predefined Streams, Using byte streams, Reading and writing Files using byte streams, Using Java's Character-based streams, Using Java's type wrappers to Convert Numeric Strings
Multithreading: Thread Model, The main thread, Creating a thread, Creating multiple threads, Using *isAlive()* and *join()*,Thread priorities, Synchronization, Interthread communication.
Applets: Applet basics, A complete applet skeleton, Applet initialization and termination, Requesting repainting, Using the status window, Passing parameters to Applets.

UNIT-IV (9+3)

GUI Programming: Introduction to swing, Components and containers, Layout Managers, Event Handling, Use anonymous inner class to handle events, Exploring swing controls - *JLabel, JButton, JToggleButton, JCheckBox, JRadioButton, JTextField, JScrollBar, JScrollPane, JList, JComboBox;* Working with Menus **-** Menu Basics, JMenuBar, *JMenu, JMenuItem,* Creating a main menu.

Text Books:

1. Herbert Schildt,"JAVA The Complete Reference", *9th Edition*, *McGraw-Hill Education India Pvt.Ltd* , ISBN: 9781259002465, 2011.
2. Herbert Schildt, Dale Skrien, "Java Fundamentals (A Comprehensive Introduction)", *1st Edition, McGraw Hill Education,* ISBN-13: 978-1-25-900659-3, 2013. (Chapters: 11, 15, 17, 18).

Reference Books:

1. Sachin Malhotra, Saurabh Choudhary, "Programming in JAVA", *2nd Edition, Oxford Publications,* ISBN-13: 978-0-19-809485-2, 2013. (Chapters: 1 to 8, 12 to 15)
2. Kathy Sierra, Bert Bates, "Head First Java", *2nd Edition, O'Reilly Publictions,* ISBN-13: 978-0596009205, 2013.
3. Uttam K.Roy, "Advanced JAVA Programming", *1st edition*, *Oxford Publications;* ISBN-13: 978-0199455508, 2013.

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

CO1: implement OOP concepts using java

CO2: utilize reusability concepts like inheritance, polymorphism, exception handling, interfaces and packages in application development

CO3: apply the I/O, multithreading and applets concepts in java programming

CO4: design effective GUI applications

U14CS307   DATA STRUCTURES AND ALGORITHMS LABORATORY

Class: B. Tech III-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme:

L	T	P	C
-	-	3	2

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: concepts, operations and implementation details of various data structures
   LO2: implementing the different algorithms using C++ programming language
   LO3: improving the student capability in applying various data structures in different applications
   LO4: 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 stacks in single array.
7. Program to convert infix expression into postfix.
8. Program to convert given infix expression into prefix notation.
9. Program to evaluate given postfix expression.

Experiment-IV
10. Program to implement queue operations using arrays.
11. Program to implement circular queue operations using arrays.

Experiment-V
12. Program to create single linked list and implement its operations.
    i.   Insert
    ii.   Delete
    iii. Search
    iv. Reverse
13. Program to create single linked list and implement its operations with separate header node.
    i.   Insert
    ii.   Delete
    iii. Search
    iv. Reverse

Experiment-VI
14. Program to implement double linked list and its operations.
15. Program to implement double linked list and its operations with separate header node.

Experiment-VII

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16. Program to implement circular single linked list and its operations.
17. Program to implement circular double linked list and its operations.

Experiment-VIII
18. Program to implement stack operations using linked list.
19. Program to implement queue operations using linked list.

Experiment-IX
20. Implementation of binary tree and its traversal techniques using recursive and non recursive methods.
21. Program to create a binary search tree and perform the tree operations.
    a) Insertion of a node b) Deleting a node.

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

Experiment-XI
23. Program to implement Fibonacci Search.
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 laboratory manual, *prepared by faculty of Dept. of Computer Science &Engineering.*

Text Book:
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(COs):

Upon completion of this course, students will be able to…
 CO1: *know practical knowledge about implementing various data structures using C++*
 CO2: *understand the knowledge about how various data structures will be implemented like arrays, stacks, queues, linked list, trees, and graphs*
 CO3: *implement various sorting and searching techniques*
 CO4: *apply these data structures efficiently to develop different software applications*

U14CS308   JAVA PROGRAMMING LABORATORY

Class: B. Tech III-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme:

L	T	P	C
-	-	3	2

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: the concepts of java programming
LO2: debug and test java applications effectively
LO3: effective use of exceptional handling, packages and interfaces in develop applications
LO4: I/O and GUI programming in java

List of Experiments

Experiment-I

1. Write a program to demonstrate control structures using sample of displaying prime numbers within a given range.
2. Write a program to read an array and display them using for-each control. Finally display the sum of array elements.
3. Write a program to read a matrix and display whether it is an identity matrix or not. Use civilized form of *break* statement.
4. Write a program to define a two dimensional array where each row contains different number of columns. Display the 2D-array using for-each.

Experiment-II

1. Write a program to demonstrate creating multiple objects.
2. Write a program to demonstrate passing objects to methods.
3. Write a program to demonstrate constructors and garbage collector by invoking it explicitly.
4. Write a program to demonstrate variable length argument.

Experiment-III

1. Accept a string, count number of vowels and remove all vowels in it.
2. Read at least **5** strings from command line argument and display them in sorted order.
3. Accept the string, count number of vowels and remove all vowels using *StringBuffer* class**.**
4. Accept a line of text, tokenize the line using *StringTokenizer* class and print the tokens in reverse order.

Experiment-IV

1. Write program to demonstrate multilevel-inheritance.
2. Write program to demonstrate dynamic method dispatch in java.
3. Write a program to demonstrate use of abstract class.
4. Write a program to demonstrate the use of overriding *equals()* method of an Object class.

Experiment-V

1. Write a program to create a package, and demonstrate to import a package into our file.
2. Write a program to define a *Stack* Interface and implement it into a class.
3. Write a program to implement multiple interfaces into single class.

Experiment-VI

1. Handle *ArrayIndexOfBoundsException*, *NumberFormatException* and *ArithmeticException* using multiple catch blocks.
2. Write a program to demonstrate re-throw of exception, and finally block.
3. Find the average of '**N'** numbers where '**N'** to be the 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-VII

1. Write a program to demonstrate wrapper class using sample of reading two integer numbers from command line and display their quotient.
2. Write a program to demonstrate Character-based streams.
3. Write a program to show the content of the specified file.
4. Write a program to copy the content of one file to another.

Experiment-VIII

1. Create two threads. One thread displays "Hello" for every half second and another thread displays "Hai" for every second.
2. 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.
3. Give a solution for *Producer* and *Consumer* problem using thread synchronization and inter-thread communication where a *Producer* produces an integer value and the *Consumer* consumes that integer.

Experiment-IX

1. Develop an applet to display "Good Morning" if current time is between 6AM and 12PM and "Good Afternoon" if the current time is between 12PM and 6PM, and "Good Evening" if the current time is between 6PM and 12AM.
2. Develop an applet which draws different geometric shapes and fill them with different colors.
3. Draw an applet with 10 lines, with different sizes in different places.
4. Implement an applet program to display moving banner.

Experiment-X

1. Design an applet to draw a ball with different colors on it.
2. Design an applet to demonstrate mouse events and key events.

Experiment-XI

1. Implement an applet to perform button event with a sample of registration form.
2. Design an applet to implement *ScrollBar* component. Consider three *ScrollBars* and depending on their values change the background color with help of *AdjustmentEvent*.
3. Write an applet program to demonstrate *JScrollPane* Component.

Experiment-XII

1. Design a JFrame that displays "Hello World" text with selected font details (font name, style and size). Use *JComboBox* to list different font names, use *JList* control for listing different font sizes, and use radio buttons for selecting font style.
2. Create a JFrame to add a menu bar with which we can change the background color, draw different shapes like circle, oval, rectangle and square.
3. Develop a JFrame window with required layouts, with a sample of calculator application.

Laboratory Manual:

1. Java Programming laboratory manual, *prepared by faculty of Dept. of CSE.*

Text Book:

1. Herbert Schildt, Dale Skrien, "Java Fundamentals (A Comprehensive Introduction)", *1st Edition, McGraw Hill Education,* ISBN-13: 978-1-25-900659-3, 2013. (Chapters: 1 to 12, 15, 17 to 22, 24).

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

CO1: *implement OOP concepts using Java*

CO2:*implement the concepts like inheritance, polymorphism, packages and interfaces in application development*

CO3: *develop the ability to solve real-world problems through software development in high-level*

programming language like Java

CO4: *build I/O and GUI applications with Java*

U14MH309   SOFT AND INTERPERSONAL SKILLS

Class: B. Tech III-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
-	-	2	1

Continuous Internal Evaluation	100 marks
End Semester Examination	

Course Learning Objectives (LOs):

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

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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:

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

Course Learning Outcomes (COs):

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.

KATIYA 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
COMPUTER SCIENCE & ENGINEERING

S. No.	Course Category	Course Code	Course Name	Periods/Week			Credits	Evaluation Scheme				
								CIE			ESE	Total Marks
				L	T	P		TA	MSE	Total		
1	BS	U14MH401	Engineering Mathematics-IV	3	1	-	4	15	25	40	60	100
2	PC	U14CS402	Theory of Computation	3	1	-	4	15	25	40	60	100
3	PC	U14CS403	Database Management Systems	3	1	-	4	15	25	40	60	100
4	PC	U14CS404	Software Engineering	3	1	-	4	15	25	40	60	100
5	PC	U14CS405	Operating Systems	3	1	-	4	15	25	40	60	100
6	PC	U14CS406	Database Management Systems Laboratory	-	-	3	2	15	25	40	60	100
7	PC	U14CS407	Operating Systems Laboratory	-	-	3	2	40	-	40	60	100
8	ES	U14EE412	Basic Electrical and Electronics Engineering Laboratory	-	-	3	2	40	-	40	60	100
			Total	**15**	**5**	**9**	**26**	**-**	**-**	**320**	**480**	**800**
9	MC	U14MH409	Compliance with Current English	-	-	2	1	100	-	100	-	100
10	MC#	U14CH209	Environmental Studies	2	-	-	2	15	25	40	60	100

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

U14MH401   ENGINEERING MATHEMATICS-IV

Class: B. Tech IV-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
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 Books:

2. Grewal. B.S., "Higher Engineering Mathematics", *Khanna Publishers,* New Delhi, 43rd edn. 2014.

Reference Books:

4. Gupta and Kapoor, "Fundamentals of Mathematical Statistics", *Sulthan Chand and & sons,* New Delhi, 11th edn. , 2010.

5. Kreyszig E., "Advanced Engineering Mathematics", *John Wiley & Sons, Inc.,*U.K., 9th edn., 2013.

Course Learning Outcomes (COs):
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

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U14CS402   THEORY OF COMPUTATION

Class: B. Tech IV-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: construction of finite state machines and the equivalent regular expressions
LO2: identifying the given language is regular or not
LO3: designing pushdown automata and the equivalent context free grammars
LO4: designing Turing machines

UNIT-I (9+3)

Automata: Introduction to mathematical preliminaries used and 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 context free languages (*CFL*).

Pushdown automata (PDA): Definition of the pushdown automaton, The languages of pushdown automata (*PDA*), Equivalence of pushdown automata (*PDA*) and context free grammars (*CFG*).

UNIT-IV (9+3)

Introduction to turing machines: Problems that computer cannot solve, The turing machine, Programming techniques for turing machines, Extension to the basic turing machine.

Undecidability: A language that is not recursively enumerable (*RE*), An undecidable problem that is *RE*, Post's correspondence problem (*PCP*), Undecidable problems, Overview of *P* and *NP* problems.

Text Books:

1. John E. Hopcroft, Rajeev Motwani and Jeffery D. Ullman, "Introduction to Automata Theory Languages & Computation", *Pearson Education, 3rd Edition,* (ISBN-13: 978-0321455369), 2008.

Reference Books:

1. Michael Sipser, "Introduction to the Theory of Computation", *3rd Edition*, *Cengage Learning*, ISBN-10: 8131517500, 2001.
2. JE Hopcroft and JD Ullman, "Introduction to Automata Theory, Languages, and Computation", *3rd Edition*, *Addison-Wesley,* ISBN: 0-201-44124-1, 2001.
3. Mishra K.L.P., Chandrasekaran N," Theory Of Computer Science : Automata, Languages and Computation", *3rd Edition, PHI,* ISBN: 978-81-203-2968-3, *2006.*
4. Bernard M.Moret," The Theory of Computation", *1st Edition*, *Addison-Wesley* ISBN-13: 9788131708705, 1997

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…
CO1: define the basic kinds of finite automata and their capabilities
CO2: categorize languages into their types
CO3: design context free grammar, push-down automata
CO4: design turing machines

U14CS403   DATABASE MANAGEMENT SYSTEMS

<u>Class:</u> B. Tech IV-Semester   <u>Branch:</u>   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: understanding the different issues involved in the design of a database system
LO2: data manipulation language for updating and managing a database
LO3: identifying functional dependencies to normalize the relations of database
LO4: transaction Processing, Concurrency Control and Recovery

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<u>UNIT-I</u> (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.

<u>UNIT-II</u> (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.

<u>UNIT-III</u> (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, Multi valued 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 Books:

1. RamezElmasri and Shamkanth B. Navathe, "Fundamentals of Database Systems", *Pearson Education, Third edition*, ISBN No: 81-7808-137-7, 2003.

Reference Books:

1. Thomas Connolly and Carolyn Begg, "Database Systems", *Pearson Education, Third Edition,* ISBN No: 81-7808-861-4, 2003.
2. Abraham Silberschatz, Henry F.Korth and S.Sudarshan, "Database System Concepts", *McGraw-Hill, Third Edition,* ISBN No: 0-07-114810-8, 1997.
3. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems ", *McGraw Hill, International Edition,* ISBN No: 0-07-123151-X, 2003.

Course Learning Outcomes (COs):

Upon completion of this course, students will be able to…

   CO1: state the importance of DBMS and compare DBMS with traditional file processing systems
   CO2: analyze and design the database that includes E-R model and normalization techniques
   CO3: describe query evaluation and query optimization technique
   CO4: categorize database recovery techniques and security issues

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U14CS404   SOFTWARE ENIGINEERING

Class: B. Tech IV-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: fundamental concepts of software and the different types of software models
LO2: different types design concepts and patterns
LO3: analyzing the appropriate test methods for given software
LO4: metrics for different software and analyze the quality of a software

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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 *W5HH* principle.

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

Text Books:

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

Reference Books:

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

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

CO1: implement the appropriate software model for a given real time application
CO2: develop the different types of software designs and patterns
CO3: apply the appropriate testing methods for given software
CO4: apply the metric methods and analyze the quality of software

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U14CS405   OPERATING SYSTEMS

Class: B. Tech IV-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: the principles, techniques and approaches in operating systems
LO2: process scheduling, process synchronization methods and deadlock handling techniques
LO3: memory management and disk management techniques
LO4: file management and OS protection and security techniques

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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 Books:

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

Reference Books:

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

Course Learning Outcomes(COs):
Upon completion of this course, students will be able to…
CO1: possess the knowledge of role of operating systems and their types
CO2: apply the concept of process, scheduling algorithms and process synchronization for problem solving.
CO3: acquire the knowledge of memory management techniques and apply them in various application developments
CO4: realize the concept of file management, protection and security methods.

