Estd. 1995

SETHU INSTITUTE OF TECHNOLOGY
(An Autonomous Institution)

Pulloor, Kariapatti – 626 115.

ISO 9001:2008
FS 70973

B.E. COMPUTER SCIENCE & ENGINEERING

REGULATIONS 2015

CHOICE BASED CREDIT SYSTEM

CURRICULUM & SYLLABUS

(1st SEMESTER To 8th SEMESTER)

Approved in the Academic Council Meeting held on 25.08.18

Chairperson
Board of Studies
Computer Science & Engineering
Sethu Institute of Technology
Kariapatti - 626 115

CHAIRMAN
ACADEMIC COUNCIL

CHAIRMAN
ACADEMIC COUNCIL
Sethu Institute of Technology

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B.E. Degree Programme

CBCS CURRICULUM

Regulations 2015

Bachelor of Engineering in Computer Science & Engineering

OVERALL COURSE STRUCTURE

Category	Total No. of Courses	Credits	Percentage
Humanities & Social Sciences	**5**	**11**	**6.5**
Basic Sciences	**11**	**31**	**18.3**
Engineering Sciences	**5**	**12**	**7.1**
Professional Core	**32**	**73**	**43.2**
Professional Elective	**6**	**18**	**10.7**
Open Electives	**3**	**9**	**5.3**
Project Work	**2**	**15**	**8.9**
Mandatory Course	**3**	**-**	**-**
TOTAL	**64**	**169**	**100**

COURSE CREDITS – SEMESTER WISE

Branch	I	II	III	IV	V	VI	VII	VIII	TOTAL
CSE	22	21	22	23	22	22	17	20	169

Semester I

Course Code	Course Title	L	T	P	C
THEORY					
15UEN101	Technical English (Common to ALL Branches)	2	0	0	2
15UMA102	Engineering Mathematics – I (Common to ALL Branches)	3	2	0	4
15UPH103	Engineering Physics (Common to ALL Branches)	3	0	0	3
15UCY105	Applied Chemistry (Common to CSE,ECE,EEE,IT& EIE)	3	0	0	3
15UCS107	Computer Programming (Common to ALL Branches)	3	0	0	3
15UME108	Engineering Graphics (Common to ALL Branches)	3	2	0	4
PRACTICAL					
15UCS109	Computer Programming Laboratory (Common to ALL Branches)	0	0	2	1
15UCS111	Engineering Fundamentals Laboratory (Common to CSE, ECE & IT)	0	0	2	1
15UGS112	Basic Sciences Laboratory- I (Common to ALL Branches)	0	0	2	1
	TOTAL	**17**	**4**	**6**	**22**
Total No. of Credits – 22					

Semester II

Course Code	Course Title	L	T	P	C
THEORY					
15UEN201	Business English and Presentation skills (Common to ALL Branches)	3	0	0	3
15UMA202	Engineering Mathematics – II (Common to ALL Branches)	3	2	0	4
15UPH205	Semi Conductor Physics and Opto Electronics (Common to CSE, ECE &IT)	3	0	0	3
15UCY207	Environmental Science (Common to ALL Branches)	3	0	0	3
15UCS208	Digital Principles and System Design (Common to CSE & IT)	3	0	0	3
15UCS209	Programming and Data Structures	3	0	0	3
PRACTICAL					
15UGS210	Basic Sciences Laboratory -II (Common to ALL Branches)	0	0	2	1
15UCS211	Programming and Data Structures Laboratory	0	0	2	1
	TOTAL	**18**	**2**	**4**	**21**
Total No. of Credits – 21					

Semester III

Course Code	Course Title	L	T	P	C
THEORY					
15UMA322	Probability, Statistics and Queueing Systems (Common to CSE & IT)	3	2	0	4
15UCS302	Data Structures	3	0	0	3
15UCS303	Computer Organization and Architecture (Common to CSE & IT)	2	2	0	3
15UCS304	Object Oriented Programming with C++	3	0	0	3
15UIT305	Operating Systems (Common to CSE & IT)	3	0	0	3
15UCS306	Database System Concepts	3	0	0	3
PRACTICAL					
15UCS307	Object Oriented Programming and Data Structures Laboratory	0	0	2	1
15UCS308	Database Systems Laboratory	0	0	2	1
15UIT309	Operating Systems Laboratory (Common to CSE & IT)	0	0	2	1
	TOTAL	**17**	**4**	**6**	**22**
Total No. of Credits – 22					

