

118PHT03

ENGINEERING PHYSICS

L	T	P	C
2	0	0	2

Course objectives:

1. To understand the concept of properties of matter.
2. To understand the properties of sound and principles of quantization of energy.
3. To understand the properties of coherent light and its importance.

UNIT-I PROPERTIES OF MATTER

9

Elasticity – Stress – Strain diagram – Factors affecting elasticity – Twisting couple on a wire – Torsion pendulum – Young’s modulus - cantilever – Uniform and Non uniform bending (theory and experiment)–Viscosity-Poiseuille’s method for Coefficient of Viscosity (Qualitative).

UNIT-II ACOUSTICS AND ULTRASONICS

9

Classification of sound, loudness, intensity – Decibel – Weber Fechner Law – Reverberation and Reverberation time – derivation of Sabine’s formula for Reverberation time (Growth and Decay)– Absorption coefficient and its determination.

Introduction of Ultrasonics – Production – magnetostriction effect – magnetostriction generator – piezoelectric effect – piezoelectric generator – Detection of ultrasonic waves, properties – Cavitation – Applications – Depth of sea – Non Destructive Testing.

UNIT-III QUANTUM PHYSICS

9

Black body radiation – Planck’s theory (derivation) – Deduction of Wien’s displacement law and Rayleigh–jeans’ Law from Planck’s theory – Compton Effect–derivation– Matter waves – Schrödinger’s wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box – Degeneracy and Non-degeneracy.

UNIT-IV LASER

9

Introduction – Principle of Spontaneous emission and stimulated emission – Population inversion – pumping – Einstein’s A and B coefficients – derivation – Types of lasers – He-Ne, CO₂, Nd-YAG, Semiconductor lasers – homojunction – Applications of Laser.

UNIT-V WAVE OPTICS & FIBRE OPTICS

9

Interference – Air wedge (theory & experiment) – Polarization– Methods of polarizing light–Theory of plane circularly and elliptically polarized light.

Principle and propagation of light in optical fibers – Numerical aperture and Acceptance angle – Types of optical fibers (material, refractive index, and mode) – Fiber optical communication system (Block diagram) – Fiber optic sensors – Temperature & Displacement sensors (Qualitative).

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student will be able to

CO1: To understand properties of solids with different types of moduli and to gain knowledge about absorption coefficients of solids and different surfaces.

CO2: To understand basic concepts of high frequency sound waves and its applications.

CO3: To understand basic concepts of quantum mechanical behavior of wave and particle along with applications.

CO4: To understand the concepts of production of laser and its behavior with diffraction principle of interference.

CO5: To apply the concept of polarization phenomenon and thereby its applications in fiber optic communication.


Text Books:

1. R.K. Gaur and S.C. Gupta, 'Engineering Physics' Dhanpat Rai Publications, New Delhi (2003)
2. Jayaprakash R.N, 'Engineering Physics - I', Dhanam Publications, Chennai, (2007).

Books for reference:

1. R. Murugesan , Kiruthiga Sivaprasath , Modern Physics S. Chand publications 2016, New Delhi.
2. A. Ghatak Optics The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY 10020.
3. Dr.M.N.Avadhanulu, Introduction to Lasers: theory and applications S.Chand publications 2012, New Delhi.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	To understand properties of solids with different types of moduli and to gain knowledge about absorption coefficients of solids and different surfaces.	3	2	1	3									3		1
CO2	To understand basic concepts of high frequency sound waves and its applications.	3	2	1	3									3		1
CO3	To understand basic concepts of quantum mechanical behavior of wave and particle along with applications.	3	2		1									3		3
CO4	To understand the concepts of production of laser and its behavior with diffraction principle of interference.	3	2	2	2									3		2
CO5	To apply the concept of polarization phenomenon and thereby its applications in fiber optic communication.	3	2	1	1									3		2


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OBJECTIVE(S):

1. To know the basics of algorithmic problem solving
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures — lists, tuples, dictionaries.
6. To do input/output with files in Python.

Prerequisite: Nil**UNIT I ALGORITHMIC PROBLEM SOLVING****9**

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA, EXPRESSIONS, STATEMENTS**9**

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT III CONTROL FLOW, FUNCTIONS**9**

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV LISTS, TUPLES, DICTIONARIES**9**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, merge sort, histogram.

UNIT V FILES, MODULES, PACKAGES**9**

Files and exception: text files, reading and writing files, format operator; command line arguments, date and time, errors and exceptions, handling exceptions, debugging; modules, packages; Illustrative programs: word count, copy file.

TOTAL HOURS: 45 PERIODS**COURSE OUTCOMES:****Upon completion of the course, students will be able to**

- CO1:** Develop algorithmic solutions to simple computational problems
- CO2:** Read, write, execute by hand simple Python programs.
- CO3:** Structure simple Python programs for solving problems.
- CO4:** Decompose a Python program into functions.
- CO5:** Represent compound data using Python lists, tuples, dictionaries and
Read and write data from/to files in Python Programs.


TEXT BOOKS:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (<http://greenteapress.com/wp/think-python/>)
2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

REFERENCES:

1. John V Guttag, —Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press, 2013
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-Disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, —Exploring Python||, Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Kenneth A. Lambert, —Fundamentals of Python: First Programs||, CENGAGE Learning, 2012.
5. Charles Dierbach, —Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS 01	PS 02	PS 03
CO1	Develop algorithmic solutions to simple computational problems		3													
CO2	Read, write, execute by hand simple Python programs.					2							2	2		
CO3	Structure simple Python programs for solving problems.			3											3	
CO4	Decompose a Python program into functions.		2			3					2		1			
CO5	Represent compound data using Python lists, tuples, dictionaries and Read and write data from/to files in Python Programs.		1	3		2										3


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COURSE OBJECTIVES:

- To understand the practical concepts of Interference and diffraction.
- To understand the concept of velocities of sound in different liquids.
- To get better knowledge of modulus of elasticity.
- To understand the concepts of thermal conductivity.
- To understand the concepts of viscosities of liquid.

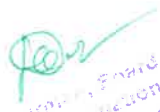
LIST OF EXPERIMENTS

1. (a) Determination of laser parameters – Wavelength.
(b) Particle size determination using Diode Laser.
2. Determination of thickness of a thin wire-Air wedge method.
3. Determination of velocity of sound and compressibility of liquid- Ultrasonic interferometer.
4. Determination of wavelength of mercury spectrum-Spectrometer grating.
5. Determination of thermal conductivity of a bad conductor-Lee's disc method.
6. Determination of Young's modulus of the material –Non uniform bending.
7. Determination of viscosity of liquid – Poiseuille's method.
8. Spectrometer- Dispersive power of prism.
9. Determination of Young's modulus of the material - Uniform bending.
10. Tensional pendulum- Determination of Rigidity modulus.

TOTAL HOURS: 45 PERIODS**COURSE OUTCOMES:****At the end of the course, the student will be able to**

- CO1:** Understanding the moduli of elasticity by determining Young's modulus and Rigidity modulus of a beam and cylinder respectively.
- CO2:** Understanding the phenomenon of diffraction, dispersion and interference of light using optical component
- CO3:** Acquiring knowledge of viscosity by determining coefficient of viscosity of a liquid and measuring the parameters of ultrasound propagating through a liquid
- CO4:** Understanding the phenomenon of heat transfer through conductors and bad conductors by determining thermal conductivity.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Understanding the moduli of elasticity by determining Young's modulus and Rigidity modulus of a beam and cylinder respectively.	3	3	3	3	3								3		3
CO2	Understanding the phenomenon of diffraction, dispersion and interference of light using optical component	3	3	3	3	3								3		3
CO3	Acquiring knowledge of viscosity by determining coefficient of viscosity of a liquid and measuring the parameters of ultrasound propagating through a liquid	3	3	3	3	3								3		3
CO4	Understanding the phenomenon of heat transfer through conductors and bad conductors by determining thermal conductivity.	3	3	3	3	3								3		3


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118PPP08

**PROBLEM SOLVING AND
PYTHON PROGRAMMING LABORATORY**

L	T	P	C
0	0	2	1

OBJECTIVE(S):

1. To write, test, and debug simple Python programs.
2. To implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python.

LIST OF PROGRAMS:

1. To Implement python scripts using Variables and operators
2. To Demonstrate Operator precedence to evaluate an expression
3. Display grade of a student using elif statement
4. Implement Floyd triangle using for loop
5. Checks the given number is prime or not using while loop
6. Compute the GCD of Numbers using functions
7. Finding factorial of a given number using recursive function.
8. Takes a list of words and returns the length of longest one using strings
9. To perform linear and binary search using strings
10. To implement list as arrays (multiply 2 matrices)
11. To demonstrate use of list & related functions
12. To demonstrate use of tuple, set& related functions
13. To demonstrate use of Dictionary& related functions
14. Finding most frequent words in a text read from a file
15. Programs that take command line arguments (word count)

PLATFORM NEEDED

Python 3 interpreter for Windows/Linux


TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

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

- CO1:** Write, test, and debug simple Python programs.
- CO2:** Implement Python programs with conditionals and loops.
- CO3:** Develop Python programs step-wise by defining functions and calling them.
- CO4:** Use Python lists, tuples, dictionaries for representing compound data.
- CO5:** Read and write data from/to files in Python.

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1 Write, test, and debug simple Python programs.		2													
CO2 Implement Python programs with conditionals and loops.			2		2							1	2		
CO3 Develop Python programs step-wise by defining functions and calling them.			3	2										3	
CO4 Use Python lists, tuples, dictionaries for representing compound data.		2			3					2		1			
CO5 Read and write data from/to files in Python.		1	3		2										1


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118ESE06

**BASIC ELECTRICAL ELECTRONICS AND INSTRUMENTATION
ENGINEERING**

L T P C
3 0 0 3

OBJECTIVES:

1. To learn the basics of electrical elements.
2. To introduce the fundamental concepts of DC and AC circuits.
3. To interpret the principle and characteristics of semiconductor devices.
4. To analyze the various logic gates and switching theory.
5. To understand the principles of measurement systems and transducers.

UNIT – I INTRODUCTION TO BASIC ELECTRICAL ELEMENTS

9

Electrical circuit: passive elements - Resistor, Inductor and Capacitor; active elements- Current, Voltage, Power and Energy – Ohm's Law and limitations - Kirchoff's Laws – relationship between current, voltage and power – Resistors in series, parallel and series -parallel circuits.

UNIT - II FUNDAMENTALS OF DC AND AC CIRCUITS

9

DC Circuits: Sources of Electrical Energy - Independent and Dependent Source, Source Conversion - Star –Delta conversion- Mesh and Nodal Analysis.

AC Circuits: Generation of sinusoidal - voltage, average - RMS value, form factor and peak factor- Phasor diagrams of R, L, C, combination of R-L, R-C and R-L-C circuits.

UNIT – III SEMICONDUCTOR DEVICES AND APPLICATIONS

9

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Elementary Treatment of Small Signal Amplifier.

UNIT – IV DIGITAL ELECTRONICS

9

Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops – Registers and Counters – A/D and D/A Conversion (single concepts).

UNIT – V MEASUREMENT SYSTEMS AND TRANSDUCERS

9

Measurements-Significance of Measurements-Methods of Measurement-Direct methods, indirect methods-Instrument and measurement systems-Mechanical, Electrical and Electronic instruments-Classification of instruments- characteristics of instruments and measurement systems-Errors-Type of Errors –Units and Standards. Moving coil and moving iron meters, Energy meter and watt meter. Transducers- RTD, Strain gauge, LVDT.


TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

Upon Completion of this course, students will be able to:

- CO1: Recognize the different combinations of circuit elements and solving the circuit by applying basic circuital laws.
- CO2: Acquire a good understanding of DC and AC circuits.
- CO3: Demonstrate the characteristics of semiconductor devices.
- CO4: Design the various logic gates for switching applications.
- CO5: Understand the principles of measurement systems and transducers.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Learn the concept of manufacturing methods encountered in engineering practice such as foundry and welding processes													2		
CO2	Know the working of internal combustion engines and the concept of sources of energy, working principle of refrigeration and air conditioning		2							1	2				2	
CO3	Recognize the different combinations of circuit elements and solving the circuit by applying basic circuit laws.	2										3			3	
CO4	Acquire a good understanding of DC and AC circuits.		3					2		1				2		
CO5	Understand the principles of measurement systems and transducers.		2											1	3	1


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OBJECTIVES:

1. To understand the graphical skills for drawing the object and the principle of free-hand sketching techniques.
2. To understand the principle of orthographic projection of points, lines and plane surfaces.
3. To study the principle of simple solids.
4. To understand the principle of section and development of solids.
5. To understand the principle of Isometric and Perspective projections.

Concepts and conventions (Not for Examination)

03

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES AND FREE HAND SKETCHING

15

Curves used in engineering practices:

Conics – Construction of ellipse, Parabola and hyperbola by Eccentricity method – Construction of cycloid – Construction of involutes of square and circle – Drawing of tangents and normal to the above curves. **Free hand sketching:**

Representation of Three Dimensional objects – General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES

15

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations – Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT III PROJECTION OF SOLIDS

15

Projection of simple solids like prisms, pyramids, cylinders and cones when the axis is inclined to one reference plane by change of position method.

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

15

Sectioning of simple solids like prisms, pyramids, cylinders and cones in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones

– Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS

12

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones.

Perspective projection of prisms, pyramids and cylinders by visual ray method.

TOTAL HOURS:45 PERIODS

Course Outcome		PS O1	PS O2	PS O3	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.	3			2	2		3			1			3	2	
CO2	Public awareness of environmental is at infant stage.	3				2		3						3	2	
CO3	Ignorance and incomplete knowledge has led to misconceptions	3	1					3						3	2	
CO4	Development and improvement in std. of living has led to serious environmental disasters	3		1	1			3						3	2	


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218CPT05

PROGRAMMING IN C

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions, pointers and structures
- To do input/output and file handling in C

UNIT-I BASICS OF C LANGUAGE

9

Introduction to C Programming – Fundamentals – Structure of a C Program – Compilation and Linking Processes – Constants, Variables – Data Types – Expressions Using Operators in C – Managing Input and Output Operations – Decision Making and Branching – Looping Statements – Solving Simple Scientific and Statistical Problems.

UNIT-II ARRAYS AND STRINGS

9

Arrays – Initialization – Declaration - One Dimensional and Two Dimensional Arrays - Strings- String Operations – String Arrays. Simple Programs - Sorting- Searching - Matrix Operations-Preprocessor Directives.

UNIT-III FUNCTIONS, STRUCTURES & UNIONS

9

Functions: Definition of function - Declaration of function - Pass by value - Pass by reference – Recursion. Structures and Unions: Introduction - Need for structure data type - Structure definition – Structure declaration - Structure within a structure - Union - Programs using Structures and Unions.

UNIT-IV POINTERS

9

Pointers: Definition – Initialization – Pointer Constant - Pointer Operators - Pointers Arithmetic - Pointer to an array: Pointers and one dimensional array -Pointers and Multi-Dimensional array - Pointer to Pointer - Void Pointer – Null Pointer - Pointer to Function - Pointer and Strings - Dynamic memory allocation.

UNIT-V STORAGE CLASSES AND FILES

9

Storage classes – auto, static, extern, and register- scope rules - Files: Introduction – Using files in C - Operations on files - Types of file processing: Sequential access, Random access - Sequential access file working with text files - File Handling Functions - Error handling - Command Line Arguments.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Develop simple applications in C basics
- CO2:** Design and implement applications using arrays and strings
- CO3:** Develop and implement applications in C using functions and structures.
- CO4:** Develop applications in C using pointers.
- CO5:** Design applications using sequential and random access file processing.

TEXT BOOKS:

1. Ashok.N.Kamthane,- “Computer Programming” , Pearson Education, Second edition (India), 2012.
2. E.Balagurusamy, - “Computing fundamentals and C Programming”, Tata McGraw-Hill Publishing Company Limited, 2008.

COURSE OUTCOMES:

The student will be able to

CO1: Recognize the conventions and apply dimensioning concepts while drafting simple objects.

CO2: Draw the orthographic projection of points, line, and plane surfaces.

CO3: Draw the orthographic projection of simple solids.

CO4: Draw the section of solid drawings and development of surfaces of the given objects.

CO5: apply the concepts of isometric and perspective projection in engineering practice.


TEXT BOOKS:

1. Ranganath G, Channankaiah and Halesh Koti, "Engineering Graphics", Second Edition, Sahana Publishers, 2015.
2. Bhatt. N.D., "Engineering Drawing" Charotar Publishing House, 53th Edition, 2014.

REFERENCE BOOKS:

1. Dhananjay A.Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw Hill Publishing Company Limited, 2017.
2. Gopalakrishnana. K. R, "Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.
3. Basant Agarwal and C.M.Agarwal, "Engineering Drawing", Tata McGraw Hill, 2013.
4. Natrajan K. V, "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2012.
5. M.B.Shaw and B.C.Rana, "Engineering Drawing", Pearson Education India, 2011.

Course Outcome	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PS	PS	PS	
	1	2	3	4	5	6	7	8	9	10	11	12	O1	O2	O3	
CO1 Recognize the conventions and apply dimensioning concepts while drafting simple objects.		2		1								1	1			1
CO2 Draw the orthographic projection of points, line, and plane surfaces.	2	1		1								1			2	
CO3 Draw the orthographic projection of simple solids.	2	2		2								1			3	
CO4 Draw the section of solid drawings and development of surfaces of the given objects.		1		2								2				2
CO5 Apply the concepts of isometric and perspective projection in engineering practice.	1	1	1									2				1


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OBJECTIVES:

1. To get the knowledge on welding techniques and its types.
2. To do the fitting operation on a given material. (Specimen)
3. To carry out sheet metal operation.
4. To know the principle involved in plumbing work.
5. To do the carpentry work on a given work piece.

LIST OF EXPERIMENTS WELDING:

Study of Electric Arc welding and Gas welding tools and equipment's.

Preparation of Arc welding and Gas welding models:

- i) Butt joint ii) Lap joint iii) T - joint.

FITTING:

Study of fitting tools and operations.

Preparation of fitting models: i) V-fitting ii) Square fitting

SHEET METAL WORK:

Study of sheet metal tools and operations

Preparation of sheet metal models: i) Rectangular Tray ii) Funnel

PLUMBING WORKS:

Study of pipeline joints and house hold fittings.

Preparation of plumbing models: Basic pipe connections with PVC and GI pipe fittings.

CARPENTRY:

Study of wooden joints and tools used in roofs, doors, windows, furniture.

Preparation of carpentry models:

- i) Lap joint ii) Dovetail joint iii) T-Joint DEMONSTRATION ON:

ELECTRICAL ENGINEERING PRACTICE

Study of Electrical components and equipment's

Residential house wiring using switches, fuse, indicator, lamp and energy meter.

ELECTRONICS ENGINEERING PRACTICE

Study of Electronic components –Resistor, color coding, capacitors etc

Soldering practice –components soldering in simple electric circuit &

testing continuity

COMPUTER HARDWARE AND SOFTWARE PRACTICE

Study of PC Hardware, Internet & World Wide Web and Productivity tools

including Word, Excel, Power Point and Publisher.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

The students will be able to

- CO1:** Prepare simple Lap, Butt and T- joints using arc welding equipment's.
- CO2:** Prepare the rectangular trays and funnels by conducting sheet metal operation.
- CO3:** Prepare the pipe connections and identify the various components used in plumbing.
- CO4:** Prepare simple wooden joints using wood working tools.
- CO5:** Demonstrate basic electrical, electronic and computer components based on their physical parameters and dimensions.