U14CS406   DATABASE MANAGEMENT SYSTEMS LABORATORY

Class: B. Tech IV-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
-	-	3	2

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: database concepts using oracle software*
> *LO2: capability of mass storage of relevant data*
> *LO3: capability of eliminating redundant data and providing security to database*
> *LO4: security to database by using triggers*

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.

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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 Computer Science & Engineering.*

Text Book:

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

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…
  CO1: populate a query in database using SQL DDL/DML commands
  CO2: declare and enforce integrity constraints on a database using RDBMS
  CO3: apply functions and various database objects
  CO4: develop PL/SQL stored procedures, functions, cursors, packages and triggers

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U14CS407 OPERATING SYSTEMS LABORATORY

Class: B. Tech IV-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
-	-	3	2

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: UNIX environment and basic UNIX commands
LO2: fundamentals of shell programming.
LO3: implementing different CPU scheduling algorithms, page replacement algorithms and dead lock avoidance algorithm
LO4: different types of file organization techniques

List of Experiments

Experiment -I

1. Basic UNIX commands:
   General utility commands - *login, cal, date, who, uname, echo, passwd, pwd, exit*;
   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 all the C files from current directory.
   d) Merge given three different files into single one.
   e) Display the list of files in given directory.
   f) Set given file as read only.

Experiment – II
1. Filters: (Data processing commands) *more, head, tail, cut, paste, sort, uniq, nl, tr*.
2. Communication commands: *write, mail, talk, finger, news.*

Experiment – III
1. Process related commands: *ps, kill, nice, at* and *batch.*
2. Pattern searching commands: *grep, egrep, fgrep.*
3. 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
1. Practicing the Vi editor commands.
2. Shell script related commands: *sh, read,* command line args - *($1), $ and & $*;
   set, exit,* status *($?);* logical operator - *||, &&; exit, if, sleep, wait, case, while, until, for, export, expr.*

Experiment – V

1. Write programs for the following
   - a) Reading a character and displaying it on the screen.
   - b) Display the name and class of a student in separate line.
   - c) To check the given two characters are equal or not.
2. 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

1. 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.
2. Write a shell script to check the given character is vowel or not.
3. Write a shell script to perform all arithmetic operations using switch statement.
4. 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

1. Write the shell programs for the following
   - a) Print the Fibonacci series
   - b) Check the given number is prime or not
   - c) Print the following format

```
1
1  2
1  2  3
1  2  3    4
…..
```

Experiment -VIII

1. Write a shell script to display the given string in reverse order.
2. Write a shell script to find minimum and maximum elements in the given array of integers.
3. Write a shell script function for finding factorial of a given number.

Experiment -IX

1. Implement the following CPU Scheduling Algorithms.

   a) First come first serve   b) Round robin
   c) Shortest job first   d) Priority scheduling

Experiment -X

1. Implement the banker's algorithm for deadlock avoidance.

Experiment -XI

1. Implement the following page replacement algorithms
   - a) FIFO   b) LRU

Experiment -XII

1. Implement the following directory structures.
    a) Single level directory   b) Two level directory

Laboratory Manual:

1. Operating System Laboratory Manual, *Prepared by the faculty of Department of Computer Science & Engineering.*

Text Books:

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

Course Learning Outcomes(COs):
Upon completion of this course, students will be able to…
    CO1: acquire the knowledge of UNIX commands
    CO2: apply the shell programming concepts for developing applications
    CO3: debug and document programs in Shell scripts
    CO4: implement the operating system concepts like CPU scheduling algorithms, page replacement algorithms, dead lock avoidance algorithm and directory structures implementation

U14EE412   **BASIC ELECTRICAL & ELECTRONICS ENGINEERING LABORATORY**

Class: B.Tech., **IV-S**emester   **Branch:** Common to CSE, CE & ME

Teaching Scheme :

L	T	P	C
-	-	3	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This laboratory 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 EXPERMENTS

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 & regulation of a transformer by O.C & S.C test.
10.   Determination of efficiency & regulation of a transformer by direct load test.
11.   Determination of Self & Mutual inductance of a coupled coil.

Laboratory Manual:

1.   Manual for "Basic Electrical & Electronics Engineering Laboratory" *prepared by the Department of EEE.*

Course Learning Outcomes (COs):
After completion of this laboratory 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

U14MH409   COMPLIANCE WITH CURRENT ENGLISH

Class: B. Tech IV-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	100 marks
End Semester Examination	-

Course Learning Objectives (LOs):
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(COs):
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*
>   CO: *develop dialogues and conversations in English and make oral presentations effectively*
>   CO: *use sound vocabulary in communication*
>   CO4: *write a report, an official letter, an essay, prepare CV / Resume and precise the given passage.*

U14CH209   ENVIRONMENTAL STUDIES

Class: B. Tech IV-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
2	-	-	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):
> *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.

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 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(COs):
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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*** *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
COMPUTER SCIENCE & ENGINEERING

S. No.	Course Category	Course Code	Course Name	Periods/Week			Credits	Evaluation Scheme				
								CIE			ESE	Total Marks
				L	T	P		TA	MSE	Total		
1	PC	U14CS501	Computer Networks	3	1	-	4	15	25	40	60	100
2	PC	U14CS502	Design and Analysis of Algorithms	3	1	-	4	15	25	40	60	100
3	ES	U14EI503	Microprocessors and Interfacing	3	1	-	4	15	25	40	60	100
4	PC	U14CS504	Language Processors	3	1	-	4	15	25	40	60	100
5	PC	U14CS505	Web Programming	3	1	-	4	15	25	40	60	100
6	PC	U14CS506	Language Processors Laboratory	-	-	3	2	40	-	40	60	100
7	PC	U14CS507	Web Programming Laboratory	-	-	3	2	40	-	40	60	100
8	ES	U14EI510	Digital Electronics and Microprocessors Laboratory	-	-	3	2	40	-	40	60	100
9	PR	U14CS509	Seminar	-	-	-	1	100	-	100	-	100
			Total	**15**	**5**	**9**	**27**	**-**	**-**	**420**	**480**	**900**

Student Contact Hours/Week : 29   Total Credits : 27

U14CS501   COMPUTER NETWORKS

Class: B. Tech V-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: computer network architecture and reference model
LO2: different types of data link and medium access control protocols
LO3: developing routing algorithms and internet working
LO4: network protocols for real time applications

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 model.
Physical layer: Theoretical basis for data communication, Transmission media - Guided transmission media, Wireless transmission, Communication satellites, Digital modulation and multiplexing.
Switching: Circuit and 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, *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.
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.

UNIT-IV (9+3)

Transport layer: The transport service, 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: Domain name system (*DNS*), Electronic mail, Work wide web, Streaming audio and video.

Text Books:

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

Reference Books:

1. William Stallings, "Data and Computer Communications", *9th Edition, Prentice-Hall of India (PHI),* ISBN-81-203-1240-6, 2011
2. Forouzan, "Data Communication and Networking", *5th Edition, Tata McGraw Hill ,* ISBN: 978-0-07-296775-3, 2012

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to...

CO1: demonstrate computer network architecture, OSI and TCP/IP reference models
CO2: determine types of data link and medium access control protocols
CO3: use Routing algorithms and internet working
CO4: design network protocols for real time applications

U14CS502 DESIGN AND ANALYSIS OF ALGORITHMS

Class: B. Tech V-Semester   **Branch:** Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: analyzing the algorithms and calculating their complexity
LO2: designing algorithms using greedy strategy, divide and conquer approach and dynamic programming
LO3: backtracking and least cost search
LO4: fundamental computability concepts and the complexity of classes P, NP and NP-complete

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UNIT-I (9+3)

Introduction: Algorithm analysis, Performance analysis, Space complexity and time complexity, Big 'O' notation, Omega notation, Theta notation, Different mathematical approach's for solving Time complexity of Algorithms.
Sets and disjoint set union: Introduction, Union, 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, Travelling 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, Travelling 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 Books:

1. E.Horowitz, S.Sahni, S.Rajasekaran, "Fundamentals of Computer Algorithms", *2nd Edition*, *Universities Press*, ISBN: 978-8173716126, 2008

Reference Books:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Cliford Stein, "Introduction to Algorithms", *3rd Edition, Prentice-Hall of India,* ISBN: 978-81-203-4007-7, 2010
2. S.Sridhar, "Design and Analysis of Algorithms", *Oxford University Press, India,* ISBN - 13: 978-0-19-809369-5, ISBN-10: 0-19-809369-1, 2015

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…
   CO1: analyze the time and space complexity of an algorithms
   CO2: design algorithms using greedy strategy and dynamic programming
   CO3: identify algorithm design methodology to solve problems
   CO4: analyze the classes P, N and NP Complete and be able to prove that a certain problem is NP complete

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U14EI503   MICROPROCESSORS AND INTERFACING

Class: B. Tech V-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: 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)

8086 family architecture: *Review of 8085 MPU 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)

Serial Data Communication through 8086: DMA Controller 8257, Programmable Timer/Counter 8254, 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 (COs):

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*

U14CS504   LANGUAGE PROCESSORS

Class: B. Tech V-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: different compiler construction tools and compiler design
LO2: describing grammars and language definition
LO3: syntax directed translation and symbol table
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 deterministic finite automata based 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 attribute, 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, Directed acyclic graph (*DAG*) representation of basic blocks, Peephole optimization, Generating code from directed acyclic graphs, Code generation algorithm.
Code optimization: Introduction, The Principal sources of optimization, Optimization of basic blocks, Loops in flow graphs, Introduction to global data flow analysis, Code improving transformations.

Text Books:

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

Reference Books:

1. Allen I. Holub "Compiler Design in C", *2nd Edition, Prentice Hall of India*, ISBN-13: 978-8120307780, 2003
2. C. N. Fischer, R. J. LeBlanc, "Crafting a compiler with C", *1st Edition, Pearson Education*, ISBN-13: 978-0805321661, 2003
3. J.P. Bennet, "Introduction to Compiler Techniques", *2nd Edition, Tata McGraw-Hill*, ISBN-13: 978-0077072155, 2003
4. Henk Alblas, Albert Nymeyer, "Practice and Principles of Compiler Building with C", *1st Edition, PHI*, ISBN-13: 978-0133492675, 2001

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

CO1: apply the knowledge of lex tool and yacc tool to develop a scanner & parser
CO2: demonstrate syntax analysis process
CO3: design and conduct experiments for Intermediate Code Generation in compiler
CO4: implement code optimization techniques to improve the performance of a program in terms of speed and space

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U14CS505   WEB PROGRAMMING

Class: B. Tech V-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
3	1	-	4

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

LO1: designing the static web page using HTML Tags, CSS properities, javascript
LO2: demonstrate JDBC connections, XML Schema with servlets
LO3: designing a web page in JSP with different databases
LO4: PHP scripting language, accessing the data from the database using MySQL and different types of databases

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UNIT-I (9+3)

Introduction to HTML: Basic Tags, List, Linking document, Creating table and its attributes, Images, Frames, Forms, *CSS* (cascading style sheet) rules and properties.
Introduction to JavaScript: JavaScript syntax, Datatype, Variable, Array, Operator and expression, Looping, Function, Dialog box, Events and events handling.

UNIT-II (9+3)

JDBC: Introduction to *JDBC*, Types of *JDBC* drivers, Different statement objects statement, Prepared statement, Callable statement, Batch updates.
Introduction to XML: Structuring of data, *XML* namespaces, Document type definitions (*DTD's*), *W3C XML* schema documents, *XML* vocabularies, Extensible style sheet language and *XSL* transformations, Document object model (*DOM*).
Servlets: The *javax.servlet.http* package, Handling http request and responses, Cookies session tracking, Security issues.

UNIT-III (9+3)

Introduction to JSP: *JSP* and *HTTP*, *JSP* engines, How *JSP* works, *JSP* and servlet, Anatomy of a *JSP* page, *JSP* syntax, *JSP* components, Session tracking, Database connectivity, *JDBC* drivers, *SQL* statement**.**

UNIT-IV (9+3)

Introduction to PHP: Overview of *PHP*, General server characteristics, Starting to script on server side, Syntax, Variables, Strings, Operators, *if else*, Loop, *switch*, array, function, Session, Exception, Form handling, Servers to run PHP.
Databases with PHP: Working with *MySQL* database, Operations of database using queries; Accessing *MySQL* database with *PHP* - How web database architectures work, Querying a database from the web, Checking and filtering input data, Setting up a connection, Choosing a database to use, Querying the database, Retrieving the query results, Disconnecting from the database, Putting new information in the database, Using prepared statements, Using other PHP database interfaces.

Text Books:

1. Kogent, "Web Technologies HTML, CSS, JavaScript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XML", *1st Edition, Dreamtech Press (Black Book),* ISBN-13:9789351192510, 2013.

2. Phil Hanna, "JSP: The Complete Reference", *2nd Edition, McGraw-Hill,* ISBN: 007-212768-6, 2001, (Chapters 4,5,6,7,12,13,14,16)

Reference Books:

1. Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP", *4th Edition, BPB Publications,* ISBN-13: 978-8183330084, 2009,
2. Uttam K.Roy, "Web Technologies", *7th Edition*, *Oxford Higher Education,* ISBN-10: 0-19-806622-8, ISBN-13: 978-0-19-806622-4, 2010
3. Luke Welling, Laura Thomson,"PHP and MySQL Web Development", *3rd Edition, Sams Publications,* ISBN: 0-672-32672-8, 2005
4. Jayson Falkner, Kevin Jones, "Servlets and Java Server Pages", *1st Edition, Pearson,* ISBN: 0-321-13649-7, 2003

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…
  CO1: design a static web page using HTML Tags, CSS properities, javascripts
  CO2: design and develop a dynamic web page using JDBC, XML schema, servlets.
  CO3: design and develop a web page to access data from the databases using JSP concepts
  CO4: design and demonstrate on secured web page with PHP scripting, MySQL

U14CS506   LAGUAGE PROCESSORS LABORATORY

Class: B. Tech V-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
-	-	3	2

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: determining lexical analyzer(LEX) using lexical analyzer tool and syntax analyzer or parser using yet another compiler compiler(YACC) tool
    LO2: generating assembly code for the given language
    LO3: designing front end of the compiler by means of generating Intermediate codes
    LO4: developing lexical analyzer from a regular expression and yet another compiler compiler from context free grammar

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Experiment-I

1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines
2. Implement the lexical analyzer using *JLexical* Analyzer, *FLexical* Analyzer or other lexical analyzer generating tools

Experiment-II

1. Write a program to compute *FIRST* and *FOLLOW*
2. Design predictive parser for the given language

Experiment-III

1. Design a look ahead LR(*LALR*) bottom up parser for the given language
2. Convert the *BNF* rules into yet another compiler compiler form and write code to generate abstract syntax tree

Experiment-IV

1. A program to generate assembly code
2. Write a program to implement operator precedence parsing

Experiment-V

  Write lexical analyzer program for the following

1. To count the number of keywords and identifiers in a sentence
2. To convert an octal number to decimal number
3. To recognize strings of numbers (integers) in the input, and simply prints them out

Experiment-VI

  Write lexical analyzer program for the following.