Semester IV

Course Code	Course Title	L	T	P	C
THEORY					
15UMA421	Discrete Mathematics (Common to CSE & IT)	3	2	0	4
15UCS402	Java Programming (Common to CSE & IT)	3	0	0	3
15UCS403	Design and Analysis of Algorithms	2	2	0	3
15UCS404	Computer Communication and Networks	3	0	0	3
15UCS405	Software Engineering	3	0	0	3
15UEC426	Microprocessors and Microcontrollers	3	0	0	3
15UGS431	Reasoning and Quantitative Aptitude (Common to ALL Branches)	1	0	0	1
PRACTICAL					
15UCS407	Java Programming Laboratory (Common to CSE & IT)	0	0	2	1
15UCS408	Data Communication and Networks Laboratory	0	0	2	1
15UEC429	Digital and Microprocessors Laboratory	0	0	2	1
	TOTAL	**18**	**4**	**6**	**23**
Total No. of Credits – 23					

Semester V

Course Code	Course Title	L	T	P	C
THEORY					
15UCS501	Internet and Web Technology (Common to CSE & IT)	3	0	0	3
15UCS502	Object Oriented Analysis and Design	2	0	0	2
15UIT503	Graphics and Multimedia (Common to CSE & IT)	3	0	0	3
15UCS504	Theory of Computation	3	2	0	4
	Professional Elective – I	3	0	0	3
	Professional Elective – II	3	0	0	3
PRACTICAL					
15UCS507	Internet and Web Technology Laboratory (Common to CSE & IT)	0	0	2	1
15UCS508	Case Tools Laboratory	0	0	2	1
15UIT509	Graphics and Multimedia Laboratory (Common to CSE & IT)	0	0	2	1
15UGS531	Soft Skills and Communication Laboratory (Common to CSE,ECE,EEE & IT)	0	0	2	1
	TOTAL	**17**	**2**	**8**	**22**
Total No. of Credits – 22					

Semester VI

Course Code	Course Title	L	T	P	C
THEORY					
15UCS601	Principles of Compiler Design	2	2	0	3
15UIT602	Mobile Applications Development (Common to CSE & IT)	3	0	0	3
15UCS603	Artificial Intelligence	3	0	0	3
	Professional Elective – III	3	0	0	3
	Professional Elective IV	3	0	0	3
	Open Elective – I	3	0	0	3
PRACTICAL					
15UCS607	Technical Project	0	0	6	3
15UIT608	Mobile Applications Development Laboratory (Common to CSE & IT)	0	0	2	1
	TOTAL	**17**	**2**	**8**	**22**
Total No. of Credits – 22					

Semester VII

Course Code	Course Title	L	T	P	C
THEORY					
15UME701	Project Management and Finance (Common to ALL Branches)	3	0	0	3
15UCS702	Insight into Cloud Computing (Common to CSE & IT)	3	0	0	3
15UCS703	Data Science	3	0	0	3
	Professional Elective V	3	0	0	3
	Open Elective – II	3	0	0	3
PRACTICAL					
15UCS706	Cloud Computing Laboratory (Common to CSE & IT)	0	0	2	1
15UCS707	Data Science Laboratory	0	0	2	1
	TOTAL	**15**	**0**	**4**	**17**
Total No. of Credits – 17					

Semester VIII

Course Code	Course Title	L	T	P	C
THEORY					
15UME801	Professional Ethics (Common to ALL Branches)	2	0	0	2
	Professional Elective VI	3	0	0	3
	Open Elective – III	3	0	0	3
PRACTICAL					
15UCS804/ 15UGE810	Project Work/ Multidisciplinary Project Phase II	0	0	24	12
	TOTAL	**8**	**0**	**24**	**20**
Total No. of Credits – 20					

