			L	T	P	C
115PHT03		ENGINEERING PHYSICS	3	0	0	3

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 - Heavy cantilever – Uniform and Non uniform bending (theory and experiment)–Viscosity- Poiseuille's method for Coefficient of Viscosity.

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 – SONAR – Non Destructive Testing – pulse echo system.

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 – Theory and experimental verification – Matter waves – Schrödinger's wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box – Electrons in a metal.

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.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES

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).

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	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

115FPT05	FUNDAMENTALS OF COMPUTING & C PROGRAMMING	L	T	P	C
		3	0	0	3

OBJECTIVE(S):
- To enable the student to learn about the basics of computer and problem solving methods.
- To learn the basics of C language.
- To learn the various features of C programming language.

Prerequisite: Nil

UNIT-I   INTRODUCTION   **9**
Introduction - Characteristics of Computers - Basic Computer organization- Number System – Computer Software –Types - Problem-Solving Techniques-Program Control Structures-Programming Paradigms – Characteristics of Good Program-programming Language - Compiler, Interpreter, Linker, Loader - Internet Basics.

UNIT-II   C LANGUAGE BASICS   **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-III   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-IV   FUNCTIONS, STORAGE CLASSES AND POINTERS   **9**
Functions: Definition of function – Declaration of function – Pass by value – Pass by reference – Recursion.
Storage classes – auto, static, extern, register- scope rules.
Pointers: Definition – Initialization – Pointers arithmetic – Pointers and arrays - Dynamic memory allocation - Example Problems

UNIT-V   STRUCTURES, UNIONS AND FILES   **9**
Structures and Unions: Introduction – Need for structure data type – Structure definition – Structure declaration – Structure within a structure - Union - Programs using Structures and Unions.
Files: Introduction – Using files in C - Working with text files.

                                                              TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:
   CO1: Able to acquire knowledge in Computer, Internet basics and problem solving methods.
   CO2: Able to understand and implement the programs in C 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 (India), 2008.
   2. E.Balagurusamy, ―Computing fundamentals and C Programming, Tata McGraw-Hill Publishing Company Limited, 2008.

REFERENCES:

1. Pradip Dey, Manas Ghoush, —Programming in , Oxford University Press, 2012.
2. Byron Gottfried, —Programming with C, 2nd Edition, (Indian Adapted Edition), TMH publications, 2006.
3. Stephen G.Kochan, —Programming in C, Third Edition, Pearson Education India, 2005.
4. Brian W.Kernighan and Dennis M.Ritchie, —The C Programming Language, Pearson Education Inc., 2005.
5. Behrouz A.Forouzan and Richard.F.Gilberg, —A Structured Programming Approach Using C, II Edition, Brooks-Cole Thomson Learning Publications, 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 01	PS 02	PS 03
Co1	Able to acquire knowledge in Computer, Internet basics and problem solving methods		3													
Co2	Able to understand and implement the programs in C using arrays and Strings					2							2	2		
Co3	Develop and implement applications in C using functions and structures			3											3	
Co4	Develop applications in C using pointers	2				3					2		1			
Co5	Design applications using sequential and random access file processing		1	3		2										3

		L	T	P	C
115ESE11	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	3	0	0	3

Prerequisite: Nil

Objectives:

UNIT – I   ELECTRICAL CIRCUITS & MEASUREMENTS   09

Ohm's Law – Kirchoff's Laws – Series and parallel DC Circuits – Introduction to AC Circuits – Average and RMS Value – Power and Power factor – Single Phase and Three Phase Balanced Circuits.
Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Digital Energy meter (Block Diagram Approach only)

UNIT - II   ELECTRICAL MACHINES   09

Construction, Principle of Operation, Basic Equations of DC Generators, DC Motors, Single Phase Transformer and single phase induction Motor - their applications.

UNIT - III   SEMICONDUCTOR DEVICES AND APPLICATIONS   09

Characteristics of PN Junction Diode – Zener Diode and its Characteristics –Applications- Half wave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations – Applications of BJT for switching.

UNIT - IV   FUNDAMENTALS OF DIGITAL ELECTRONICS   09

Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops –A/D and D/A Conversion (successive approximation and R-2R ladder).

UNIT - V   FUNDAMENTALS OF COMMUNICATION ENGINEERING   09

Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles of Amplitude and Frequency Modulations. Communication Systems: Optical Fiber communication and Satellite communication (Block Diagram Approach only).

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:

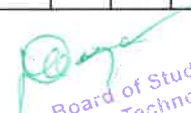|	
CO1	Recognize the different combinations of circuit elements and solving the circuit by applying basic circuital laws.
CO2	Acquire a good understanding of basics of electrical machines
CO3	Emphasis knowledge on construction, characteristics of various devices.
CO4	Emphasis knowledge on fundamental concept of decimal number system and represent number system in powers of base
CO5:	Understand the principles of measurement systems and transducers.

TEXT BOOKS

1   Muthusubramanian R, Salivahanan S and Muraleedharan K A, "Basic Electrical, Electronics and Computer Engineering", TMH, Second Edition, 2006.

2   V.N. Mittle "Basic Electrical Engineering", TMH Edition, New Delhi, 1990.

3   R.S. Sedha, "Applied Electronics" S. Chand & Co., 2006.

REFERENCE BOOKS

1 Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press 2005.
2 B.L.Theraja, A.K.Theraja, "A text book of Electrical Technology, Volume 4", S.Chand and company Ltd., 2005
3 Mehta V K, "Principles of Electronics", S.Chand & Company Ltd, 1994.
4 Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
5 Premkumar N, "Basic Electrical Engineering", Anuradha Publishers, 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	Recognize the different combinations of circuit elements and solving the circuit by applying basic circuital laws.													2		
Co2	Acquire a good understanding of basics of electrical machines		2							1	2				2	
Co3	Emphasis knowledge on construction, characteristics of various devices.	2										3			3	
Co4	Emphasis knowledge on fundamental concept of decimal number system and represent number system in powers of base		3					2		1				2		
Co5	Understand the principles of measurement systems and transducers.		2											1		1

Chairman, Board of Studies (UG)
Faculty of Information Technology (Autonomous)
Adhiyamaan College of Engineering (Autonomous)
Hosur - 635 109
Krishnagiri (Dt), Tamil Nadu.

	L	T	P	C
115ESP01 COMPUTER PRACTICES LABORATORY	0	0	4	2

OBJECTIVE(S):

- To enable the students to prepare the documents, presentation using office automation tools.
- To enable the students to write programs using C.

Prerequisite: Nil

LIST OF EXPERIMENTS:

Word Processing 6

1. a) Preparation of Bio – Data with header and Footer options
   b) Preparation of News-Bulletin with formatting options
2. a) Business Letter using Mail Merge concept
   b) Typing Equations and inserting Symbols
3. Table creation with formula & protecting a word document

Spread Sheet 6

4. Mark-Sheet preparation using formula editor
5. Preparation of various charts (Bar, Pie, Line)
6. Import/Export of excel file & protection of Excel file

Presentation 6

7. Prepare a presentation in Power point showing the features of MS OFFICE and also set timings to view it.
8. Prepare a presentation for showing the types of computers with the following settings:
   a) Set different slide transitions
   b) Give header & footer for each slide
   c) Hiding and Showing the slides access
9. a)Prepare a presentation with a text, picture & graph expressing the introduction of new product.
   b) Prepare a presentation with a text and picture for various courses offered in our college with animation effect.