Course Outcome		PS O1	PS O2	PS O3	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	Carry out the volumetric experiments and improve the analytical skills.		3	3	3								3	3		3
CO2	Understand the maintenance and usage of analytical instruments and thereby develop their skills in the field of engineering.		2	3	2	2							2	3	3	3
CO3	Understand the principle and handling of electrochemical instruments and Spectrophotometer.		2	3	2								2	3	3	3
CO4	Apply their knowledge for protection of different metals from corrosion by using different inhibitors		2	3	2	3					2		2	3		3


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OBJECTIVE(S):

- To develop C programs using conditional and looping statements
- To expertise in arrays and strings
- To build modular programs

Prerequisite: Programming in C

LIST OF EXPERIMENTS:

1. Programs using I/O statements and expressions.
2. Programs using decision-making statements.
3. Programs using looping statements
4. Programs using 1-D and 2-D array.
5. Programs for scientific and statistical problem.
6. Programs using string functions
7. Programs using user defined functions.
8. Programs using Recursion and call by value and call by reference
9. Program to sort the list of numbers using pass by reference.
10. Programs using structures and Union.
11. Program using structures and pointers.
12. Program using i) Sequential access file.
ii) Random access file.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students will be able to:

CO1: Write and compile programs using C- Language.

CO2: Develop programs in C for any computing problems

CO3: Implement program using control statements.

CO4: Handle arrays and strings.

CO5: Develop C programs involving functions, recursion, pointers, and structures.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Write and compile programs using C- Language.	3	3							3	3			3	3	3
CO2	Develop programs in C for any computing problems	3	3							3	3			3	3	3
CO3	Implement program using control statements.	3	3							3				3	2	
CO4	Handle arrays and strings.	3	3					2		3				2	1	
CO5	Develop C programs involving functions, recursion, pointers, and structures.	3	2							3	3			2	3	3


TEXT BOOKS:

1. Ranganath. G & Channankaiah, "Engineering Practices Laboratory Manual", S.S. Publishers, 2014.
2. Jeyapooan.T & Gowri S "Engineering Practice Lab Manual", Vikas publishing house pvt.ltd, 2016.

REFERENCE BOOKS:

1. Kannaiah.P & Narayana.K.L, "Manual on Workshop Practice", Scitech Publications, 2015.
2. Ramesh BabuV, "Engineering Practices Laboratory Manual", VRB Publishers Private Limited, Chennai, Revised Edition, 2014.
3. Peter Norton, "Introduction to Computers", 7th Edition, Mc Graw Hill, 2010.
4. Bawa. H.S, "Workshop Practice", Tata McGraw – Hill Publishing Company Limited, 2009.
5. David Anfinson and Ken Quamme, "IT Essentials PC Hardware and Software Companion Guide", CISCO Press, Pearson Education, Third Edition, 2008.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Prepare simple Lap, Butt and T- joints using arc welding equipment.	3								3	3			3	3	3
CO2	Prepare the rectangular trays and funnels by conducting sheet metal operation.	2	2							2	3	3		2	3	3
CO3	Prepare the pipe connections and identify the various components used in plumbing.	2								2	3	3		2	3	3
CO4	Prepare simple wooden joints using wood working tools.	2	3					2		2	3			2	3	3
CO5	Demonstrate basic electrical, electronic and computer components based on their physical parameters and dimensions.	3	2							3	3	2		1	3	3


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OBJECTIVES:

1. To study the basic theory of structure of crystalline materials.
2. To understand the essential principles of electrical properties of materials.
3. To get the better knowledge of Physics of semiconductor materials.
4. Become proficient in optical properties of materials.
5. To understand the essential concepts of quantum structures and their applications

UNIT I CRYSTALLOGRAPHY

9

Crystal structures- Parameters- Bravais lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number - Packing factor for SC, BCC, FCC, HCP and Diamond cubic structure - NaCl, ZnS structures (qualitative). Miller indices- unit cell approach.

UNIT II ELECTRICAL PROPERTIES OF MATERIALS

9

Classical free electron theory-Expression for electrical conductivity-Thermal conductivity, Expression-Wiedemann-Franz law-Success and failures-Quantum free electron theory-Particle in a finite potential well-Tunneling-Particle in a three dimensional box-degenerate States-Fermi-Dirac statistics-Density of energy states-Energy bands in solids.

UNIT III SEMICONDUCTORS AND TRANSPORT PHYSICS

9

Intrinsic Semiconductors-Energy band diagram-direct and indirect band gap semiconductors - Carrier concentration in intrinsic semiconductors-extrinsic semiconductors-Carrier concentration in N-type & P-type semiconductors (qualitative) -Variation of carrier concentration with temperature -Hall effect and devices-Ohmic contacts-Schottky diode.

UNIT IV OPTICAL PROPERTIES OF MATERIALS

9

Classification of optical materials - Absorption emission and scattering of light in metals, insulators and semiconductors (concepts only) – photo current in a P-N diode – solar cell – LED –Organic LED – Laser diodes – Optical data storage techniques.

UNIT V QUANTUM DEVICES

9

Particle in a rectangular box and sphere: wave function and energy- quantum confinement-quantum structures- tunneling – single electron phenomena- single electron transistor states-classical bits- multiple qubits-block sphere- quantum gates-advantage of quantum computation.

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:**

At the end of the course, the students will able to

- CO1:** Have the necessary understanding on the functioning of crystalline in solids of materials.
- CO2:** Gain knowledge on classical and quantum electron theories, and energy band structures,
- CO3:** Acquire knowledge on basics of semiconductor physics and its applications in various devices,
- CO4:** Have the necessary understanding on the functioning of optical materials for optoelectronics,
- CO5:** Understand the basics of quantum structures and their applications.

REFERENCE BOOKS:

1. Pradip Dey, Manas Ghosh, -“Programming in C”, Oxford University Press, 2012.
2. Byron Gottfried, - “Programming with C”, 2nd Edition, (Indian Adapted Edition), TMH Publications, 2010.
3. Stephen G.Kochan, - “Programming in C”, 4th Edition, Pearson Education India, 2015.
4. Brian W.Kernighan and Dennis M.Ritchie, -“The C Programming Language”, Pearson Education Inc., 2005.
5. Behrouz A.Forouzan and Richard.F.Gilberg, - “Computer Science A Structured Programming Approach using C” 3rd Edition, Cengage Publications, 2013

Course Outcome		PS O1	PS O2	PS O3	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Co1	Develop simple applications in C basics		3	3	3								3	3		3
Co2	Design and implement applications using arrays and strings		2	3	2	2							2	3	3	3
Co3	Develop and implement applications in C using functions and structures.		2	3	2								2	3	3	3
Co4	Develop applications in C using pointers.		2	3	2	3					2		2	3		3
Co5	Design applications using sequential and random access file processing.		1	3	3	2							3	3	2	3


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315GET02

ENVIRONMENTAL SCIENCE AND SUSTAINABILITY

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OBJECTIVE(S):

The student should be conversant with the evolution of environmentalism and the importance of environmental studies, various natural resources and the current threats to their sustainability, significance and protection of bio diversity and various forms of environmental degradation and international conventions and protocols for the protection of environment and concept of sustainability.

UNIT-I INTRODUCTION TO ENVIRONMENT AND ECOSYSTEM

9

Definition, scope and importance of environment – need for public awareness. Atmosphere – composition of atmosphere (troposphere, stratosphere, mesosphere and thermosphere) Biosphere – Hydrosphere – Lithosphere. Concept of ecosystem – structure and functions of ecosystem- producers, consumers and decomposers - Energy flow –Ecological succession-Food chains-Food webs- Ecological pyramids-Introduction, types, characteristic features -structures and function of forest, grassland and aquatic ecosystems (ponds and rivers) - Case Studies in current scenario.

UNIT-II NATURAL RESOURCES AND BIODIVERSITY

9

Forest resources - Water resources - Mineral resources - Food resources - Energy resources - Land resources. Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographically classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNIT-III ENVIRONMENTAL POLLUTION

9

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV SOCIAL ISSUES, HUMAN POPULATION AND THE ENVIRONMENT

9

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies role of non-governmental organization environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – Wasteland reclamation – consumerism and waste products – environment protection act –environmental legislation- central and state pollution control boards.

UNIT-V CONCEPT OF SUSTAINABLE DEVELOPMENT

9

Definition of sustainability -Components of sustainability History and emergence of the concept of sustainable development – Our Common Future - Objectives of Sustainable Development - Millennium Development Goals - Environment and Development linkages – Globalization and environment -Sustainability indicators-Hurdles to Sustainability.

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student should be able to:

- CO1: Understand & appropriate the structure of ecosystem and its impact on environment.
- CO2: Understand the various natural resources and biodiversity.
- CO3: Recognize the environmental problems caused due to pollution.
- CO4: Understand the concept of sustainable development.

TEXT BOOKS:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw- Hill, New Delhi, (2006).

REFERENCE BOOKS:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005)

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Understand & appropriate the structure of ecosystem and its impact on environment.	2	2		3			1			3	2	3			2
CO2	Understand the various natural resources and biodiversity.		2		3						3	2	3		2	
CO3	Recognize the environmental problems caused due to pollution.				3						3	2	3	1		
CO4	Understand the concept of sustainable development.	1			3						3	2	3		1	


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OBJECTIVE(S):

- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits.
- To introduce the concept of memories and programmable logic devices.
- To illustrate the concept of synchronous and asynchronous sequential circuits.

Prerequisites: Nil

UNIT-I BOOLEAN ALGEBRA AND LOGIC GATES

9

Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Logic gates.

UNIT-II COMBINATIONAL LOGIC

9

Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations – Code conversion - Decoders and encoders - Multiplexers and Demultiplexers–Comparator.

UNIT-III SYNCHRONOUS AND ASYNCHRONOUS SEQUENTIAL LOGIC

9

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Hazards-Hazard free realizations.

UNIT-IV PROGRAMMABLE LOGIC DEVICES, MEMORY AND LOGIC FAMILIES

9

Memories: ROM, PROM, EPROM, PLA, PLD, FPGA, Introduction to Flash Memory. Digital Logic Families: TTL, ECL, CMOS.

UNIT-V VHDL

9

VHDL program structure-operators-Data flow modeling-Design of combinational and sequential circuits (Examples: Adders, subtractors, multiplexers/Demultiplexers, Encoder/Decoder, FFs,Counters).

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the student should be able to:

- CO1:** Solve the Postulates of Boolean algebra using different techniques.
CO2: Design the Combinational and sequential circuits.
CO3: Apply the concept of synchronous and asynchronous circuit.
CO4: Knowledge in VHDL for VLSI Design.

TEXT BOOK:

1. M.Morris Mano, "Digital Design", 3rd Edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House, Latest Edition.
2. Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill, 2007.
3. Charles H.Roth,Lizy Kurian John,"Digital System Design using VHDL"2nd edition PWS Publishing Company, 2008.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Solve the Postulates of Boolean algebra using different techniques	3		2										1		
CO2	Design the Combinational and sequential circuits		2	3											2	
CO3	Apply the concept of synchronous and asynchronous circuit	3	3			3									3	
CO4	Knowledge in VHDL for VLSI Design		2				2									

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OBJECTIVE(S):

- To solve problems using linear and non linear data structures.
- To understand the fundamentals of algorithm analysis.
- To have a comprehensive knowledge of various algorithm design techniques.

Prerequisite: Fundamentals of Computing and C Programming

UNIT-I LINEAR STRUCTURES

9

Abstract Data Types (ADT) – List ADT – Array-based implementation – Linked list implementation – Cursor-based linked lists – Doubly-linked lists – Applications of lists Stack ADT – Queue ADT – Circular queue implementation – Applications of stacks and queues.

UNIT-II NON-LINEAR STRUCTURES

9

Tree – Tree traversals – Left child right sibling data structures for general trees – Binary Tree ADT – expression trees – Applications of trees – Binary search tree ADT – AVL trees – B+ Tree - Binary heaps Graph-Definitions – Topological sort-breadth and depth first traversal - Shortest-path algorithms minimum spanning tree – Prim's and Kruskal's algorithms – Applications of graphs.

UNIT-III SORTING AND SEARCHING

9

Internal Sorting – Bubble sort, Insertion sort, Shell sort, Selection and Merge sort - External Sorting. Comparison of Sorting algorithms - Linear and Binary search, Hashing – Separate chaining – Open addressing – Rehashing – Extendible hashing.

UNIT-IV BASICS OF ALGORITHM ANALYSIS

9

Introduction - Notion of Algorithm – Fundamentals of Algorithmic Problem Solving - Fundamentals of the Analysis of algorithm Efficiency - Measuring an input's size - Units for Measuring Running Time - Orders of growth – Worst-case, Best-case and Average - Case efficiencies - Asymptotic notations and basic efficiency classes.

UNIT-V ALGORITHM DESIGN TECHNIQUES

9

Introduction to algorithm design techniques: Greedy algorithms - Huffman's Tree, Divide and conquer – Quick sort - Dynamic programming – Warshall's and Floyd's Algorithms, Backtracking – n Queens Problem - Branch and bound-Travelling Salesman Problem - P, NP and NP complete Problems.

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Identify an appropriate data structures for a given problem.
- CO2:** Implement the different Hashing, searching and sorting techniques.
- CO3:** Enhance the capability in complexity analysis.
- CO4:** Apply various algorithm design techniques for a given problem.

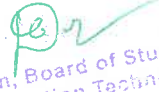
TEXT BOOKS:

1. M.A. Weiss, "Data Structures and algorithm analysis in C", Second Edition, Pearson Education Asia, 2008.
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Second Edition, Pearson Education, New Delhi, 2005.

REFERENCE BOOKS:

1. Richard F.Gilberg and Vohrouz A.Forouzan, "Data Structures: A Pseudo code Approach with C", Thomson Brooks / COLE, 1998.
2. A.V.Aho, J.E.Hopcroft and J.D.Ullman,"Data structures and Algorithms", Addison-Wesley Publishing Company, 2010.
3. Aaron M.Tanaenbaum, YedidiahLangsam, Moshe J. Augenstein "Data Structures using C" , Prentice Hall of India, 2007.
4. Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, "Fundamentals of Computer Algorithm", Second Edition, Galgotia Publications, New Delhi, 2003.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Identify an appropriate data structures for a given problem	3	3	3	2									3	2	
CO2	Implement the different Hashing, searching and sorting techniques	3	3	2	2										3	
CO3	Enhance the capability in complexity analysis		3	3										2		
CO4	Apply various algorithm design techniques for a given problem		2	3	3										3	


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OBJECTIVE(S):

- To learn the basic syntax and semantics of the Java language and programming environment.
- To understand error handling and multithreading concepts in java.
- Have the ability to write a simple GUI programs with Applet & Swing.
- Be aware of the importance of Utility Classes & Generic Classes.

Prerequisite: Object Oriented Programming**UNIT –I BASIC CONCEPTS OF JAVA 9**

Introduction to Java - Features of Java - Difference between C++ and Java - Class fundamentals - Declaring Objects- Object Reference Variables - Data Types – operators - Control Statements - Introducing methods - Constructors – Input & Output - Type Conversions and Casting – Arrays - Command line arguments - This keyword – Polymorphism- Inheritance – Interfaces-static variables and methods - Final class and methods.

UNIT-II PACKAGES & EXCEPTION HANDLING 9

Abstract class and methods - Nested classes - Inner classes -Packages - Importing a Packages - Exception Handling: Exception Types - Uncaught Exceptions - Using Try Catch - Multiple Catch - Nested Try – throw – Throws - finally - Built in Exceptions - User defined Exceptions - Introduction to Wrapper classes.

UNIT – III MULTITHREADING&STRING HANDLING 9

Adapter classes - Thread Model - Synchronization – Interthread communication – String Handling: String functions - String class methods - Special String Operations - Character Extraction - String Comparison - Modifying a String - String Buffer - Introduction to Collection Framework: Collection Object & Classes

UNIT-IV DATABASE CONNECTIVITY, APPLLET & SWING 9

Accessing database using JDBC - Applet Architecture- Applet Life cycle-Simple Applet - Introduction to Swings – JFrame – JLabels - JButtons – JComboBox - Event Handling: Event Delegation Model - Event Classes – Event Listener Interface.

UNIT-V UTILITY CLASSES & GENERIC CLASSES 9

Utility Classes: String Tokenizer – BitSet – Date - Calendar - Gregorian – Random- Streams and Files –Byte stream - Character Streams - Stream I/O - Serialization-Generic Class- Generic Method - Generic Interface.

TOTAL HOURS: 45 PERIODS**COURSE OUTCOMES:**

Upon successful completion of this course, students should be able to:

- CO1: Create a real-world application by applying the user defined packages, interfaces.
- CO2: Implement multithreading concepts in real time scenarios.
- CO3: Design a GUI-based application using Applets &Swings.
- CO4: Understand the usage of Utility & Generic Classes.


TEXT BOOKS:

1. R.NageswaraRao, "Core Java An Integrated Approach(Includes all versions JAVA 8)", Dream tech Press, ISBN:978-8177228366,2013
2. C.Xavier, "Java Programming", 1st Edition, McGraw Hill Education, 2011.

REFERENCE BOOKS:

1. Shirish Chavan, "Java for Beginners", 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd,ISBN: 9789350237557, 2012
2. Kathy Sierra, Bert Bates, "Head First Java", 2nd Edition, O'Reilly Media, 2005
3. H. Schildt, "Java: The complete Reference", 9th Edition, TataMcGrawHill, 2014.
4. Paul Deitel, Harvey Deitel, "Java How to Program", 10th Edition, Pearson Education, 2016.
5. Cay S. Horstmann, "Core Java: Volume I- Fundamentals", 10th Edition, Prentice Hall, 2015.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Create a real-world application by applying the user defined packages, interfaces	3	3	3										3		
CO2	Implement multithreading concepts in real time scenarios	3	2	3	3	3	3							3	3	
CO3	Design a GUI-based application using Applets &Swings	3	1	3	2		2									
CO4	Understand the usage of Utility & Generic Classes	3	3	3	3			3							3	3


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OBJECTIVE(S):

- To have insight into the basic structure of computers.
- To understand the design and organization of computer systems.
- To comprehend the importance of the memory and I/O organization.
- To familiarize basic concepts of Parallelism.

Pre requisite: Fundamentals of Computing & C Programming

UNIT-I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Performance - Memory Locations and Addresses – Instructions and instruction sequencing - Addressing modes – Basic I / O Operations – Stacks and Queues – Sub routines.

UNIT-II COMPUTER ARITHMETIC AND CONTROL UNIT 9

Addition and Subtraction of Signed Numbers – Design of Fast Adders – Multiplication of Positive Numbers – Signed Operand Multiplication and Fast Multiplication – Integer Division - Floating point Numbers and operations - Control Units - Fundamental concepts – Execution of a complete instruction – Hardwired control – Micro programmed control.

UNIT-III PIPELINING 9

Basic concepts – Data hazards – Instruction hazards - Unconditional branches – Conditional branches – Branch Prediction – Influence on instruction sets – Data path and control considerations - Super scalar operations – Performance considerations.

UNIT-IV MEMORY & I/O ORGANIZATION 9

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Accessing I/O devices – Interrupts – Direct Memory Access – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

UNIT-V PARALLELISM 9

ILP – Concepts & Challenges – Compiler Techniques – Reducing branch costs – Dynamic scheduling - Parallel Processing and Performance - Hardware Multithreading - Vector (SIMD) Processing - Shared-Memory Multiprocessors - Cache Coherence - Message-Passing Multi computers - Parallel Programming for Multiprocessors - Performance Modeling.

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

At the end of the course the student will be able to

- CO1:** Understand Basic operational concepts and design of ALU of Digital Computer.
- CO2:** Design and analyze the performance of pipelined control unit.
- CO3:** Understand memory hierarchy and I/O Organization.
- CO4:** Perceive knowledge on Instruction Level Parallelism and Parallel Processing.

TEXT BOOKS:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky & Naraig Manjikian- "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.
2. John L. Hennessey and David A. Patterson, - "Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.