TOTAL CREDITS – 169

LIST OF ELECTIVES

Course Code	Course Title	L	T	P	C
15UCS901	Multicore Programming	3	0	0	3
15UCS902	Information Storage Management*	3	0	0	3
15UCS903	Network Analysis and Management	3	0	0	3
15UCS904	Data Mining	3	0	0	3
15UCS905	Distributed Computing	3	0	0	3
15UCS906	Game Programming	3	0	0	3
15UCS907	Knowledge Based Decision Support Systems	3	0	0	3
15UCS908	C# and .NET Framework	2	0	2	3
15UCS909	Natural Language Processing	3	0	0	3
15UCS910	Building Internet of Things	3	0	0	3
15UCS911	Grid Computing	3	0	0	3
15UCS912	Nano Computing	3	0	0	3
15UCS913	Cyber Forensics	3	0	0	3
15UCS914	Quantum Computing	3	0	0	3
15UCS915	Principles of Software Architecture	3	0	0	3
15UCS916	Cryptography	2	0	2	3
15UCS917	Semantic Web Paradigm	3	0	0	3
15UCS918	Information Retrieval	3	0	0	3
15UCS919	Human Computer Interaction	3	0	0	3
15UCS920	Green Computing	3	0	0	3
15UCS921	E-Learning Techniques	3	0	0	3
15UCS922	Neural Networks and its Applications	3	0	0	3
15UCS923	Fuzzy logic	3	0	0	3
15UCS924	Mobile computing	3	0	0	3
15UCS925	Business Intelligence and its applications*	3	0	0	3
15UCS926	Web Services and Service Oriented Architecture	3	0	0	3
15UCS927	Machine Learning Algorithms	3	0	0	3
15UIT910	Building Enterprise Applications*	3	0	0	3
15UIT911	Software Testing*	3	0	0	3
15UIT924	Agile Software Development*	3	0	0	3
15UGE710	Multidisciplinary Project Phase I*	3	0	0	3

Course Code	Course Title	L	T	P	C
INTERDISCIPLINARY COURSES					
15UGM953	Embedded Programming	3	0	0	3
***List of courses designed by the industry**					

OPEN ELECTIVES OFFERED TO OTHER PROGRAMMES

Course Code	Course Title	L	T	P	C
15UCS971	Programming with C++	3	0	0	3
15UCS972	Programming with Java	3	0	0	3
15UCS973	Cloud Architecture and its Services	3	0	0	3
15UCS974	Massive Dataset Analytics	3	0	0	3
15UCS975	Fundamentals of Software Engineering	3	0	0	3
15UCS976	Internet of Things	3	0	0	3

LIST OF ONE CREDIT COURSES DESIGNED BY THE INDUSTRY

Course Code	Course Title	L	T	P	C
15UCS861	Software Project Management	1	0	0	1
15UCS862	Multimedia	1	0	0	1
15UCS863	PYTHON Programming	1	0	0	1
15UCS864	PHP	1	0	0	1
15UCS865	ASP.NET	1	0	0	1
15UCS866	R Programming	1	0	0	1
15UCS867	Windows System Administration	0	0	2	1

COURSES OFFERED TO OTHER PROGRAMMES

Course Code	Course Title	L	T	P	C
B.E. (ECE)					
15UCS429	Programming with C Laboratory	0	0	2	1
B.E. (EEE)					
15UCS627	Problem Solving Using C	0	0	2	1
B.E. (EEE)					
15UCS955	Data Structures and Algorithm Analysis in C	3	0	0	3

MANDATORY COURSES

Category	Courses
Personality and Social Development	Sports
Skills Development	English Proficiency Certificate such as BEC, TOFEL, IELTS
	Foreign Languages
	Soft Skills and Aptitude
	Aptitude Proficiency certificate such as GRE, GMAT, CAT
	Co-Curricular Activities
	Intellectual Property Rights
Value Education	15UGS331-Value Education and Human Rights

SEMESTER-I

Semester I

Course Code	Course Title	L	T	P	C
THEORY					
15UEN101	Technical English (Common to ALL Branches)	2	0	0	2
15UMA102	Engineering Mathematics – I (Common to ALL Branches)	3	2	0	4
15UPH103	Engineering Physics (Common to ALL Branches)	3	0	0	3
15UCY105	Applied Chemistry (Common to ECE, EEE, EIE, CSE, IT& Biomedical)	3	0	0	3
15UCS107	Computer Programming (Common to ALL Branches)	3	0	0	3
15UME108	Engineering Graphics (Common to ALL Branches)	3	2	0	4
PRACTICAL					
15UCS109	Computer Programming Laboratory (Common to ALL Branches)	0	0	2	1
15UCS111	Engineering Fundamentals Laboratory (Common to CSE, ECE & IT)	0	0	2	1
15UGS112	Basic Sciences Laboratory- I (Common to ALL Branches)	0	0	2	1
	TOTAL	**17**	**4**	**6**	**22**
Total No. of Credits – 22					