C-Programming 27

10. Generation of Fibonnacci series.
11. Finding factorial of given number.
12. Printing multiplication table using While statement.
13. Program to evaluate Sine series.
14. Creating menu option with Switch-Case.
15. Programs using Function (with , without arguments).
16. Program using Recursive functions.
17. Program using 1-D,2-D Arrays.
18. Program using String.
19. Program using Structure and Union concept.
20. Program with Pointers.
21. Program using File Handling functions.

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

CO1: Able to efficiently apply office automation tools for professional requirements and able to solve simple mathematical & logical problems using C programs.

CO2: Able to build program 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Co1	Able to efficiently apply office automation tools for professional requirements and able to solve simple mathematical & logical problems using C programs.	3	3							3	3			3	3	3
Co2	Able to build program 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

	L	T	P	C
215PHT03 APPLIED PHYSICS

L	T	P	C
3	0	0	3

OBJECTIVES

1. To enable students to understand the structure of solids and properties.
2. To understand the concept of classical theory and quantum theory.
3. To get the better knowledge of semiconductor materials.
4. Properties of magnetic materials and superconductors.
5. Recent development in new engineering materials.

UNIT I   CRYSTAL PHYSICS 9

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC, HCP and diamond structure – NaCl, ZnS structures (qualitative).

UNIT II   CONDUCTING MATERIALS 9

Conductors – classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals .

UNIT III   SEMICONDUCTING MATERIALS 9

Intrinsic semiconductor – Carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – Electrical conductivity – Band gap determination – Extrinsic semiconductors – Carrier concentration derivation in n-type and p-type semiconductor – Variation of Fermi level with temperature and impurity concentration – Electrical conductivity of extrinsic semiconductors.

UNIT IV   DIELECTRIC MATERIALS AND NANO MATERIALS 9

Electrical susceptibility – Dielectric constant – Electronic, ionic, orientational and space charge polarization – Frequency and temperature dependence of polarization – internal field – Claussius – Mosotti relation (derivation).
Nano materials: Synthesis – Plasma arcing – Chemical vapour deposition, Electro deposition – Ball milling – Properties of nanoparticles and applications.

UNIT V   NUCLEAR AND THERMAL PHYSICS 9

Nuclear fission-Nuclear fusion-Stellar energy-conditions to be satisfied for sustained nuclear reactions-nuclear reactors-classification-general features-efficiency-coolants moderations thermal reactors.
Heat conduction-Expression for thermal conductivity- Amount of heat flow through a plane wall in one direction- Heat conduction through a compound media of two layers-Determine thermal conductivity-Lee's disc method for bad conductors

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES

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

CO1: Understand the basics of crystallography, magnetic materials, superconductivity and its applications.

CO2: Comprehend and apply the concepts of quantum and classical problems for different physical problems.

CO3: Acquire comprehensive knowledge of lasers and optical fibres and their role in communication system.

CO4: Acquire comprehensive knowledge of lasers and optical fibres and their role in communication system.

CO5: Acquaint with the applications of nano science and technology and study of drastic changes in the properties of nano sized particles.

TEXT BOOKS:

1. Jayaprakash R.N, 'Engineering Physics - II', Dhanam Publications, Chennai, (2007)
2. Jayakumar, S. 'Materials science', R.K. Publishers, Coimbatore, (2008).

REFERENCES:

1. Rajendran, V, and Marikani A, 'Materials science' TMH publications, (2004) New delhi.
2. Palanisamy P.K, 'Materials science', Scitech publications (India) Pvt. LTd., Chennai,
3. M.Arumugam, 'Materials Science' Anuradha publications, Kumbakonam, (2006).
4. Charles Kittel, 'Introduction to Solid State Physics', John Wiley & sons, 7th edition, Singapore (2007)
5. Charles P. Poole and Frank J. Ownen, 'Introduction to Nanotechnology', Wiley India (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	Understand the basics of crystallography, magnetic materials, superconductivity and its applications.	3	2	1	3						1			3		1
Co2	Comprehend and apply the concepts of quantum and classical problems for different physical problems.	3	2	1	3						1			3		1
Co3	Acquire comprehensive knowledge of lasers and optical fibres and their role in communication system.	3	2		1						1			3		3
Co4	Acquire comprehensive knowledge of lasers and optical fibres and their role in communication system.	3	2	2	2						1			3		2
Co5	Acquaint with the applications of nano science and technology and study of drastic changes in the properties of nano sized particles.	3	2	1	1						1			3		2

	L	T	P	C
215CYT04 **APPLIED CHEMISTRY**	3	0	0	3

OBJECTIVES:
- To make the students conversant with basics of polymer chemistry.
- To acquaint the student with concepts of important photo physical and photochemical processes and spectroscopy.
- To develop an understanding of the basic concepts of engineering materials and its applications.
- To acquaint the students with the basics of fuels, and chemistry behind combustion process.
- To make the student acquire sound knowledge of adsorption and its industrial application

UNIT I   **POLYMER CHEMISTRY**   9

Introduction: Classification of polymers – Natural and synthetic; Functionality – Degree of polymerization. Types and mechanism of polymerization: Addition (Free Radical, cationic and anionic); condensation and copolymerization. Plastics-Thermoplastics and Thermosetting. Preparation, properties and uses of Nylon 6,6, Terylene, polyurethane, BuNa-S, BuNa-N and Epoxy resin. Rubber – Vulcanization of rubber.

UNIT II   **PHOTOCHEMISTRY AND SPECTROSCOPY**   9

Photochemistry: Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law. Quantum efficiency –Photophysical process- Fluorescence, Phosphorescence, Chemiluminescence and Photo-sensitization. Spectroscopy: Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. UV-visible and IR spectroscopy – principles, instrumentation – applications (any 2).

UNIT III   **ENGINEERING MATERIALS**   9

Refractories: definition, characteristics, classification, properties – refractoriness, RUL, dimensional stability, thermal spalling, porosity; Manufacture of alumina, magnesite and Zirconia.

Lubricants: Functions of' lubricant – Types of Lubricants – solid lubricants-use of water as a lubricant-plastic lubricant-gaseous lubricants. Mechanism of lubrication- Fluid or Hydrodynamic Lubrication, Thin film or Boundary lubrication & Extreme pressure lubrication. Properties of lubricants – Viscosity – Viscosity Index -Flash and Fire point – Cloud and Pour point – Oiliness - Aniline point-Neutralization number-Mechanical stability.

UNIT IV   **FUELS AND COMBUSTION**   9

Fuel: Introduction- classification of fuels- calorific value- higher and lower calorific values- coal- analysis of coal (proximate and ultimate)- carbonization- manufacture of metallurgical coke (Otto Hoffmann method) – petroleum – Fractional distillation - manufacture of synthetic petrol (Bergius process)- knocking- octane number - diesel oil- cetane number - natural gas- compressed natural gas(CNG)- liquefied petroleum gases(LPG). Combustion of fuels – (simple problems) flue gas analysis (ORSAT Method).