REFERENCE BOOKS:

1. David A. Patterson and John L. Hennessy, -" Computer Organization and Design: The Hardware / Software interface", Third Edition, Elsevier, 2005.
2. William Stallings, - "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.
3. John P. Hayes, - "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.
4. V.P. Heuring, H.F. Jordan, - "Computer Systems Design and Architecture", Second Edition, Pearson Education, 2004.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Understand Basic operational concepts and design of ALU of Digital Computer	3	3	2										3		
CO2	Design and analyze the performance of pipelined control unit	2	3	3	2										3	
CO3	Understand memory hierarchy and I/O Organization		3	3	3	2										
CO4	Perceive knowledge on Instruction Level Parallelism and Parallel Processing	1	2		3										2	


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OBJECTIVE(S):

- To verify the digital circuits using logical IC's.
- To study the methods for simplifying Boolean expressions and designing the digital circuits practically.
- To Implement of combinational and sequential circuits

Prerequisites: Nil

LIST OF EXPERIMENTS:

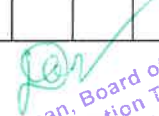
1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of Adder/Subtractor, Encoders/Decoders, Code Converters using basic gates.
3. Design and implementation of 4-bit binary adder / subtractor using MSI Circuits.
4. Design and implementation of parity generator / checker using basic gates and MSI Circuits
5. Design and implementation of Magnitude Comparator
6. Design and implementation of Multiplexers/Demultiplexers
7. Design and implementation of Shift registers
8. Design and implementation of Synchronous and Asynchronous counters
9. Simulation of Adder/Subtractor, using Hardware Description Language (VHDL/ Verilog HDL software required)
10. Simulation of Encoders/Decoders using Hardware Description Language (VHDL/ Verilog HDL software required)
11. Simulation of Shift Registers using HDL (VHDL/ Verilog HDL software required)
12. Simulation of Counters using HDL (VHDL/ Verilog HDL software required).

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Verification of digital circuits using logical IC's.
CO2: Simplification of Boolean expression and implementing those circuits practically.
CO3: Implementation of combinational and sequential circuits.
CO4: Programming fundamentals in VHDL.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Verification of digital circuits using logical IC's	3	3											3		
CO2	Simplification of Boolean expression and implementing those circuits practically	2	3													
CO3	Implementation of combinational and sequential circuits	3	3	3											3	
CO4	Programming fundamentals in VHDL		3	3		2									3	


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OBJECTIVE(S):

- To understand and implement basic data structures using C.
- To apply linear and non linear data structures in problem solving.

Pre requisite: Fundamentals of Computing & C Programming, Data Structures & Algorithms.

LIST OF EXPERIMENTS

1. Implementation of singly and doubly linked list using C.
2. Represent a polynomial as a linked list and write functions for polynomial addition.
3. Convert an expression and evaluate it using Stack.
4. Implementation of Queue operations using linked list in C.
5. Implementation of Circular Queue using linked list in C.
6. Implementation of Linear and Binary search techniques using C.
7. Implementation of hashing techniques using C.
8. Implementation of shell sort using C.
9. Implementation of merge sort using C.
10. Implementation of binary search tree using C.
11. Implementation of an expression tree. Produce its Pre-order, In-order and Post-order traversals
12. Implementation of Dijkstra's algorithm using C.
13. Implementation of Quick sort using C.
14. Implementation of 8-Queens problem using backtracking using C.
15. Calculate the running time of any two sorting algorithms and find the best among the two using C.

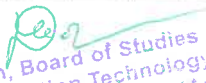
TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Implement various basic data structures and its operations.
CO2: Implement various Hashing, Searching and Sorting algorithms.
CO3: Perform various tree operations.
CO4: Develop applications based on data structures.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Implement various basic data structures and its operations		3	3	3									3		3
CO2	Implement various Hashing, Searching and Sorting algorithms		3	3		1									3	
CO3	Perform various tree operations			2	3	2	2									
CO4	Develop applications based on data structures		2		2									2		


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315CIP09

JAVA PROGRAMMING LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVE(S):

- To create Java programs that leverage the object-oriented features such as Abstraction, Inheritance and Interfaces.
- To implement error-handling techniques using exception handling.
- To create an event-driven GUI Applications using Swing components.
- To implement I/O functionality to read and write the files.

Prerequisite: Fundamentals of Computing & C Programming, Object Oriented Programming, Java Programming

LIST OF EXPERIMENTS:

Solving Simple problems using

1. Class, Methods
2. Type casting, Static and Final Keyword
3. Polymorphism: Method overloading & Constructor overloading
4. Inheritance (overriding)
5. Interfaces
6. Abstract class
7. Packages
8. Exception handling
9. Threads (single and multithreads)
10. String Handling functions
11. JDBC
12. Applet
13. Event Handling.
14. Swings
15. File handling and I/O handling

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

Upon successful completion of this course, students should be able to:

- CO1:** Write a programs that use the fundamental program constructs, including packages & interfaces
- CO2:** Create &access database connection and handling exceptions.
- CO3:** Design a GUI-based event handling application using Applets &Swings.
- CO4:** Understand the I/O functionality to read & write in the files.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Write a programs that use the fundamental program constructs, including packages & interfaces		3	3	3	3								3	3	3
CO2	Create &access database connection and handling exceptions.		2	3	1	3								3	3	3
CO3	Design a GUI-based event handling application using Applets &Swings.		3	3	2	2								3	3	3
CO4	Understand the I/O functionality to read & write in the files.		3	2	3									3	3	3


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415PQT01

PROBABILITY AND QUEUEING THEORY

L	T	P	C
3	1	0	4

(Common to IT & CSE)

OBJECTIVE(S)

- To impart the knowledge of basic probabilistic theory.
- To learn one dimensional discrete and continuous probability distributions occurring in natural phenomena.
- To extend the probability theory to two dimensional random variable and to study the statistical measures.
- To study the classification and analysis of few discrete random process.
- To acquire the skills to analyze queueing models.

UNIT-I PROBABILITY AND RANDOM VARIABLE

9 + 3

Axioms of probability - Conditional probability - Total probability – Baye’s theorem- Random variable - Probability mass function - Probability density function - Properties - Moments - Moment generating functions and their properties.

UNIT-II PROBABILITY DISTRIBUTIONS

9 + 3

Binomial, Poisson, Geometric, Uniform, Exponential, and Normal distributions and their properties - Functions of a random variable.

UNIT-III TWO-DIMENSIONAL RANDOM VARIABLES

9 + 3

Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Central limit theorem (Statement and applications only for independent and identically distributed random variables).

UNIT IV RANDOM PROCESSES

9 + 3

Classification – Stationary process – Poisson process - Markov process – Discrete parameter Markov chain – Chapman Kolmogorov equations.

UNIT V QUEUEING THEORY

9 + 3

Markovian queues – Little’s formula – Models: (M/M/1) : (∞ /FIFO), (M/M/s) : (∞ /FIFO), (M/M/1) : (k/FIFO), (M/M/s) : (k/FIFO) – Non-Markovian Queues: Pollaczek-Khinchin formula - (M/G/1) : (∞ /GD).

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course the student will be able to

- CO1:** Imbibe the knowledge of basic probability improves the quality of interpretation and decision making in real time problems of uncertainty.
- CO2:** Learn the concept of two dimensional random variables which helps to understand and analyse the statistical measures which describes an outcome of a random experiment.
- CO3;** Understand and characterize the random variable phenomenon which evolve with respect to time in a probabilistic approach.
- CO4:** Construct and solve queueing models that are suitable for practical problems encountered in daily life.

TEXT BOOKS:

1. Ibe, O.C. “Fundamentals of Applied Probability and Random Processes”, Elsevier, U.P., 1st Indian Reprint, 2007.
2. Gross, D. and Harris, C.M., “Fundamentals of Queueing Theory”, Wiley Student edition, 2008.

REFERENCES:

1. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill, New Delhi, 9th Reprint, 2010.
2. Veerarajan.T., "Probability, Statistics and Random Processes", Tata McGraw-Hill publishing company Limited, New Delhi, 2014.
1. Kandasamy.P,Thilagavathy,K.,&Gunavathi.K., "Probability, Statistics and Queueing Theory"., S.Chand& Company Ltd., New Delhi, 2014.
2. Gupta.S.C.,& Kapoor,V.K., "Fundamentals of mathematical statistics", 10th edition(Reprint), Sultan Chand & Sons publishers, New Delhi, 2002.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
Co1	Imbibe the knowledge of basic probability improves the quality of interpretation and decision making in real time problems of uncertainty	3	2	3	3	3							3	3	2	
Co2	Learn the concept of two dimensional random variables which helps to understand and analyse the statistical measures which describes an outcome of a random experiment	3	3	2	3	3							3		3	3
Co3	Understand and characterize the random variable phenomenon which evolve with respect to time in a probabilistic approach	3	3	3	1	3								2	3	3
Co4	Construct and solve queuing models that are suitable for practical problems encountered in daily life	3	2	2	3	3							3			3


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415CIT02

OPERATING SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- Acquire basic Knowledge on computer operating system structures and functioning
- Impart knowledge on scheduling, process synchronization and deadlocks
- Be familiar with different memory management techniques and storage management
- Understand security and protection mechanisms in operating systems.

Prerequisite: Fundamentals of Computing and C Programming.

UNIT-I PROCESSES AND THREADS

9

Introduction to operating systems – computer system organization –computer system architecture - operating system structures: OS Services - system calls – system programs – system structure. Processes: Process concept – Process scheduling – Operations on processes – Interprocess communication – Communication in client-server systems. Case study: IPC in Linux. Threads: Multi-threading models – Threading issues. Case Study: Pthreads library.

UNIT-II CPU SCHEDULING AND PROCESS SYNCHRONIZATION

9

CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation. Case study: Process scheduling in Linux. Process synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – Monitors. Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock.

UNIT-III MEMORY MANAGEMENT

9

Memory Management: Introduction – Swapping – Contiguous memory allocation– Paging – Segmentation – Segmentation with paging. Virtual Memory: Introduction – Demand paging — copy on write – Page replacement – Allocation of frames – Thrashing. Case Study: Memory management in Linux.

UNIT-IV STORAGE MANAGEMENT

9

Mass-Storage Structure: Introduction– Disk Structure - disk attachment- Disk scheduling – Disk management – Swap-space management – RAID– stable storage. Case study: I/O in Linux. File-System Interface: File concept – Access methods – Directory and Disk structure – File-system mounting – file sharing - Protection. File-System Implementation: Files-system structure – File-System Implementation - Directory implementation – Allocation methods – Free-space management – efficiency and performance – recovery. Case studies: File system in Linux – file system in Windows 7.

UNIT-V PROTECTION, SECURITY AND VIRTUAL MACHINES

9

Protection: Goals of protection – Principles of Protection – Domain of Protection – Access Matrix – Implementation of the Access Matrix – Access Control- Revocation of Access Rights – Capability Based Systems – Language Based Protection. Security: The Security problem – Program Threats – System and Network Threats – cryptography as a security tool –User Authentication - implementing Security Defenses – Firewalling to protect systems and networks – Computer-Security Classifications. Virtual Machines: Introduction – Benefits and features – Types of Virtual Machines and their implementations – Virtualization and Operating System components.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course student should be able to

- CO1:** Gain extensive knowledge and apply the concepts of process management
- CO2:** Determine the efficiency of CPU Scheduling Algorithms
- CO3:** Demonstrate and implement memory management, and paging techniques.
- CO4:** Illustrate I/O system, file system, Disk management functionalities in operating systems.
- CO5:** Be familiar with protection and security mechanism.

TEXT BOOK:

1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", Ninth Edition, Wiley India Pvt. Ltd., 2013.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson Education/PHI 2001.
2. Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004. Harvey M. Deital, "Operating Systems", Third Edition, Pearson Education, 2004

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Gain extensive knowledge and apply the concepts of process management	3	3	3		3								3		
CO2	Determine the efficiency of CPU Scheduling Algorithms	3	3	3	2	3									3	3
CO3	Demonstrate and implement memory management, and paging techniques.	2	3	2	3	2									3	
CO4	Illustrate I/O system, file system, Disk management functionalities in operating systems.	2	2		2	3										3
CO5	Be familiar with protection and security mechanism.	1	3	2	3									3		

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415CIT03

DATABASE MANAGEMENT SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- Learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- Make a study of SQL and relational database design.
- Know the fundamental concepts of transaction processing, concurrency control techniques and recovery procedure.
- To know the internal storage structures, indexing and advanced database concepts.

Prerequisites: Fundamentals of computing & C Programming, Data Structures and Algorithms.

UNIT-I INTRODUCTION 7

Purpose of Database System – Views of data - Database Languages – Data Models – Database System Architecture – Database users and Administrator – Entity Relationship model (E-R Model) – E-R Diagrams.

UNIT-II RELATIONAL MODEL 9

The relational Model – The catalog - Types of Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - SQL fundamentals - operations – Additional Operations- Integrity – Triggers - Security & Authorization – Advanced SQL features –Embedded SQL– Dynamic SQL- Views – Introduction to Distributed Databases and Client/Server Databases.

UNIT-III DATABASE DESIGN 9

Functional Dependencies – Non-loss Decomposition– First, Second, Third Normal Forms & Dependency Preservation – Boyce / Codd Normal Form- Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT-IV TRANSACTION MANAGEMENT 9

Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery – Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Intent Locking – Deadlock- Serializability – Recovery Isolation Levels – SQL Facilities for Concurrency.

UNIT-V DATA STORAGE & ADVANCED DATABASES 11

Overview of Physical Storage Media – Magnetic Disks – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B tree - B+ tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – measures of query cost – Database Tuning - OODB & XML Databases – Introduction to mobile & web databases.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course student should be able to

- CO1:** Gain and design extensive knowledge on various data models and ER diagram.
- CO2:** Recognize and develop sophisticated queries and authorization techniques to extract information from database
- CO3:** Analyze and eliminate all kind of dependency in a database schema via normalization techniques.
- CO4:** Apply concurrency control and recovery mechanism.
- CO5:** Understand the internal storage structures using different file and indexing techniques & advanced database concepts


TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 6th Edition, Tata McGraw Hill, 2013.
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2012.

REFERENCE BOOKS:

1. Ramez Elmasri, Shamkant B. Navathe, "Database Systems", 6th Edition, Pearson, 2013.
2. Raghu Ramakrishnan, J.Gehrke, "Database Management Systems", 3rd Edition, McGraw Hill, 2014.
3. Shio Kumar Singh, "Database Systems Concepts, Design and Applications", 2nd Edition, Pearson, 2011.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Gain and design extensive knowledge on various data models and ER diagram.	3	3	1										3		
CO2	Recognize and develop sophisticated queries and authorization techniques to extract information from database	3	3		3								3		3	
CO3	Analyze and eliminate all kind of dependency in a database schema via normalization techniques.	3	3	2										3		
CO4	Apply concurrency control and recovery mechanism.	2	3	3											3	
CO5	Understand the internal storage structures using different file and indexing techniques & advanced database concepts	2	2	3												3


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415ITT04

MICROPROCESSORS & MICROCONTROLLERS

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- Describe the architecture and programming of 8086 Microprocessor
- Learn the multiprocessor configurations with I/O processor and Numeric Data Processor.
- Understand the Memory and I/O interfacing of 8086 Microprocessor
- Describe the architecture and programming of 8051 Microcontroller
- Understand the Memory and I/O interfacing of 8051 Microcontroller

Prerequisite: Digital Principles and System Design

UNIT-I INTEL 8086 MICROPROCESSOR

9

Intel 8086 microprocessor - Architecture - Signals- Instruction Set-Addressing Modes- Assembly Language Programming.

UNIT-II MULTIPROCESSOR CONFIGURATIONS

9

Maximum and minimum mode configuration, Assembler Directives- -Procedures-Macros-Interrupts and Interrupt Service Routines, 8087 Numeric Data Processor - Architecture –8089 I/O Processor –Architecture.

UNIT-III MEMORY AND I/O INTERFACING

9

Memory interfacing and I/O interfacing with 8086 – Parallel communication interface(8255) – Serial communication interface(8251) – Programmable timer(8254)-Keyboard/Display controller(8279) – Interrupt controller (8259)– DMA controller (8257) .

UNIT-IV INTEL 8051 MICROCONTROLLER

9

Architecture of 8051 Microcontroller – I/O ports – memory –Addressing Modes –Instruction set- Assembly language programming- Interrupts.

UNIT-V INTERFACING WITH 8051 MICRO CONTROLLER

9

Timers and Counters – Serial data I/O –Interfacing with keyboards, 7 segment LEDs, LCDs, Interfacing with ADCs. Interfacing with DACs. Applications- Stepper Motor.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

Upon Completion of this course, students will be able to:

- CO1:** Explain the architecture and programming of 8086 Microprocessor
- CO2:** Demonstrate the multiprocessor configurations with I/O processor and Numeric Data Processor.
- CO3:** Analyze the Memory and I/O interfacing of 8086 Microprocessor
- CO4:** Explain the architecture and programming of 8051 Microcontroller
- CO5:** Analyze the Memory and I/O interfacing of 8051 Microcontroller.


TEXT BOOKS:

1. Yn-cheng Liu, Glenn A. Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", second edition, Prentice Hall of India , 2006
2. Kenneth J. Ayala, "The 8051 microcontroller Architecture, Programming and applications" second Edition, Penram international.
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, "The 8051 microcontroller and embedded systems using Assembly and C", second edition, Pearson education / Prentice hall of India , 2007.

REFERENCE BOOKS:

1. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware", second edition, Tata Mc Graw Hill, 2006.
2. A.K. Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", Tata Mc Graw Hill, 2006.
3. Peter Abel, "IBM PC Assembly language and programming", fifth edition, Pearson education / Prentice Hall of India Pvt. Ltd, 2007.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Explain the architecture and programming of 8086 Microprocessor	3	2	3	3		2							3		
CO2	Demonstrate the multiprocessor configurations with I/O processor and Numeric Data Processor.	2	3	2	3		3							2		3
CO3	Analyze the Memory and I/O interfacing of 8086 Microprocessor	3	3	2											3	
CO4	Explain the architecture and programming of 8051 Microcontroller	3	3	3		3	3								3	
CO5	Analyze the Memory and I/O interfacing of 8051 Microcontroller				2											3


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415CIT05

COMPUTER NETWORKS

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- Grasp the principles of data communication.
- Understand the functions of Data link layers.
- Understand the networking concepts and different routing algorithms
- Get familiarized with different Transport and application layer protocols.

Prerequisite: Fundamentals of Computing & C Programming

UNIT-I DATA COMMUNICATIONS & PHYSICAL LAYER

8

Introduction: Components – Data representation – Direction of Data flow – Networks: criteria and physical structure – Protocols and Standards – Layered Tasks – ISO/OSI model and layers in the OSI model – Addressing. Transmission Media: Guided Transmission Media – Twisted pair – Coaxial Cable – Fiber Optics – Unguided Media–Radio waves–Microwaves–Infrared. Network Components: Connectors – Transceivers – Media converters – Network Interface card – PC cards.

UNIT-II DATA LINK LAYER

10

Error Detection and Correction: Types of Errors–Redundancy– Parity – CRC – Hamming code – Data Link Control: Flow Control and Error control – stop and wait – Go back-N ARQ – selective repeat ARQ- sliding window – Media Access Control (MAC) – CSMA / CD - Wired & Wireless LAN: Ethernet - Bluetooth.

UNIT- III NETWORK LAYER

10

Internetworking Devices: Repeaters – Hubs – Bridges – Switches – DSL – Routers – Modems -Gateways. IP addressing methods – Sub netting – Internetworking – Packet Switching and Datagram approach –Routing Algorithms: Distance Vector Routing – Link State Routing – Network Layer Protocols : ARP –IPV4 –IPV6 - Address Mapping- ICMP- IGMP.

UNIT- IV TRANSPORT LAYER

9

Process to process delivery – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control Techniques – Congestion Prevention Policies - Quality of Services (QOS) – Integrated Services.

UNIT- V APPLICATION LAYER

8

Domain Name Space (DNS) – SMTP - POP3 –WWW – HTTP - FTP – SNMP.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course student should be able to

- CO1:** Gain extensive knowledge on networks, role of each network layers, transmission medias and network components.
- CO2:** Apply various routing algorithms over a network to provide optimal, error free transmission of data using error detection and correction techniques.
- CO3:** Understand the functionality of protocols.
- CO4:** Analyze and implement the design of a network using TCP & UDP
- CO5:** Understand the services in application layer


TEXT BOOKS:

1. Behrouz A. Forouzan, "Data communication and Networking", 5th Edition, Tata McGraw-Hill, 2013.
2. Andrew S. Tanenbaum, David J. Wetherall, "Computer Networks", 5th Edition, PHI Learning, 2014.