SEMESTER- I

15UEN101	TECHNICAL ENGLISH (Common to ALL Branches)	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES :

- To enhance the vocabulary of students.
- To strengthen the application of functional grammar and basic skills.
- To improve the language proficiency of students.

UNIT I		6

Grammar - Parts of Speech-Tense – **Vocabulary** – Technical Word Formation- Prefix- suffix - Synonyms and Antonyms– **Writing** – Instructions – Formal Letters - **Reading** Comprehension - Prose: A Nation's Strength – Dr. Karan Singh.

UNIT II		6

Grammar – Concord -'Wh' Questions – **Vocabulary** – One Word Substitutes – Listening & Speaking – Conducting Meetings – **Writing** - Preparation of the Checklist, Essay writing – **Reading** -Prose: My Vision for India-Dr.A.P.J.AbdulKalam.

UNIT III		6

Grammar – Voice – **Vocabulary**– Compound Nouns**Writing** – Minutes – Agenda -Transformation of Information (Transcoding)- **Reading Prose:** Professions of Women-Virginia Woolf.

UNIT IV		6

Grammar - Conditional clauses - **Vocabulary** - Idioms & Phrases - **Writing** Letters to Editor - Making Invitations - Acceptance & Declining - Summarizing –**Reading** - Prose: Computers-Peter Laurie.

UNIT V		6

Grammar – Determiners – Vocabulary – Homophones & Homonyms – Writing Recommendations- Note Making - Report Writing- Reading – Prose: What We Must Learn From the West-Narayana Murthy.

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Use grammar effectively in writing meaningful sentences and paragraphs.
- Exhibit improved reading comprehension and vocabulary.
- Demonstrate writing skills in various formal situations.
- Demonstrate improved oral fluency.
- Present reports on various purposes.

TEXTBOOK:

1. S.M.Rajasangar: Technical English, Rathna Arts,Sivakasi, 2018.

REFERENCE BOOKS:

1. Faculty members of English, SIT, Technical English, 2015.
2. AsrafRizvi.M, “Effective Technical Communication”, NewDelhi, TataMcGraw-Hill Publishing Company Limited, (2007).
3. Lakshminarayanan.K.R, “English for Technical Communication”, Chennai, Scitech Publications, India Pvt.Ltd, (2004).

15UMA102	ENGINEERING MATHEMATICS–I (Common to ALL Branches)	L	T	P	C
		3	2	0	4

COURSE OBJECTIVES :

- To make the students capable of identifying algebraic eigenvalue problems from practical areas and obtain the eigen solutions in certain cases.
- To make the students knowledgeable in integrating various types of functions using various integration methods.
- To familiarize the students with the basic rules of differentiation and use them to find derivatives of products and quotientsthat they might encounter in their studies of other subjects in the same or higher semesters.

UNIT I	DIFFERENTIAL CALCULUS	9+6

Introduction – Definition of derivatives – Limits and Continuity – Differentiation techniques (Product rule, Quotient rule, Chain rule) – Successive differentiation (n^{th} derivatives) – Leibnitz theorem (without proof) – Maclaurin's series – Physical Applications (Newton's law of cooling – Heat flow problems, Rate of decay of radioactive materials - Chemical reactions and solutions, Ohm's law, Kirchoff's law – Simple electric circuit problems)

UNIT II	FUNCTIONS OFSEVERAL VARIABLES	9+6

Partial derivatives – Euler's theorem for homogenous functions – Total derivatives –Differentiation of implicit functions – Jacobian – Taylor's expansion – Maxima and Minima – Method of Lagrangian Multipliers.

UNIT III	INTEGRALCALCULUS	8+6

Definitions and concepts of integrals – Methods of integration (Decomposition method, Substitution method, Integration by parts) – Definite integrals – Properties and problems – Reduction formulae – Beta and Gamma functions .