Mechanism of Adsorption- Types of Adsorption- Adsorption of Gases by Solids- Adsorption Isotherms-Freundlich Adsorption equation-Langmuir Adsorption Isotherm - Adsorption of Solutes from Solutions. Application of adsorption- gas masks, heterogeneous catalysis, froth floatation process, removal of colouring matter from solutions, Chromatographic analysis (Thin layer and column only).

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES

After studying this course, students will be able to

CO1: Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.

CO2: Substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

CO3: Design economically and new methods of synthesis nano materials.

CO4: Apply their knowledge for protection of different metals from corrosion.

CO5: Have the knowledge of converting solar energy into most needy electrical energy efficiently and economically to reduce the environmental pollution

TEXT BOOKS

1. P.C. Jain and Monika Jain, Engineering Chemistry, DhanpatRai and Sons, NewDelhi 2004. 16th Edition.
2. N. Krishnamurthy, P. Vallinayagam and D. Madhavan, Engineering Chemistry, 2nd Edition. PHI Learning PVT., LTD, New Delhi, 2008. 3rd Edition.
3. K. Sivakumar, Applied Chemistry, Sahana Publishers, Coiambatore 2016.1st Edition.

REFERENCE BOOKS

1. S. S. Dara, A Textbook of Engineering Chemistry, S. Chand & Co., Ltd. NewDelhi. 2008. Reprint edition.
2. B. K. Sharma, Engineering Chemistry, 3rd edition Krishna Prakashan Media (P)Ltd., Meerut, 2001.
3. ArunBhal, B.S. Bhal, G. D. Tuli, Essentials of Physical Chemistry, S. Chand & Co., Ltd. New Delhi. 26th Edition.
4. P. W. Atkins & Julio de Paula, Atkins' Physical Chemistry, Oxford University Press York, 7thEdn, 2002.
5. ShashiChawla, A Text Book of Engineering Chemistry, 3rd Edition, DhanpatRai&New Delhi, 2007.
6. S. Vairam, P. Kalyani&Suba Ramesh, Engineering Chemistry, IstEdn, John Wiley &Sons, India, 2011.
7. Lee J.D., Concise Inorganic Chemistry, 7th Edn, Blackwel Science Publications Oxford, London, 2004.

	L	T	P	C
215EGT05 ENGINEERING GRAPHICS	2	0	3	4

OBJECTIVES:

1. The students will learn graphics skill for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.
2. To understand the basic principles of technical / engineering drawing.
3. To understand the different steps in producing drawings according to BIS convention.

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 squad 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, cylinder and cone 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 above solids 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:75 PERIODS

	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 innovative methods to produce soft water for industrial use and potable water at cheaper cost.	3			2	2					1			3	2	3
Co2	Substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.	3				2								3	2	3
Co3	Design economically and new methods of synthesis nano materials.	3	1											3	2	3
Co4	Apply their knowledge for protection of different metals from corrosion.	3		1	1									3	2	3
Co5	Have the knowledge of converting solar energy into most needy electrical energy efficiently and economically to reduce the environmental pollution	3				2					2			3	2	3

L	T	P	C
3	0	0	3

215ESE11   OBJECT ORIENTED PROGRAMMING

OBJECTIVE(S):
- To understand object-oriented programming features.
- To study the implementation of various features of OOP in C++.
- To illustrates solution of different problems using C++.

Prerequisite: Fundamentals of Computing and C Programming.

UNIT-I   INTRODUCTION   9
Object-Oriented Paradigm - Merits and Demerits of OO Methodology – Object-Oriented Programming Concepts: Classes – Objects – Data abstraction and encapsulation – Inheritance – Polymorphism – Dynamic binding – Message Passing – C++ Fundamentals: Tokens – Expressions – Control Structures - Functions.

UNIT-II   CLASSES AND OBJECTS   9
Classes and Objects – Passing objects as arguments – returning objects – Friend functions – Inline function – Static data and member functions - Constructors - Parameterized constructor – Copy constructor – Destructor - Array of Objects – pointer to object members.

UNIT-III   POLYMORPHISM AND INHERITANCE   9
Polymorphism – Function overloading – Unary operator overloading – binary operator overloading – Data Conversion- Overloading with Friend Functions. Inheritance – Constructor in Derived class – Abstract Classes - Types of Inheritance.

UNIT-IV   VIRTUAL FUNCTIONS AND TEMPLATES   9
Virtual functions – Need - Pure Virtual Functions – Virtual Destructors Template – Class template, Function Template.

UNIT-V   FILES AND EXCEPTION HANDLING   9
C++ streams – console streams – console stream classes - formatted and unformatted console I/O operations – Manipulators File streams classes - File modes - File pointers and Manipulations - File I/O – Exception handling - Exception handling Model – List of Exceptions – catch all Exception –uncaught Exceptions.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES

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

CO1: Describe the important concepts of Object Oriented Programming.
CO2: Identify the relationship between the classes and link them using appropriate concepts.
CO3: Develop solutions for given problems using Polymorphism and Inheritance concepts to solve real world problems.
CO4: Devise generic classes capable of manipulating primitive and user defined data types.
CO5: Develop and implement File I/O operations and Exception handling mechanisms.

TEXT BOOK (S) :

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", TMH publishers, 6th edition, New Delhi, 2002.
2. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Tata McGraw Hill, 2007.
3. Ravish R Singh, "Network Analysis and Synthesis", McGraw Hill, 2013.

REFERENCE BOOK(S) :

1 Paranjothi SR, "Electric Circuits Analysis," New Age International Ltd., NewDelhi, 1996.
2 Joseph A. Edminister, Mahmood Nahri, "Electric circuits", Schaum's series,Tata McGraw-Hill, New Delhi 2001.
3 Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 1999.

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	Recognise the different combinations of circuit elements and solving the circuit by applying basic circuital laws irrespective of the type of steady state source given.		3	1	3								3			3
Co2	Analyse electrical circuits by applying theorems.		2	1	2								2		3	3
Co3	Recall the basic concepts of laplace transform and thus analyse the transient behavior of electrical circuits		2	1	2								2		3	3
Co4	Explain the way of generation of alternating voltage and the response of single phase circuits and three phase circuits employing balanced and unbalanced loads.		2	1	2	3						2	2			3

			L	T	P	C
215ESP06	**OBJECT ORIENTED PROGRAMMING LABORATORY**		0	0	4	2

OBJECTIVE(S):
- To learn object oriented programming concepts using C++ to solve problem.
- To implement various concepts of OOP using C++.

List of Experiments:
1. Simple C++ Control Structures and arrays.
2. Simple class, objects and array of objects.
3. Function Recursion and Inline function.
4. Constructors, Destructors.
5. Unary and binary operator overloading.
6. Function Overloading.
7. Inheritance, Data conversions.
8. Friend function and Friend class.
9. Virtual function and virtual base class.
10. Function Templates, Class Templates.
11. File operations.
12. Exception handling.

TOTAL HOURS:45 PERIODS

COURSE OUTCOMES:
At the end of the course student should be able to
    CO1: Implement class, object, and constructor concepts by using object oriented programming language.
    CO2: Develop programs using inheritance and polymorphism.
    CO3: Develop and implement overloading concepts & various functions.
    CO4: Construct generic classes using templates & STL.
    CO5: Implement various file concepts, exception handling by using object oriented concepts.