1. To count the number of vowels and consonants in a given input string
2. To count the number of characters, words and lines in the given input
3. To count the number of '+'ve and '-'ve integers and fractions

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Experiment-VII

Write lexical analyzer program for the following

1. To count the number of comment lines in the given *C* program
2. To count the number of scanf and printf statements in a *C* program
3. To illustrate no pattern and no action concept

Experiment-VIII

Write lexical analyzer program for the following

1. To add line numbers to the given file and displays the same onto the standard output
2. To extract only comments from *C* program and display the same on standard output

Experiment-IX

Write yet another compiler compiler program for the following

1. To identify a simple and a compound statement
2. To check whether given string $a^n b^n$ (n>=1)is accepted by the grammar.

Experiment-X

Write yet another compiler compiler program for the following

1. To check the validity of an arithmetic expression
2. To identify an input for the grammar $a^n b$ (n>=10)

Experiment-XI

Write yet another compiler compiler program for the following

1. To recognize nested IF control statements and display the levels of nesting
2. To check the validity of a sentence

Experiment-XII

Write yet another compiler compiler program for the following

1. To check the validity of date
2. For testing balanced parentheses**.**

Laboratory manual:

1. Language Processors Laboratory Manual, *Prepared by the faculty of Department of Computer Science and Engineering*.

Text Books:

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

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

    CO1: apply the knowledge of lexical analyzer(LEX) tool and yet another compiler compiler(YACC) tool to develop a scanner piler and parser

    CO2: design & implement front end of the com

    CO3: develop program for implementing symbol table

    CO4: use the new tools and technologies for designing a compiler

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U14CS507   WEB PROGRAMMING LABORATORY

Class: B. Tech V-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
-	-	3	2

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: designing a static web page using HTML tags, CSS, javascript
    LO2: demonstrating a dynamic web page using JDBC, XML schema, servlets
    LO3: accessing data from different databases using JSP concepts
    LO4: designing a secured web page with PHP scripting, accessing the data from the databases
       with MySQL

List of Experiments

Experiment-I

1. Design the following static web pages with the following attributes:
    - **a.** Basic Tags.
    - **b.** Heading Tags.
    - **c.** List (Ordered and Un-Ordered).
    - **d.** Textbox, Buttons.

Experiment-II

2. Design the following static web pages required for an online store web site.
    - **a.** *Home Page*: The static home page must contain three **frames**.
    - *Top frame***:** Logo and the stores name and links to Home page, Login page, Registration page, Catalogue page and Cart page.
    - *Left frame***:** At least four links for navigation, which will display the catalogue of respective links.
    - *Right frame***:** The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.
    - **b.** *Login Page*: Create a simple form with input fields and demonstrate required field validations to validate that all input fields are required and display error messages if the above validations do not hold, navigate to next page when the input fields are valid.

Experiment-III

- **c.** *Catalogue Page*: The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:
    - Snap shot of Cover Page.
    - Author Name and Publisher.
    - Price and Add to cart button.

Experiment-IV

3. **VALIDATION:** Write *JavaScript* to validate the following fields of the above registration page.
    - **a.** Name (Name should contains alphabets and the length should not be less than 6 characters).
    - **b.** Password (Password should not be less than 6 characters length).

> c. E-mail id (should not contain any invalid and must follow the standard pattern (*name@domain.com*)
> d. Phone number (Phone number should contain 10 digits only).
> Note: You can also validate the login page with these parameters.

4. **CSS (Cascading Style Sheets):** Design a web page using **CSS (Cascading Style Sheets)** which includes the following:
   a. Use different font, styles: In the style definition you define how each selector should work (font, color etc.).Then, in the body of your pages, you refer to these selectors to activate the styles.
   b. Set a background image for both the page and single elements on the page. You can define the background image for the page like this:
   c. Control the repetition of the image with the background-repeat property. As background-repeat: repeat
   d. Define styles for links
   e. Work with layers
   f. Add a customized cursor
5. Embedding JavaScript in HTML pages.
6. Design a form and validate its field by using JavaScript.

Experiment-V
7. Design a web page to demonstrate on each button events using JavaScript.
8. WAP to create popup boxes in JavaScript.
9. Program to create a class that contains an overloaded method called "add" to calculate the sum of two integers, two float numbers and, one integer and one float.

Experiment-VI
10. Display the contents of a database table in a neat format.
11. Insert *N*, no. of records into a database table using *Prepared Statement.*
12. Enhance the salaries into the database table by 10% who are earning salary greater than 5000 using *Callable Statement.*
13. Delete all records whose marks are below 50% and also display the count.

Experiment-VII
14. User Authentication
   Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the web.xml and access them in the servlet by using the getInitParameters() method.
15. Write a program illustrating MySQL database program using Servlets

Experiment-VIII
16. Write a HTML file to create a simple form with input fields and demonstrate required field validations to validate that all input fields are required and display error messages if the above validations do not hold.
17. Create a JSP Page with and run in JSP Engines.
18. Demonstrate Session Tracking in JSP.

Experiment-IX

19. Create Database Connectivity with JSP page with different JDBC Drivers.
20. Create a JSP Page to Insert, Update, Select, and Delete the Data into the Database and from the Database.

Experiment-X

21. Create a form for your college library entering student details for each student in the college. Validate the form using PHP valuators and display error messages.
22. Write a PHP which does the following job:
    Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the UserName and Password from the database (instead of cookies).

Experiment-XI

23. Create tables in the database which contain the details of items of each category. Modify your catalogue page in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.
24. Create and delete MYSQL database using PHP.

Experiment-XII

25. Create a PHP program to demonstrate opening and closing a file.
26. Create a PHP program to demonstrate reading a file and writing in a file.

Laboratory manual:

1. Web Programming Laboratory Manual, *Prepared by the faculty of Department of Computer Science and Engineering*.

Text Books:

1. Kogent, "Web Technologies HTML, CSS, JavaScript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XML", *1st Edition, Dreamtech Press (Black Book)*, ISBN-13:9789351192510, 2013.

2. Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP", *BPB Publications, 4th Edition*, ISBN-13: 978-8183330084), 2009

3. Phil Hanna ,"JSP: The Complete Reference", *McGraw-Hill, 2nd Edition*,(ISBN:0-07-212768-6) 2001 (Chapters 4,5,6,7,12,13,14,16)

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…
   CO1: develop a static web page using HTML Tags, CSS, javascripts
   CO2: implement with JDBC connections, XML schema, servlets
   CO3: implement a web page in JSP, accessing the data from different databases
   CO4: implement a web page in PHP scripting; retrieve the data using MySQL and other different types of databases

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U14EI510 DIGITAL ELECTRONICS &MICROPROCESSOR LABORATORY

Class: B.Tech. V-Semester   **Branch**: Computer Science & Engineering

Teaching Scheme:

L	T	P	C
-	-	3	2

Examination Scheme:

Continuous Internal Evaluation:	40 marks
End Semester Exam :	60 marks

Course Learning Objectives(LOs):

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. Digital Electronics &Microprocessor Processor Laboratory Manual, *Prepared by the faculty of Department of Electronics and Instrumentation Engineering*.

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)

Course Learning Outcomes(COs):

Upon completion of the course, the student 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

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U14CS509   SEMINAR

Class: B. Tech V-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
-	-	-	1

Continuous Internal Evaluation	100 marks
End Semester Examination	-

Course Learning Objectives (LOs):
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 (COs):
Upon completion of this course, the 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
COMPUTER SCIENCE & ENGINEERING

S. No.	Course Category	Course Code	Course Name	Periods/Week			Credits	Evaluation Scheme				
								CIE			ESE	Total Marks
				L	T	P		TA	MSE	Total		
1	OE	U14OE601	Open Elective-I	4	-	-	4	15	25	40	60	100
2	PC	U14CS602	Wireless and Mobile Communications	3	1	-	4	15	25	40	60	100
3	PC	U14CS603	Machine Learning	3	1	-	4	15	25	40	60	100
4	PC	U14CS604	Data Warehousing and Data Mining	3	1	-	4	15	25	40	60	100
5	PE	U14CS605	Cryptography and Network Security	3	1	-	4	15	25	40	60	100
6	PC	U14CS606	Professional Elective-I	4	-	-	4	15	25	40	60	100
7	PC	U14CS607	Data Analytics Laboratory	-	-	3	2	40	-	40	60	100
8	PC	U14CS608	GUI Programming Laboratory	-	-	3	2	40	-	40	60	100
9	PR	U14CS609	Mini Project	-	-	-	2	40	-	40	60	100
			Total	**20**	**4**	**6**	**30**	**-**	**-**	**360**	**540**	**900**

Student Contact Hours/Week : 30   Total Credits   : 30

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

U14OE 601A: Disaster Management   U14CS 606A: Advanced Databases

U14OE 601B: Project Management   U14CS 606B: Computer Graphics and Multimedia

U14OE 601C: Professional Ethics in Engineering   U14CS 606C: Embedded Systems

U14OE 601D: Rural Technology and Community Development

U14OE601A   DISASTER MANAGEMENT

Class: B. Tech VI-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
4	-	-	4

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

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 and chemical disasters

LO3: financial management of disaster and related losses

LO4: multimedia technology in disaster management and training

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UNIT-I (12)

Introduction and principles of disaster management: Nature - Development, Hazards and Disasters, Natural Disasters such as 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. Satish Modh. "Introduction to Disaster management", *Macmillan Publishers, India.*
2. Rajib shah and R.R Krishnamurthy "Disaster management – Global Challenges and local solutions" *University Press.*

Reference Books:

1. Jagbir Singh "Disaster Management-Future Challenges and Opportunities" *I.K Publishers.*
2. H.K Gupta. "Disaster management", *Universities Press, India.*
3. G.K. Ghosh "Disaster management", *A.P.H. Publishing Corporation.*

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

CO1: *describe & differentiate types of disasters*

CO2: *apply prevention, preparedness and mitigation measures for earthquakes, floods, fire, landslides, cyclones and tsunamis, nuclear & chemical disasters*

CO3: *appraise financial management of disaster and related losses*

CO4: *use multimedia technology in disaster risk management and training*

U14OE601B   PROJECT MANAGEMENT

<u>**Class:**</u> B. Tech VI-Semester   <u>**Branch:**</u>   Computer Science & Engineering

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: the 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)

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

UNIT-II (12)

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 the Corporate Culture – Professional Responsibilities - Success Variables - Working with Executives.

UNIT-III (12)

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 Phaseouts and Transfers - Stopping Projects - Scheduling Techniques: CPM and PERT - Pricing and Estimating.

UNIT-IV (12)

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 Books:

1. Harold Kerzner, Project Management: A systems approach to planning, scheduling and controlling, John Wiley Publishers, Tenth Edition, 2009
2. Jack R Meredith & Samuel J mantel Jr, Project Management : A Managerial Approach, John Wiley publications, Eighth Edition, 2012

Reference Books:

1. John M Nicholas & Herman Steyn, Project Management for Business, Engineering and Technology, Elsevier Publications
2. Adedeji B. Badiru, Project Management: Systems, Principles and Applications, CRC Press

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Course Learning Outcomes(COs):

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 along with project schedule and suitable budget

    CO4: identify important risks facing a new project and apply appropriate techniques to assess ongoing project performance

U14OE601C   PROFESSIONAL ETHICS IN ENGINEERING

Class: B. Tech VI-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
4	-	-	4

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

LO1: awareness on engineering ethics and human value
LO2: professionalism and role of ethics
LO3: the assessment of safety and risk and risk benefit analysis
LO4: multinational companies and the role of engineers in MNC

UNIT-I (12)

Human Values: Morals, Values and 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 - the 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 Books:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", *4th Edition, McGraw-Hill*, New York, 2005
2. D R Kiran, "Professonal Ethics and Human Values", *McGraw-Hill Educaton(India) Pvt. Ltd*

Reference Books:

1. Charles D. Fleddermann, "Engineering Ethics", *Pearson Education / Prentice Hall, New Jersey*, 2004 (Indian Reprint now available).
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Professional Ethics and Human Values", *Prentice Hall of India*, New Delhi, 2013

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…
  CO1: associate with professional ethics and human values
  CO2: generalize professionalism and code of ethics
  CO3: estimate Risk benefits and reduce the risks
  CO4: analyze the role of engineer in multinational companies

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U14OE601D RURAL TECHNOLOGY AND COMMUNITY DEVELOPMNET

<u>**Class:**</u> B. Tech VI-Semester   <u>**Branch:**</u>   Computer Science & Engineering

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**:** *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 a*n 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 (COs):
  After 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 explains different models of community organization for bringing social change*

U14CS602   WIRELESS AND MOBILE COMMUNICATIONS

<u>**Class:**</u> B. Tech VI-Semester   <u>**Branch:**</u> Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
3	1	-	4

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

   LO1: essentials of wireless networks and protocols
   LO2: wireless network communication LAN technology and standards
   LO3: mobile computing and medium access control mechanisms
   LO4: mobile network and transport layer protocols

<u>UNIT-I</u> (9+3)

Introduction: The cellular revolution, Global cellular network, Broadband, The future trends, Trouble with wireless.

Antennas and propagation: Antennas, Propagation modes, Line of sight transmission, Fading in the mobile environment.

Mobile IP and wireless access protocol: Mobile *IP* and wireless application protocol.

<u>UNIT-II</u> (9+3)

Wireless LAN technology: Infrared *LANs*, Spread spectrum *LANs*, Narrow band microwave *LANs*.

IEEE802.11 wireless LAN standard: *IEEE 802* protocol architecture, *IEEE 802.11* architecture and services, *IEEE 802.11* medium access control, *IEEE 802.11* physical layer, Other *IEEE 802.11* standards.

Bluetooth: Radio specification, Baseband specification, Link manager protocol, Logical link control and adaptation protocol.

<u>UNIT-III</u> (9+3)

Mobile computing (MC): Introduction to *MC*, Novel applications, Limitations.

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security.

Medium access control: Motivation for a specialized *MAC, SDMA, FDMA, TDMA, CDMA*.

<u>UNIT-IV</u> (9+3)

Mobile network layer: Mobile *IP* Goals, Assumptions, Entities and terminology, *IP* packet delivery, Agent advertisement and discovery, Registration, Tunneling and encapsulation, Optimizations, Dynamic host configuration protocol (*DHCP*).

Mobile transport layer: Traditional *TCP*, Indirect *TCP*, Snooping *TCP*, Mobile *TCP*, Fast retransmit / Fast recovery, Transmission / Time out freezing, Selective retransmission, Transaction oriented *TCP*.