UNIT IV	MULTIPLE INTEGRALS	8+6

Double integration – Cartesian and Polar coordinates – Change of order of integration – Area as a double integral - Change of variables between Cartesian and Polar coordinates – Triple integration in Cartesian coordinates – Volume as triple integral.

UNIT V	MATRICES	8+6

Eigenvalue and eigenvector of a real matrix – Characteristic equation – Properties – Cayley-Hamilton theorem (excluding Proof) – Orthogonal reduction –(transformation of a symmetric matrix to diagonal form) – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

SUPPLEMENTTOPIC (for internal evaluation only) **3**

Evocation /Application of Mathematics, Quick Mathematics – Speed Multiplication and DivisionApplications of Matrices .

TOTAL : 45 (L) + 30 (T) = 75 Periods

COURSE OUTCOMES:

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

- Analyze functions using limits, continuity and derivatives to solve problems involving these functions.
- Use the Lagrange multiplier method to predict extreme values of functions with constraints and to find the absolute maximum and minimum of a function on different domains.
- Apply the various methods of integration for evaluating definite integrals.
- Apply the knowledge of multiple integrals to findthe area and volume of region bounded by the given curves.
- Find Eigen values and Eigenvectors for symmetric and non-symmetric matrices.

TEXTBOOKS:

1. BALI N. P and MANISH GOYAL, "A Text book of Engineering Mathematics", Laxmi Publications (P) Ltd, New Delhi, 8th Edition, (2011).

2. GREWAL. B.S, "Higher Engineering Mathematics", Khanna Publications, New Delhi, 42ndEdition, (2012).

REFERENCE BOOKS:

1. RAMANA B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 11th Reprint, (2010).

2. GLYN JAMES, "Advanced Engineering Mathematics",Pearson Education, New Delhi, 7th Edition, (2007).

3. JAIN R.K and IYENGAR S.R.K," Advanced Engineering Mathematics", Narosa Publishing House, New Delhi, 3rd Edition, (2007).

4. BHARATI KRISHNA TIRTHAJI, "Vedic Mathematics - Mental Calculation",Motilal Banarsidass Publications, New Delhi, 1st Edition, (1965).

5. KREYSZIG. E, "Advanced Engineering Mathematics", John Wiley & Sons, New York, 10th Edition, (2011).

6. P.SIVARAMAKRISHNA DAS, E.RUKMANGADACHARI"Engineering mathematics", volume1, Pearson Edison New Delhi, 2nd Edition, (2013).

15UPH103	ENGINEERING PHYSICS (Common to ALL Branches)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES :

- To develop knowledge on principles of Thermal Physics.
- To make students to understand classification of sound and applications of Ultrasonics.
- To use the principles of Lasers and its types.
- To apply principles of Quantum physics in engineering field.
- To develop the research interest in crystal physics.

UNIT I	CRYSTAL PHYSICS	9

Crystalline – Amorphous materials – single and poly crystal- Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – parameters of Unit cell – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – crystal growth technique- Bridgeman method.

UNIT II	ACOUSTICS AND ULTRASONICS	9

Classification of sound – decibel- weber- Fechner law – Units of Loudness- decibel- phon- sone- Reverberation – Absorption Coefficient –Introduction to ultrasonic- Magnetostriction effect – piezoelectric effect - piezoelectric generator- Detection of ultrasonic waves - properties – Cavitations -Velocity measurement – acoustic grating - Industrial applications – SONAR .

UNIT III	WAVE OPTICS AND LASERS	9

Introduction – interference – refractive index –Expression for plane, circularly and elliptically polarized light LASER: Introduction- Principles of Laser- Einstein theory of stimulated emission- Population inversion Methods - Types of lasers – Co2 laser - semiconductor laser – homojunction – heterojunction - Applications.

UNIT IV	QUANTUM PHYSICS	9

Introduction to black body- de Broglie wavelength – Schrödinger's wave equation – Time dependent – Time independent equation – Physical significance of wave function - Compton Effect – Theory and experimental verification .