LIST OF EQUIPMENTS AND SOFTWARE FOR A BATCH OF 30 STUDENTS
    Hardware:
    LAN System with 30 Nodes (OR) Stand_alone PCs -30 No's.
    Printer – 3 No's.
    Software:
    OS: Windows / Linux
    Turbo C.

REFERENCES

1. Jeremy M, Berg John.L, Tymoczko and Lubert Stryer, "Biochemistry," W.H. Freeman and Co. Ltd., 6th Ed., 2006.
2. Robert Weaver, "Molecular Biology," MCGraw-Hill, 5th Edition, 2012.
3. Jon Cooper, "Biosensors A Practical Approach" Bellwether Books, 2004.
4. Martin Alexander, "Biodegradation and Bioremediation," Academic Press,1994.
5. Kenneth Murphy, "Janeway's Immunobiology," Garland Science; 8th edition, 2011.
6. Eric. R, Kandel, James.H, Schwartz, Thomas. M, Jessell, "Principles of Neural Science", Mc-Graw Hill, 5th Edition, 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	Familiar with the basic organization of organisms and subsequent building to a living being.												2	2	2	2
CO2	Understand the biological concepts from an engineering perspective	3	3	3									2	2	2	2
CO3	Understand the concepts of biological sensing and its challenges	3	3	3									2	2	2	2
CO4	Understand development of artificial systems mimicking human action	3	3										2	2	2	2
CO5	Integrate biological principles for developing next generation technologies	3	3										2	2	2	2

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		L	T	P	C

215HSP11 **LANGUAGE LABORATORY**

L	T	P	C
0	0	4	2

OBJECTIVES:

- To equip students of engineering and technology with effective speaking and listening skills in English.
- To help them develop 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 at Placement Interviews, Group Discussions and other recruitment exercises.

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 corporate world 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 Communication Skills Laboratory is designed to prepare the students to adapt themselves with ease to the industry environment, and make them rendering as prospective assets to industries. The course will equip the students with the necessary communication skills that would go a long way in helping them in their profession.

Lecture – Practice – PC based (45 hours)

A. English Language Lab

1. Listening: (3+3)

Listening - Barriers to listening – Types of listening – Fill in the blanks – Listening Comprehension – Note taking.

2. Reading: (1+6)

Reading – Techniques – Skimming and Scanning – Note making Review (book – journal – essay – movie etc.,) Newspaper Reading Cloze Reading

3. Speaking: (5+15)

Practicing Short Dialogues – Speeches – Interpreting pictures – objects – cartoons – Telephone etiquette Tongue twisters

Presentation skills – Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples

Group discussion – Structure of GD – Strategies in GD - Moderator – led and other GDs — Team work - Body Language - Mock GD -Video samples

Phonetics – Stress and intonation - Common Errors in Spoken English

4. Writing: (2+4)

Jumbled words Jumbled Paragraph Preposition Concord Error Spotting Editing Letter writing (Covering letter – Follow up letter - Letter of thanks giving - appreciation – gratitude) E-mail Etiquettes

5. Soft Skills (2+4)

Team building – strategies - stages- blocks of an assertive team Assertiveness , Articulateness Time management Stress management Psychometrics

COURSE OUTCOMES:

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

CO 1: Identify common errors in spoken and written communication.

CO 2: Get familiarized with English vocabulary and language proficiency.

CO 3: Improve nature and style of sensible writing, acquire employment and workplace communication skills.

CO 4: Improve their Technical Communication Skills through Technical Reading and Writing practices.

CO 5: Perform well in campus recruitment, engineering and all other general competitive examinations.

Text Books:

1. Anderson, P.V, Technical Communication, Thomson Wadsworth, 6th Edition, New Delhi, 2007.

2. Prakash, P, Verbal and Non-Verbal Reasoning, Macmillan India Ltd., 2nd Edition, New Delhi, 2004.

References:

1. Dhanavel S. P., English and Soft Skills, Orient BlackSwan Pvt. Ltd. Hydrabad, 2010.

2. Evans, D, Decision maker, Cambridge University Press, 1997.

3. John Seely, The Oxford Guide to Writing and Speaking, Oxford University Press, New Delhi, 2004.

4. Thorpe, E, and Thorpe, S, Objective English, Pearson Education, Second Edition, New Delhi, 2007.

5. Turton, N.D and Heaton, J.B, Dictionary of Common Errors, Addison Wesley Longman Ltd., Indian reprint 1998.

Lab Requirements:

1. Teacher console and systems for students.

2. English Language Lab Software

3. Career Lab Software

	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 common errors in spoken and written communication.	2	2	3	2			2					1	3		1
CO2	Get familiarized with English vocabulary and language proficiency.		2	3	3			2					1	2	3	1
CO3	Improve nature and style of sensible writing, acquire employment and workplace communication skills.	3	2	3	1			2					1	2	2	1
CO4	Improve their Technical Communication Skills through Technical Reading and Writing practices.		2	2							2		1	2		1
CO5	Perform well in campus recruitment, engineering and all other general competitive examinations.		2										2	2		2

315GET02	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY	L	T	P	C
		3	0	0	3

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 POPULATON 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,NewDelhi, (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	

315ITT03	DIGITAL PRINCIPLES AND SYSTEM DESIGN	L	T	P	C
		3	0	0	3

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										

	L	T	P	C
315ITT04 DATA STRUCTURES AND ALGORITHMS	3	0	0	3

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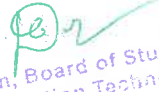
TEXT BOOKS:
1. M.A. Weiss, "Data Structures and algorithm analysis in C", Second Edition, Pearson Education Asia, 2008.
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Second Edition,Pearson Education, New Delhi, 2005.

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 Agorithms", Addison-Wesley Publishing Company, 2010.

3. Aaron M.Tanaenbaum, YedidyahLangsam, 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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315CIT05	JAVA PROGRAMMING	L	T	P	C
		3	0	0	3

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, APPLET & 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", 10thEdition, 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

	L	T	P	C
315CIT06 COMPUTER ORGANIZATION AND ARCHITECTURE	3	0	0	3

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	

315ITP07	DIGITAL LABORATORY	L	T	P	C
		0	0	4	2

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
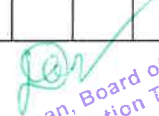
LIST OF EXPERIMENTS:
1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of Adder/Subtractor, Encoders/Decoders, Code Converters using basic gates.
3. Design and implementation of 4-bit binary adder / subtractor using MSI Circuits.
4. Design and implementation of 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	

315ITP08	DATA STRUCTURES AND ALGORITHMS LABORATORY	L	T	P	C
		0	0	4	2

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.
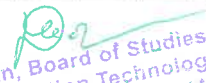
TOTAL HOURS: 45 PERIODS

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		

	L	T	P	C
315CIP09 JAVA PROGRAMMING LABORATORY	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

	L	T	P	C
415PQT01 PROBABILITY AND QUEUEING THEORY	3	1	0	4

<div align="center">(Common to IT & CSE)</div>

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 forindependent 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: $(M/M/1) : (\infty/FIFO)$, $(M/M/s) : (\infty/FIFO)$, $(M/M/1) : (k/FIFO)$, $(M/M/s) : (k/FIFO)$ – Non-Markovian Queues: Pollaczek-Khinchin formula - $(M/G/1) : (\infty/GD)$.