Text Books:

1. William Stallings, "Wireless Communications and Networks", *2nd Edition*, *Pearson Education*, ISBN 81-7808-560-7,2002(Chapters 1,5,12 to 15)
2. Raj Kamal,"Mobile Computing", *Oxford University Press 2007*, ISBN: 0195686772(Chapters 1 to 6)

Reference Books:

1. Jochen Schiller,"Mobile Communications", *2nd edition*, *Addison-Wesley*, ISBN 0-321-12381-6, *2004*
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", *Wiley, 2002*, ISBN 0471419028

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

CO1: demonstrate essentials of wireless networks and protocols

CO2: use wireless network communication LAN technology and standards in establish the networks

CO3: demonstrate Mobile computing and develop medium access control mechanisms

CO4: create mobile network and use transport layer protocols

U14CS603   MACHINE LEARNING

Class: B. Tech VI-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme:

L	T	P	C
3	1	-	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: intelligent searching techniques for problem solving
*LO2: essential knowledge representations and deduction techniques in intelligent
 application developments*
LO3: machine learning fundamentals and statistical classification methods
LO4: reinforcement learning and linear models for machine learning

UNIT-I (9+3)

Introduction: Agents and environment, rationality, the nature of environments, the structure of agents.
Problem Solving: problem solving agents, example problems, searching for solutions, uniformed search strategies, informed search strategies, Heuristic functions, local search algorithms, online search agents.

UNIT-II (9+3)

Constrain satisfaction and adversarial search: constraint satisfaction problems, back tracking and local search for constrain satisfaction problems, optimal decision in games, Alpha-Beta pruning, and real time decisions.
First order logic: Syntax and semantics for first order logic, Using first order logic, Knowledge engineering in first order logic.
Inference in First order logic: propositional versus first order logic, unification and lifting, forward chaining, backward chaining, Resolution.

UNIT-III (9+3)

Machine learning: The problems that can be solved with machine learning, the output of machine, the workhorses of machine, Classification, Scoring and Ranking, Class probability estimation, handling more than two classes.
Statistical Learning methods: Statistical learning, learning with Hidden variable, instant based learning, Neural networks, Kernel machines.

UNIT-IV (9+3)

Reinforcement Learning: Introduction, passive reinforcement learning, active reinforcement learning, generalization in reinforcement learning, policy search.
Linear Models: The Least-Squares method, Support vector machines, obtaining probabilities from linear classifiers.

Text Books:

1. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", *Second Edition, Pearson Education, 2003*, ISBN: 978-0137903955.
2. Peter Flach, "Machine Learning: The Art and Science of Algorithms that Make Sense of Data", *Cambridge University Press, First 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*, *First 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, First Edition,* ISBN-13: 978-1461294061, 2011.

Course Learning Outcomes (COs):

Upon completion of this course, students will be able to…

  CO1: apply the intelligent searching techniques for problem solving

  CO2: utilize suitable knowledge representations techniques for intelligent application
     developments

  CO3: describe concepts of machine learning and statistical classification

  CO4: apply the reinforcement learning and linear model to develop machine learning applications

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U14CS604   DATA WAREHOUSING AND DATA MINING

Class: B. Tech VI-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
3	1	-	4

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

LO1: fundamental theories and concepts of data warehouse and data mining
LO2: preprocessing techniques, basic algorithms and techniques for mining frequent patterns, associations and correlations
LO3: popular classification and prediction techniques
LO4: clustering techniques, web mining and business applications of data mining

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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 item sets, Improving the efficiency of Apriori algorithm, *FP growth* algorithm, Mining frequent Item sets using vertical data format, Mining closed frequent item sets, 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

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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, Intrusion detection.

Text Books:

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

Reference Books:

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

Course Learning Outcomes(Cos):

 Upon completion of this course, students will be able to…

    CO1: describe and utilize a range of techniques for designing data warehouse and data mining systems

    CO2: apply methods in integrating and interpreting the data sets and improving effectiveness, efficiency and quality for data analysis. Implement classical algorithms and develop new algorithms in data mining and data warehousing, assess the strengths and weaknesses of the algorithms, identify the application areas and apply them

    CO3: classify and predict the input data with the help of various classification and prediction techniques

    CO4: apply various clustering technique in different data mining application

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U14CS605   CRYPTOGRAPHY AND NETWORK SECURITY

<u>**Class:**</u>   B. Tech VI-Semester   <u>**Branch:**</u>   Computer Science & Engineering

Teaching Scheme:

L	T	P	C
3	1	-	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: basic concepts of security attacks, services and mechanisms
   LO2: fundamental of cryptographic algorithms
   LO3: authentication mechanisms and digital signature
   LO4: IP security, firewalls and various malicious software

<u>UNIT-I</u> (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.

<u>UNIT-II</u> (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*.

<u>UNIT-III</u> (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*.

<u>UNIT-IV</u> (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 Books:

1. William Stallings, "Cryptography and Network Security: Principles and Practice ", *5th Edition*, *Pearson Education*, ISBN-13: 978-0-13-609704-4, 2011

Reference Books:

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

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…
   CO1: differentiate services, attacks and mechanisms
   CO2: apply the mathematical concepts in cryptographic algorithms
   CO3: acquire the knowledge on key management and message authentication techniques
   CO4: protect the data from unauthorized persons, intruders and malicious software

U14CS606A ADVANCED DATABASES

<u>**Class:**</u> B.Tech, VI-Semester   <u>**Branch:**</u>   Computer Science & engineering

Teaching Scheme :

L	T	P	C
4	-	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):
This course will develop students knowledge in/on…
    LO1 : data on external storage and file organizations
    LO2 : the features of object database systems
    LO3 : the architectures of distributed databases
    LO4 : the deductive databases using Recursive Queries

UNIT-I (12)

Overview of Storage and Indexing: Data on external storage, file organizations and indexing, index data structures, comparison of file organizations, indexes and performance tuning.
Storing Data Disks and Files: The memory hierarchy, redundant arrays of independent disks, disk space management, buffer manager, files of records, page formats, record formats.
Tree-Structured Indexing: Intuition for tree indexes, ISAM, B+ trees, search, insert, delete, duplicates, b+ trees in practice.
Hash-Based Indexing: Static hashing, extendible hashing, linear hashing, extendible versus linear hashing.

UNIT-II (12)

Object-Database Systems: Motivating example, structured data types, operations on structured data, encapsulation and ADTS, inheritance, objects, OIDS and reference types, database design for an ORDBMS, ORDBMS implementation challenges, OODBMS, comparing RDBMS,OODBMS, and ORDBMS.
Parallel Databases: Introduction, architectures for parallel databases, parallel query evaluation, parallelizing individual operations, parallel query optimization.

UNIT-III (12)

Distributed Databases: Introduction, distributed data processing, distributed database system, promises of DDBSS, problem areas.
Distributed DBMS Architecture: Architectural models for distributed DBMS, DDMBS architecture.
Distributed Database Design: Alternative design strategies, distribution design issues, fragmentation, allocation.
Query Processing and decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

UNIT-IV (12)

Deductive Databases: Introduction to recursive queries, theoretical foundations, recursive queries with negation, from data log to SQL, evaluating recursive queries. **Web databases:**

Introduction to information retrieval, indexing for text search, web search engines, managing text in DBMS, a data model for XML.

XQUERY: Querying xml data, efficient evaluation of xml queries.

Spatial Data Management: Types of spatial data and queries, applications involving spatial data, introduction to spatial indexes, indexing based on space-filling curves, Grid files, R Trees: Point and region data, issues on high dimensional indexing.

Text Book:

1. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems ", *First Edition, Mc-Graw Hill*, ISBN No: 0-07-123151-X, 2003.

Reference Books

1) Thomas Connolly and Carolyn Begg, "Database Systems", *Third Edition, Pearson Education,* ISBN No: 81-7808-861-4, 2003.
2) Hector Garcia Molina,Jeffery D Ullman,Jennifer Widom," Database Systems: The Complete Book",2nd Edition, *Mc-Graw Hill*, 2008.

Course Learning Outcomes (COs):

Upon completion of this course, students will be able to …

    CO1:analyze the Index data structures and Performance tuning
    CO2:outline the encapsulation and abstract data types in object database systems
    CO3: design   the recursive queries to manage the XML database environment efficiently
    CO4: gain the knowledge in space filling curves with indexing techniques

U14CS606B   COMPUTER GRAPHICS AND MULTIMEDIA

Class: B. Tech VI-Semester   **Branch:**   Computer Science & Engineering

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: computer graphics primitive algorithms to draw lines, circles and polygons
LO2: different algorithms on windowing and clipping and 2D transformations
LO3: determining basic concepts on modeling of 3D objects and the significance of animation
LO4: fundamental concepts of multimedia systems

UNIT-I (12)

Geometry and line generation: Introduction, Application of computer graphics, Pixels and frame buffer, Graphics standards, Image representation, *DDA* and Bresenham line generation algorithms, Graphics primitive operations, Character generation methods, Aliasing and anti aliasing.
Polygons: Polygon representation, Inside test methods, Seed filling, 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, Cohen sutherland outcode algorithm , Sutherland hodgman algorithm, Midpoint subdivision algorithm, Generalized clipping.
Three dimensions: *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 line removal algorithms: *Z buffer* algorithm, Painters algorithm, Warnock algorithm, Franklin algorithm, Back face removal algorithm.
Computer based animation: Basic concepts, Animation languages, Methods of controlling animation, Display of animation, Transmission of animation.

UNIT-IV (12)

Multimedia: Media and data streams, Main properties of multimedia system; Traditional data stream characteristics - Asynchronous transfer mode, Synchronous transfer mode.
Sound / Audio: Basic sound concepts - Computer representation of sound, Audio formats; Music - *MIDI* concepts, *MIDI* devices, *MIDI* messages, *MIDI* software; 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, A Programming Approach" *2nd Edition, McGraw-Hill*, *International Edition*, ISBN: 0-07-1005472-6, 1987 (Chapters 1 to 6, 8, 9)
2. Ralf Steinmetz, Klara Nahrstedt, "Multimedia: Computing, Communicatons & Applications", *Pearson First Impression*, 2006, ISBN: 81-7758-441-3, 2001 (Chapters 2, 3, 17)

Reference Books:

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

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

    CO1: analyze line, circle and polygon algorithms
    CO2: design algorithms on windowing and clipping of 2D and 3D transformations
    CO3: analyze hidden surface and line removal algorithms in 3D modeling
    CO4: demonstrate knowledge on multimedia applications

U14CS606C   EMBEDDED SYSTEMS

Class: B. Tech III-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
4	-	-	4

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

LO1: essentials of embedded systems and 8051 micro controller
LO2: memory management and interrupt services in embedded systems
LO3: developing and testing embedded system software
LO4: designing embedded systems using a real time operating system

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UNIT-I (12)

Introduction to embedded systems: Definition, Characteristics, Processor embedded into a system, Embedded hardware units and devices, Embedded softwares, 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.

UNIT-IV (12)

Real time operating systems: Interrupt routines in *RTOS* environment. Principles for design using a real time operating system, Encapsulation using semaphores and queues, Hard real time considerations, Saving memory and power

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RTOS task scheduling models: Cooperative scheduling model, Time slicing scheduling models, Preemptive scheduling model, Earliest deadline first, Rate monotonic schedulers and fixed real time scheduling models, Performance metrics, security issues.

Case studies: Case study of embedded hard ware and software architectures of chocolate vending machine, Digital camera and smart card design example.

Text Books:

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

Reference Books:

1. David E.Simon, "An Embedded Software Primer", *1st Edition, Pearson Education,* ISBN: 020161569X, 1999
2. Frank Vahid, Tony Givargis, "Embedded System Design: A Unified Hardware / Software Introduction", *2nd Edition, John Wiley& Sons,* , ISBN: 0471386782, 2002
3. Muhammad Ali Mazidi, Janice Gillispiemazidi, "The 8051 Microcontrollers and Embedded Systems", *11th Indian Reprint, Pearson Education,* ISBN: 81-7808-574-7, 2005

Course Learning Outcomes(COs):

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: design embedded systems using Real-time operating system

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U14CS607   DATA ANALYTICS LABORATORY

Class: B. Tech VI-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
-	-	3	2

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):
This course will develop students' knowledge in/on…
LO1: building data warehouse and implementation of OLAP operations
LO2: using WEKA machine learning toolkit
LO3: implementation of data preprocessing techniques using WEKA tool
LO4: implementing typical data mining techniques

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 in WEKA Tool.

Experiment-X
10. Implement ID3 Classification algorithm using WEKA Tool.

Experiment-XI
11. Implement simple K-means Clustering algorithm using WEKA Tool.

Experiment-XII

Implement visualization using WEKA Tool.

Laboratory Manual:

1. Data Analytics Laboratory Manual, *Prepared by the faculty of Department of Computer Science and Engineering*

Text Books:

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

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

CO1: develop skills to conduct online analytic processing and analyze data
CO2: develop skills to use WEKA Tool
CO3: implement data preprocessing techniques using WEKA tool
CO4: develop skills to effectively apply data mining techniques to solve real business problems and perform research

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U14CS608   GUI PROGRAMMING LABORATORY

Class: B. Tech VI-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme:

L	T	P	C
-	-	3	2

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: designing an interface following the golden rules of GUI
LO2: C#.Net programming language to design applications
LO3: different categories of GUI applications
LO4: designing 2-tier applications using ASP.Net

Experiment-1
1. Program to demonstrate Command Line arguments processing.
2. Program to demonstrate Boxing and UnBoxing.
3. Program to implement Stack operations.
4. Program to demonstrate Operator Overloading.
5. Program to multiply to matrices using Rectangular arrays.
6. Program to find the sum of all the elements present in a jagged array of 3 inner arrays.
7. Program to demonstrate Creating, Managing and Destroying Threads using Multithreading concept.

Experiment -2
8. Program to demonstrate error handling using Try, Catch and Finally blocks.
9. Program to demonstrate use of Virtual and Override key words.
10. Program to implement Linked List using the existing collections namespace.
11. Program to demonstrate abstract class and abstract methods.
12. Program to build a class which implements an interface which already exists.
13. Program to illustrate the use of different Properties.
14. Program to demonstrate arrays of interface types.

Experiment -3
15. Develop C# Windows Application to design a Mini Calculator.
16. Develop C# Windows Application to design a New Form with Panel, PictureBox, ProgressBar and Timer Controls.

Experiment-4
17. Develop C# Windows Application for Customer screen which takes Customer name, Country, Gender, Hobby and Status.
18. Preview screen that will display data entered in to the Customer data entry screen.

Experiment-5
19. Develop C# Windows Application to work with Multiple Forms, Setting Startup Form, Adding Controls and Setting Properties at Design time and Run time.
20. Develop C# Windows Application to design a New Form with Button, Label, TextBox and ListBox, CheckBox, RadioButton and GroupBox Controls.

Experiment-6

21. Develop C# Windows Application to design a New Form with Menu items at design time and run time along with OpenFileDialog, SaveFileDialog, FontDialog and ColorDialog Controls. To implement Notepad Application.

Experiment-7

22. Develop C# Windows Application to design Navigational Menus which will help to Navigate Entry Screen and Display Screen using MDI.

Experiment-8

23. Develop C# Windows Application to create a New Data Connection using ADO.NET and to Access Data using Data BindingNavigator control.
24. Develop C# Windows Application to Select, Insert, Update and Delete a Record from a Employee Table using ADO.NET Components and display data using DataGridView Control.