REFERENCE BOOKS:

1. William Stallings, "Data and Computer Communication", 9th Edition, Pearson Education, 2014.
2. Alberto Leon Garcia, Indra Widjaja, "Communication Networks Fundamental Concepts and key Architectures", 2nd Edition, Tata McGraw-Hill, 2009.
3. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", 6th Edition, Pearson Education, 2012.
4. Larry L Peterson, Bruce S Davie, "Computer Networks", 5th Edition, Morgan Kaufmann Publisher, 2012.
5. Prakash C Gupta, "Data Communications and Computer Networks", 2nd Edition, PHI Learning, 2013.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Gain extensive knowledge on networks, role of each network layers, transmission medias And network components.	3	3	3	3									3		
CO2	Apply various routing algorithms over a network to provide optimal, error free transmission of data using error detection and correction techniques.	3	2	3	3	3										
CO3	Understand the functionality of protocols.	3	3	2	3	3									3	
CO4	Analyze and implement the design of a network using TCP & UDP	3	3	3	2											
CO5	Understand the services in application layer	3	2	2		3								3	3	


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OBJECTIVE(S):

- Learn and analyze various algorithm techniques.
- Aware of mathematical background for algorithm analysis and implementation of various strategies like Divide and Conquer, Greedy Method, Dynamic Programming, Backtracking, Branch and Bound
- Be familiar with limitations of algorithm and solving iterative problems.

Prerequisites: Data Structures and Algorithms**UNIT-I INTRODUCTION**

9

Algorithm- Fundamentals of Algorithmic Problem Solving: Algorithm design and analysis process - Algorithm Design Techniques - Methods of Specifying an Algorithm – Algorithm Analysis - Important Problem Types - Asymptotic Notations - Properties of big-Oh notation – Recurrence equations – Solving recurrence equations: Substitution method, Iteration method and Master’s method.

UNIT-II DIVIDE AND CONQUER AND GREEDY ALGORITHMS

10

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Single Source Shortest Path Problem - Container Loading – Knapsack Problem - Huffman codes.

UNIT-III DYNAMIC PROGRAMMING AND GRAPH TRAVERSALS

10

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem, Flow Shop Scheduling. Graph Traversals: Breadth First Search – Depth First Search – Connected Components – Spanning Trees – Biconnected Components.

UNIT-IV BACKTRACKING AND BRANCH AND BOUND

8

Backtracking: General Method – 8 Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Problem – Knapsack Problem. Branch and Bound: Least Cost Search (LC) – FIFO Branch and Bound - 0/1 Knapsack Problem.

UNIT-V ITERATIVE IMPROVEMENT AND LIMITATIONS OF ALGORITHM POWER

8

Iterative Improvement: The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs – The Stable Marriage Problem. Limitations of Algorithm Power: P, NP and NP-Complete Problems.

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:**

At the end of the course the students are able to

- CO1:** Analyze time and space complexity of algorithms.
- CO2:** Decisively analyze diverse algorithm strategies for the given problem.
- CO3:** Formulate and compute recurrence relations for the given algorithm.
- CO4:** Select optimal solution for the given computational problem.
- CO5:** Improve the efficiency of the algorithm by understanding its limitations.


TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, “Computer Algorithms/ C++”, Second Edition, Universities Press, 2007.
2. Anany Levitin, “Introduction to the Design and Analysis of Algorithms”, Third Edition, Pearson Education, 2012.

REFERENCE BOOKS:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Analyze time and space complexity of algorithms.	3		3		3								3		3
CO2	Decisively analyze diverse algorithm strategies for the given problem.	3	3		3										3	
CO3	Formulate and compute recurrence relations for the given algorithm.	3	3	2		3									3	3
CO4	Select optimal solution for the given computational problem.	2	3	3												3
CO5	Improve the efficiency of the algorithm by understanding its limitations.		3			3								3		


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415CIP07

OPERATING SYSTEMS LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVE(S):

- Learn shell programming and the use of various system calls in the UNIX environment.
- Expose to process creation, scheduling and inter process communication.
- Be familiar with implementation of page replacement algorithms, file allocations, memory management and deadlock avoidance

Pre requisites: Fundamentals of Computing & C Programming, Operating System

LIST OF EXPERIMENTS

(Implement the following on LINUX or other Unix like platform. Use C for high level language implementation)

1. Basic Shell commands.
2. Write programs to implement File management and Directory management system calls of UNIX operating system (open(), close(), lseek(), read(), write(), mount, umount, link, unlink, mkdir, rmdir).
3. Write programs to implement Process management system calls of UNIX operating system (fork(), wait(), execlp(), exit(), signal(sig, handler), kill(sig, pid)).
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for CPU scheduling algorithms (preemptive and non preemptive). For each of the Scheduling policies, compute and print the average waiting time and average turnaround time.
5. Implementation of Inter Process Communication (using pipes/ shared memory/ message queues).
6. Implement the producer consumer problem using semaphores.
7. Simulation of deadlock avoidance & prevention algorithms.
8. Simulation of Memory management algorithms.
9. Implementation of page replacement algorithms.
10. Implementation of file allocation methods (linked/indexed/contiguous).
11. Implementation of disk scheduling algorithms.
12. Implementation of user authentication.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course student should be able to

- CO1:** Implement basic services and functionalities of operating system using system call.
- CO2:** Implement various CPU scheduling algorithm and inter process communication and semaphores.
- CO3:** Implement memory management algorithms.
- CO4:** Demonstrate file allocation and organization techniques.
- CO5:** Illustrate disk scheduling algorithms.

HARDWARE & SOFTWARE REQUIRED FOR A BATCH OF 36 STUDENTS


Hardware: 36 PC

Software: Linux (Ubuntu/OpenSUSE/Fedora/Red Hat/Debian/Mint OS) Linux could be loaded in individual PCs

or

A single server could be loaded with Linux and connected from the individual PCs.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
C01	Implement basic services and functionalities of operating system using system call.	2	2	3	2	3								3		
C02	Implement various CPU scheduling algorithm and inter process communication and semaphores.	3	2	3	3	3									2	
C03	Implement memory management algorithms.	3	2	3	3	2									3	
C04	Demonstrate file allocation and organization techniques.	3	2	3		3									2	3
C05	Illustrate disk scheduling algorithms.	2	3	2		2								3		3


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OBJECTIVE(S):

- Create database with different types of integrity constraints and use the SQL commands such as DDL, DML & DCL to access data from database.
- Learn to implement SQL join operations & functions, Views
- To know the fundamental concepts of procedures & reports
- To design a database using different tools

Pre requisites: Fundamentals of Computing & C Programming**LIST OF EXPERIMENTS:**

1. Create table for any schema & perform following operations
 - A. Add new fields, modify table & fields, remove any record & empty using DDL Commands
 - B. Add new record, remove old record & update fields using DML Commands
 - C. Apply following constraints: Check, Default, Null, Primary & Foreign key
2. Create tables for any schema & perform Undo, Redo operations, User permission using DCL Commands
3. Create any two tables & convert into normalized form using
 - A. Nested Queries
 - B. Join queries
 - C. Set Operations
4. Implement SQL functions such as Date, Character, general, Aggregate & number functions, etc...
5. Create Horizontal, Vertical view & perform following operations add, remove, join, check view updates
6. Implement PL/SQL Programs with Embedded SQL form
 - A. Control structures using Loop, if-else, While & for loop
 - B. Procedures to update & reflect in related tables
 - C. Using Functions
7. Create trigger for update & modify database
8. Design any simple program using VB / VC++
9. Design oracle form for any schema that uses both manual & design wizard option
10. Display database details with oracle reports using manual & design wizard option.
11. Develop menu design for any schema using VB
12. Design & develop any schema with front-end tools using VB/VC++ with Database connection.
13. Design any program / application using MongoDB

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:****At the end of the course student should be able to**

- CO 1: Design and implement database schema for a given problem domain.
- CO 2: Populate and query a database using SQL operations.
- CO 3: Prepare reports.
- CO 4: Design & develop an application using advanced databases.
- CO5: Develop any application using VB/VC++

HARDWARE AND SOFTWARE REQUIRED FOR A BATCH OF 36 STUDENTS:**Hardware:**

36 Personal Computers

Software:

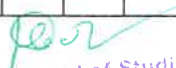
Front end : VB / VC ++

Back end : MySQL, Oracle 11g, MongoDB

Platform : Windows 2000 Professional/XP or higher

Oracle server could be loaded and can be connected from individual PCs

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Design and implement database schema for a given problem domain.	2	3	3	3	2								3		3
CO2	Populate and query a database using SQL operations.		3	2	3	2								3		3
CO3	Prepare reports.		2	3	3	3								2	3	2
CO4	Design & develop an application using advanced databases	1	1	3	2	3									3	3
CO5	Develop any application using VB/VC++			1	2	2								3	2	3


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OBJECTIVE(S):

- Get familiarized with socket programming
- Understand the basic networking commands
- Analyze the performance of protocols in different layers using simulation tools.

Prerequisite: Fundamentals of Computing & C Programming, Object Oriented Programming

LIST OF EXPERIMENTS:

1. Basic network command line utilities such as ping, netstat, tracert, nslookup, port scan, ARP, ipconfig.

Implement the following experiments in C/C++/Java:

2. Generate Hamming code for error detection and correction
3. Implement Error Detection code using CRC
4. Implementation of stop and wait protocol
5. Implementation of sliding window protocol
6. Implementation of UDP
7. Implementation of TCP

Implement the following experiments using simulator:

8. Study of Basic concepts of Network Simulator (NS2), its installation and working environment.
9. Using NS2 Network Simulation,
 - i) Initialize & Network simulator object.
 - ii) Group of Nodes to form a LAN
 - iii) Delay of Link
 - iv) Bandwidth of Link.
10. Simulate a four Duplex network and apply TCP agent between two nodes and UDP agents between other two nodes and by changing the parameters, determine the number of packets sent and dropped by TCP/UDP.
11. Simulate a wired network and measure the following performance metrics

i) Throughput	ii) Delay	iii) Packet Loss
---------------	-----------	------------------
12. Implement Link State routing and Distance Vector routing measure the following performance metrics

i) Throughput	ii) Delay	iii) Packet Loss
---------------	-----------	------------------
13. Experiment on packet capture and network traffic using wire shark tool.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course student should be able to

- CO1:** Generate the code for arithmetic operations in assembly language
- CO2:** Implement data link protocols.
- CO3:** Analyze and implement various routing algorithms.
- CO4:** Simulate networks and analyze traffic using various tools.
- CO5:** Analyze the performance of protocols in different layers.

HARDWARE AND SOFTWARE REQUIRED FOR A BATCH OF 36 STUDENTS:**Hardware:**

36 Personal Computers

Software:

- C / C++/ Java - Compiler, JDK1.5 or Higher.
- Network simulator like NS2 / Wire Shark.
- Linux / Windows 2000 Professional/XP or higher - OS.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Generate the code for arithmetic operations in assembly language	1	1											1		
CO2	Implement data link protocols.		2	2												
CO3	Analyze and implement various routing algorithms.					3									2	
CO4	Simulate networks and analyze traffic using various tools.		1			3									2	
CO5	Analyze the performance of protocols in different layers.			2		2										



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INTERNET PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To understand basic HTML5 tags and its usage in designing web pages.
- To understand and apply web development techniques using client-side and server side scripting language.
- To gain knowledge in JSP, Servlets.
- To know working principles of web services.

Prerequisite: Java Programming

UNIT-I WEBSITE BASICS, HTML 5 & STYLE SHEETS 9

Web Basics - Difference between Website and Web Services - Introduction to HTML5- Headings – Links - Images - Special Characters and Horizontal Rules - Lists - Tables - Forms - CSS Building Blocks - Constructing Style sheets - Working with Style sheets - Defining Selectors - Formatting text with styles - Layout with Styles

UNIT-II CLIENT -SIDE PROGRAMMING 9

Introduction to Java Script, Control statements, Functions, Arrays, Objects, DOM - Event Handling - jQuery - Introduction to jQuery - jQuery Effects - jQuery Vs DOM - Traversing.

UNIT-III XML AND XSL 9

XML Basics, Structuring data - XML Name Spaces - Document Type Definition – XML Schema Document - Extensible Style sheet Language - XSL Transformations - Using XML with DOM

UNIT-IV SERVER-SIDE PROGRAMMING 9

Java Servlets: Architecture – Generating Dynamic Content - Life Cycle - Parameter Data - Sessions- Cookies - URL Rewriting.

JSP Technology: Introduction - JSP - Running JSP Applications - Basic JSP - JavaBeans Classes and JSP-Tag Libraries and Files.

UNIT-V WEB SERVICES 9

Introduction to Web Services: The Basics of Web Services- Interacting with Web Services-WSDL: Describing Web Services, Basics -WSDL Elements - SOAP: Accessing Web services - SOAP Specification - SOAP Message Processing - UDDI: Publishing and Discovering Web Services - UDDI Data Model.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the Course, students will be able to:

- CO1:** Acquire knowledge about Web Programming & Style Sheets
- CO2:** Develop interactive web pages using JavaScript
- CO3:** Design and validate forms using XML and XSL
- CO4:** Build Servlets, JSP Program to solve real world problems
- CO5:** Acquire knowledge in Web Services


TEXT BOOKS:

1. Deitel and Nieto, "Internet and World Wide Web - How to Program", Prentice Hall, 5th Edition, 2011.
2. JeffreyC. Jackson, "Web Technologies - A Computer Science Perspective", Pearson Education, 2006.
3. Eric Newcomer, "Understanding Web Services: XML, WSDL, SOAP, and UDDI", Addison- Wesley, 2002.

REFERENCE BOOKS:

1. Elizabeth Castro BruceHyslop "HTML5 & CSS3 Visual Quick Start Guide" Pearson Education India; Seventh Edition, ISBN-13: 978-032171961.
2. Cody Lindley "jQuery Cook Book" O`Rilly, November 2009.
3. Michael Morrison, "Teach Yourself XML in 24 Hours, Complete Starter Kit," 3rd Edition-2005.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Acquire knowledge about Web Programming & Style Sheets			3									2	3		2
CO2	Develop interactive web pages using JavaScript			2		3					2				3	
CO3	Design and validate forms using XML and XSL		3		3									2		
CO4	Build Servlets, JSP Program to solve real world problems		3	2	2										3	
CO5	Acquire knowledge in Web Services					3	2					2			3	1


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OBJECTIVE(S):

The Students would be able

- Identify scope of software engineering and learn different SDLC models.
- To analyze software requirements.
- To design and develop an efficient software system.
- To understand testing strategies and Concepts of SQA.
- To learn software metrics with SQA models with standardization.

Prerequisite: Fundamentals of computing and C programming.

UNIT I SOFTWARE PRODUCT AND PROCESS 9

Introduction – S/W Engineering Paradigm – Verification – Validation – Life Cycle Models– System Engineering – Computer Based System – Business Process Engineering – Product Engineering Overview- Agile development: Agile process- process models.

UNIT II SOFTWARE REQUIREMENTS 9

Functional and Non-Functional – Software Document – Requirement Engineering Process – Feasibility Studies – Software Prototyping – Prototyping in the Software Process – Data – Functional and Behavioral Models – Structured Analysis and Data Dictionary.

UNIT III ANALYSIS, DESIGN CONCEPTS AND PRINCIPLES 9

Systems Engineering - Analysis Concepts - Design Process And Concepts – Modular Design – Design Heuristic – Architectural Design – Data Design – User Interface Design – Real Time Software Design – System Design – Real Time Executives – Data Acquisition System – Monitoring And Control System.

UNIT IV FUNDAMENTALS OF SQA 9

Software Quality: Software Error, Fault, Failure - Definition -Objective - Software Quality assurance & Software Engineering - Quality Management - The Role of SQA – SQA Plan - SQA considerations – Managing Software Quality : Quality Motivation-Measurement criteria –Establishing a Software Quality program – Estimating Software Quality – Defect Prevention: Principles – Process change for Defect Prevention- Defect Prevention Considerations.

UNIT V SOFTWARE QUALITY METRICS AND ASSURANCE MODELS 9

Product Metrics: Frame work for product metrics-Metrics for Analysis and design Model-Metrics for Source code- Metrics for testing- Metrics for Maintenance. Metrics for process and projects- Quality Management Standards-scope- ISO 9001 and 9000-3-CMM and CMMI-SPICE.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course students will be able to:

- CO1:** Utilize concepts in software development life cycle.
- CO2:** Prepare software requirements specification (SRS) document for real time applications.
- CO3:** Analyze different software design architectures and their implications.
- CO4:** Understand the different software testing strategies and fundamental concepts of SQA.
- CO5:** Identify & Apply SQA Tools for various real time applications.

TEXT BOOKS:

1. Roger S. Pressman, "Software Engineering – A practitioner’s Approach", Sixth Edition, McGraw-Hill International Edition, 2010.
2. Ian Sommerville, "Software Engineering", Seventh Edition, Pearson Education Asia, 2005.
3. Daniel Galin, "Software Quality Assurance - From Theory To Implementation", Pearson Education Inc., 2014.

REFERENCE BOOKS:

1. Watts S Humphrey, "Managing the Software Process", Pearson Education Inc, 2012
2. Watts S.Humphrey,"A Discipline for Software Engineering", Pearson Education, 2007.
3. James F.Peters and Witold Pedrycz,"Software Engineering, An Engineering Approach", Wiley-India, 2007.
4. Stephen R.Schach, "Software Engineering", Tata McGraw-Hill Publishing Company Limited, 2007.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Utilize concepts in software development life cycle.	2	3	3	3							3		3		3
CO2	Prepare software requirements specification (SRS) document for real time applications.		3	3	3	3				3		3				3
CO3	Analyze different software design architectures and their implications.	3	3	3	3	2				3		3		3	3	3
CO4	Understand the different software testing strategies and fundamental concepts of SQA.		3	3	2							2		2		3
CO5	Identify & Apply SQA Tools for various real time applications.									3		3				3


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OBJECTIVE(S):

- To study the concepts of modeling in object oriented context
- To learn about Unified Modeling Language
- To learn design techniques and methodologies.

Prerequisite: Software Engineering and Object Oriented Programming

UNIT- I INTRODUCTION**10**

An Overview of Object Oriented Systems Development - Object Basics – Objects and Classes- Abstraction- Encapsulation- Inheritance- Polymorphism Object Oriented Systems Development Life Cycle **OOAD Methodologies** Rumbaugh Methodology - Booch Methodology – Jacobson Methodology - Patterns – Frameworks – Unified Approach

UNIT- II SYSTEM MODELLING**11**

Introduction to Unified Modeling Language – Usage of UML - Types of UML Diagrams

USE CASE MODELING - Understanding Use cases-Identifying Use cases-Association between use cases (uses and Extends)-Describing use cases-Dividing Use cases into packages- Naming a Use case - Use case Diagram

OBJECT MODELING: Class diagrams, associations, generalization, composition, object diagrams, associations, aggregation and composition

DYNAMIC MODELING: Interaction diagrams, sequence diagrams, collaboration diagrams, state diagrams, activity diagrams.

IMPLEMENTATION MODELING: Package diagrams, deployment diagrams, component diagrams, combining component and deployment diagrams.

UNIT- III OBJECT ORIENTED ANALYSIS**8**

Object Analysis - Classification – Identifying Object relationships - Attributes and Methods

UNIT- IV OBJECT ORIENTED DESIGN**8**

Design axioms - Designing Classes – Access Layer - Object Storage - Object Interoperability.

UNIT-V USER INTERFACE DESIGN**8**

Designing Interface Objects –Designing View layer classes – Macro-Level Process - Micro- Level Process – Guidelines for Designing View Layer – Prototyping User Interface - Case study: point of sale.

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:**

At the end of the course student should be able to

- CO1:** Apply Object Oriented Methodologies and Unified Modeling Approach to develop a system model.
- CO2:** Analyze, identify object relationship, attributes and methods to build a class.
- CO3:** Use the UML analysis and design diagrams.
- CO4:** Create UML for requirements, designs and component interfaces
- CO5:** Design classes, user interface and to have wide knowledge on object storage and interoperability to develop an effective model.