<div align="right">TOTAL HOURS:45 PERIODS</div>

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 uncertainity.
- **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 queuing 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 uncertainity	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

	L	T	P	C
415CIT02 OPERATING SYSTEMS	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: Fundaments 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		

		L	T	P	C
415CIT03	**DATABASE MANAGEMENT SYSTEMS**	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
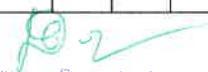 & advanced database concepts

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

	L	T	P	C
415ITT04 MICROPROCESSORS & MICROCONTROLLERS	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

	L	T	P	C
415CIT05 COMPUTER NETWORKS	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	

	L	T	P	C
415CIE03 **DESIGN AND ANALYSIS OF ALGORITHM**	3	0	0	3

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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	L	T	P	C
415CIP07   **OPERATING SYSTEMS LABORATORY** | 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.

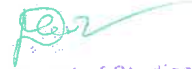**HARDWARE & SOFTWARE REQUIRED FOR A BATCH OF 36 STUDENTS**
Hardware: 36 PC
Software: Linux (Ubuntu/OpenSUSE/Fedora/Red Hat/Debian/Mint OS) Linux could be loaded in individual PCs
or
A single server could be loaded with Linux and connected from the individual PCs.

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
CO1	Implement basic services and functionalities of operating system using system call.	2	2	3	2	3								3		
CO2	Implement various CPU scheduling algorithm and inter process communication and semaphores.	3	2	3	3	3									2	
CO3	Implement memory management algorithms.	3	2	3	3	2									3	
CO4	Demonstrate file allocation and organization techniques.	3	2	3		3									2	3
CO5	Illustrate disk scheduling algorithms.	2	3	2		2								3		3

415CIP08	DATABASE MANAGEMENT SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2

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:
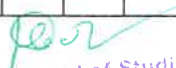 36 Personal Computers
Software:
  Front end   : VB / VC ++
  Back end   : MySQL, Oracle 11g, MongoDB
  Platform   : Windows 2000 Professional/XP or higher
  Oracle server could be loaded and can be connected from individual PCs

	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

	L	T	P	C
	0	0	4	2

415CIP09   <mark>COMPUTER NETWORKS LABORATORY</mark>

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											

	L	T	P	C
515ITT01   **INTERNET PROGRAMMING**   **3   0   0   3**

OBJECTIVE(S):
- To understand basic HTML5tags 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. Deiteland 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

	L	T	P	C

515ITT02   SOFTWARE ENGINEERING AND QUALITY ASSURANCE

L	T	P	C
3	0	0	3

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

	L	T	P	C

515ITT03　　　　　OBJECT ORIENTED ANALYSIS AND DESIGN

L	T	P	C
3	0	0	3

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		

	L	T	P	C
515ITT04 COMMUNICATION ENGINEERING	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

		L	T	P	C
515CIE05	C# & .NET PROGRAMMING	3	0	0	3

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

	L	T	P	C
515MAE01 **APPLIED STATISTICS AND NUMERICAL METHODS**	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   **9 +3**
INTEGRATION

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 $1/3^{rd}$ and $3/8^{th}$ 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 ($\overline{x}$ 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 intial 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.Dougles 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

515ITP07	INTERNET PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

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	

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		L	**T**	**P**	**C**
515ITP08	OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY	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		

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

		L	T	P	C
615ITT01	COMPILER ENGINEERING	3	1	0	4

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: Fundaments 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. Dhamdhere 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, Ceriel 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

	L	T	P	C
615ITT02 CRYPTOGRAPHY AND SECURITY IN COMPUTING	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	

	L	T	P	C
615ITT02 CRYPTOGRAPHY AND SECURITY IN COMPUTING	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.

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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	

		L	T	P	C
615ITT03	**UNIX INTERNALS**	3	0	0	3

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 ofIndia,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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615ITT04   OPEN SOURCE SOFTWARE | | 3 | 0 | 0 | 3 |

	L	T	P	C
615ITT04 OPEN SOURCE SOFTWARE	3	0	0	3

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.

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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

			L	T	P	C
615ECO09		**SATELLITE COMMUNICATION**	3	0	0	3

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/no- 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/No- 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

	L	T	P	C
615ITP07 COMPILER AND SECURITY LABORATORY	0	0	4	2

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. Identifers, 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

	615ITP08	OPEN SOURCE SOFTWARE LABORATORY	L	T	P	C
			0	0	4	2

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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

	L	T	P	C
615CIP09 **EMPLOYABILITY SKILLS LABORATORY**	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 enthrust 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

	L	T	P	C
711CIT01	**MOBILE COMPUTING**			
	3	0	0	3

OBJECTIVE(S):
- To learn the basics of wireless voice and data communication technologies.
- To impart the fundamental concepts of mobile communications systems
- To understand working knowledge on various telephone and satellite networks.
- To study the working principles of wireless LAN and its standards.
- To build skills in working with Wireless Application Protocols to develop mobile content.

Prerequisite: Computer Networks & Communication Engineering

UNIT– I WIRELESS COMMUNICATION FUNDAMENTALS 9
Introduction – Wireless Transmission – Frequencies for Radio Transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread Spectrum – Cellular Systems – MAC – SDMA – FDMA – TDMA – CDMA – Comparison of S/T/F/CDMA.

UNIT– II TELECOMMUNICATION NETWORKS 10
Telecommunication systems –GSM –GPRS –DECT –TETRA -UMTS –IMT-2000 Satellite Systems – Basics – Routing-Localization-Broadcast Systems –DAB -DVB.

UNIT - III WIRLESS LAN 9
Wireless LAN –IEEE 802.11 Standards -Architecture –Services –Physical layer -MAC -IEEE 802.11a-802.11b Standards -HIPERLAN: WATM, BRAN, HIPERLAN2 -Blue Tooth:Architecture, Radio & Baseband layer, Link manager protocol, L2CAP, Security, SDP, Profiles.

UNIT– IV MOBILE NETWORK LAYER 9
Mobile IP:Goals, Assumptions & Requirements, Entities & Terminology, IP Packet Delivery, Agent discovery, Registration, Tunneling & Encapsulation, Optimizations, Reverse tunneling, IPV6, IP Micro-mobility support –Dynamic Host Configuration Protocol -Mobile ad-hoc Networks:Routing –DSDV –DSR –Alternative Metrics -Overview ad-hoc Routing Protocols.

UNIT - V TRANSPORT AND APPLICATION LAYERS 8
Traditional TCP:Congestion Control, Slow Start, Fast Retransmit/Fast Recovery, Implications of Mobility – Classical TCP Improvements:Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/Fast Recovery, Transmission/Time-Out Freezing, Selective Retransmission, Transaction-Oriented TCP –TCP Over 2.5/3G Wireless Networks,Performance Enhancing Proxies–WAP-Architecture, WDP, WTLS, WTP, WSP, WAE, WML, WML Script, WTA, Push Architecture, Push/Pull Services.