Experiment-9

25. Develop C# Windows Application using Simple Data Binding and Complex Data Binding and with advanced Data Binding using Windows Presentation Foundation.

Experiment-10

26. Develop C# Windows Application to Access Data Using OleDb DataReader.
27. Develop C# Windows Application to Access Data Using OleDb DataAdapter and DataSet.

Experiment-11

28. Connecting to SQL Server, getting data and getting acquainted with ADO.NET components, like connection, command and DataAdapter using ASP.NET
29. Inserting, Deleting and Updating Data from the User Interface to SQL Server.

Experiment-12

30. Reading and Writing XML Documents with XML Text Reader/Writer Class.
31. Write a Program in ASP that has a form taking the user's name as input. Store this 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.
32. Use ad-rotator to change advertisements on client side request.
33. Create a Session dictionary using object tag. In session-on start add keys for Time, UserAgent, RemoteIP & add appropriate values. Create a simple page to display the values.
34. Implement Session tracking using user authentication.
35. Write a Program to delete all cookies of your web site that has created on the client's computer.

Laboratory Manual:

1. Graphical User Interface Laboratory Manual, *Prepared by the faculty of Department of Computer Science and Engineering.*

Text Books:

1. Matthew A. Telles"C#BlackBook", *Edition:illustrated, Publisher:Coriolis Group Books, 2002, he University of Michigan,* ISBN:1588801926, 9781588801920

Course Learning Outcomes(COs):

Upon completion of this course, students will be able to…

    CO1: create a user friendly application programs following the golden rules of GUI
    CO2: acquire the programming skills in C# language
    CO3: create different types of applications like windows and web based
    CO4: create an interactive web based application that works over client-server models (2 tier)

U14CS609   MINI PROJECT

Class: B. Tech VI-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme: **Examination Scheme:**

L	T	P	C
-	-	-	2

Continuous Internal Evaluation	100 marks
End Semester Examination	-

Course Learning Objectives (LOs):
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 Mini Project Evaluation Committee (DMPEC)*
2. *DMPEC* 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 mini project oral presentation
3. There shall be only continuous Internal Evaluation (CIE) for mini project
4. The CIE for mini project 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

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Course Learning Outcomes (COs):
Upon completion of this course, the 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

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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
COMPUTER SCIENCE & ENGINEERING

S. No.	Course Category	Course Code	Course Name	Periods/Week			Credits	Evaluation Scheme				
								CIE			ESE	Total Marks
				L	T	P		TA	MSE	Total		
1	OE	U14OE701	Open Elective-II	4	-	-	4	15	25	40	60	100
2	PC	U14CS702	Middleware Technologies	3	1	-	4	15	25	40	60	100
3	PC	U14CS703	Cloud Computing	3	1	-	4	15	25	40	60	100
4	PE	U14CS704	Professional Elective-II	4	-	-	4	15	25	40	60	100
5	PE	U14CS705	Professional Elective-III	4	-	-	4	15	25	40	60	100
6	PC	U14CS706	Middleware Technologies Laboratory	-	-	3	2	40	-	40	60	100
7	PC	U14CS707	Object Oriented Analysis and Design Laboratory	-	-	3	2	40	-	40	60	100
8	PR	U14CS708	Major Project Work *Phase- I*	-	-	7	4	100	-	100	-	100
			Total	**18**	**2**	**13**	**28**	**-**	**-**	**380**	**420**	**800**

Student Contact Hours/Week   : 33   Total Credits: 28

Open Elective-II
U14OE 701A: Operations Research
U14OE 701B: Management Information Systems
U14OE 701C: Entrepreneurship Development
U14OE 701D: FOREX and Foreign Trade

Professional Elective-II
U14CS 704A: High Performance Computing
U14CS 704B: Digital Image Processing
U14CS 704C: Secure Software Engineering

Professional Elective-III
U14CS 705A: Soft Computing
U14CS 705B: Design Patterns
U14CS 705C: Human Computer Interaction

U14OE701 A   OPEARTIONS RESEARCH

Class: B.Tech. VII semester   **Branch:**   CE, ME and CSE

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: 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

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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 edn., 2013. (*Unit I,II,IV*)
2. S.S. Rao, "Optimization Techniques", *New Age International*, New Delhi, 3rd edn., 2013. (*Unit III*)

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

Course Learning Outcomes (COs):
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*

Class: B. Tech VII-Semester   **Branch:** Common to CE, ME, CSE

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: 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.

UNIT-IV (12)

Business processing Re-engineering (BPR): Introduction, Business process, Process model of the organization, Value stream model of the organization, What delays the business process, Relevance of information technology, MIS and BPR.

Decision support system and Knowledge management: Decision support systems (DSS) concepts and philosophy, DSS application in E-enterprise, Knowledge management, Knowledge management systems, Knowledge based expert system.

Enterprise management systems: Enterprise resource planning (ERP) systems, ERP model and modules, Benefits of the ERP, ERP product evaluation, ERP implementation, Supply chain management (SCM), Information management in SCM.

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

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

Course Learning Outcomes(COs):
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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U14OE 701C	**ENTREPRENEURSHIP DEVELOPMENT**	

Class: B. Tech. VII Semester **Branch:** CE, ME and CSE

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: 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(COs):
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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U14OE701D   FOREX & FOREIGN TRADE

Class: B.Tech. VII semester   **Branch:**   CE, ME and CSE

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

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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 14/e,* 2012.

2. M.L. Seth, "Macro Economics " *Lakshmi Narayan Agarwal, Publishers, New Delhi , 22/e* 2014.

3. M.C. Vaish, Ratan Prakashan Mandir, "Monetary Theory "*Vikas Publications, New Delhi 16/e,* 2014.

Reference Books:

1. Y.K.Bhushan, "Business Organization and Modern Management" *Sultan & Sons Publishers, New Delhi. 15/e,* 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, 1/e, Ludhiana*

COURSE LEARNING OUTCOMES (COs):
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*

U14CS702   MIDDLEWARE TECHNOLOGIES

Class: B. Tech VII-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: essentials of distributed object technologies
   LO2: fundamentals of socket programming
   LO3: enterprise java beans and CORBA technologies
   LO4: CORBA and DCOM services

UNIT I (9+3)

Distributed object technologies: Concept of distributed object systems, Reasons to distribute for centralized objects. Client-server system architecture, Multi tier system architectures. File Server, Database Server, Group Server, Object Server, Web Server

Middleware Technologies: General Middleware, Service Specific Middleware, Client/Server Building blocks – RPC - Messaging – Peer – to – Peer, Java RMI, Computing standards, OMG, Middleware types, Middleware in distributed Applications.

UNIT II (9+3)

Sockets: Address Structures, Value-Result arguments, Byte ordering, Byte manipulation functions - *inet_aton, inet_addr;* Byte address functions - *inet_ntoa, inet_pton*, *inet_ntop, sock_ntop.*

Elementary TCP Sockets: Socket functions, *connect* function, *bind* function, listen function, *accept* function, *fork* and *exec* functions, concurrent servers, *close* function, *getsockname* and *getpeername* functions.

TCP Client-server example: Normal startup, Termination, Handling SIGCHLD Signals, Connection Abort, Termination of Server processes, Crashing and Rebooting, Shutdown of Server host.

Unit III (9+3)

 EJB architecture: Overview of EJB software architecture, EJB Conversation, Building and Deploying EJBs, Roles, applications, EJB Session Beans, EJB entity beans, Lifecycle of Beans, EJB clients, Developing an application, Deployment.

CORBA: Introduction and concepts, distributed objects in CORBA, components, architectural features, method invocations, static and dynamic Inter face definition language models, CORBA's self describing data, interface repository, Building an application using CORBA,

UNIT IV (9+3)

CORBA Services: Overview of CORBA Services, Object location Services, Messaging Services, CORBA Component Model.

COM: Evolution of DCOM, Introduction to COM, COM clients and servers, COM IDL, COM Interfaces COM Threading Models, Marshalling, Custom and standard marshalling - Comparison COM and CORBA .

Text Books:
1. G. Sudha Sadasivam, Radha Shankarmani, "Middleware and Enterprise Integration Technologies", *first edition, Wiley*, ISBN: 9788126522903, 2009.
2. W.Richard Stevens, "UNIX NETWORK PROGRAMMING Networking APIs: Sockets and XTI, Volume 1", *Second edition, Pearson Education*, ISBN-81-203 2061-1, 2002. (Chapters 2,3,5)

Reference Books:
1. Jan Graba, An Introduction to Network Programming with Java, *Springer, First Edition,* ISBN-13: 978-1-84628-380-2.
2. Arno Puder, "Distributed Systems Architecture: A Middleware Approach", Morgan Kaufmann, *First Edition,* ISBN-13: 978-1558606487, 2005.

Course Learning Outcomes (COs):

Upon completion of this course, students will be able to…

    CO1: describe concepts of distributed object technologies
    CO2: design client-server applications using TCP sockets
    CO3: use enterprise java beans and CORBA technologies in application developments
    CO4: evaluate CORBA and DCOM services

U14CS703   CLOUD COMPUTING

Class: B. Tech VII-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
3	1	-	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: the concepts and fundamentals of cloud computing technology*
- *LO2: various cloud models and different services offered by cloud technology developments*
- *LO3: key components of cloud computing technology like cloud virtualization cloud storage and cloud platforms*
- *LO4: security related issues involved in 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, and 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 **a**pplication, 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 Books:
1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, "Mastering Cloud Computing", *Tata McGraw Hill, First 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, First Edition*, ISBN: 978-0-07-162695-8, 2010.
2. Barrie Sosinsky, "Cloud Computing Bible", *Wiley Publications*, *First Edition* ISBN: 978-0-470-90356-8, 2011.
3. Dr.Kumar Saurabh, "Cloud Computing Insights into New-Era Infrastructure", *Wiley India Publications, First Edition* ISBN: 978-81-265-2883-7, 2011.

Course Learning Outcomes (COs):
Upon completion of this course, students will be able to…
   CO1: assess the knowledge and the important role of cloud computing in the development of various applications
  CO2: describe the of various services offered in cloud computing
  CO3: summarize the knowledge of underlying technologies used in cloud computing
  CO4: identify the security related issues involved in cloud computing

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U14CS704A HIGH PERFORMANCE COMPUTING

<u>Class:</u> B.Tech. VII-Semester   <u>Branch:</u> Computer Science & Engineering

Teaching Scheme :

L	T	P	C
4	-	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…
 LO1: identifying the issues involved in Parallel Computing
 LO2: analyze parallel programs and message passing paradigms
 LO3: programming shared address space platforms, Open MP and Dense matrix algorithms
 LO4: GPU programming and heterogeneous computing with Open CL

UNIT-I (12)

Introduction to Parallel Computing: Importance of parallelism, scope of parallel computing.

Parallel Programming Platforms: Implicit parallelism, Limitations of memory system performance, control structure, communication model, physical organization, and communication costs in parallel machines, Routing mechanisms for interconnection networks, Impact of process-processor mapping and mapping techniques. **Principles of parallel algorithm design:** Preliminaries, decomposition techniques, characteristics of tasks and interactions, mapping techniques for load balancing, methods for reducing interaction overheads, parallel algorithm models.

UNIT-II (12)

Basic communication operations: One-to-all broadcast and all-to-one reduction, all-to-all broadcast and reduction, All-reduce and prefix-sum operations, scatter and gather, All-to-all personalized communication, circular shift and splitting routing messages in parts. **Analytical modeling of parallel programs:** sources of overhead in parallel programs, performance metrics for parallel systems, the effect of granularity on performance, scalability of parallel systems, minimum execution time and minimum cost-optimal execution time, asymptotic analysis of parallel programs. **Programming using message passing paradigm:** Principles of message-passing programming, building blocks, Message Passing Interface(MPI), Topologies and embedding, Overlapping communication with computation, collective communication and computation operations, Groups and communicators.

UNIT-III (12)

Programming shared address space platforms: Threads basics, need of threads, POSIX thread API, creation and termination of thread, Synchronization primitives, controlling thread and synchronization attributes, thread cancellation, Composite synchronization constructs, OpenMP-Threading building blocks, An overview of Memory Allocators, An overview of Intel Threading building blocks. **Sorting:** Sorting networks, Bubble sort, Quick sort, Bucket sort and other sorting algorithms**,** understanding Dense Matrix Algorithms and Graph algorithms with examples**.**

UNIT-IV (12)

Introduction to General-purpose GPU programming (CUDA): Brief History of GPUs, An Overview of GPU Programming, An Overview of GPU Memory Hierarchy Features, An Overview of CUDA and its architecture**,** Applications of CUDA, Introduction to CUDA C, Parallel Programming in CUDA C.

Introduction to Heterogeneous Computing – OpenCL, OpenCL Kernel, OpenCL memory model, OpenCL Execution Model, OpenCL Platform and Devices, OpenCL execution environment, Overview of OpenCL API, Heterogeneous Programming in OpenCL.

Text Books:
1. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, "Introduction to Parallel Computing" Second Edition, Pearson Education, ISBN-13: 978-0201648652, 2003. (Chapters: 1-10)
2. Jason Sanders, Edward Kandrot, "CUDA By Example – An Introduction to General Purpose GPU Programming", First Edition, Addison Wesley, ISBN-13: 978-0131387683, 2010. (Chapters: 1-4)

Reference Books:
1. Benedict R Gaster, Lee Howes, David R Kaeli Perhaad Mistry Dana Schaa, "Heterogeneous Computing with OpenCL", McGraw-Hill, Inc. Newyork, Second Edition, ISBN-13: 978-0124058941, 2012 (Chapters: 2)
2. Michael J. Quinn, "Parallel Programming in C with MPI and OpenMP", First Edition, McGraw-Hill Science, ISBN-13: 978-0072822564, 2003.

Course Learning Outcomes (COs):
Upon completion of this course, students will be able to…
  CO1: design and analyze the parallel algorithms for real world problems and implement them on available parallel computer systems
  CO2: optimize the performance of a parallel program to suit a particular hardware and software environment
  CO3: write Programs using accelerator technologies of GPUs with CUDA, OpenC.
  CO4: design algorithms suited for Multi-core processor systems using OpenCL, OpenMP, threading techniques

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U14CS704B   DIGITAL IMAGE PROCESSING

Class: B.Tech. VII-Semester   **Branch:** Computer Science & engineering

Teaching Scheme :

L	T	P	C
4	-	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…
    LO1: basic concepts, principles and methods of Digital Image Processing
    LO2: 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: concepts of Image Segmentation, Representation and Object identification techniques

<u>UNIT - I</u> (12)

Introduction: The origins of digital image processing, Fundamental steps in digital image processing, Components of an image are processing system.
Digital Image Fundamentals: Elements of visual perception. Light and the electromagnetic spectrum, Image sensing and acquisition, Image sampling and quantization, Basic relationships between pixels, An introduction to the mathematical tools used in digital image processing.

<u>UNIT - II</u> (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.

<u>UNIT - III</u> (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.

<u>UNIT - IV</u> (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 Books:
1. Rafael C. Gonzalez and Richard E. Woods "Digital Image Processing", *Prentice Hall, Third Edition,* ISBN-10: 013168728, ISBN-13: 9780131687288, 2010.