TEXT BOOK:

1. Ali Bahrami, "Object Oriented Systems Development", Tata Mc Graw-Hill, NewDelhi, 1st Edition, 2008.

REFERENCE BOOKS:

1. James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language User Guide", Pearson Education, 3rd Edition, 2012.
2. Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, "UML 2 Toolkit", OMG Press Wiley Publishing Inc., New Delhi, 2011.
3. Craig Larman, "Applying UML and Patterns : An Introduction to Object-Oriented Analysis and Design and Iterative Development", Pearson Education, 3rd Edition, 2012.
4. Mahesh P Matha, "Object Oriented Analysis and Design using UML", PHI Learning, New Delhi, 2008
5. Martin Fowler, "UML Distilled", 3rd Edition, PHI Learning, New Delhi, 2015.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Apply Object Oriented Methodologies and Unified Modeling Approach to develop a system model.	3	3	3	2					3		3		3		
CO2	Analyze, identify object relationship, attributes and methods to build a class.		3	2	3					3		3			3	
CO3	Use the UML analysis and design diagrams.		3	2	1				3	3		3				3
CO4	Create UML for requirements, designs and component interfaces		2	3	3					2	2	3		2		3
CO5	Design classes, user interface and to have wide knowledge on object storage and interoperability to develop an effective model.	3	3	3	2					3		3		3		


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COMMUNICATION ENGINEERING

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To understand the various modulation and demodulation schemes for Amplitude and Angle Modulation.
- To infer the basic concepts of Digital Communication systems in baseband signals.
- To summarize the design concepts and performance of sampling and pulse modulation techniques.
- To acquire knowledge about spread spectrum and multiple access techniques.
- To learn about the fundamental concepts in Satellite and Optical communication.

Prerequisite: Nil

UNIT-I FUNDAMENTALS OF ANALOG COMMUNICATION 9

Need for Modulation-Principles of Amplitude Modulation, AM Envelope, Frequency Spectrum and Bandwidth, Modulation Index and Percentage Modulation, , AM Power Distribution, Angle Modulation - FM and PM Waveforms, Phase Deviation and Modulation Index, Frequency Deviation and Percent Modulation,

UNIT-II DIGITAL COMMUNICATION 9

Introduction- Sampling Theorem- Digital Modulation Schemes-ASK-FSK-BPSK-QPSK-DPSK, Bit Rate and Baud Rate Calculations, Quadrature Amplitude Modulation.

UNIT-III DIGITAL TRANSMISSION 9

Introduction- Pulse Modulation Schemes- PAM-PWM-PPM-PCM –Delta Modulation, Adaptive Delta Modulation, Differential Pulse Code Modulation- Pulse Transmission – Inter Symbol Interference, Eye Patterns.

UNIT-IV SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9

Introduction, PN Sequences – Properties – m-Sequence –DSSS –Processing Gain, Jamming – FHSS – Multiple Access – FDMA, TDMA, CDMA.

UNIT-V SATELLITE AND OPTICALCOMMUNICATION 9

Introduction - Satellite Communication Systems - Kepler's Law, LEO and GEO Orbits, Link Model-Optical Communication Systems-Elements of Optical Fiber Transmission Link, Fiber Types, Losses, Optical Sources and Detectors.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES

Upon Completion of this course, students will be able to :

- CO1:** Analyze the different modulation and demodulation schemes
- CO2:** Apply the basic concepts of different Digital communication Techniques.
- CO3:** Channelize the design concepts and performance of sampling and pulse modulation techniques.
- CO4:** Interpret the knowledge about spread spectrum and multiple access techniques
- CO5:** Gain knowledge on Satellite and Optical communication.

TEXT BOOKS:

1. Wayne Tomasi, "Advanced Electronic Communication Systems", 6/e, Pearson Education, 2007.
2. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons. 2001.

REFERENCE BOOKS:

1. H.Taub, D L Schilling, G Saha, "Principles of Communication" 3/e, 2007.
2. B.P.Lathi, "Modern Analog And Digital Communication systems", 3/e, Oxford University Press, 2007
3. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
4. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, PHI, 2002.
5. Gerd Keiser, "Optical Fiber Communications", Tata McGraw-Hill Education, 4th Edition, 2008.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Analyze the different modulation and demodulation schemes	3	3												2	
CO2	Apply the basic concepts of different Digital communication Techniques.	2	3											3		
CO3	Channelize the design concepts and performance of sampling and pulse modulation techniques.			3												
CO4	Interpret the knowledge about spread spectrum and multiple access techniques	3			3											
CO5	Gain knowledge on Satellite and Optical communication.		2				1								2	2


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OBJECTIVE(S):

- To understand the fundamentals of .NET Programming
- To develop real time applications using C#

Prerequisite: Object Oriented Programming.

UNIT-I C# LANGUAGE FUNDAMENTALS

9

The Building Block of the .NET Platform (CLR,CTS, and CLS) – Overview of Assemblies - The Anatomy of a Simple C# Program - Defining Classes and Creating Objects - The System Console Class-Establishing Member Visibility - Default Values of Class Member Variables-Member Variable Initialization Syntax- Static Keyword - Method Parameter Modifiers - Iteration Constructs - Decision Constructs and the Relational / Equality Operators - Understanding Value Types and Reference Types-Boxing and Unboxing - Working with .NET Enumerations - Overriding Some Default Behaviors of System. Object - The System Data Types - String Data Type - .NET Array Types - Custom Namespaces.

UNIT-II OBJECT ORIENTED PROGRAMMING WITH C#

9

Understanding the C# Class Type - Reviewing the Pillars of OOP - The First Pillars: C#'s Encapsulation Services, The Second Pillar: C#'s Inheritance Support - Programming for Containment/Delegation - The Third Pillar: C#'s Polymorphic Support-C# Casting Rules - Understanding Object Lifetime - Basics of Object Lifetime - Role of Application Roots - Garbage Collection - Building Finalizable and Disposable Types. Exception Handling - Throwing a Generic Exception - Catching Exceptions.

UNIT-III INTERFACES, COLLECTIONS, DELEGATES, EVENTS AND LAMDA EXPRESSION

9

Defining Interfaces in C#-Implementing an Interface in C# - Contrasting Interfaces to Abstract Base Classes-Building Interface Hierarchies - Building Enumerable Types (IEnumerable and IEnumerator) Building Cloneable Objects (ICloneable) -Building Comparable Objects (IComparable) -The Interfaces of the System.Collections Namespace - Defining a Delegate in C# -Simplest Possible Delegate Example-Enabling Multicasting -C# Events - Lamdas Expression.

UNIT-IV DEVELOPING WINDOW APPLICATION FORMS

9

Windows Forms Types - Application Class- Functionality of the Control Class - Functionality of the Form Class-Building Windows Applications - Working with StatusStrips - Working with ToolStrips - Building an MDI Application - Basic Controls.

UNIT-V ADO.NETAND ASP.NET

9

ADO.NET Overview – Using Database Connections, Commands, The Data Reader, The DataSet Class,ASP.NET Introduction – Web Forms – ADO.NET and Data Binding-ASP.NET Features – User and Custom Controls – Master Pages- Site Navigation – Security.

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:**

At the end of the course students should be able to:

- CO1:** Understand anatomy of C# Programming.
- CO2:** Develop Console application using object oriented concepts, advanced features in C#.
- CO3:** Develop Applications using Interfaces and Events.
- CO4:** Develop Window form application with Database connectivity.
- CO5:** Build Applications using ADO.NETAND ASP.NET.


TEXT BOOKS:

1. Andrew Troelsen, "Pro C# 5.0 and the .NET 4.5 Framework" Apress, Sixth Edition,2012 ISBN: 978-1-4302-4233-8
2. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012.

REFERENCE BOOKS:

1. Herbert Schildt, "The Complete Reference: C# 4.0", Tata McGraw Hill, 2012.
2. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2004.
3. O`Reilly "Programming C# 5.0" ,O`Reilly Media ISBN: 978-1-4493-2041-6 | ISBN 10:1-4493-2041-4, October 2012.
4. Michael Schmalz "C# Database Basics" O`Reilly Media ISBN:978-1-4493-0998-5, 2012

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Understand anatomy of C# Programming.				3	1								3		
CO2	Develop Console application using object oriented concepts, advanced features in C#.			3	3	3	2	3						3	3	
CO3	Develop Applications using Interfaces and Events.			3	3	3		3						3	3	
CO4	Develop Window form application with Database connectivity.		2	3	2	3	3	3						3	3	3
CO5	Build Applications using ADO.NETAND ASP.NET.			2	3	3	3	3						3	3	3


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APPLIED STATISTICS AND NUMERICAL METHODS

L	T	P	C
3	1	0	4

(Professional Elective for Information Technology)**OBJECTIVE(S):**

- To solve equations using direct and iterative methods, to introduce interpolation techniques and to study the principle of numerical differentiation and integration.
- To learn some of the methods of numerical solutions of ordinary differential equations with initial conditions.
- To introduce the notion of sampling distributions and have acquired knowledge of statistical techniques useful in making rational decision in management problems.
- To expose to statistical methods designed to contribute to the process of making scientific judgments in the face of uncertainty and variation.

UNIT-I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9 + 3

Newton-Raphson Method- Direct Methods-Gauss Elimination Method-Gauss-Jordan Methods – Iterative Methods of Gauss-Jacobi and Gauss-Seidel – Eigen values of a matrix by Power Method.

UNIT-II INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION 9 + 3

Newton's forward and backward difference interpolation - Lagrange's and Newton's divided difference interpolation - Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal and Simpson's 1/3rd and 3/8th rules.

UNIT-III NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 9 + 3

Taylor's series Method - Euler's Method - Modified Euler's Method - Fourth order Runge - Kutta Method for Solving First Order Equations - Predictor-Corrector Methods for Solving First Order Equations: Milne's Method and Adam-Bashforth Method.

UNIT-IV TESTING OF HYPOTHESIS 9 + 3

Sampling distributions - Tests for Single Mean, Proportion, Difference of Means (large and small samples) – Tests for Single Variance and Equality of Variances – Chi-square test for Goodness of fit – Independence of Attributes.

UNIT-V DESIGN OF EXPERIMENTS 9 + 3

ANOVA - Completely randomized design – Randomized block design – Latin square design.
Control charts for measurements (\bar{x} and R-charts).

TOTAL HOURS:60 PERIODS**COURSE OUTCOMES:****At the end of the course the student will be able to**

- CO1:** Apply numerical methods such as direct, iterative and interpolation to solve algebraic or transcendental equations and system of equations.
- CO2:** Appreciate numerical solutions for differential and integral calculus as a handy tool to solve problems.
- CO3:** Implement numerical algorithms to find solutions for initial value problems for ordinary differential equations.
- CO4:** Draw inference and decision making through hypothesis testing.


TEXT BOOKS:

1. Grewal, B.S. and Grewal, J.S., "Numerical methods in Engineering and Science", 6th Edition, Khanna Publishers, New Delhi, 2004.
2. Gupta, S.C., & Kapoor, V.K., "Fundamentals of mathematical statistics", 11th edition, Sultan Chand & Sons publishers, New Delhi, 2013.

REFERENCE BOOKS:

1. Richard L. Burden and J. Douglas Faires, "Numerical Analysis", Ninth Edition, BROOKS/COLE, Cengage.com., 2012. (Visit www.cengage.com/international)
2. R.E. Walpole, R.H. Myers, S.L. Myers, and K. Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th edition, 2007.
3. Veerarajan, T., "Probability, Statistics and Random Processes", Tata McGraw-Hill publishing company Limited, New Delhi, 2014.
4. S.S. Sastry, "Introductory Methods of Numerical Analysis", 5th Edition, Prentice Hall of India Private Ltd., New Delhi, 2012.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Apply numerical methods such as direct, iterative and interpolation to solve algebraic or transcendental equations and system of equations.	3		3		3								3		3
CO2	Appreciate numerical solutions for differential and integral calculus as a handy tool to solve problems.	3	3		3										3	
CO3	Implement numerical algorithms to find solutions for initial value problems for ordinary differential equations.	3	3	2		3									3	3
CO4	Draw inference and decision making through hypothesis testing.	2	3	3												3


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OBJECTIVE(S):

- To understand the HTML tags and its usage in web designing.
- To gain knowledge about client and server side scripting languages.
- To understand XML & XML Parsing.

Prerequisite: Java Programming**LIST OF EXPERIMENTS:**

1. Design a simple web page using paragraphs, text, label.
2. Design a web page using links, tables & forms.
3. Design a website by using CSS.
4. Implement Client side scripting using Java script.
5. Implement Client side scripting using JQuery.
6. Create an XML Document using XML – DTD & XSL.
7. Create simple application using Java Bean.
8. Using cookies to track users in browsers from the web servers.
9. Write a simple Program with Servlet.
10. Implement web application using JSP.

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:****At the end of the Course, students will be able to:****CO1:** Create a dynamic web page by applying client side scripting language**CO2:** Parse XML Documents**CO3:** Develop a java bean component.**CO4:** Design Webpages with server side scripting languages.**LIST OF EQUIPMENT FOR A BATCH OF 36 STUDENTS****HARDWARE:**

Standalone desktops - 36 Nos

SOFTWARE:

NetBeans, Mysql /Oracle 9i, Any Browser.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Create a dynamic web page by applying client side scripting language			3									2	3		2
CO2	Parse XML Documents			2		3					2				3	
CO3	Develop a java bean component.		3		3									2		
CO4	Design Webpages with server side scripting languages.		3	2	2										3	

515ITP08

**OBJECT ORIENTED
ANALYSIS AND DESIGN LABORATORY**

L	T	P	C
0	0	4	2

OBJECTIVE(S):

The student should be made to:

- Learn the basics of OO analysis and design skills.
- Get exposed to the UML design diagrams.
- Learn to map design to code.
- Be familiar with the various testing techniques.

Prerequisite: Fundamentals of Computing & C Programming, Object Oriented Programming

LIST OF EXPERIMENTS:

Prepare the following documents for two or three of the experiments listed below and develop the software engineering methodology.

1. **Project Analysis** Prepare Project Plan by Thorough study of the problem – Identifying project scope, Objectives, Infrastructure.
2. **Software requirement Analysis** Describe the individual Phases / Modules of the project, Identify deliverables.
3. **System Modeling** Preparing Class Diagram, Object Diagram, Interaction diagrams, sequence diagrams, collaboration diagrams, state diagrams, activity diagrams, Package diagrams, deployment diagrams, component diagrams.
4. **Data Modeling-** E-R Diagrams and Data dictionary
5. **Software Development and Debugging**
6. **Software Testing** Prepare test plan test cases and perform validation testing.

SUGGESTED LIST OF APPLICATIONS

1. Feedback System
2. Internal Marks System
3. Quiz System
4. Online Ticket Reservation System
5. Course Registration System
6. Dashboard System
7. ATM Systems
8. Stock Maintenance
9. Real-Time Scheduler
10. Deposit Monitoring System

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:


At the end of the course student should be able to

- CO1:** Prepare a project plan by analyzing project scope and objectives by using OO concepts.
- CO2:** Design & develop UML diagrams.
- CO3:** Get knowledge on Argo UML tool for developing UML diagrams.
- CO4:** Compare test cases, test plan for an application project

LIST OF EQUIPMENTS AND SOFTWARE FOR A BATCH OF 36 STUDENTS

PC : 36 Nos.
 OS : Windows 2000/ Windows XP/ NT (or) Higher
 Software : ArgoUML (freeware) – to be installed in all PC's.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Prepare a project plan by analyzing project scope and objectives by using OO concepts.		3	3	2	3				3		3		3		3
CO2	Design & develop UML diagrams.		2	3	3	2						3			2	
CO3	Get knowledge on Argo UML tool for developing UML diagrams.		3	3	3	2						3			3	3
CO4	Compare test cases, test plan for an application project		1	2	3	2						3		2		


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515IEP05

C# and .NET PROGRAMMING LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVE(S):

- To understand Console Applications using C#.
- To Demonstrate advance features of C#.

Prerequisite: Object Oriented Programming.**Solve Simple Console Application using C#.**

1. Command line arguments processing
2. Arrays and its types
3. Operators
4. Boxing / Unboxing
5. String Manipulation with the String Builder and String Classes
6. Containment/Delegation
7. Exception handling
8. Interfaces and Abstract Class
9. Delegates
10. Events
11. Collections
12. Windows Forms (SDI & MDI)
13. Database Access with ADO.NET
14. Design a Simple page using ASP.NET
15. Develop a Simple Application Project (E.g. Banking, Library, Student Management etc.....)

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:****At the end of the course students should be able to:****CO1:** Develop application using the features of C#.**CO2:** Develop GUI application using interfaces, delegates and events.**CO3:** Build window form application with database connectivity.**CO4:** Solve the real world problems using C#.**HARDWARE AND SOFTWARE REQUIRED FOR A BATCH OF 36 STUDENTS:****Hardware:**

36 Personal Computers

Software:

Tool : Visual Studio 2010.

Platform : Windows 2000 Professional / XP or higher

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Develop application using the features of C#.				3	1								3		
CO2	Develop GUI application using interfaces, delegates and events.			3	3	3	2	3						3	3	
CO3	Build window form application with database connectivity.			3	3	3		3						3	3	
CO4	Solve the real world problems using C#.		2	3	2	3	3	3						3	3	3


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OBJECTIVE(S):

- To learn to design and implement a lexical analyzer.
- To learn the role of a parser and to study the different ways of parsing tokens.
- To study the process of Intermediate Code generation and its representations.
- To study the concepts of machine code generation.
- To study the concepts of Code Optimization and the various Run time storage allocation strategies.

Prerequisites: Fundamentals of Computing and C Programming.

UNIT-I INTRODUCTION, LEXICAL ANALYSIS AND FINITE AUTOMATA 9+3

Language Processors – The Structure of Compiler – Applications of Compiler Technology – Programming Language Basics. Lexical Analysis – The Role of the Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – The Lexical-Analyzer Generator - LEX– Finite Automata – From Regular Expression to Automata – Design of a Lexical-Analyzer Generator – Optimization of DFA-based Pattern Matchers.

UNIT-II SYNTAX ANALYSIS 9+3

Introduction – Context-Free Grammars – Writing a Grammar – Top-Down Parsing – Recursive-Descent Parsing and Predictive Parsers - Bottom-up Parsing – Shift-Reduce Parsing and Operator Precedence Parsing - Introduction to LR Parsing: Simple LR – More Powerful LR Parsers – Canonical LR and LALR Parsers.

UNIT-III INTERMEDIATE CODE GENERATION 9+3

Variants of Syntax Trees – Three-Address Code – Types and Declarations – Translation of Expressions – Type Checking – Control Flow – Back patching – Switch-Statements – Intermediate Code for Procedures.

UNIT-IV CODE GENERATION 9+3

Issues in the Design of a Code Generator – The Target Language – Addresses in the Target Code – Basic Blocks and Flow Graphs – Optimization of Basic Blocks – A Simple Code Generator – Peephole Optimization.

UNIT-V CODE OPTIMIZATION AND RUN-TIME ENVIRONMENT 9+3

The Principal Sources of Optimization – Introduction of Data-Flow Analysis – Loops in Flow Graphs- Run-Time Environments – Storage Organization – Stack Allocation of Space – Heap Management. Case Study: One pass and Multi pass Compilers.

TOTAL HOURS:60 PERIODS

COURSE OUTCOMES:

At the end of the course the students are able to

CO1: Describe the various phases of a compiler.

CO2: Parse the generated tokens using top down and bottom up parsers.

CO3: Represent the intermediate code for the source languages.

CO4: Design and analyze code generation schemes.

CO5: Apply the various optimization techniques.


TEXT BOOK

1. Alfred Aho, Jeffrey Ullman, Monica S. Lam, and Ravi Sethi—"Compilers: Principles, Techniques and Tools", Second Edition, Pearson Education, 2014.