TOTAL HOURS: 45 PERIODS
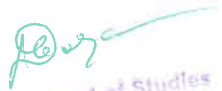
COURSE OUTCOMES:
> **CO1:** Able to understand the working principles of wireless and mobile communication networks.
> **CO2:** Able to apply advanced data communicating methods and networking protocols for mobile and wireless environments.
> **CO3:** Able to gain sound knowledge to develop wireless applications using script and mark-up languages.

TEXT BOOKS:
1. Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2011. (UNIT-I : Chap 1, 2 & 3, UNIT-II: Chap 4, 5 &6, UNITIII: Chap 7, UNITIV: Chap 8, UNITV: Chap 9 &10)
2. William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, Second Edition, 2009. (UNIT I: Chap 7&10, UNITII: Chap 9)

REFERENCES:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks, PHI/PearsonEducation, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, Second Edition, 2012.
3. Hazysztof Wesolowshi, "Mobile Communication Systems", John Wiley and Sons Ltd, 2002.

		L	T	P	C
711CIT02	**WEB TECHNOLOGY**	3	0	0	3

OBJECTIVE(S):

- To understand the communication between web browsers and servers as well as how information is displayed by browser.
- Presents basic information about cascading style sheets (CSS), a style sheet technology designed to work with HTML and XML documents. Study of JavaScript as a programming language, largely independently of how it might relate to a web browser.
- Focus on Document Object Model (DOM), an API that defines how JavaScript programs can access and manipulate the HTML document currently displayed by a browser. Moves from client-side programming involving web browsers to server-side programming (Servlet).
- Focus on Java server pages technology (Separating Programming and Presentation).
- Illustrates how the various web service technologies interact.

Prerequisite: Java

UNIT– I   INTRODUCTION   9

Internet Principles and Components: History of the Internet and World Wide Web-CGI-Protocols -HTTP, SMTP, POP3, MIME, IMAP. Domain Name Server, Web Browsers and Web Servers. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms -XML Creating HTML documents.

UNIT– II   JAVA APPLET & STYLE SHEETS   9

Java Applet: Introduction -Starting an Applet application -Applet component basics -Labels and Icons -Buttons -Bounded range components -List and Combo Boxes. **Style Sheets:** CSS-Introduction to Cascading Style Sheets–Features-Core Syntax-Style Sheets and HTML Style Rule Cascading and inheritance.

UNIT– III   JAVASCRIPT, DHTML   9

Client -Side Programming: The JavaScript Language-History and Versions-Introduction to JavaScript in Perspective–Syntax-Variables and DataTypes-Statements–Operators–Literals–Functions–Objects– Arrays-Built-in Objects-JavaScript Debuggers.
Host Objects: Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling -Accommodating Noncompliant Browsers Properties of window.

UNIT– IV   JAVA SERVLETS AND JSP   9

Architecture -Overview-A Servlet-Generating Dynamic Content-Life Cycle-Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlet and Concurrency-Case Study- Related Technologies.
JSP Technology: Introduction-JSP and Servlet -Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm Related Technologies.

UNIT– V   WEB SERVICES   9

Introduction to Web Services:XML, XSD,UDDI, SOAP, WSDL,REST , Service Provider -Service Consumer -Web Service Architecture -Developing and deploying web services -Case Study.

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

CO1: Able to understand the communication mechanism between web servers and web browsers.

CO2: Able to gain basic knowledge about Cascading Style Sheets and to work with HTML and DHTMl.

CO2: Able to understand Servlets, JSP technologies and how various web service technologies interact.

TEXT BOOKS:

1. Deitel and Deitel, Goldberg, "Internet and World Wide Web -How to Program", Pearson Education Asia, 2001.
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.

REFERENCES:

1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007.
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How to Program", Third Edition, Pearson Education' 2006.
3. Marty Hall and Larry Brown, "Core Web Programming" Second Edition, Volume I and II, Pearson Education, 2001.
4. Bates, "Developing Web Applications", Wiley, 2006.
5. Phillip Hanna, "JSP 2.0 -The Complete Reference", McGraw- Hill, 2003. 6.Mathew Eernisse, "Build Your Own AJAX Web Applications", Site Point, 2006.

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		L	T	P	C
711ITT03	**DATA WAREHOUSING AND DATA MINING**	3	0	0	3

OBJECTIVE(S):
- To make familiar with the various concepts of data warehousing like meta data, data mart, summary table, fact data and dimension data.
- To sail along with the various approaches in data mining.
- To familiarize with the various data warehousing and data mining tools and its application in various fields.

Prerequisite: Database Management Systems

UNIT– I   DATA WAREHOUSING   9

Data warehousing Components - Building a Data warehouse - Mapping the Data Warehouse to a Multiprocessor Architecture - DBMS Schemas for Decision Support - Data Extraction, Cleanup, and Transformation Tools - Metadata.

UNIT– II   BUSINESS ANALYSIS   9

Reporting and Query tools and Applications - Tool Categories - The Need for Applications -Cognos Impromptu - Online Analytical Processing (OLAP) – Need - Multidimensional Data Model - OLAP Guidelines - Multidimensional versus Multi relational OLAP - Categories of Tools - OLAP Tools and the internet.

UNIT– III   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- IV   ASSOCIATION RULE MINING AND CLASSIFICATION   9

Mining Frequent Patterns- Associations and Correlations - Frequent item set – Mining Various Kinds of Association Rules - Correlation Analysis - Constraint Based Association Mining - Classification and Prediction - Basic Concepts - Decision Tree Induction – Bayesian Classification - Rule Based Classification - Classification by Back propagation - Support Vector Machines - 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.

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:
   CO1: Able to have extensive knowledge on concepts of data warehousing like meta data, Data mart, dimension data and design principles to use OLTP and OLAP tools.
   CO2: Able to apply data mining algorithms.
   CO3: Able to apply the data mining technique such as association rule mining, classification, clustering and Bayesian networks to solve real life problems.

TEXT BOOKS:
1. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

REFERENCES BOOKS:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction To Data Mining", Pearson Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

		L	T	P	C
711ITT04	**ENTERPRISE COMPUTING**	3	0	0	3

OBJECTIVE(S):
- To know about the Enterprise and its related issues.
- To provide a sound knowledge in various middleware technologies for distributed
- Enterprise applications.
- To know about different services for distributed Enterprise systems.
-

Prerequisite: Web Technology & Java Programming

UNIT I   ENTERPRISE FOUNDATIONS   9

Enterprise Architectural Overview - Object Oriented Software Development for Enterprise - Component Based Software Development for Enterprise - Java Enterprise System – Enterprise Data - Basis of JDBC - Interfaces – Drivers - Advanced JDBC Features.

UNIT II   MIDDLEWARE TECHNOLOGIES FOR ENTERPRISE   9

General Middleware - Service Specific Middleware - Client/Server Building blocks - RPC -Messaging – Peer to Peer - Java RMI - Computing standards – OMG - Overview of CORBA - Overview of COM/DCOM - Overview of EJB - Middleware Types - Middleware in distributed Applications.