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

Course Learning Outcomes (COs):
Up on completion of this course, students will be able to…
 CO1: acquire the knowledge on fundamentals of Digital image processing including the topics of filtering, transforms, morphology, image analysis and compression
 CO2: apply and implement frequency domain and spatial domains filters for image smoothing and sharpening in MATLAB
 CO3: learn the Color image processing and apply Image Compression Techniques, Image Morphing Methods for digital images
 CO4: analyze the Image Segmentation, Representation and Object identification technique

U14CS704C SECURE SOFTWARE ENGINEERING

Class: B.Tech. VII- Semester   **Branch:** Computer Science & Engineering

Teaching Scheme :

L	T	P	C
4	-	-	4

Examination Scheme :

Continuous Internal Evaluation:	40 marks
End Semester Exam :	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on …
   LO1:specification and design of secure software
   LO2:secure software engineering practices
   LO3:testing security levels of an software
   LO4:managing secure software's

UNIT-I (12)

Software Security Issues: introduction, the problem, Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of Detecting Software Security, **Secure Software Properties:** Properties of Secure Software, Influencing the security properties of Software, Asserting and specifying the desired security properties.

UNIT-II (12)

Requirements engineering for secure software: Introduction, the SQUARE process Model, Requirements elicitation and prioritization, **Secure Software Architecture and Design:** Introduction, software security practices for architecture and design, Architectural risk analysis.

UNIT-III (12)

Knowledge for secure software design: security principles, security guidelines and attack patterns. **Secure coding and Testing:** Code analysis, Software Security testing, Security testing, Considerations throughput the SDLC.

UNIT –IV (12)

Secure Systems Assembling Challenges: introduction, security failures, functional and attacker perspectives for security analysis, system complexity drivers and security, **Managing Secure Software's:** Governance and security, Adopting an enterprise software security framework, Deciding how much security is enough, Security and project management, Maturity of Practices.

Text Books:
1. Julia H. Allen, Nancy R. Mead, Sean J. Barnum, Robert J. Ellison,Gary," Software Security Engineering: A Guide for Project Managers**,** *Addison Wesley, First Edition,* ISBN 978-0- 321-50917, 2004.

Reference books:

1. Jason Grembi, "Developing Secure Software", *Cengage Learning, First Edition***,** ISBN:9788131508886, 2009.
2. Richard Sinn, "Software Security ", *Cengage Learning, First Edition,* ISBN: 142831945X,2008.

Course Learning Outcomes (COs):
Upon completion of this course, the student will be able to…
    CO1:explain the specification and design of secure software
    CO2:adopt secure software practices for application development
    CO3:test security levels of an software
    CO4:mange security software's

U14CS705A   SOFT COMPUTING

<u>Class:</u> B.Tech. VII-Semester   **Branch:** Computer Science & Engineering

Teaching Scheme :

L	T	P	C
4	-	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…
    LO1: key aspects of soft computing and Genetic algorithm
    LO2: fuzzy logic components
    LO3: neural networks and its applications
    LO4: hybrid systems

<u>UNIT-I</u> (12)

Introduction to Soft Computing: Evolution of computing, Soft computing constituents and Conventional artificial intelligence, From conventional AI to computational intelligence, Soft computing characteristics.

 Introduction to and Genetic Algorithms: A Gentle introduction to genetic algorithms -What are Genetic algorithms, Robustness of traditional optimization and Search methods, The goals of optimization , How are Genetic algorithms Different from traditional methods, A simple Genetic algorithm ,Genetic algorithms at Work—a Simulation by hand, similarity templates (Schemata), Learning the lingo.

<u>UNIT-II</u> (12)

Fuzzy Logic: Fuzzy sets, Operations on fuzzy sets, Fuzzy relations, Membership functions, Fuzzy rules and Fuzzy reasoning, Fuzzy inference systems, Fuzzy Expert systems, Fuzzy decision making.

<u>UNIT-III</u> (12)

Neural Networks: Basic Concepts of neural networks, Model of artificial neuron ,Neural network architectures, Learning methods, Early neural   network architectures, Architecture of back propagation network ,Back propagation learning, Architecture of ART, Architecture of ART1, ART1 Algorithm, Architecture of ART2, ART2 algorithm, Support vector machines, Self organizing maps.

<u>UNIT-IV</u> (12)

Hybrid Systems: Hybrid systems-Sequential hybrid systems, Auxiliary Hybrid Systems, embedded Hybrid Systems,
Neural Networks, Fuzzy Logic and Genetic algorithm Hybrids: Neuro-Fuzzy Hybrids, Neuro-Genetic Hybrids, Fuzzy-Genetic Hybrids.
Preview of hybrid systems to be discussed: Genetic algorithm based Back propagation Network, Fuzzy-back propagation network, Simplified fuzzy, ARTMAP, Associative memory and Fuzzy associative memory, Fuzzy logic controlled Genetic algorithms.

Text Books:
1. Jyh – Shing Roger Jang, Chuen – Tsai Sun, Eiji Mizutani, "Neuro – Fuzzy and Soft Computing", *First Edition, Prentice – Hall of India*, ISBN:978-81-317-1109-5, 2008. (Chapter 1, 2, 3, 4)
2. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", *First Edition, Addison Wesley*, 2007,ISBN: 9780201157673. (Chapter 1)
3. S. Rajsekharan, Vijayalaxmi Pai , "Neural Networks, Fuzzy logic and Genetic Algorithms, Synthesis and applications ",*First Edition, PHI*, 2006,ISBN:81-203-2186-3. (Chapter 2, 3, 5 and 10)

Reference Books:
1. Simon Haykin ,"Neural Networks", *Second Edition, Pearson Education*, ISBN 81-7808-300-0, 2001.
2. Kwang H.Lee, "First course on Fuzzy Theory and Applications", *Springer , Verlag Berlin Heidelberg*, ISBN:978-3-540-22988-95, 2005.
3. B.Yegnanarayana," Artificial Neural Networks", *First Edition, Pentice-Hall India*, ISBN 81-203-1253-8,2003.

Course Learning Outcomes (COs):
Upon completion of this course, students will be able to…
  CO1:outline the concepts of soft computing and apply Genetic algorithms
  CO2:evaluate the Fuzzy systems
  CO3:analyze the neural network algorithms
  CO4: evaluate the hybrid systems

U14CS705B   DESIGN PATTERNS

Class: B.Tech. VII-Semester   **Branch:** Computer Science & Engineering

Teaching Scheme :

L	T	P	C
4	-	-	4

Examination Scheme :

Continuous Internal Evaluation:	40 marks
End Semester Exam:	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…
LO1:evolution of patterns
LO2:functionality to designs while minimizing complexity
LO3:specific design patterns used in programming languages with idioms and styles
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 Pattern: 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)

Conclusion: What to expect from design patterns, A brief history, The pattern community, An invitation, A parting thought, Programming world without design patterns, Asynchronous update approach, Polling mechanism, GUI usage in

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multiple observers, Object oriented development in design patterns, Risk associated with code changes, Value chain.

Text Books:
1. Erich Gamma, "Design Patterns", *Pearson Education, First Edition*, *ISBN*-10: 0-471-79854-*1*, 1995.

Reference Books:
1. Len Bass, Paul Clements & Rick Kazman, "Software Architecture in Practice", *Pearson Education, Second edition*, ISBN-10: 0321154959, 2003.
2. Jason Smith, "Elemental Design Patterns", *Addison Wesley, First Edition*, ISBN-13:9780321711922, 2012.
3. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal, "Pattern-Oriented Software Architecture: A System of Patterns", *John Wiley and Sons, First edition*, ISBN: 9780471958697, 1996.

Course Learning Outcomes (COs):
Upon completion of this course, the student will be able to….
    CO1: demonstrate the history of patterns development
    CO2 : apply the benefits of a patterns approach to programming design
    CO3: design patterns to improve the design of new and existing software
    CO4: verify different patterns so that they work together in a software design

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U14CS705C   HUMAN COMPUTER INTERACTION

Class: B.Tech. VII-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme :

L	T	P	C
4	-	-	4

Examination Scheme :

Continuous Internal Evaluation:	40 marks
End Semester Exam :	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…
  LO1:the concepts, terminology, facts and principles in Human Computer Interaction
  LO2:latest developments in interface technology
  LO3:effective interfaces for real-time applications
  LO4:purpose, and scope of testing the end product

UNIT-I (9+3)

Graphical user interface: Importance of user interface and definition, Benefits of good design, Goals of Interface, Popularity of graphics, Advantageous and disadvantageous of graphical system, Characteristics.
Web user interface: Popularity, Characteristics and principles of web user interface.
User interface design process: Principles of user interface design, Obstacles and pitfalls in the development path, Five-commandments, Usability assessment in design process, Common usability problems.

UNIT-II (9+3)

Understanding User: Understanding of people interaction with computers, Important human characteristics in design, Human considerations in design.
Understand the business functions: Business definition and requirements analysis, Determine basic business functions, Design standard style guides, Training and documentation needs, Understanding the principles of good screen design.

UNIT-III (9+3)

Menus and navigation schemes: Structures of menus, Functions of menus, Contents of menus, Formatting of menus, Phrasing the menus, Selecting menu choices, Navigating the menus.
Selecting the windows: Window characteristics, Components, Window presentation styles, Types of windows, Window management, Organizing window functions, Window operations and web systems, Providing effective feedback and guidance.

UNIT-IV (9+3)

Screen-based controls: Operable controls, Text entry controls, Selection controls, Other operable controls, Presentation controls.
Create meaningful graphics: Icons, Multimedia, Color usages, Choosing colors.

Usability testing: Purpose, Importance and scope, Kinds of tests, Developing and conducting the test.

Text Book:
1. Wilbert O Galitz, "The Essential Guide to User Interface Design", *Wiley Dream Tech, 2nd Edition,* ISBN: 0-471-084646, 2002.

Reference Books:
1. Alan Dix, Janet Fincay, Gre Goryd, Abowd and Russell Bealg, "Human Computer Interaction", *Pearson Education, 3rd Edition,* ISBN-13: 978-0130461094, 2003.
2. Jenny Preece, Yvonne Rogers and Helen Sharp, "Interaction Design: Beyond Human – Computer Interaction", *Wiley Dreamtech, 3rd Edition,* ISBN-13: 978-0470665763, 2007.
3. Soren Lauesen , "User Interface Design: A Software Engineering Perspective", *1st Edition, Addison Wesley*, ISBN 10: 0321181433, 2005.
4. Ben Shneiderman, "Designing the User Interface", *Pearson Education Asia, 3rd Edition,* ISBN-10: 0-201-69497-2, 1998.

Course Learning Outcomes (COs):
Upon completion of this course, the student will be able to…
    CO1:demonstrate terminology, principles and human computer interaction styles.
    CO2:analyze latest developments in interface development technology.
    CO3:acquire knowledge about selection of suitable menus, windows and navigation for client
        applications.
    CO4:develop the test cases and as well as test the end product before deliver to the client

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U14CS706 MIDDLEWARE TECHNOLOGIES LABORATORY

Class: B.Tech. VII-Semester   **Branch:** Computer Science & Engineering

Teaching Scheme :

L	T	P	C
-	-	3	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):
After completion of the course, the student will be able to….
   LO1: fundamentals of socket programming
   LO2: remote procedure call and remote method invocation
   LO3: enterprise java beans and CORBA technologies
   LO4: CORBA and DCOM services

List of Experiments

Experiment 1
 Implement the following client and server programs using UNIX socket Programming.
   a.) TCP Daytime client and server program using in built Daytime server program
   b.) Implement TCP Echo Client and Server Program

Experiment 2
Implement File Server from Server to Client, the Client passes File Name

Experiment 3
Implement the following client and server programs using Java Socket Programming.
   a) Implement the echo server
   b) Implement TCP Daytime server program

Experiment 4
   1. Implement Remote Procedure Call using Remote Command Execution
   2. Implement Directory Server Program

Experiment 5
Develop Remote Method Invocation (RMI) application to download various files from various servers

Experiment 6
   1. Develop an Enterprise Java Bean for Banking Operations.
   2. Develop an Enterprise Java Bean for Library Operations

Experiment 7
   1. Develop an Active- X control for File operations

Experiment 8
   1. Develop a component for converting the currency values using COM/. NET
   2. Develop a component for encryption and decryption using COM/. NET

Syllabi for B.Tech. Computer Science & Engineering – KITSW

Experiment 9

Develop a component for retrieving information from message box using DCOM/. NET

Experiment 10

Develop a middleware component for retrieving Stock Market Exchange information using CORBA

Experiment 11

Develop a middleware component for retrieving Weather Forecast information using CORBA.

Experiment 12

Create an application for converting case conversion using IDL

Lab Manual:

1. Lab manual on "Middleware technologies", *prepared by faculty of Department of Computer Science & Engineering, KITS-Warangal.*

Text Books:

1. G. Sudha Sadasivam, Radha Shankarmani, "Middleware and Enterprise Integration Technologies", *first edition, Wiley*, ISBN: 9788126522903, 2009.
2. W.Richard Stevens, "UNIX NETWORK PROGRAMMING Networking APIs: Sockets and XTI, Volume 1", *Second edition, Pearson Education*, ISBN-81-203 2061-1, 2002. (Chapters 2,3,5)

Course Learning Outcomes(COs):

Upon completion of this course, the student will be able to…

    CO1: implement client-server applications using TCP sockets
    CO2: develop distributed applications with remote method invocation methods
    CO3: use enterprise java beans and CORBA technologies in application developments
    CO4: evaluate CORBA and DCOM services based applications

U14CS707 OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

Class: B.Tech. VII-Semester   **Branch:** Computer Science & Engineering

Teaching Scheme :

L	T	P	C
-	-	3	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):
The course will develop student's knowledge in/on…
  LO1: use case documents that capture requirements for a software system
  LO2: class diagrams that model both the domain model and design model of a software system
  LO3: transforming a designed model into code through a mapping to an implementation language
  LO4: functions of each object-oriented analysis and design model using the UML case tools.

List of Experiments

Experiment-I:
Design Forward Engineer Class diagrams for the following.
  a. File System
  b. Spread Sheet
  c. Window Manager
  d. School Information System

Experiment-II:
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-III:
Construct Use case Diagrams for the following.
  a. Diagram Editor
  b. Library Information System
  c. Banking System
  d.Cab Dispatching System.

Experiment-IV:
Construct Sequence Diagrams for the following.
  a. Mobile Phone
  b. Use case student register for a course
  c. Diagram Editor.

Experiment-V:
Construct Collaboration Diagrams for the following.
  a. Use case Librarian issues books to student.
  b. Mobile Phone
  c. Diagram Editor.

Experiment-VI:
Construct Activity Diagrams for the following.
  a. ATM Transaction
  b.Ticket Machine
  c.Sales Order Processing.

Experiment-VII
Construct State Chart Diagrams for the following.
  a. Account
  b.CD Player
  c.ATM machine.

Experiment-VIII:
Case Study 1: Passport Automation System

Experiment-IX:
Case Study 2: Credit card processing

Experiment-X:
 Case Study 3: BPO management system

Experiment-XI
 Case Study 4: e-book management system.