REFERENCE BOOKS:

1. Dhamdhare D M, "Compiler Construction Principles and Practice" Second edition, Macmillan India Ltd., New Delhi, 2005.
2. Jean Paul Tremblay, Paul G Serenson, "The Theory and Practice of Compiler Writing", McGraw Hill, New Delhi, 2007.
3. Dick Grone, Henri E Bal, Cerial J H Jacobs and Keen Gangendoen, "Modern Compiler Design", John Wiley, New Delhi, 2009.
4. Steven S. Muchnick, "Advanced Compiler Design Implementation", First Edition Elsevier Science India, Morgan Kaufmann Publishers, 2008.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
Co1	Describe the various phases of a compiler.		3	3	2	3	2							2	3	
Co2	Parse the generated tokens using top down and bottom up parsers.		2	2	3	3	3				3			1	3	3
Co3	Represent the intermediate code for the source languages.		3	3	3	3	3				3				3	3
Co4	Design and analyze code generation schemes.		2	3	2	3	3				3				3	3
Co5	Apply the various optimization techniques		2	3	2	2	2							2		2


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615ITT02

CRYPTOGRAPHY AND SECURITY IN COMPUTING

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To understand the basics of cryptography.
- To comprehend the mathematical foundations of security principles.
- To gain and awareness about current securities in network.

Prerequisite: Computer Networks

UNIT-I SYMMETRIC KEY ENCRYPTION 9
Overview - Classical Encryption Techniques – Block Ciphers and the Data Encryption Standard – Block Cipher Operation - Advanced Encryption Standard: AES Structure, AES Transformation Function.

UNIT-II NUMBER THEORY AND PUBLIC KEY ENCRYPTION 10
Basic Concepts in Number Theory: The Euclidean Algorithm, ModularArithmetic, Prime Numbers, Fermat’s and Euler’s Theorem, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms-Public-Key Cryptography and RSA-Cryptographic Hash Functions: Applications, Secure Hash Algorithm (SHA) – Digital Signature Overview.

UNIT-III KEY MANAGEMENT AND INTERNET SECURITY 8
Key Management and Distribution - Authentication Applications: Kerberos - Electronic Mail Security: PGP, S/MIME - IP Security Overview.

UNIT-IV SECURITY IN NETWORKS 9
Threats in Networks – Firewalls: Design, Types, and Configuration –Intrusion Detection System: Types, Goals, Strengths and Limitation, Snort.

UNIT-V PROGRAM SECURITY 9
Secure Programs-NonMalicious Program Errors – Viruses and other malicious code – Targetted malicious code – Control against Program Threats.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course the students are able to

- CO1:** Apply Cryptographic algorithms for encryption and decryption for secure data transmission.
- CO2:** Understand the mathematical aspects behind security.
- CO3:** Apply key management and authentication techniques to provide secure Communication.
- CO4:** Understand the roles of threats in networks and the importance of firewalls and intrusion Detection System.
- CO5:** Independently discover and identify abnormalities within the network caused by worms, viruses and program threats.

TEXT BOOKS:

1. William Stallings, “Cryptography and Network Security, SixthEdition, Prentice Hall, New Delhi, 2014.
2. Charles P.Pfleeger,Shari Lawrence pfleeger, “Security in Computing ” Fifth Edition,Prentice Hall, 2015.

REFERENCE BOOKS:

1. Behrouz A Forouzan , "Cryptography and Network Security", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2010.
2. AtulKahate,"Cryptography and Network Security",ThirdEdition,McGraw Hill Education Pvt. Ltd., New Delhi, 2013.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Apply Cryptographic algorithms for encryption and decryption for secure data transmission.	3	3											2		
CO2	Understand the mathematical aspects behind security.	3			2											
CO3	Apply key management and authentication techniques to provide secure Communication.			2	3									3		
CO4	Understand the roles of threats in networks and the importance of firewalls and intrusion Detection System.	1					3								2	
CO5	Independently discover and identify abnormalities within the network caused by worms, viruses and program threats.		2				3	2							3	

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OBJECTIVE(S):

- To understand the architecture and data structures of Unix Kernel
- To learn the functions and implementations of various system calls.
- To acquire knowledge on concepts of process management.
- To understand the concepts of Memory management & IO.

Prerequisite: Operating Systems

UNIT-I INTRODUCTION 9

General Overview of the System: History – System structure – User perspective –Operating System Services – Assumptions about Hardware. Introduction to the Kernel Architecture of the UNIX Operating System – Introduction to System Concept - The Buffer Cache - Buffer headers – Structure of the Buffer Pool – Scenarios for Retrieval of a Buffer– Reading and Writing Disk Blocks – Advantages and Disadvantages of the Buffer Cache.

UNIT-II FILE SUBSYSTEMS 9

Internal Representation of Files: Inodes – Structure of a Regular File – Directories –Conversion of a Path Name to an Inode – Super Block – Inode Assignment to a New File – Allocation of Disk Blocks.

UNIT-III SYSTEM CALLS FOR THE FILE SYSTEM 9

Open – Read – Write – File And Record Locking – Adjusting the Position of File I/O – lseek – close – File Creation – Creation of Special Files – Changing Directory – Root – Owner - Mode – stat and fstat – Pipes – dup – Mounting And Un mounting File Systems – link – unlink.

UNIT-IV PROCESSES 9

Process States and Transitions – Layout of System Memory – The Context of Process- Saving the Context of a Process – Manipulation of the Process Address Space - Process Control -process Creation – Signals – Process Termination – Awaiting Process Termination – Invoking other programs – User Id of a Process – Changing the size of a Process – Shell – System Boot and the INIT Process– Process Scheduling.

UNIT-V MEMORY MANAGEMENT AND I/O 9

Memory Management Policies - Swapping – Demand Paging - The I/O Subsystem: Driver Interface – Disk Drivers – Terminal Drivers.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course the students are able to

- CO1:** Identify the data structure for kernel and methods for managing the buffer cache.
- CO2:** Design and implement the subsystems of an operating system.
- CO3:** Implement the various system calls for Unix OS.
- CO4:** illustrate the process and process scheduling concepts.
- CO5:** Analyze the memory management of an open source operating system.

TEXT BOOK:

1. Bach M.J. -"The Design of the Unix Operating System", Prentice Hall of India, 2011.

REFERENCE BOOKS:

1. B. Goodheart, J. Cox, -" The Magic Garden Explained", Prentice Hall of India, 1986.
2. S. J. Leffler, M. K. McKusick, M. J. Karels and J. S. Quarterman., -" The Design and Implementation of the 4.3 BSD Unix Operating System", Addison Wesley, 1998.
3. Robert Love, "Linux Kernel Development", 3rd Edition, Addison Wesley, 2010. Narosa Publishers, New Delhi, 2011.

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
Co1 Identify the data structure for kernel and methods for managing the buffer cache.	3	3											2		
Co2 Design and implement the subsystems of an operating system.	3			2											
Co3 Implement the various system calls for Unix OS.			2	3									3		
Co4 illustrate the process and process scheduling concepts.	1					3								2	
Co5 Analyze the memory management of an open source operating system.		2				3	2							3	



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OBJECTIVE(S):

- To explore the nature of scripting languages to design.
- To understand the open source database for development of applications.
- To acquire knowledge on concepts of python.
- To develop python applications using GUI programming.

UNIT-I INTRODUCTION AND PHP

9

Introduction to OSS : Need, Advantages, Applications - PHP: Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOPs – String Manipulation and regular expression- Date and Time – File handling - error handling.

UNIT-II MYSQL

9

MySQL: Introduction – MySQL commands – working on SQL programs – Record selection Technology – Sorting Query Results – Generating Summary – Working with metadata – Using sequences - PHP and MySQL - PHP Connectivity.

UNIT-III PYTHON

9

Python Basics - Data Variables and Operators –Control Structures - Collections: Strings - Lists - Tuples - Set and Dictionaries -Functions -Standard Library– Modules – File I/O – Exception handling.

UNIT-IV ADVANCE CONCEPTS IN PYTHON

10

Introduction to OOC – Classes and objects – Methods – Inheritance –Aggregation –Association– case study.**Python and MySQL Database Integration:** Connect Database – Create and Insert Operations – Parameter Passing – Retrieving data from Database – Cursor attribute.

UNIT-V GUI PROGRAMMING IN PYTHON

8

Regular expressions- CGI Programming – CGI Architecture – Cookies - GUI Programming (Tkinter) – Case Study – Buttons- Labels – Listbox – Checkbox –Message - Frame - Entry.

TOTAL HOURS:45 PERIODS**COURSE OUTCOME:**

At the end of the course the students are able to

- CO1: Create and run application using PHP scripting languages.
- CO2: Implement the open source databases with scripting languages.
- CO3: Read, write, execute by hand python programs.
- CO4: Build complex and large software systems using object oriented programming.
- CO5: Improve their programming skills and their knowledge of GUI concepts.

TEXT BOOKS:

1. VikramVaswani, "MySQL: The Complete Reference", 2nd Edition, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009.
2. Steve Suchring, "PHP6& MySQL Bible", John Wiley Publishing Inc., Reprint 2010.
3. Allen B. Downey , "Think Python: How to Think Like a Computer Scientist", 2ndEdition, Shroff/O'Reilly, 2016.


REFERENCE BOOKS:

1. Wesley J. Chun, "Core Python Programming", 2ndEdition, Prentice Hall, 2015.
2. RasmusLerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2012.
3. Steven Holzner, "PHP: The Complete Reference", 2ndEdition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2010.
4. Paul Barry, "Head First Python", O'Reilly Media, November 2016.
5. Dr. R. NageswaraRao, "Core Python Programming", Dreamtech Press, 2016.

E- REFERENCES:

1. <https://www.tutorialspoint.com/python>

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
Co1	Create and run application using PHP scripting languages.		3	3	2	3	2							2	3	
Co2	Implement the open source databases with scripting languages.		2	2	3	3	3				3			1	3	3
Co3	Read, write, execute by hand python programs.		3	3	3	3	3				3				3	3
Co4	Build complex and large software systems using object oriented programming.		2	3	2	3	3				3				3	3
Co5	Improve their programming skills and their knowledge of GUI concepts.		2	3	2	2	2							2		2


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OBJECTIVE(S):

- Building and design of the foundational enterprise IT architecture.
- To evolving technology, continued improvements in enterprise applications and establishing baseline metrics is important to the sustenance of key infrastructure elements of software enterprise applications.
- A Unified meta-model of elements can lead to effective business analysis from an idea that originated in order to bring rigid engineering concepts to building enterprise IT systems, Enterprise Architecture (EA) is evolving into a business driven.
- To formally capture and implement the dynamic and static elements of an enterprise to manage enterprise change.

Prerequisite: Software Engineering, Object Oriented Analysis and Design.

UNIT- I INTRODUCTION**8**

Introduction to Enterprise Applications and their Types, Software Engineering Methodologies, Life Cycle of Raising an Enterprise Application, Introduction to Skills Required to Build an Enterprise Application, Key Determinants of Successful Enterprise Applications, and Measuring the Success of Enterprise Applications.

UNIT- II INCEPTING ENTERPRISE APPLICATIONS**9**

Inception of Enterprise Applications, Enterprise Analysis, Business Modeling, Requirements Elicitation, Use Case Modeling, Prototyping, Non Functional Requirements, Requirements Validation, Planning and Estimation.

UNIT-III ARCHITECTING AND DESIGNING ENTERPRISE APPLICATIONS**10**

Concept of Architecture, Views and Viewpoints, Enterprise Architecture, Logical Architecture, Technical Architecture - Design, Different Technical Layers, Best Practices, Data Architecture and Design – Relational, XML, and Other Structured Data Representations, Infrastructure Architecture and Design Elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of Application Architecture and Design.

UNIT- IV CONSTRUCTING ENTERPRISE APPLICATIONS**9**

Construction Readiness of Enterprise Applications - Defining a Construction Plan, Defining a Package Structure, Setting up a Configuration Management Plan, Setting up a Development Environment, Introduction to the Concept of Software Construction Maps, Construction of Technical Solutions Layers, Methodologies of Code Review, Static Code Analysis, Build and Testing, Dynamic Code Analysis – Code Profiling and Code Coverage.

UNIT- V TESTING AND ROLLING OUT ENTERPRISE APPLICATIONS**9**

Types and Methods of Testing an Enterprise Application, Testing Levels and Approaches, Testing Environments, Integration Testing, Performance Testing, Penetration Testing, Usability Testing, Globalization Testing and Interface Testing, User Acceptance Testing, Rolling out an Enterprise Application.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course the students are able to

- CO1:** Design and build the foundational enterprise IT architecture.
CO2: Elicitate, architect, design and validate the inception of enterprise application.
CO3: Capture and implement the dynamic and static elements of an enterprise to manage Enterprise change.
CO4: Design Static and Dynamic applications.
CO5: Test enterprise applications in various levels.

TEXT BOOKS:

1. Raising Enterprise Applications: A Software Engineering Perspective, AnubhavPradhanSatheesha B.NanjappaSenthil K. NallasamyVeerakumarEsakimuthu, 1st Edition, Wiley India Pvt Ltd, 2010.

REFERENCE BOOKS:

1. RaffaeleGarofalo, "Building Enterprise Applications with Windows Presentation Foundation and the Model View ViewModel Pattern", 1stEdition, Microsoft Press, 2011.
2. Dominic Duggan, "Enterprise Software Architecture and Design Entities, Services, and Resources", 1stEdition, Wiley India Pvt Ltd, 2012.
3. Martin Fowler, "Patterns of Enterprise Application Architecture", 1st Edition, Pearson/ Goels. Computer Hut Publisher.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Design and build the foundational enterprise IT architecture.		2	3			3							1		
CO2	Elicitate, architect, design and validate the inception of enterprise application.		2			3					3				3	
CO3	Capture and implement the dynamic and static elements of an enterprise to manage Enterprise change.			3				2		3				2	3	
CO4	Design Static and Dynamic applications.		2	3		2									2	
CO5	Test enterprise applications in various levels.			3	3			3				3				3


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OBJECTIVE(S):

At the end of the course, the students should be able to:

- Understand the Kepler's law of motion and different orbital elements
- Know the Attitude and orbit control in spacecraft subsystems and link design
- Understand the analog and digital multiple access
- Understand the distinct types of Earth segment
- Summarize the various applications of Satellite.

UNIT-I ORBIT DYNAMICS

9

Kepler's Laws of planetary motion , orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility –eclipse-Sub satellite point – Sun transit outage-Launching Procedures - launch vehicles and propulsion.

UNIT-II SPACE SEGMENT AND LINK DESIGN

9

Space Segment: Power Supply – Attitude Control – Spinning Satellite Stabilization – Momentum Wheel Stabilization – Station Keeping – Thermal Control – TT&C Subsystem – Transponders – Wideband Receiver – Input Demultiplexer – Power Amplifier – Antenna Subsystem

Link Design: Satellite uplink – down link- link power budget equation - c/n_0 - G/T - Noise temperature- System noise- propagation factors- rain and ice effects- Earth Station parameters- polarization.

UNIT-III SATELLITE ACCESS

9

Modulation and Multiplexing: Voice, Data and Video- Analog Satellite communication – FDMA Technique, SCPC, CSSB system – Digital satellite communication system –TDMA ,CDMA Techniques.

UNIT-IV EARTH SEGMENT

9

Introduction - Active and passive satellite- Transmitters- receivers- Antennas- Terrestrial Interface- TVRO- MATV- CATV- Test Equipments- Measurements on G/T - C/N_0 - EIRP- Antenna Gain.

UNIT-V SATELLITE APPLICATIONS

9

INTELSAT Series, INSAT, VSAT, INMARSAT, Satellite Navigational System-IRNSS , Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet.

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES**

Upon Completion of this course, students will be able to:

- CO1:** Analyze different orbital elements.
- CO2:** Control the space craft subsystems and design link budget analysis.
- CO3:** Apply multiple access technique for Satellite Communication.
- CO4:** Describe the various types of Earth Segments.
- CO5:** Understand different applications of Satellite.

TEXT BOOKS:

1. Dennis Roddy, "Satellite Communication", 4th Edition, Mc Graw Hill International, 2006.
2. Wilbur L.Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, "Satellite Communication Systems Engineering", Prentice Hall/Pearson, 2007.
3. Timothy Pratt - Charles Bostian & Jeremy Allmuti- "Satellite Communications" -John Willy & Sons (Asia) Pvt-Ltd- 2004.

REFERENCE BOOKS:

- 1 Tri T. Ha, "Digital Satellite Communication", II nd edition, 1990.
- 2 M-Richharia : " Satellite Communication Systems (Design Principles)" Pearson Second Edition, 2003.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Analyze different orbital elements.	2			2				2							
CO2	Control the space craft subsystems and design link budget analysis.					3						3		2		
CO3	Apply multiple access technique for Satellite Communication.		2													
CO4	Describe the various types of Earth Segments.		2		3										3	
CO5	Understand different applications of Satellite.				2			3	2							3


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OBJECTIVE(S):

- To learn compiler construction tools.
- To design the specification of language constructs.
- To learn code generation and optimization techniques.
- To learn and understand the encryption techniques.
- To understand the network traffic analysis.

LIST OF EXPERIMENTS:**COMPILER LABORATORY:**

1. Symbol table creation from a list of declarations
2. Lexical analyzer to recognize patterns in C (ex. Identifiers, constants, comments, operators etc.)
3. Parser with LEX and YACC to validate —for statement.
4. Evaluation of arithmetic expression with LEX and YACC.
5. Syntax tree creation from —if statement.
6. Three address code generation for assignment statement with array references.
7. Code Optimization techniques (Constant Propagation, Constant Folding).

SECURITY LABORATORY:

8. Implementation of classical encryption techniques.
 - a. Caesar cipher
 - b. Playfair cipher
9. Implementation of Transposition Technique.
10. Implementation of Steganography technique.
11. Implementation of symmetric key algorithm using SDES
12. Implementation of Extended Euclid's algorithm
13. Implementation of Public key algorithm using RSA
14. Packet Sniffing using Wireshark tool to perform the network traffic analysis attack.

TOTAL HOURS:45 PERIODS**RECOMMENDED (Content Beyond Syllabus)**

- Develop a client server application for basic cryptosystem.
- Generate Digital Signature for the Digital Document.
- Detection of Buffer Overflow attack.

COURSE OUTCOMES:**At the end of the course the students are able to**

- CO1:** Construct the token recognizer from token specification.
- CO2:** Implement parser from the syntax specification.
- CO3:** Generate intermediate code and to implement simple code optimization techniques.
- CO4:** Implement the classical encryption techniques.
- CO5:** Provide security by implementing cryptographic algorithms.
- CO6:** Use tools to perform and analyze the network traffic attack.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
Co1	Construct the token recognizer from token specification.		2	2	3	2								3		
Co2	Implement parser from the syntax specification.		3	2	3	1								2		
Co3	Generate intermediate code and to implement simple code optimization techniques.		3	3	3	2									3	
Co4	Implement the classical encryption techniques.		2	2	2	3								1		
Co5	Provide security by implementing cryptographic algorithms.		3	3	2	1								2		
Co6	Use tools to perform and analyze the network traffic attack.		2	2	2	3								1		

SOFTWARE REQUIRED

Operating System: Windows, Linux.

TOOLS:


Compiler : Lex, YAAC

Security: Wire shark and Eclipse

LANGUAGE:

Compiler : C

Security: java


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OBJECTIVE(S):

- To learn new technology to create web based applications.
- To understand versatile open source software tools.
- To build dynamic and sustainable applications for the web.
- To perform application development, deployment.

LIST OF EXPERIMENTS:

1. Write a simple PHP scripts with functions.
2. Write a PHP scripts using arrays.
3. Write a PHP script to implement strings handling functions
4. Write PHP scripts to implement OOP concepts.
5. Create forms in PHP to get form data and to retrieve data from get requests.
6. Connecting the MySQL database and perform the following
 - a. Creating and deleting databases
 - b. Creating, inserting& deleting tables
7. Implement the following activities using MySQL
 - a. Selecting specific rows and columns
 - b. Deleting and updating rows
8. Create a database with PHP and MySQL to perform basic operations.
9. Write a pythoncode for basic operations.
10. Write a Python Scripts to implement collections: List, Set, Dictionaries and Tuples.
11. Write a Python script using object, classes and methods.
12. Write a program to implement database connectivity with Python and MySQL.
13. Design and implement GUI with python programming

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:****At the end of course students are able to**

- CO1:** Design and develop input validation test schemes using PHP scripting languages.
- CO2:** Gain knowledge and hands-on experience in database tools.
- CO3:** Select programming language and tools suitable for given problem.
- CO4:** Analyze and adapt simple and basic python scripts for GUI application.