UNIT V	PROPERTIES OF SOLIDS AND THERMAL PHYSICS	9

Elasticity- Hooke's law – Different types of moduli of elasticity– stress -strain diagram – Poisson's ratio –Factors affecting elasticity –Bending moment – Depression of a cantilever –Young's modulus by uniform bending - Thermal conductivity- Newton's law of cooling – Lee's disc method - Concept of Entropy.**TOTAL : 45 Periods**

COURSE OUTCOMES:

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

- Apply the crystal growth techniques
- Discuss the basic concepts of Acoustics and Ultrasonics.
- Acquire knowledge about wave optics and Lasers
- Summarize the principles of quantum physics
- Explain the methods of thermal conduction.

TEXT BOOKS:

1. Dr. Mani.P, “A Text Book of Engineering Physics”, Dhanam Publications, Edition ,2014, Chennai.
2. Rajendran.V, “Engineering,Physics”, Tata Mc-Graw Hill Publishing Company limited, New Delhi, Revised Edition 2013.
3. Palanisami P.K., “Physics For Engineers”, Scitech Publications (India), Pvt Ltd., Chennai, 2014.

REFERENCE BOOKS:

1. Raghuvenshi G.S., “Engineering Physics”, PHI Learning Private Limited, New Delhi, Revised Edition 2014.
2. Arul doss .G., “Engineering Physics”, PHI Learning Limited, New Delhi, Revised Edition 2013.
3. Marikani .A., “Engineering Physics”, PHI Learning Private Limited, New Delhi, Revised Edition 2012.
4. Sankar B.N., and Pillai .S.O., “A Text book of Engineering Physics”, New Age International Publishers Private Limited, New Delhi, Revised Edition 2013.
5. Avadhanulu M.N. and Kshirsagar P.G., “A Textbook: of Engineering Physics”, S.Chand& Company Ltd., New Delhi, 2015.

15UCY105	APPLIED CHEMISTRY (Common to ECE, EEE, CSE, IT& Biomedical Engineering Branches)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES :

- Introduction to the fundamental concepts of chemical bonds.
- Understand the principles and applications of corrosion science.
- Gain knowledge about energy storage devices & Electrochemical sensors.
- Understand the principles and applications of spectroscopy and the concept of green chemistry.
- Acquire knowledge on smart materials.
-

UNIT I	CHEMICAL BONDING	9

Chemical Bonding: Electronic Configuration– Ionic Bond - Covalent Bond – Metallic bond –Aufbau principle, Octet Rule, Pauli Exclusion principle, Molecular Orbital theory, Valence bond theory and its limitations, Various types of hybridization (SP, SP2 , SP3)(Homo nuclear& H2, N2, O2) and shapes of molecules based on MO theory -bond strength and bond energy, Born-Haber cycle, Fajan's rule–Non Covalent Bonding-Hydrogen bonding, Vander Waals forces.

UNIT II	ELECTRO CHEMISTRY AND CORROSION	9

Electrochemistry: Introduction -Electrochemical cells- reversible and irreversible cells – EMF – measurement of EMF-Single electrode potential-Nernst equation.
Chemical corrosion: Introduction- Definition- Types - (Dry corrosion, mechanism and its Example)- Electrochemical corrosion (Wet corrosion, mechanism and its Types – Galvanic & Differential aeration Corrosion- Pitting, crevice & Wire fence corrosion). Factors influencing rate of corrosion. Corrosion prevention - Cathodic protection, Corrosion inhibitors, and Protective coatings – Paint, Electroplating – Gold plating-Risk Analysis -Electroless plating – Nickel plating

UNIT III	CONVENTIONAL ENERGY STORAGE DEVICES AND SENSORS	9

Conventional devices - Batteries- Primary and secondary batteries- Construction, working and applications of Zn – MnO2, Lead acid storage and Cd batteries. Fuel cells – Differences between battery and fuel cell, construction and working of H2 – O2 fuel cell.

Electrochemical sensors: Chemically modified electrode (CMEs) – Concept, CMEs sensors, Chemical sensors – gas sensors – ion selective electrodes, principle, types (solid state membranes and liquid membranes) and applications. Biosensors – electrochemical biosensors – glucose biosensors.