Experiment-XII:
Case Study 5: Recruitment system.

Lab Manual:
1. Lab manual on "Object Oriented Analysis and Design", *prepared by faculty of Department of Computer Science & Engineering, KITS Warangal.*

Text Books:
 1. Grady Booch,   James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", *2nd Edition, Addison-Wesley Professional*, ISBN-13: 978-0321267979, 2005.

Course Learning Outcomes(COs):
Upon successful completion of this course, the students will be able to…
   CO1: explain basic object oriented concepts such as types, inheritance & interfaces
   CO2: implement Forward and Reverse Engineering Techniques.
   CO3: explain the facets of the Unified Process approach to designing and building a software
        system
   CO4: develop object oriented designs of software suing Unified Modeling Language

U14CS708 MAJOR PROJECT WORK PHASE-I

<u>**Class**</u>: B.Tech. VII-Semester   **Branch:** Computer Science & Engineering

Teaching Scheme :

L	T	P	C
-	-	7	4

Examination Scheme :

Continuous Internal Evaluation	100 marks
End Semester Exam	-

Course Learning Objectives (LOs):
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 (COs):
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
CO2: 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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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
COMPUTER SCIENCE & ENGINEERING

S. No.	Course Category	Course Code	Course Name	Periods/Week			Credits	Evaluation Scheme					
								CIE			ESE	Total Marks
				L	T	P		TA	MSE	Total		
1	HS	U14MH801	Management, Economics and Accountancy	3	1	-	4	15	25	40	60	100
2	PC	U14CS802	Software Testing and Quality Assurance	3	1	-	4	15	25	40	60	100
3	PE	U14CS803	Professional Elective-IV	4	-	-	4	15	25	40	60	100
4	PE	U14CS804	Professional Elective-V	4	-	-	4	15	25	40	60	100
5	PC	U14CS805	CASE Tools & Software Testing Laboratory	-	-	3	2	40	-	40	60	100
6	PC	U14CS806	Mobile Applications Development Laboratory	-	-	3	2	40	-	40	60	100
7	PR	U14CS807	Major Project Work *Phase- II*	-	-	13	7	40	-	40	60	100
			Total	14	2	19	27	-	-	280	420	700

Student Contact Hours/Week : 35   Total Credits : 27

Professional Elective-IV   **Professional Elective-V**

U14CS 803A: Big Data Management   U14CS 804A: E-Commerce
U14CS 803B: Information Retrieval Systems   U14CS 804B: Semantic Web and Social Networks
U14CS 803C: Natural Language Processing   U14CS 804C: Web Services

U14MH801   MANAGEMENT, ECONOMICS AND ACCOUNTANCY

Class: B. Tech VIII-Semester   **Branch:**   CE, ME & CSE

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop student's 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 Ed.,* 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 (COs):

Upon completion of this course, the students will be able to

CO 1: judge the differences between practical and theoretical management.
CO 2: associate an idea of Micro, Macro Economics and Forms of Business Organizations
CO 3 distinguish between Journal and Ledger.
CO 4: assess the profits and losses & financial position through the Balance Sheet.

U14CS802   SOFTWARE TESTING AND QUALITY ASSURANCE

Class: B. Tech VIII-Semester   **Branch:**   Computer Science & Engineering

Teaching Scheme:

L	T	P	C
3	1	-	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: practices that supports the production of quality software
LO2: various Software testing techniques
LO3: life-cycle models for requirements, defects, test cases, and test results
LO4: process models for units, integration, system, acceptance testing and different types of quality models

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UNIT-I (9+3)

Introduction: Software development life cycle, Role of testing, Verification and validation, Objectives and issues of testing, Testing activities and levels, Categories of testing-white-box and black-box testing, Test planning and design, Monitoring test execution, Measuring test execution, Test team organization and management.

Unit Testing: Concept of unit testing, Static unit testing**,** Defect prevention, Dynamic unit testing, Mutation testing, Debugging.

Control Flow Testing: Outline of control flow testing, Control flow graph, Paths in a control flow graph, Path selection criteria, All-path coverage criterion.

UNIT-II (9+3)

System Architecture: System architecture with sub-systems and components overview, Information modeling of system and DFD diagrams with examples, Data flow anomalies, Overview of dynamic data flow testing, Data flow graph, Data flow terms, Data flow testing criteria, Comparison of data flow test selection criteria, Feasible paths and test selection criteria.

Integration Testing: Concept of integration testing, Different types of interfaces and interface errors, Granularity of system integration testing, System integration techniques, Test plan for system integration.

System Tests: Basic tests, Functionality tests, Robustness tests, Interoperability tests, Performance tests, Scalability tests, Stress tests, Load and stability tests, Reliability tests, Regression tests, Documentation tests.

UNIT-III (9+3)

System Test Plan and Design: Structure of a system test plan, Test approach, Test design factors, Test case design effectiveness, Test execution strategy, Requirements identification, Characteristics of testable requirements, Preparedness to start system testing, Metrics for tracking system test, Beta testing, System test report , Measuring test effectiveness.

Acceptance Testing: Types of acceptance testing, Acceptance criteria, Selection of acceptance criteria, Acceptance test plan, Acceptance test execution, Acceptance test report.

UNIT-IV (9+3)

Software Quality: Five views of software quality, McCalls quality factors, Quality factors, Quality criteria, Relationship between quality factors and criteria, ISO 9126 quality

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characteristics, Quality metrics, ISO 9000:2000 software quality standard, ISO 9000:2000 fundamentals, ISO 9001:2000 requirements.

Software Quality Assurance: Quality planning and control, Quality improvement process, Evolution of software quality assurance (SQA), Major SQA activities.

Text Books:
1. Sagar Naik and Tripathy, "Software Testing and Quality Assurance: Theory and Practice", Wiley Spektrum, First Edition, ISBN-13: 978-0471789116, 2008.

Reference Books:
1. A. Roger Pressman, "Software Engineering Software Engineering: A Practitioner's Approach ", *McGraw Hill Higher Education, Sixth International Edition,* ISBN-13: 978-0071240833, 2004.
2. Jeff Tian, "Software Quality Engineering (SQE)", *Wiley-Blackwell, First Edition,* ISBN-13**:** 978-0471713456, 2005.

Course Learning Outcomes (COs):

Up on completion of the course, the student will able to…

   CO1: apply essential software engineering practices for development of quality software

   CO2: apply various software testing techniques component-wise, subsystem-wise, system- wise

   CO3: design and develop test cases for testing software

   CO4: assess and grade developed software based on the knowledge of software quality Models

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U14CS 803A   BIG DATA MANAGEMENT

Class: B.Tech VIII-Semester

Branch: Computer Science & Engineering

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 student's knowledge in/on…
LO1: essentials of Big data management and applications
LO2: data analytics and reporting
LO3: hadoop map reduce framework for developing Big data applications
LO4: big data applications capable with Hadoop distributed file system

UNIT I (12)

Introduction:, Velocity, Variety, Veracity, and Drivers for Big Data, Sophisticated consumers, Automation, Monetization.
Big Data Analytics Applications:Social Media command center, Product knowledge hub, Infrastructure and operations studies, Product selection, Design and engineering, Location-based services, Online advertising, Risk management.

UNIT II (12)

Architecture Components: Massively parallel processing platforms, **Unstructured Data Analytics and Reporting:** Search and count, Context-sensitive and domain-specific searches, Categories and ontology, Qualitative comparisons, Data privacy protection, Real-Time adaptive analytics and Decision engines.
Advanced Analytics Platform: Real-Time architecture for conversations, Orchestration and Synthesis using analytics engines, Entity resolution, Model management, Discovery using data at rest, Integration strategies.

UNIT III (12)

Map-Reduce: Introduction to Map-Reduce, Physical organization of compute nodes, Map tasks, Grouping by key, Reduce tasks, Combiners, Map-Reduce execution, Coping with node failures, Map-Reduce algorithm for matrix vector multiplication, Relational algebra operations with Map-Reduce.
Hadoop Map-Reduce: Introduction, Job tracker, Task tracker, Handling child task, Worker node and Job tracker failures, YARN.

UNIT IV (12)

Hadoop Distributed File System: Goals and motivations, Design, Reading and writing data, Managing file system metadata, Name node availability.
Apache Hadoop clusters: introduction Hadoop, Versions and features, Hardware selection, cluster sizing, Operating system selection and Preparation, FIFO.

Text Books:

1. Dr. Arvind Sathi, "Big Data Analytics:Disruptive Technologies for Changing the Game", *IBM Corporation, First Edition,* ISBN: 978-1-58347-380-1, 2012.
2. Eric Sammer, "Hadoop Operations", *O'Reilley, First Edition,* ISBN: 9350239264, 2012. (Chapters 3,4,5)

Reference Books:

1. Anand Rajarama, Jure Leskovec, Jeffrey D. Ullman. "Mining of Massive Datasets", *Prime, First Edition,* ISBN-13: 978-1107015357, 2013.
2. Tom White, "Hadoop: The Definitive Guide", O'Reilley, Third Edition, ISBN: 9350237563, 2012.

Course Learning Outcomes (COs):

Upon completion of this course, students will be able to ….

CO1: *understand advances of Big data Management and applications*

CO2: *analyze and report unstructured data*

CO3: *apply Hadoop Map reduce frame work for building Big data applications*

CO4: *design Big data applications capable of using Hadoop distributed file system*

U14CS 803B   INFORMATION RETRIEVAL SYSTEMS

Class: B.Tech. VIII-Semester   **Branch:** Computer Science & engineering

Teaching Scheme:

L	T	P	C
4	-	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

The course will develop student's knowledge in/on…

    LO1: essentials and impacts of information retrieval systems

    LO2: term frequency to design effective document retrieval systems

    LO3: advances in text classification algorithms

    LO4: web searching techniques in web based applications

UNIT-I (12)

Boolean Retrieval: Information retrieval problem, Building an inverted index, Processing Boolean queries.

Term Vocabulary and Postings Lists: Document delineation and Character sequence decoding, Steps to determining the vocabulary of terms, Positional postings and phrase queries.

Dictionaries and Tolerant Retrieval: Search structures for dictionaries, Wildcard queries, Spelling and phonetics correction.

Index Construction: Blocked sort-based indexing, Single-pass in-memory indexing, Distributed and dynamic indexing.

UNIT-II (12)

Scoring Term Weighting and Vector Space Model: Parametric and zone indexes, Term frequency and weighting, The vector space model for scoring.

Computing Scores in a Complete Search System: Efficient scoring and ranking, Components of an information retrieval system, Vector space scoring and query operator interaction.

Evaluation in Information Retrieval: Information retrieval system evaluation, Standard test collections, Evaluation of unranked retrieval sets and ranked retrieval results, Assessing relevance.

Relevance Feedback and Query Expansion: Relevance feedback and pseudo relevance feedback, Global methods for query reformulation.

UNIT-III (12)

Text Classification: Naive Bayes text classification, The Bernoulli model, Properties of Naïve-Bayes, Feature selection.

Vector Space Classification: Document representations and measures of relatedness in vector spaces, Rocchio classification, k-nearest neighbor, Linear versus nonlinear classifiers.

Support Vector Machine Learning on Documents: Support vector machines, Extensions to the SVM model, Issues in the classification of text documents, Machine learning methods in ad hoc information retrieval.

Language Models for Information Fetrieval: Language models, The query likelihood model, Extended language modeling approaches.

Web Search Basics: Web search characteristics, Advertising as the economic model, The search user experience, Index size and estimation.

Web Crawling and Indexes: Overview, Crawling, Distributing indexes, Connectivity servers.

Link Analysis: The Web as a graph, Page-Rank algorithm, Hubs and Authorities.

TEXT BOOKS:

1. Christopher D. Manning and Prabhakar Raghavan and Hinrich Schütze, "Introduction to Information Retrieval ", Cambridge University Press, 1st edition, ISBN 1139472100, 2008.

REFERENCE BOOKS:

1. Kowalski, Gerald, Mark T Maybury, "Information Storage and Retrieval Systems: Theory and Implementation", Springer, 1st edition, ISBN 0-972-37924-1, 2002.
2. Ricardo Baeza-Yates, Modern Information Retrieval, Pearson Education, 1st edition, ISBN 978-81-317-0977-1, 2007.
3. David A Grossman and Ophir Frieder, "Information Retrieval: Algorithms and Heuristics", Springer, 2nd Edition, ISBN 1-4020-3004-5, 2004.

Course Learning Outcomes (COs):

Upon completion of the course, the student will able to…

    CO1: demonstrate the knowledge on information retrieval systems and related concepts

    CO2: asses the techniques to compute, evaluate and index term frequency

    CO3: design effective document retrieval systems for real time applications

    CO4: analyze and improve the existing text classification algorithms

    CO5:develop web based application system with suitable search engines

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U14CS 803C   NATURAL LANGUAGE PROCESSING

Class: B.Tech. VIII-Semester   **Branch:** Computer Science & engineering

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: essentials of natural language processing
  LO2: language morphology and part of speech tagging
  LO3: syntax parsing and semantic analysis
  LO4: applications of natural language processing

UNIT-I (12)

Natural Language Processing (NLP): introduction, NLP tasks in syntax, semantics, and pragmatics, Issues, Applications, The role of machine learning, Probability Basics, Information theory, N-gram Language Models, Stimating parameters and smoothing, Evaluating language models.

UNIT-II (12)

Morphology and part of speech tagging: Linguistic essentials, Lexical syntax, Morphology and Finite state transducers, Part of speech tagging, Rule based part of speech tagging; Markov models - Hidden markov models, Transformation based models, Maximum entropy models, Conditional random fields.

UNIT-III (12)

Syntax parsing: Syntax Parsing, Grammar formalisms and treebanks, Parsing with Context Free Grammars (CFG), Features and Unification, Statistical parsing and probabilistic CFGs, Lexicalized PCFGs.
Semantic analysis: Representing meaning, Semantic analysis, Lexical semantics, Word sense disambiguation, Supervised, Dictionary based and Unsupervised Approaches.

UNIT-IV (12)

Compositional semantics: introduction, Semantic Role Labeling and Semantic Parsing, Discourse Analysis.
Applications: Named entity recognition and relation extraction- IE using sequence labeling- Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment-phrase-based translation – Question Answering

Text book:

1. Daniel Jurafsky and James H. Martin, "Speech and Language Processing", Prentice Hall, second edition, ISBN: 978-0131873216, 2008.

Reference books:

1. Steven Bird , Ewan Klein and Edward Loper, " Natural Language Processing with Python", O'Reilly Media, 1 edition, ISBN:978-0596516499, 2009.
2. Roland R. Hausser, " Foundations of Computational Linguistics: Human- C o m p u t e r Communication in Natural Language", MIT Press, first edition, ISBN: 978-3540424178, 2011.