LIST OF SOFTWARES REQUIRED

- Operating System : Linux / Windows.
- Open Source Software: PHP, Python.
- Database : MySQL.
- Open Source Platform: XAMPP, Eclipse IDE.

1		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
Co1	Design and develop input validation test schemes using PHP scripting languages.		3	3	2		2							2	3	
Co2	Gain knowledge and hands-on experience in database tools.	1	2		3		3				3			1	3	3
Co3	Select programming language and tools suitable for given problem.	1	3		3		3				3				3	3
Co4	Analyze and adapt simple and basic python scripts for GUI application.	1	2	3	2		3				3				3	3

615CIP09

EMPLOYABILITY SKILLS LABORATORY

L	T	P	C
1	0	3	2

(B.E. BME, ECE, EEE & B. Tech. IT)**OBJECTIVE(S):**

- To equip students of engineering and technology with effective speaking and listening skills in English.
- To help them enrich their soft skills and interpersonal skills, which will make the transition from college to workplace smoother and help them excel in their career.
- To enhance the performance of the students in the recruitment processes, self enhancement and launching start ups.

Globalization has brought in numerous opportunities for the teeming millions, with more focus on the students' overall capability apart from academic competence. Many students, particularly those from non-English medium schools, find it difficult to enter in the corporate arena due to their inadequacy of communication skills and soft skills, despite possessing sound knowledge in their subject area along with technical capability. Keeping this necessity of pre-employment coaching for career developments of the students in view, this course on Employability Skills Laboratory is designed to prepare the students to adapt themselves with ease to the industry environment, and entrust themselves prospective assets to industries. The course will equip the students with the necessary employability skills that would go a long way in helping them in their career.

UNIT-I**7**

Listening Audios and Answering MCQs - Watching Video Clips on Famous Speeches, Motivational Videos, Documentaries and Answering MCQs - Listening Comprehension and TED talks.

UNIT-II**10**

Prepared Talk – Extempore - Story Knitting - Picture Talk – Brainstorming – Debates - Group Discussions - Elevator Speech - Mock HR Interviews - Story Narration – Miming - Short Skits.

UNIT-III**12**

Reading Comprehension - Verbal Analogy - Classification - Alphabet Test - Logical Sequence of Words - Statement & Conclusions - Statement & Courses of Action - Situation Reaction Test - Theme Detection - Deriving Conclusions from Passages.

UNIT-IV**7**

Business Letters - Email Writing (hints development) - Essay Writing - Paragraph Writing - Paraphrasing.

UNIT-V**9**

Vocabulary Test (GRE, TOEFL, TOEIC & CAT Exam words) - Confused Pair of words - Contronyms - One Word Substitution - Sequencing of Sentences – Sentence Correction.

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:**

On completion of the course, the students shall have the ability to:

- CO1:** Comprehend the various strategies of listening and its significance.
- CO2:** Articulate their views clearly and concisely with self-confidence and persuasiveness.
- CO3:** Understand the prevailing practices of testing in the recruitment process by the corporates and the institutional selection processes.
- CO4:** Communicate the corporate and social requirements in an impressive written mode.
- CO5:** Enhance their verbal skills in the screening tests competently both for recruitment and pursuing higher studies as well.

TEXT BOOKS:

1. Agarwal R. S. "A Modern Approach to Verbal and Non-verbal Reasoning", Chand & Co., New Delhi, 2012.

REFERENCE BOOKS:

1. Lingua: "Essays for TOEFL/IELTS", Dreamtech Press, New Delhi, 2016.
2. Lily Mangalam, "Global English Comprehension", Allied Publishers Pvt. Ltd., New Delhi, 2014.
3. Sharon Weiner Green and Ira K. Wolf, "Barron's GRE", Glagotia Publications Pvt. Ltd., 18th Edition, New Delhi, 2011.
4. Mohamed Elias, R. Gupta's "IELTS/TOEFL Essays", Ramesh Publishing House, 6th Edition, New Delhi, 2016.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
Co1	Comprehend the various strategies of listening and its significance.									3	3	3	3			3
Co2	Articulate their views clearly and concisely with self-confidence and persuasiveness.									3	3	3	3			3
Co3	Understand the prevailing practices of testing in the recruitment process by the corporates and the institutional selection processes.									3	3	3	3			3
Co4	Communicate the corporate and social requirements in an impressive written mode.									3	3	3	3			3
Co5	Enhance their verbal skills in the screening tests competently both for recruitment and pursuing higher studies as well.									3	3	3	3			3


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715ITT01

MOBILE COMMUNICATIONS

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To impart the fundamental concepts of mobile communications systems
- To understand working knowledge on various telecommunication systems and MAC protocols.
- To study the working principles of TCP/IP and its standards.
- To learn about MANET & VANET design, routing and security issues.
- To build skills in working with Wireless application Protocols to develop mobile content.

UNIT-I INTRODUCTION

9

Basics of Communication technologies - Mobile Computing Introduction – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application-Cellular Mobile Communication.

UNIT-II TELECOMMUNICATION SYSTEM& MAC PROTOCOLS

9

Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS). MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes-802.11 MAC Standard-MAC Protocols for Ad Hoc Networks.

UNIT-III MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER

9

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization-Dynamic Host Configuration Protocol. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.

UNIT-IV MOBILE AD-HOC NETWORKS

9

Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Routing in MANETs - MANET Routing Protocols : DSDV, DSR, AODV – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security Attacks and Counter Measures in MANETs.

UNIT-V APPLICATION LAYERS

9

WAP-Architecture, WDP, WTLS, WTP, WSP, WAE, WML, WML Script, WTA, Push Architecture, Push/Pull Services.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Explore the basics of mobile telecommunication system.
- CO2:** Familiarize with working aspects of telecommunication system & MAC protocols.
- CO3:** Analyze the working principles of TCP/IP & its standards.
- CO4:** Understand design issues of Ad hoc networks,
- CO5:** Develop a mobile application.

TEXT BOOKS:

1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd, New Delhi – 2012.
2. Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2011.

REFERENCE BOOKS:

1. C.Siva Ram Murthy and B.S.Manoj, "AdHoc Wireless Networks", Second Edition, Pearson Education, 2007.
2. Dharma PrakashAgarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
3. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
4. William.C.Y.Lee,"Mobile Cellular Telecommunications-Analog and Digital Systems", Second Edition,TataMcGraw Hill Edition ,2006.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Explore the basics of mobile telecommunication system.	3	2	1	3		2							1	2	
CO2	Familiarize with working aspects of telecommunication system & MAC protocols.		3	2	2		2								1	
CO3	Analyze the working principles of TCP/IP & its standards.	1	3	3	2		2							2		
CO4	Understand design issues of Ad hoc networks,	1			3		2							3		
CO5	Develop a mobile application.			1	3		3							3		



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715CIT02 DATA WAREHOUSING AND DATA MINING

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To make familiar with the various concepts of data warehouse architecture, Online Analytical Processing (OLAP), Meta data, Data mart, and multidimensional data models.
- To sail along with the various approaches in data mining.
- To familiarize with data mining algorithms and its application in various fields.

Prerequisite: Database Management Systems

UNIT-I DATA WAREHOUSE & OLAP TECHNOLOGY

9

Data Warehouse Overview - Multidimensional Data Model - Data Warehouse Architecture - Data Warehouse Implementation - Data Warehousing to Data Mining.

UNIT-II DATA MINING

9

Introduction - Kinds of data - Data Mining Functionalities - Interestingness of Patterns - Classification of Data Mining Systems - Data Mining Task Primitives - Integration of a Data Mining System with a Data Warehouse - Issues - Data Preprocessing.

UNIT-III ASSOCIATION RULE MINING

9

Mining Frequent Patterns- Associations and Correlations - Frequent item set Mining Methods – Mining Various Kinds of Association Rules - Correlation Analysis - Constraint Based Association Mining.

UNIT- IV CLASSIFICATION

9

Basic Concepts - Classification and Prediction - Issues - Decision Tree Induction – Bayesian Classification - Rule Based Classification - Classification by Back propagation - Support Vector Machines – Associative Classification - Prediction.

UNIT-V CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING

9

Cluster Analysis - Types of Data - Categorization of Major Clustering Methods – k-Means - Partitioning Methods - Hierarchical Methods - Density-Based Methods - Grid Based Methods - Model-Based Clustering Methods - Clustering High Dimensional Data - Constraint – Based Cluster Analysis - Outlier Analysis - Data Mining Applications - Trends in Data Mining - Case study : DBMiner , WEKA Tool.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Have an extensive knowledge on concepts of data warehousing and differentiate OLTP and OLAP.
- CO2:** Discover and measure interesting patterns from different kinds of databases.
- CO3:** Apply the technique of association finding to solve real life problems.
- CO4:** Compare and contrast the various classifiers.
- CO5:** Able to explore recent trends in data mining and its applications.


TEXT BOOKS:

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

REFERENCES BOOKS:

1. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction To Data Mining", Pearson Education, 2007.
3. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
4. G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
5. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
Co1	Have an extensive knowledge on concepts of data warehousing Modeling and Implementation				2					3				3	1	3
Co2	Discover and measure interesting patterns from different kinds of databases.		3	2	3	3				3				3	3	
Co3	Apply association rule mining techniques for data analysis.		3	3	3	2				3					3	3
Co4	Compare and contrast the various classifiers.		2	2	1	2				3				2		
Co5	Able to explore recent trends in data mining and its applications.		2	3	2	3				3						3


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715CIT03

MOBILE APPLICATION DEVELOPMENT

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To learn the characteristics of mobile applications.
- To learn about the intricacies of UI required by mobile applications.
- To study about the design aspects of mobile application.
- To learn development of mobile applications.

Prerequisites: Java Programming

UNIT –I GETTING STARTED WITH MOBILITY 9

Mobility landscape, Mobile platforms – Apple iPhone Platform- Google Android Platform – Eclipse Simulator, Mobile apps development, setting up the mobile app development environment along with an emulator - Case Study on Mobile App development.

UNIT-II BUILDING BLOCKS OF MOBILE APPS – I 9

App user interface designing – mobile UI resources (Layout, UI elements, Drawable Menu), Activity-states and life cycle, interaction amongst activities. App functionality beyond user interface - Threads, ASync task, Services – states and lifecycle, Notifications.

UNIT-III BUILDING BLOCKS OF MOBILE APPS – II 9

Broadcast receivers, Telephony and SMS APIs , Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet)

UNIT-IV SPRUCING UP MOBILE APPS 9

Graphics and animation – custom views, canvas, animation APIs, multimedia – Audio/video playback and record, location awareness, and native hardware access (sensors such as accelerometer and gyroscope)

UNIT-V TESTING MOBILE APPS AND TAKING APPS TO MARKET 9

Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk, Versioning, signing and packaging mobile apps, distributing apps on mobile market place.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course students should be able to

- CO1:** Familiarize with Mobile apps development aspects.
- CO2:** Design and implement the user interfaces for mobile applications
- CO3:** Develop useful mobile applications using Google Android and Eclipse simulator.
- CO4:** Develop mobile applications using graphics and animation
- CO5:** Perform testing, signing, packaging and distribution of mobile apps

TEXT BOOK:

1. Anubhav Pradhan, Anil V Deshpande, "Mobile Apps Development", First Edition, Wiley India, (2013)

REFERENCE BOOKS:

1. Barry Burd , "Android Application Development All in one for Dummies", First Edition , Wiley India ,(2011)
2. Lauren Darcey , Shane Conder, "Teach Yourself Android Application Development In 24 Hours", Second Edition, Wiley India , (2012)

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Familiarize with Mobile apps development aspects.		2	3										1		
CO2	Design and implement the user interfaces for mobile applications			3			2							3		
CO3	Develop useful mobile applications using Google Android and Eclipse simulator.			2		3	2	2							3	
CO4	Develop mobile applications using graphics and animation			3	2		3								3	
CO5	Perform testing, signing, packaging and distribution of mobile apps					3		2	2					3		2



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OBJECTIVES:

- To understand the concept of cloud and utility computing.
- To understand the various issues in cloud computing.
- To familiarize themselves with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.
- To be able to set up a private cloud.

UNIT-I INTRODUCTION**8**

Introduction - Historical Development - Cloud Computing Architecture – The Cloud Reference Model – Cloud Characteristics – Cloud Deployment Models: Public, Private, Community, Hybrid Clouds - Cloud Delivery Models: IaaS, PaaS, SaaS – Open Source Private Cloud Software: Eucalyptus, Open Nebula, Open Stack.

UNIT-II VIRTUALIZATION**9**

Data Center Technology - Virtualization - Characteristics of Virtualized Environments - Taxonomy of Virtualization Techniques – Virtualization and Cloud Computing – Pros and Cons of Virtualization - Implementation Levels of Virtualization - Tools and Mechanisms: Xen, VMWare, Microsoft Hyper-V.

UNIT-III CLOUD COMPUTING MECHANISM**9**

Cloud Infrastructure Mechanism: Cloud Storage, Cloud Usage Monitor, Resource Replication – Specialized Cloud Mechanism: Load Balancer, SLA Monitor, Pay-per-use Monitor, Audit Monitor, Failover System, Hypervisor, Resource Cluster, Multi Device Broker, State Management Database – Cloud Management Mechanism: Remote Administration System, Resource Management System, SLA Management System, Billing Management System.

UNIT-IV HADOOP AND MAP REDUCE**10**

Apache Hadoop – Hadoop Map Reduce – Hadoop Distributed File System- Hadoop I/O- Developing a Map Reduce Application - Map Reduce Types and Formats - Map Reduce Features– Hadoop Cluster Setup – Administering Hadoop.

UNIT-V SECURITY IN THE CLOUD**9**

Basic Terms and Concepts – Threat Agents – Cloud Security Threats – Cloud Security Mechanism: Encryption, Hashing, Digital Signature, Public Key Infrastructure, Identity and Access Management, Single Sign-on, Cloud Based Security Groups, Hardened Virtual Server Images

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:**

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

- CO1:** Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
- CO2:** Choose the appropriate technologies, algorithms and approaches for the related issues in cloud.
- CO3:** Identify the architecture, infrastructure and delivery models of cloud computing.
- CO4:** Understand and apply Map and Reduce Programming.
- CO5:** Understand the core issues of cloud computing such as security, privacy and interoperability.

TEXT BOOK:

1. Thomas Erl, Zaigham Mahood, Ricardo Uttini, "Cloud Computing, Concept, Technology and Architecture", Prentice Hall, 2013.

REFERENCE BOOKS:

1. Toby Velte, Anthony Velte, Robert C. Elsenpeter, - Cloud Computing, A Practical Approach Tata McGraw-Hill Edition, 2010.
2. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, - Mastering Cloud Computing, Tata McGraw-Hill, 2013.
3. Arshdeep Bahga, Vijay Madiseti, - Cloud Computing: A Hands- On Approach]], Universities Press, 2014.
4. Tom White, - Hadoop: The Definitive Guide, O'Reilly Media, 4th Edition, 2015.
5. James E Smith and Ravi Nair, -Virtual Machines, Elsevier, 2005.
6. John Rittinghouse and James Ransome, Cloud Computing, Implementation, Management and Strategy, CRC Press, 2010.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.		3	3	3	3										2
CO2	Choose the appropriate technologies, algorithms and approaches for the related issues in cloud.	3		2	2	3										
CO3	Identify the architecture, infrastructure and delivery models of cloud computing.		3	2	3	3								1	2	
CO4	Understand and apply Map and Reduce Programming.		3	3	3	3								3	3	3
CO5	Understand the core issues of cloud computing such as security, privacy and interoperability.	2		2	2	3	3	3						2	2	3



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715CIE01

INTERNET OF THINGS

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To understand the fundamentals of Internet of Things
- To learn about the basics of IOT protocols
- To build a small low cost embedded system using Raspberry Pi.
- To apply the concept of Internet of Things in the real world scenario.

Prerequisites: Nil

UNIT-I INTRODUCTION

9

Introduction to Internet of Things Definition & Characteristics of IoT, Evolution of IoT, Physical Design of IoT- Things in IoT, IoT Protocols, Logical Design of IoT, IoT Functional Blocks, IoT Communication Models ,IoT Communication APIs, IoT Enabling Technologies , Wireless Sensor Networks. Cloud Computing Big Data Analytics, Communication Protocols, Embedded Systems IoT Levels & Deployment Templates, IoT Level-1, IoT Level-2,IoT Level-3,IoT Level-4,IoT Level5,IoTLevel-6 .

UNIT-II IoT, M2M AND PLATFORM DESIGN METHODOLOGY

9

IoT and M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, Software Defined Networking, Network Function Virtualization, NETCONF, YANG, IoT System Management with NETCONF-YANG, IoT Platforms Design Methodology : IoT Design Methodology , Purpose & Requirements Specification , Process Specification, Domain Model Specification, Information Model Specification, Service Specifications, IoT Level Specification, Functional View Specification, Operational View Specification, Device & Component Integration, Application Development.

UNIT-III PYTHON PACKAGES AND IOT PHYSICAL DEVICES

8

Python Packages of Interest for IoT-JSON, XML, HTTPLib & URLLib, SMTPLib, Raspberry Pi, About the Board , Linux on Raspberry Pi, Raspberry Pi Interfaces, Serial, SPI , I2C Programming Raspberry Pi with Python-Controlling LED with Raspberry Pi , Interfacing an LED and Switch with Raspberry Pi, Interfacing a Light Sensor (LDR) with Raspberry Pi, Other IoT Devices-pcDuino, Beagle Bone Black, Cubie board.

UNIT-IV IoT PHYSICAL SERVERS & CLOUD OFFERINGS

9

IoT Physical Servers & Cloud Offerings,WAMP - AutoBahn for IoT,Xively Cloud for IoT, Python Web Application Framework – Django, Django Architecture , Starting Development with Django , Designing a RESTful Web API,Amazon Web Services for IoT , Amazon EC2, Amazon AutoScaling ,Amazon S3,Amazon RDS Amazon DynamoDB, Amazon Kinesis, Amazon SQS,Amazon EMR,SkyNet IoT Messaging Platform.

UNIT-V DATA ANALYTICS FOR IoT & CASE STUDIES

10

Data Analytics for IoT-Apache Oozie, Setting up Oozie, Oozie Workflows for IoT Data Analysis, Apache Spark, Apache Storm, Setting up a Storm Cluster, Using Apache Storm for Real-time Data Analysis, REST- based approach, Web Socket-based approach. Case Studies Illustrating IoT Design-Smart Lighting, Smart Parking , Weather Monitoring System-Weather Reporting Bot ,Smart Irrigation, IoT Printer, Tools for IoT- Chef, Puppet.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:**At the end of the course, the student should be able to:**

- CO1:** Compare and analyze different design issues and domains of IoT.
- CO2:** Identify different design methodologies and end point devices of IoT.
- CO3:** Prepare different cloud based and embedded solution for IoT.
- CO4:** Formulate different case studies related to IoT framework.
- CO5:** Solve data analytical and real-time application problems on IoT.


TEXT BOOKS:

1. Arshdeep Bagha ,Vijay Madiseti,Internet of Things (A Hands-on-Approach), University Press, 2015.

REFERENCE BOOKS:

1. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), - Architecting the Internet of Things, Springer, 2011.
2. Honbo Zhou, - The Internet of Things in the Cloud: A Middleware Perspective, CRCPress, 2012.
3. Jan Ho" ller, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.
4. Olivier Hersent, David Boswarthick, Omar Elloumi , -The Internet of Things – Key applications and Protocols, Wiley, 2012
5. The Evolution of Internet of Things - Texas Instruments.
(<http://www.ti.com/lit/ml/swrb028/swrb028.pdf>)

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Compare and analyze different design issues and domains of IoT.		2	3		3								2		
CO2	Identify different design methodologies and end point devices of IoT.		3	3											3	
CO3	Prepare different cloud based and embedded solution for IoT.			3				3	2					3		
CO4	Formulate different case studies related to IoT framework.															3
CO5	Solve data analytical and real-time application problems on IoT.					2			3		3	3				3


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COURSE OBJECTIVE(S):

- Understand the moral values that ought to guide engineering profession or practice.
- Resolving moral issues in engineering.
- Justifying the moral judgements in engineering. It deals with set of moral problems and issues connected with engineering.