UNIT III   EJB, CORBA AND COM   9

EJB Architecture - Overview of EJB Software Architecture - EJB Conversation - Building and Deploying EJBS – Roles - Applications - EJB Session Beans - EJB Entity Beans - Lifecycle of Beans - EJB Clients - Developing an Application - Deployment. CORBA – Components - Architectural Features - Method Invocations - Static and Dynamic: IDL. Evolution of DCOM - Introduction to COM - COM Clients and Servers - COM IDL - COM Interfaces - Comparison of COM and CORBA.

UNIT IV   .NET FRAMEWORK   9

Introducing .NET framework - Brief history - Building blocks of .NET platform - Role of .NET Class libraries - Understanding CTS, CLR, CLS - Employing .NET - Building C# Applications.

UNIT V   SERVICES FOR DISTRIBUTED ENTERPRISE SYSTEMS   9

Naming Services - Directory and Trading services - Activation Services - Message Services - Transaction Services and High Assurance Enterprise Applications.

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

CO1: Able to have knowledge about JDBC ODBC Drivers and middleware technologies for building an enterprise.

CO2: Able to gain extensive knowledge about EJB, CORBA, COM.

CO3: Able to build C# applications with .NET and have an overview about different services need for enterprise development.

TEXT BOOKS:

1. G. Sudha Sadasivam, Radha Shankarmani, "Middleware and Enterprise Integration Technologies", Wiley, 2009.
2. Paul J Perrone, Venkata S.R. Krishna R and Chaganti, "Building Java Enterprise Systems with J2EE", Tech Media , New Delhi, 2000.
3. E Balagurusamy, "Programming in C#", Second Edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 2008.

REFERENCES:

1. Judith M. Myerson, "The Complete Book of Middleware", Auerbach Publications, First Edition, 2002.
2. Tom Valesky - "Enterprise Java Beans", Addison Wesley Longman Inc. New Delhi, 2000.
3. Ed Roman - "Mastering EJB", John Wiley & Sons, New Delhi
4. George Reese, " Database Programming, with JDBC and Java", Second Edition, O'Reiliy Publishers, New Delhi, 2000.
5 Andrew Troelsen, "Pro C# with .NET 3.0", Dream Tech Press India,Special Edition, 2007.

	L	T	P	C
711CIE07 **BUILDING ENTERPRISE APPLICATIONS**

L	T	P	C
3	0	0	3

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.

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711ITE09 CLOUD COMPUTING	3	0	0	3

OBJECTIVE(S):
- To introduce the broad perspective of cloud types and migration to a cloud
- To understand the concept of virtualization.
- To understand cloud based services
- To understand cloud security and cloud based storage.

Prerequisite: Nil

UNIT-I   INTRODUCTION   9
Introduction to Cloud Computing – Roots of Cloud Computing- Layers & Types of Clouds (IaaS, PaaS, SaaS) - IDaaS, CaaS – Features – Cloud Infrastructure Management – Infrastructure & Platform as a Service Providers – Challenges & Risks – Migrating into cloud: Approaches – Seven Step Model of Migration into a cloud

UNIT-II   CLOUD BASED SERVICES & PLATFORMS   9
Understanding Abstraction & Virtualization, Using Google Web Services – Exploring Applications & Toolkit – Surveying Application Portfolio – Working with Google App Engine, Using Amazon Web Services, Using Microsoft Cloud Services

UNIT-III   CLOUD INFRASTRUCTURE   9
Managing the Cloud – Administration – Management Products – Management Standards, Understanding Cloud Security – Securing Cloud – Securing Data – Establishing Identity & Presence

UNIT-IV   BUILDING CLOUD NETWORKS & APPLICATIONS   9
Understanding Service Oriented Architecture – Introducing SOA – Defining SOA Communications – Managing & Monitoring SOA – Relating SOA & Cloud Computing, Moving Applications to the Cloud – Applications in Cloud & Cloud APIs

UNIT-V   CLOUD STORAGE & COMMUNICATION   9
Working with Cloud-Based Storage – Measuring – Provisioning – Backup Solutions -Interoperability, Working with Productivity Software, Using Webmail Services – Exploring Mail Services, Working with Syndication Services, Communicating with the Cloud – Exploring Instant Messaging & Collaboration Technologies – Using Social Networks.

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:

CO1: Able to gain extensive knowledge on cloud concepts, virtualization, cloud services and security threat exposure within a cloud computing infrastructure.

CO2: Able to implement cloud storage and cloud security.

CO3: Able to manage the cloud and can perform data communication within the cloud in a secure manner.

TEXT BOOKS:
1. Barrie Sosinsky, "Cloud Computing Bible", WILEY – INDIA, New Delhi, 2011
2. Rajkumar Buyya, Christian Vecchiola, S.Tamarai Selvi,"Mastering Cloud Computing", TMGH, 2013.

REFERENCES:
1. Kumar Saurabh."Could Computing – insights into New - Era Infrastructure". Wiley India.2011
2. Ronald L.Krutz, Russell Dean Vines, "Cloud Security - A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.
1. Michael miller, Cloud Computing, Que publishing, 2008.

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711ITP08	WEB TECHNOLOGY & ENTERPRISE COMPUTING LAB	L	T	P	C
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Prerequisites: Web Technology & Enterprise Computing

LIST OF EXPERIMENTS:
WEB TECHNOLOGY LAB
1. Create a Webpage using HTML and VBSCRIPT.
2. Create a Webpage for validating Web Form using DHTML.
3. Design a Dynamic Webpage with using JavaScript and XML.
4. Create an XML Document using XML – DTD, XSL.
5. Create a Webpage using all types of Cascading style sheets.
6. Write a Servlet Program to Track Sessions in a Web Application.
7. Write a JSP program to Access Information from Databases using Java Beans.
8. Write a Java Program to invoke Servlet from Applets.

ENTERPRISE COMPUTING LAB
Study of multi-tier software environment. Study of web servers / web browser and tools for enterprise software development and deployment.
1. Develop a package using JDBC.
2. Develop a package using RMI.
3. Develop a package using Java Beans.
4. Develop a package using EJB.
5. Build a C# application in .NET platform

TOTAL: 45

COURSE OUTCOMES:
- Able to create a dynamic web page by applying client side and server side scripting languages.
- Able to build web based application by using database connectivity.
- Able to create multi tier enterprise applications using RMI, EJB and .NET framework.

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711ITP09 **MINI PROJECT**	0	0	3	2

Pre requisites: All Programme Courses

IMPORTANCE OF MINI 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 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 OUTCOMES:
    CO1: Able to analyze engineering problem specification and recommend a optimum set of technical solutions.
    CO2: Able to acquire industry relevant skills by working in team and efficiently communicating the deliverables.
    CO3: Able to implement innovative ideas in solving contemporary issues.

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811ITT01		**SERVICE ORIENTED ARCHITECTURE**	3	0	0	3

OBJECTIVE(S):
- To understand the technology of enterprise SOA.
- To know the basics of SOA management, Networks.
- To explore the idea of service provided in SOA.

Prerequisites: Enterprise Computing

UNIT-I   THE TECHNOLOGY OF ENTERPRISE SOA   9
The goal of loose coupling-Web services overview-Introducing Service oriented Architecture: Enterprise architecture-The service oriented architecture

UNIT-II   ENTERPRISE APPLICTION INTEGRATION AND B2B COMMERCE   9
EAI-web services in portals and software development-managing the supply chain-Building hubs-Partner to Partner-Government and scientific SOA.