Course Learning Outcomes (COs):

Upon completion of this course, students will be able to…

    CO1: describe the concepts of natural language processing

    CO2: apply the lexical analysis models for morphology and part of speech tagging

    CO3: develop the syntax and semantic parsing methods for language analysis

    CO4: evaluate the applications based on natural language processing

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U14CS 804A   E-COMMERCE

<u>**Class:**</u> B.Tech VIII-Semester   <u>**Branch:**</u>   Computer Science & Engineering

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: various types of e-commerce applications and the benefits & risks of using e-payment methods in E-Commerce applications
  LO2: inter organizational and intra organizational electronic commerce issues
  LO3: dimensions of inter e-commerce systems and marketing on the internet
  LO4: information Searching and retrieval in e-commerce application and digital video usage in e-commerce

UNIT – I (12)

Introduction to Electronic Commerce: Frame work, The Anatomy of E-Commerce applications, E-Commerce consumer applications, E-Commerce organization applications.
Consumer Oriented Electronic Commerce: Mercantile process models from the consumer's perspective and merchant's perspective.
Electronic Payment Systems: Digital token based, Smart cards, Credit cards, Risks in Electronic payment systems.

UNIT – II (12)

Inter Organizational Commerce and EDI: EDI, EDI applications in business, Legal, Security, Privacy issues in EDI, EDI software implementation, EDI envelope for message transport, Value added networks.
Intra Organizational Commerce: Internal information systems, Work flow automation, Customization and Internal commerce, Supply chain management.

UNIT- III (12)

Corporate Digital Library: Dimensions of internal E-Commerce systems, Document library, Digital document types, Issues behind document infrastructure, Corporate data warehouses.
Advertising and Marketing: Information based marketing, Advertising on the internet, On-line marketing process, Market research.
On-Demand Education: Technical components, Digital copyrights and E-Commerce.

UNIT – IV (12)

Consumer Search and Resource Discovery: Information search and retrieval, E-Commerce catalogs, Information filtering.
Multimedia and Digital Video: Key multimedia concepts, Digital video and Electronic commerce, Desktop video processing, Desktop video conferencing.

Text Books:
  1. Ravi Kalakota, Andrew B. Whinston, "Frontiers of Electronic Commerce", *Pearson Education, Eleventh Edition*, ISBN 978-81-7758-392-2, 2011.

Reference Books:
1. Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, "E-Commerce Fundamentals and Applications", *John Wiley, First Edition*, ISBN 978-81-265-1469-4, 2007.
2. Kenneth C. Laudon, Carol Guercio Traver, "E-commerce: Business, Technology, Society", *Pearson Education limited, First Edition*, ISBN 978-1-292-00909-4, 2014.
3. Efraim Turban, David King, Jae Lee, Ting-Peng Liang, Deborrah C. Turban, "Electronic Commerce 2012: A Managerial and Social Networks Perspective", *First Edition*, *Pearson Prentice Hall,* ISBN 978-0-132-14538-1, 2012.

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

CO1: *describe the major categories and trends of e-commerce applications with various electronic payment methods and associated security risks*

CO2: *manage the Inter organizational and intra organizational electronic commerce issues*

CO3: *analyze the issues in inter e-commerce systems and advertizing & marketing on internet*

CO4: *discuss several Information Searching and retrieval methods and digital video usage in e-commerce*

U14CS 804B   SEMANTIC WEB AND SOCIAL NETWORK ANALYSIS

<u>Class:</u> B.Tech. VIII-Semester   <u>Branch:</u> Computer Science & Engineering

Teaching Scheme:

L	T	P	C
4	-	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):
The course will develop student's knowledge in/on…
> *LO1: essentials and impacts of web intelligence*
> *LO2: evaluating ontological engineering and semantic web applications*
> *LO3: designing web based applications using advanced semantic searching techniques*
> *LO4: improving the existing social network analysis methods*

UNIT-I (12)

Web Intelligence: Thinking and intelligent web applications, The Information age ,The world wide web, Limitations of today's web, The next generation web, Berners-Lee WWW.
Semantic Web: Semantic road map, development of semantic web, Semantic web services, Logic on the semantic web, Web architecture and business logic, Software agents, Adaptive software.

UNIT-II (12)

Ontology Engineering: Introduction to Ontology, Constructing ontology, Ontology development tools, Ontology methods, Ontology libraries and ontology mapping.
Knowledge Representation for the Semantic Web: Ontologies and their role in the semantic web, Ontologies languages for the semantic web – resource description framework(RDF), RDF schema, Ontology web language(OWL).

UNIT-III (12)

Semantic Web Applications: Semantic web applications and services, Semantic search, e-learning, Semantic bioinformatics, Knowledge base, XML based web services, Creating an OWL-S ontology for web services.
Semantic Search Technology: Search engines, Semantic search, Semantic search technology, Web search agents, semantic methods, Latent semantic index search.

UNIT-IV (12)

Social Network Analysis: What is social networks analysis, Development of the social networks analysis.
Electronic sources for Network Analysis: Electronic discussion networks, Blogs and Online communities, Web based networks.
Modeling and Aggregating Social Network Data: State of the art in network data representation, Ontological representation of social individuals, Ontological representation of social relationships, Aggregating and reasoning the social network data, Building semantic Web applications with social network feature, Flink- social network case study.

Text Books:

1. H. Peter Alesso, Craig F. Smith, "Thinking on the Web: Berners-Lee, Gödel and Turing", Wiley-Blackwell, 1st Edition, ISBN-13: 978-0-471-76866-1, 2008.

2. Peter Mika, "Social Networks and the Semantic Web", Springer, 1st Edition, ISBN-13: 978-0-387-71000-6, 2007. (Chapters 2,3 and 5)

Reference Books:

1. Rudi Studer, Stephan Grimm, Andreas Abecker, "Semantic Web Services: Concepts, Technologies, and Applications", Springer, 2007 Edition, ISBN 978-3-540-70893-3, 2007.
2. Liyang Yu, "Semantic Web and Semantic Web Services", Chapman and Hall/CRC Publishers, 1st Edition, ISBN-13: 978-15848893 35, 2007.
3. Heiner Stuckenschmidt, Frank Van Harmelen, "Information Sharing on the Semantic Web", Springer Publications, 1st Edition, ISBN-13: 978-3642058233, 2010.
4. John Hebeler , Matthew Fisher , Ryan Blace , Andrew Perez-Lopez , Mike Dean, "Semantic Web Programming", Wiley, 1st Edition, ISBN: 047041801X, 2011.

Course Learning Outcomes (COs):
Up on completion of the course, the student will able to…
  CO1: demonstrate the knowledge on semantic web and related concepts
  CO2: adopt advances in ontological engineering and semantic web
  CO3: develop web based applications using advanced semantic searching techniques
  CO4: develop effective social network analysis systems

U14CS 805C   WEB SERVICES

<u>**Class:**</u> B.Tech. VIII-Semester   <u>**Branch:**</u> Computer Science & Engineering

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: web services and knowing about operational model of web services
  LO2: web services architectures and describing web services
  LO3: exposing the importance of messaging and service orientation concepts over web services
  LO4: service registries and service discovery

UNIT-I (12)

Evolution and Emergence of Web Services: Evolution of distributed computing. Core distributed computing technologies – Client/Server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).
Introduction to Web Services : The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

UNIT-II (12)

Web Service Architecture : Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services.
Describing Web Services : WSDL introduction, non functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

UNIT-III (12)

SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

UNIT-IV (12)

Registering and Discovering Services : The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services Notification.
SOA and web services security considerations: Network-level security mechanisms, Application-level security topologies, XML security standards, Semantics and Web Services.

TEXT BOOKS:
   1. P. Papazoglou, Michael, "Web Services & SOA Principles and Technology", Pearson , Second Edition, ISBN-10: 0273732161, 2012.

REFERENCE BOOKS:

1. R. Nagappan, R. Skoczylas, R.P. Sriganesh, "Developing Java Web Services", Wiley India, ISBN-13: 978-0471236405, 2002.
2. S. Chatterjee, J. Webber, "Developing Enterprise Web Services", Pearson Education, First Edition, ISBN: 0131401602, 2002.
3. F.P.Coyle, "XML, Web Services, and the Data Revolution", Pearson Education, First Edition, ISBN-13: 978-0201776416, 2002.

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

CO1: *acquire the knowledge of basic concepts of web services, challenges and benefits of it*

CO2: *know web services architecture and preparation of WSDL for describing web services*

CO3: *analyze message passing mechanism using SOAP envelop and provide definitions to SOA*

CO4: *implement service registries with the help of UDDI data model and knowing different security considerations in UDDI*

U14CS805   CASE TOOLS AND SOFTWARE TESTING LABORATORY

Class: B.Tech. VIII-Semester   **Branch:** Computer Science & Engineering

Teaching Scheme:

L	T	P	C
-	-	3	2

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
The course will develop student's knowledge in/on…
>   LO1: case tools for managing software development
>   LO2: planning the project and documenting software requirements
>   LO3: automated testing Tools for functional/regression testing
>   LO4: creating the test scripts for software testing

LIST OF EXPERIMENTS

Experiment – I:

   Introduction on various types of Case Tools(Project Management Tools, Process Modeling tools, Documentation Tools, Diagram Tools, Analysis Tools, Design Tools, Configuration Management Tools, Change Control Tools, Programming Tools , Prototyping Tools , Web Development Tools, Quality Assurance Tools , Maintenance Tools).

Experiment – II:

   Using Management tool (MS project), Plan the Software Project.

Experiment – III:

   Using Requirement documentation tool (RequisitePro), document Software requirements.

Experiment – IV:

   Using Configuration Management Tool, design Software process overview.

Experiment – V:

   a) Introduction to Test cases.
   b) Working with the Test Case Template.
   c) Write programs in "C" Language to demonstrate the working of constructs and write possible test cases
       i) do...while ii) while….do iii) if…else iv) switch v) for

Experiment – VI:
   a) Write the test cases for any known application (e.g. banking application).
 b) Take any system (e.g. ATM system) and study its system specifications and reporting the various bugs.

Experiment – VII:
   a) Create a test plan document for any application (e.g. Library Management System)
   b) Write the Functional test cases for Flight Reservation Application.

Experiment – VIII:
   a) Introduction to Automation Testing.
   b) Introduction to Win Runner 7.0.
    c) Working with GUI Spy and GUI map Editor.

Experiment – IX:
   a) Working with Recording Modes.
   b) Working with Checkpoints.

Experiment – X:
   Creating Data Driven Tests.

Experiment – XI:
   Creating Batch Tests.

Experiment – XII:
  Implement Data driven tests using data from
   * Data Tables
   * Excel Files
   * Text Files etc.,

Lab Manual:
   1. Lab manual on "Software Testing", *prepared by faculty of Department of CSE, KITS Warangal.*

TEXT BOOKS:
   1. Mercury Interactive, "WinRunner User's Guide Version 7.0", *Mercury Interactive, ISBN-13: 978-0971352193*, 2000

Course Learning Outcomes(COs):
   Upon completion of this course, students will be able to…
   CO1: use Case Tools to design blue print of the software
   CO2: plan the project and document elicited software requirements
   CO3: improve test efficiency automation
   CO4: become a good software Teste

U14CS806   MOBILE APPLICATION DEVELOPMENT LABORATORY

<u>**Class:**</u> B.Tech. VIII-Semester   <u>**Branch:**</u> Computer Science & Engineering

Teaching Scheme:

L	T	P	C
-	-	3	2

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: designing effective user interface required by mobile applications
   LO2: aspects of mobile application development and resource constraints
   LO3: mobile applications to access World Wide Web
   LO4: characteristics of mobile applications on the Android platform

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List of Experiments

Experiment-I
1. Installation of JAVA Wireless Toolkit (J2ME).
2. Write a J2ME program to show how to change the font size and colour.

Experiment-II
3. Write a J2ME program which creates the following kind of menu.
   (a)cut, (b)copy, (c)paste, (d)delete, (e)select all, (f)unselect all.
4. Create a J2ME which creates a Select Menu for Event Handling which has the
   following options.
  (a) Cut, Copy, Paste, Delete --can be on/off.
  (b) Select all –put all 4 options on.
  (c) Unselect all –put all.

Experiment-III
5. Create a slideshow which has three slides. Which includes only text? Program
   should change to the new slide after 5 seconds. After the third slide program
   returns to the First slide.
6. Create a MIDP application, which draws a bar graph to the display. Data values
   can be given at int[] array. You can enter four data (integer) values to the input
   text field.

Experiment-IV
7. Create a MIDP application, which examine, that a phone number, which a user
   has entered is in the given format (Input Checking).
   (a)Area code should be one of the following: 091, 040, 041, 050, and 0400,044
   (b)There should 6-8 numbers in telephone number (+area code).
8. Create a MIDP application, which shows to the user 5-10 quiz questions. All
   questions have 4 possible options and one right option exactly. Application counts
   and shows to the user how many right answers were right and shows them to
   user.

Experiment-V
9. Create a constructor and startApp method for the MIDlet.
10. Create a destroyApp method for the MIDlet and complete MIDlet program.

Experiment-VI

11. Write a sample program to show how to make a SOCKET Connection from J2ME phone. This J2ME sample program show how to make a SOCKET connection from a J2ME phone. Many times there is needed to connect a BACKEND HTTP server from the J2ME application. Show to make a SOCKET connection from the phone to port 80.

Experiment-VII

12. Login to HTTP Server from a J2ME program. This J2ME sample program shows how to display a sample LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server. Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program shows how a J2ME application can do authentication to the backend server.
     Note: Use Apache Tomcat Server as Web Server and MySQL as Database Server.

Experiment-VIII

13. The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well maintained database of the given domain. Mobile client is to be connected to the server and fetch the required data value/information.
    (a) Students Marks Enquiry.
    (b) Town/City Movie Enquiry.
    (c) Railway/Road/Air (for example PNR) Enquiry/Status.
    (d) Sports (say, Cricket) Update.
    (e) Town/City Whether Update.
    (f) Public Exams (say Intermediate or SSC)/Entrance (say EAMCET Results Enquiry.

Experiment-IX

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-X

17. Write an Android application program that demonstrates the following:
    (a)Linear Layout.
    (b)Relative Layout.
    (c)Table Layout.
    (d)Grid view Layout.

Experiment-XI

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-XII

20. Java Andorid Program to Demonstrate a Match Filter.
21. Java Android Program to Demonstrate a Transform Filter.

Lab Manual:

1. Lab manual,"Android base Mobile Application Development Laboratory", *prepared by Faculty of Department of CSE, KITS Warangal.*

Text Books:

1. Jeff Mcherter, Scott Gowell, Professional Mobile Application Development, *Wiley India Private Limited*, **ISBN-13:** 978-8126538249, 2012.

Course Learning Outcomes (COs):

Upon completion of this Lab, students will be able to…

    CO1: design and implement the user interfaces of mobile applications

    CO2: develop mobile applications that are aware of the resource constraints of the devices

    CO3: build, test and maintain mobile applications that accesses the world wide web

    CO4: adopt advances in Google Android development flatrom

U14CS807 MAJOR PROJECT WORK PHASE-II

<u>**Class:**</u> B.Tech. VIII-Semester   <u>**Branch:**</u> Computer Science & Engineering

Teaching Scheme:

L	T	P	C
-	-	13	7

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: 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 (COs):
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
   CO2: 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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