Pre-requisites: **ENGINEERING ETHICS AND HUMAN VALUES**

UNIT-I	HUMAN VALUES	10
Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality		
UNIT-II	ENGINEERING ETHICS	9
Scope of Engineering Ethics – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Models of professional roles - Self-interest – Ethical Egoism.		
UNIT- III	ENGINEERING AS SOCIAL EXPERIMENTATION	9
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law – The Challenger Case Study.		
UNIT-IV	SAFETY, RESPONSIBILITIES AND RIGHTS	9
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – The Three Mile Island and Chernobyl Case Studies – Team Work and Loyalty - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination		
UNIT-V	GLOBAL ISSUES	8
Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample Code of Conduct.		

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students are able to

- CO1:** It ensures students sustained happiness through identifying the essentials of human values and skills.
- CO2:** It facilitates a correct understanding between profession and happiness
- CO3:** It helps students understand practically the importance of trust, mutually satisfying human behavior
- CO4:** It helps students enriching interaction with nature.
- CO5:** Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life.


TEXT BOOKS:

1. Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, New Delhi, 4th Edition, 2010.

REFERENCES:

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Thompsonwadsworth, A Division of Thomson Learning Inc., United States, 2000.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", OxfordUniversity Press, Oxford, 2001.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	It ensures students sustained happiness through identifying the essentials of human values and skills.		2	2	3	2								3		
CO2	It facilitates a correct understanding between profession and happiness		3	2	3	1								2		
CO3	It helps students understand practically the importance of trust, mutually satisfying human behavior		3	3	3	2									3	
CO4	It helps students enriching interaction with nature.		2	2	2	3								1		
CO5	Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life.		3	3	2	1								2		


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OBJECTIVE(S):

The student should be made to:

- Know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- Understand how to work with various mobile application development frameworks.
- Can able to draw basic graphical primitive on the mobile application.
- Learn the basic and important design concepts and issues of development of mobile applications.
- Understand how to work with GPS location tracking information.

LIST OF EXPERIMENTS:

1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multithreading
8. Develop a native application that uses GPS location information.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that creates alarm clock

TOTAL HOURS:45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Design and Implement various mobile applications using emulators.
CO2: Deploy applications to hand-held devices
CO3: Develop an application using basic graphical primitives and databases.
CO4: Construct an application using multi-threading and RSS feed.
CO5: Make use of location identification using GPS in an application.

LIST OF EQUIPMENTS:

- Standalone desktops with Windows or Android or iOS or Equivalent Mobile Application Development
- Tools with appropriate emulators and debuggers.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Design and Implement various mobile applications using emulators.		2	3										1		
CO2	Deploy applications to hand-held devices			3			2							3		
CO3	Develop an application using basic graphical primitives and databases.			2		3	2	2							3	
CO4	Construct an application using multi threading and RSS feed			3	2		3								3	
CO5	Make use of location identification using GPS in an application.					3		2	2					3		

OBJECTIVE(S):

- Create practical exposure to virtualization concepts by creating virtual machines
- Learn Application and back end web service development
- Learn hosting applications in the cloud environment and use REST API's
- Expose to database hosting and accessing in virtual environment
- Familiar with cloud authentication concept by application authentication using username/password.

LIST OF EXPERIMENTS:

1. Design and create virtual machine configuration for the given problem. Justify the use of CPU, Memory, GPU and storage. Create the Virtual machine.
2. Create key based authentication and login virtual machine from the host machines. Install required software by connecting with SSH or Putty.
3. Install Web server in the virtual machine and create sample web application(HTML,JS) and host. Run from the browser.
4. Create simple backend logic and communication with front end app using AJAX.
5. Create SQL DB and design schema for user session details .Retrieve the details from front end application.
6. Create user name, store the password in the SQL. Login using user name/password and validate.
7. Create and mount one node Hadoop cluster.
8. Access the Hadoop using API's from the application and show the data.
9. Demonstrate the use of map and reduce using simple program.

TOTAL HOURS:45 PERIODS**COURSE OUTCOMES:****Upon completion of the course, students will be able to:**

- CO1:** Develop and deploy cloud application using popular cloud platforms,
- CO2:** Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud.
- CO3:** Explain and identify the techniques of hadoop cluster in cloud.
- CO4:** Compare, contrast, and evaluate the key trade-offs between multiple approaches to map reduce in cloud system design.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:**Software:** Eucalyptus or Open Nebula or equivalent, Virtual box , Ubuntu.**Hardware:** Standalone desktops 30 Nos

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Develop and deploy cloud application using popular cloud platforms,		2	3										1		
CO2	Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud.		2	3			2							3		
CO3	Explain and identify the techniques of hadoop cluster in cloud.	2		2		3	2	2							3	
CO4	Compare, contrast, and evaluate the key trade-offs between multiple approaches to map reduce in cloud system design.			3	2		3								3	



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AIM:

To obtain the basic knowledge of doing projects by using their programming skills learned.

OBJECTIVE:

The main objective of the Mini Project is to enhance the Student's ability in solving real time problems and situations related to industry and academics needs by the application of varying tools and techniques.

PREREQUISITE: Object Oriented and Modelling & Design Lab

IMPORTANCE OF MINI PROJECT:

1. To have a systematic approach for solving problems.
2. Provides an opportunity for the students to develop and orient their solutions to the real time problems.
3. Forms the base for working in a team and to have upper hand in application of skills and knowledge gained in the previous semesters.

GUIDELINES FOR MINI PROJECT:

1. The students in groups of not more than 4 members have to take one Mini Project.
2. The team can select the problem domain based on their area of interest.
3. Periodic Monitoring of the project will be scheduled during the project hours and phase based deliverables are expected (SRS, Design Diagrams, Coding, Test reports, Project report).
4. Projects have to be developed during the project hours and it has to be in-house project.

EVALUATION OF MINI PROJECT:

1. Each project will be guided by a guide based on their area of interest.
2. Continuous assessment of the Mini Project will be done by the conduction of 3 reviews.
3. Each Individual student will be evaluated based on the progress and performance during the reviews.

TOTAL HOURS:45 PERIODS

COURSE OUTCOME:

At the end of the course the students will be able to

CO1: Demonstrate a sound technical knowledge of their selected project topic.

CO2: Design engineering solutions to complex problems utilizing a system approach.

CO3: Analyze engineering problem specification and recommend an optimum set of technical solutions.

CO4: Implement innovative ideas in solving contemporary issues.

CO5: Acquire industry relevant skills by working in team and efficiently communicating the deliverables.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Demonstrate a sound technical knowledge of their selected project topic.		2	3										1		
CO2	Design engineering solutions to complex problems utilizing a system approach.			3		1			2				1			1
CO3	Analyze engineering problem specification and recommend an optimum set of technical solutions.		2	3			2							3		
CO4	Implement innovative ideas in solving contemporary issues.	2		2		3	2	2							3	
CO5	Acquire industry relevant skills by working in team and efficiently communicating the deliverables.			3	2		3								3	

OBJECTIVE(S):

- To know the difference between traditional networks and software defined networks.
- To know the reduced complexity of network operation.
- To obtain skills about data centers and programming.
- To understand the faster time to revenue for new applications.

Prerequisites: Computer Networks

UNIT –I SDN: INTRODUCTION

9

Traditional Switch Architecture - Evolution of Switches and Control Planes - Centralized and Distributed Control and Data Plane - Data Center Innovation, Data Center Needs – The Genesis of SDN - How SDN Works: Fundamental Characteristics of SDN, SDN Operation, SDN Devices.

UNIT-II OPEN FLOW AND SDN CONTROLLER

10

OpenFlow Overview: The OpenFlow switch, The OpenFlow Controller, The OpenFlow protocol, The Controller-switch secure channel, Open Flow 1.0 and OpenFlow Basics - SDN Controllers and concepts.

UNIT-III DATA CENTERS

9

Multitenant and Virtualized Multitenant Data center – SDN Solutions for the Data Center Network – VLANs – EVPN – VxLAN – NVGRE – The Juniper SDN Framework – IETF SDN Framework – Open Daylight Controller/Framework.

UNIT-IV PROGRAMMING SDN

10

Network Programmability: Management Interface – The Application-Network Divide – The Command-Line Interface – NETCONF and NETMOD – SNMP – XMPP – Google’s Protocol buffers – Thrift – JSON – I2RS. Modern Orchestration: OpenStack – Cloud Stack – Puppet.

UNIT-V NETWORK FUNCTION VIRTUALIZATION (NFV) AND SDN APPLICATION

7

Concepts – Implementation – Applications of NFV – SDN Applications: WAN – Service Provider and Carrier Networks – Campus Networks – Hospitality Networks – Mobile Networks – Inline Network Function – Optical Networks.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

Upon successful completion of this course, students should be able to:

- CO1:** Compare and contrast between traditional switch architecture and software defined networks.
- CO2:** Understand the functionality of Openflow protocol and SDN controllers.
- CO3:** Illustrate use of SDN in Data Centers and other environments.
- CO4:** Use software programs to perform varying and complex networking tasks.
- CO5:** Expand the knowledge learned and apply it to solve real world problems.

TEXT BOOKS:

1. Paul Goransson, Chuck Black, and Timothy Culver: Software Defined Networks A Comprehensive Approach, Second Edition, Elsevier, 2014.
2. Thomas D. Nadeau & Ken Gray: SDN Software Defined Networks O'Reilly publishers, Second edition, 2017.

REFERENCE BOOKS:

1. FEI HU, "Network Innovation through OpenFlow and SDN: Principles and Design", CRC Press, Taylor & Francis Group, 2014.
2. Siamak Azodolmolky, —Software Defined Networking with Open Flow, Packet Publishing, 2013.
3. VivekTiwari, —SDN and Open Flow for Beginners||, Amazon Digital Services, Inc., 2013.

ONLINE REFERENCES:

1. Open Networking Foundation (ONF) Documents, <https://www.opennetworking.org>.
2. OpenFlow standards, <http://www.openflow.org>.
3. Online Reading lists, including: <http://www.nec-labs.com/~lume/sdn-reading-list.html>.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Compare and contrast between traditional switch architecture and software defined networks.		3													
CO2	Understand the functionality of Openflow protocol and SDN controllers.			3												
CO3	Illustrate use of SDN in Data Centers and other environments.		2		3									2		
CO4	Use software programs to perform varying and complex networking tasks.		3			2									3	
CO5	Expand the knowledge learned and apply it to solve real world problems.			3												3


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SOFTWARE TESTING

L	T	P	C
3	0	0	3

OBJECTIVE(S):

- To understand the basics of testing activities.
- To get exposed to the various criteria's for test case design.
- To understand the role played by Test Management, Planning and Organization.
- To understand the importance of Test Automation and Tool Selection.
- To get knowledge on testing applications using Testing Tools.

Prerequisite: Software Engineering.

UNIT-I INTRODUCTION

9

Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model (TMM) - Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Correctness vs. Reliability – Testing & Debugging - Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository.

UNIT-II TEST CASE DESIGN

9

Test case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Requirements Based Testing – Boundary Value Analysis – Equivalence Class Partitioning – State Based Testing – Cause-Effect Graphing – Compatibility Testing – User Documentation Testing – Domain Testing – Using White Box Approach to Test Design – Test Adequacy Criteria – Static Testing vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – Code Complexity Testing – Evaluating Test Adequacy Criteria.

UNIT-III TEST - MANAGEMENT, PLAN AND ORGANIZATION

9

People and Organizational Issues in Testing – Organization Structures for Testing Teams – Testing Services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – Reporting Test Results – The Role of three Groups in Test Planning and Policy Development – Introducing the Test Specialist – Skills needed by a Test Specialist – Building a Testing Group – Integrating Testing Activity into the Software Life Cycle.

UNIT-IV TEST AUTOMATION

9

Software Test Automation - Skills - Scope - Design and Architecture for Automation - Requirements for a test tool – Process Model for Automation – Selecting a Test Tool - Challenges in Automation - Test Metrics and Measurements - Project Progress and Productivity Metrics.

UNIT-V TESTING APPLICATIONS

9

Testing Web Application: Functional and Usability Issues – Configuration and Compatibility Testing – Reliability and Availability – Performance Testing – End to End Transaction Testing – Database Testing – Post Implementation Testing, Testing Application for Security, Tools that support the Automated Testing Life cycle - Agile Software Testing - Case Study – Testing Application using Tools.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Understand the impact of software defects and realize the importance of Software testing.
- CO2:** Design test cases on two fundamental criteria namely Functional and Non Functional Test cases.
- CO3:** Plan, manage and organize testing for the product developed.
- CO4:** Automate the testing process for the web application and to impart security into the application.
- CO5:** Use automated testing tools to test the Application projects.


TEXT BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2007.
2. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2003.
3. Renu Rajani and Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, New Delhi, 2004.

REFERENCE BOOKS:

1. Elfriede Dustin, Jeff Rashka, "Automated software testing: Introduction, Management and Performance", Pearson Education, 2008.
2. Aditya P. Mathur, "Foundations Ff Software Testing – Fundamental algorithms and techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Understand the impact of software defects and realize the importance of Software testing.	2	2		3	2						2		3		3
CO2	Design test cases on two fundamental criteria namely Functional and Non Functional Test cases.		3		3	3								2	3	3
CO3	Plan, manage and organize testing for the product developed.		3	2	2	3								2		3
CO4	Automate the testing process for the web application and to impart security into the application.			2	2	3						3			3	3
CO5	Use automated testing tools to test the Application projects.		2	3	3	3								2		


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AD HOC AND SENSOR NETWORKS

L	T	P	C
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OBJECTIVE(S):

- Learn the architecture and design issues in Ad Hoc and Sensor Network.
- Familiarize different types of MAC protocols in Ad Hoc Networks.
- Know the fundamental of routing protocols in Ad Hoc Networks.
- Understand the basic concepts of WSN.
- Imparts knowledge of routing in WSN.

Prerequisites: Computer Networks

UNIT-I INTRODUCTION

9

Fundamentals of Wireless Communication Technology – Ad Hoc and Sensor Network Concepts and Architecture – Characteristics of Ad Hoc and Sensor Network – Design Issues and Challenges in Ad Hoc and Sensor Network – Applications of Ad Hoc and Sensor Network - Cognitive Radio – Underwater Wireless Sensor Network.

UNIT-II MAC PROTOCOLS FOR AD HOC NETWORKS

9

Classifications – Contention based Protocols: MACAW – MACA by Invitation. Contention based Protocols with Reservation Mechanism: Distributed Packet Reservation Multiple Access Protocol – Collision Avoidance Multiple Access Protocol – Hop Reservation Multiple Access Protocol – Soft Reservation with Multiple Access Priority Assignment – Five Phase Reservation Protocol – Real Time Medium Access Protocol. Contention based MacProtocols with Scheduling Mechanism: Distributed Priority Scheduling and Medium access in Ad Hoc Networks – Distributed Wireless ordering Protocol.

UNIT-III ROUTING PROTOCOLS IN AD HOC NETWORKS

9

Classifications - Table Driven Routing Protocols: DSDV – WRP – CHGS . On Demand Routing Protocols: DSR – AODV – TORA – LAR . Hybrid Routing Protocols: - Core Extraction Distributed Ad Hoc Routing Protocol – ZRP. Power Aware Routing Protocols: Power aware Routing Metrics – Minimal Energy Consumption Per Packet– Maximize Network Connectivity – Minimum Cost per Packet.

UNIT-IV WIRELESS SENSOR NETWORKS

9

Data Dissemination – Data Gathering – MAC Protocols for Sensor Networks: Self Organizing – Hybrid TDMA/FDMA - CSMA based MAC protocol. Location Discovery: Indoor and Sensor Network Localization – Quality of a Sensor Network: Coverage and Exposure.

UNIT-V ROUTING IN WIRELESS SENSOR NETWORKS

9

Directed Diffusion – Sequential Assignment Routing – Minimum Cost forwarding – Coherent and Non-Coherent Processing – Energy Aware Routing – Hierarchical Routing – Cluster based Routing Protocol – LEACH – TEEN –PEGASIS – MECN.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Explain the concepts, architecture and applications of Ad Hoc and WSN.
- CO2:** Analyse the MAC protocol design concepts in Ad Hoc networks.
- CO3:** Design Ad Hoc routing protocols with respect to some protocol design issues.
- CO4:** Identify different MAC protocols and evaluate the QOS related performance measurement of Sensor Networks.
- CO5:** Recognize various routing protocols and its issues in WSN.


TEXT BOOKS:

1. C. Siva Ram Murthy and B.S. Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2012.
2. Carlos de Morais Cordeiro, Dharma Prakash Agrwal, Ad Hoc and Sensor Network: Theory and Applications, 2nd Edition, World Scientific Publishing Co, 2011.

REFERENCE BOOKS:

1. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufman Publishers, 2004.
2. C.K.Toth, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2007.
3. Kazem Sohrawy, Daniel Minoli, Taieb Znati, "Wireless Sensor Networks: Technology, Protocols and Applications", Wiley Interscience A John Wiley & sons, INC., Publication, 2007.
4. Amiya Nayak, Ivan Stojmenovic, "Wireless Sensor and Actuator Networks – Architecture and Protocols", Pearson Education, 2010.
5. Thomas Krag and Sebastin Buettrich, "Wireless Mesh Networking", O'Reilly Publishers, 2007.

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Explain the concepts, architecture and applications of Ad Hoc and WSN.	2														1
CO2	Describe the MAC protocol issues of Ad Hoc networks.															
CO3	Design Ad Hoc routing protocols with respect to some protocol design issues.			3										2		
CO4	Identify different MAC protocols and evaluate the QOS related performance measurement of Sensor Networks.		2			3								2		
CO5	Recognize various routing protocols and its issues in WSN.				3										3	


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AIM: To obtain the basic knowledge of doing projects by using their programming skills learned.

PREREQUISITE: Mini Project, All Professional Cores and Electives

OBJECTIVE:

The main objective of the Project is to enhance the Student's ability in solving real time problems and situations related to industry and academics needs by the application of varying tools and techniques.

IMPORTANCE OF PROJECT:

1. To have a systematic approach for solving problems.
2. Provides opportunity for the students to develop and orient their solutions to the real time problems.
3. Forms the base for working in a team and to have upper hand in application of skills and knowledge gained in the previous semesters.

GUIDELINES FOR PROJECT:

1. The students in groups of not more than 4 members have to take one Project.
2. The team can select the problem domain based on their Area of Specialization.
3. Periodic Monitoring of the project will be scheduled during the project hours and phase based deliverables are expected (SRS, Design Diagrams, Coding, Test reports, Project report).
4. Projects have to be developed during the project hours and it has to be in-house project.

EVALUATION OF MINI PROJECT:

1. Each project will be guided by a guide based on their Area of Specialization.
2. Continuous assessment of the Project will be done by the conduction of 3 reviews.
3. Each Individual student will be evaluated based on the progress and performance during the reviews.

COURSE OUTCOME:

At the end of the course the students will be able to

CO1: Demonstrate a sound technical knowledge of their selected project topic.

CO2: Design engineering solutions to complex problems utilizing a system approach.

CO3: Analyze engineering problem specification and recommend an optimum set of technical solutions.

CO4: Implement innovative ideas in solving contemporary issues.

CO5: Acquire industry relevant skills by working in team and efficiently communicating the deliverable

Course Outcome		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	Demonstrate a sound technical knowledge of their selected project topic.		2								1					
CO2	Design engineering solutions to complex problems utilizing a system approach.									1				2		
CO3	Analyze engineering problem specification and recommend an optimum set of technical solutions.	2	2						2							
CO4	Implement innovative ideas in solving contemporary issues.			3		3						2			3	
CO5	Acquire industry relevant skills by working in team and efficiently communicating the deliverables.				2	2		3								3