UNIT-III   REAL TIME OPERATIONS AND SECURITY   9
Goal of the real time enterprise-Delivering real time with the SOA –Real time virtual data warehouse-business level agreements. SECURITY: Risk of loose coupling-layers of SOA security-Solutions to SOA security.

UNIT-IV   SOA MANAGEMENT SOLUTION AND SOA NETWORKS   9
Problems in the unmanaged SOA-web services management solutions-Managing the SOA network-Securing the SOA network and solutions-SOA network management-Utility computing in the SOA .

UNIT-V   PEOPLE AND PROCESS OF ENTERPRISE SOA   9
Exploring an SOA for titan-achieving consensus at titan-Grouping for SOA Training ESTABLISHING PRACTICE, PLAN AND PROCEED: Services discovery-Service creation-Selecting a platform-Forming an SOA plan and proceed

TOTAL HOURS: 45 PERIODS

COURSEOUTCOMES:
- Able to gain knowledge and understand the service oriented architecture and approach.
- Able to explain the imperatives behind SOA in the field of commerce, governance and service incorporating security aspects.
- Able to device service discovery and service management by creating a SOA plan.

TEXT BOOK:
1. Eric Pulier, Hugh Taylor, " Understanding Enterprise SOA", Dreamtech press, New Delhi, 2005.

REFERENCES:
1. Chris Peiris and Dennis Mulder, "Pro WCF Practical Microsoft SOA implementation", Apress, Berkeley, CA, USA, 2007.
2. Greg Lomow, Eric Newcomer, "Understanding SOA with Web Services", Pearson Education, New Delhi, 2005.
3. Dan Woods, Thomas Mattern,"Enterprise SOA:Designing it for Business Innovation",Shroffpublishers, NewDelhi,2006.

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811CIE07	**SOFTWARE TESTING**	3	0	0	3

OBJECTIVE(S):
- To study the concept of Software Testing.
- To analyze the planning involved in Software Testing.
- To know about the tools involved in Automate Testing.

Prerequisites: Software Quality Assurance

UNIT-I   INTRODUCTION   9

Perspective of Testing – definition, approaches, testing during development life cycle, test policy, test planning, categories of defect, configuration management, risk analysis.

UNIT-II   TESTING TECHNIQUES   9

Levels of testing, acceptance testing, criticality of requirement, special tests – complexity, GUI, compatibility, security, recovery, installation, error handling, smoke, sanity, parallel and execution testing

UNIT-III   TECHNIQUES FOR AUTOMATING TEST EXECUTION   9

Testing and test automation – The V model –Tool support for life-cycle testing – The promise of test automation, Common problems of test automation – The limitations of automating software testing, Script Preprocessing, Scripting Techniques.

UNIT-IV   TOOLS TO AUTOMATE TESTING   9

Selecting tools - requirements - tool market   - tool selection project   - tool selection team - Identifying requirements - Identifying constraints - Identifying tools availability in market - Evaluating the candidate tools - decision making, Testing Tools – Win Runner, Silk Test, Load Runner, JMeter.

UNIT-V   AUTOMATED COMPARISON   9

Verification, comparison, automation – comparators, dynamic comparison – post- execution comparison – simple comparison, complex comparison – test sensitivity – comparing different types of outcomes – comparison filters and guidelines – Testware Architecture – Automating pre and post processing – Building maintainable tests

TOTAL HOURS: 45 PERIODS

COURSE OUTCOMES:
   CO1: Perform the tests reliably precisely the same operations each time they are run, thereby eliminating human error.
   CO2: Test how the software reacts under repeated execution of the same operations.
   CO3: Know how to reuse tests on different versions of an application, even if the users interface changes.

TEXT BOOKS:
1. Limaye L G, "Software Testing – Principles, Techniques and Tools", Tata Mc- Graw Hill Education Pvt. Ltd., New Delhi, 2009
2. Boris Beizer, "Software Testing Techniques", Dream Tech press, New Delhi, 1990.
3. Mark Fewster, Dorothy Graham., "Software Test Automation: Effective Use of Test Execution Tools", Addison Wesley, New Delhi, 1999.

REFERENCES:
1. William E Perry, "Effective Methods of Software Testing", John Wiley & sons, Singapore, 2006.
2. Roger S Pressman, "Software Engineering – A Practitioner's Approach", sixth edition, Tata McGraw Hill, New Delhi, 2006.
3. Glenford J Myer, "The Art of Software Testing", Second edition, John Wiley & Sons, Singapore, 2004.
4. Prasad K.V.K.K., "Software Testing Tools: Covering WinRunner, SilkTest, LoadRunner, JMeter", Dreamtech Press, USA, 2005.

	L	T	P	C
811ITE09 **ADHOC SENSOR NETWORKS**

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	3	0	0	3

OBJECTIVE(S):
- To know the usage of ADHOC sensor network.
- To know the quality of services involved.
- To describe the Mesh, Sensor networks.
-

Prerequisites: Computer Networks

UNIT I ROUTING 9

Cellular and Ad hoc wireless networks – Issues of MAC layer and Routing – Proactive,Reactive and Hybrid Routing protocols – Multicast Routing – Tree based and Meshbased protocols – Multicast with Quality of Service Provision.

UNIT II QUALITY OF SERVICE 9

Real-time traffic support – Issues and challenges in providing QoS – Classification of QoS Solutions – MAC layer classifications – QoS Aware Routing Protocols – Ticket based and Predictive location based QoS Routing Protocols

UNIT III ENERGY MANAGEMENT AD HOC NETWORKS 9

Need for Energy Management – Classification of Energy Management Schemes –Battery Management and Transmission Power Management Schemes – Network Layer and Data Link Layer Solutions – System power Management schemes

UNIT IV MESH NETWORKS 9

Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture –Opportunistic Routing – Self Configuration and Auto Configuration - Capacity Models –Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks

UNIT V SENSOR NETWORKS 9

Introduction – Sensor Network architecture – Data Dissemination – Data Gathering –MAC Protocols for sensor Networks – Location discovery – Quality of Sensor Networks– Evolving Standards – Other Issues – Recent trends in Infrastructure less Networks

TOTAL: 45

COURSE OUTCOMES:
- Able to work with existing Ad – hoc and sensor network protocols and standards.
- Able to create a Sensor network environment for different type of applications
- Able to design ad – hoc and sensor network architectures using QoS and Congestion control mechanisms
- Able to select appropriate routing algorithms for different network environments
- Able to program ad-hoc and sensor network for various applications.

TEXT BOOK:

1. C. Siva Ram Murthy and B.S.Manoj, "Ad hoc Wireless Networks – Architectures and Protocols', Pearson Education, 2004

REFERENCES:

1. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufman Publishers, 2004.
2. C.K.Toh, "Adhoc Mobile Wireless Networks", Pearson Education, 2002.
3. Thomas Krag and Sebastin Buettrich, 'Wireless Mesh Networking', O'Reilly Publishers, 2007.

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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 skill s by working in team and efficiently communicating the deliverable

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