UNIT IV	INSTRUMENTATION FOR ANALYTICAL METHODS AND GREEN CHEMISTRY	9

Beer-Lamberts law - Principle, instrumentation and applications –UV-Visible spectrophotometer- X-ray diffractometer - Thermo Gravimetric Analysis (TGA) - Differential Thermal Analysis (DTA)- Differential Scanning Colorimetry (DSC).
Green chemistry – Concept, importance, principles – e- waste disposal

UNIT V	POLYMERS& SMART MATERIALS	9

Introduction- Terminology- structure and properties -Types of Polymerisation-Conducting polymers – Chemical and Electrochemical doping; Charge transfer polymer – Polymers filled with conductive solids, Organic Light emitting diodes – Principles and applications, Liquid crystals – definition and

applications.

TOTAL : 45 Periods

COURSE OUTCOMES:

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

- Have sound knowledge on the basics of chemistry related to bonding.
- Know the principles, various types of corrosion and corrosion control techniques.
- Realize the need of green practices inenergy storage devices.
- Identify the instruments for chemical analysis.
- Gain knowledge on polymers in electronics and its applications.

TEXT BOOKS:

1. Jain P.C. and Monica Jain, “Engineering Chemistry”, DhanpatRai Publishing Company (P) Ltd, New Delhi, 2002.
2. Dr.Sunita Rattan, “A Textbook of Engineering Chemistry” S.K.Kataria& Sons., New Delhi,2013.

REFERENCES:

1. Derek Pletcher and Frank C. Walsh, “Industrial Electrochemistry”, Chapman and Hall, New York, 1993.
2. Peter Grundler, “ Chemical Sensors – An introduction for Scientists and Engineers”, Springer, New York, 2007.
3. ArnostReiser, “Photoreactive Polymers the Science and Technology of Resists”, Wiley Interscience, New York,1989.
4. Paul T. Anastas, John C. Warner, ‘Green Chemistry: Theory and Practice’, Oxford University Press, (2000).

15UCS107	COMPUTER PROGRAMMING (Common to ALL Branches)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart the concepts in basic organization of computers and problem solving techniques.
- To familiarize the programming constructs of C.
- To explain the concepts of arrays, strings, functions, pointers, structures and unions in C.

UNIT I	INTRODUCTION	8

Generation and Classification of Computers - Basic Organization of a Computer – Problem formulation – Problem Solving - Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart.

UNIT II	C PROGRAMMING 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.

UNIT III	DECISION MAKING AND LOOPING STATEMENTS	10

if - if-else - nested if-else – else-if ladder statement – switch – goto – for- while – do-while – break – continue statements – Problem solving with decision making and looping statements.

UNIT IV	ARRAYS, STRINGS AND FUNCTIONS	9

Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays - String - String operations – string arrays - Function – definition of function – Declaration of function – Parameter passing methods – Recursion - Storage classes – Problem solving with arrays, strings and functions.

UNIT V	POINTERS, STRUCTURES AND UNIONS	9

Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays - Dynamic Memory allocation – Structure - need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Pre-processor directives.

TOTAL: 45Periods

COURSE OUTCOMES:

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

- Illustrate the basics about computer.
- Develop simple programs.
- Develop simple programs using branching and looping constructs.
- Write C program using arrays, strings and functions.
- Write C programs for simple applications.

TEXT BOOKS :

1. Balagurusamy, E, “Programming in AnsiC”,Third Edition, Tats McGraw-Hill Publishing Company Limited, New Delhi, 2005.
2. PradipDey, ManasGhosh, “Fundamentals of Computing and Programming in C”, Oxford University Press, First Edition, 2009.
3. Behrouz A. Forouzan, Richard F.Gilberg, “A Structured Programming Approach using C”, Third Edition, Thomson Course Technology, 2007.

REFERENCE BOOKS :

1. Yashavant P. Kanetkar. “ Let Us C”, BPB Publications, 2011.
2. Kernighan.B.W ,Ritchie.D.M, “The C Programming language”, Pearson Education,Second Edition, 2006.
3. Stephen G.Kochan, “Programming in C”, Pearson Education India,Third Edition, 2005.
4. Anita Goel ,Ajay Mittal, ” Computer Fundamentals and Programming in C””, Dorling Kindersley (India) Pvt. Ltd, Pearson Education in South Asia, 2011.
5. Byron S Gottfried, ” Programming with C ”, Schaum’s Outlines, Tata McGraw-Hill,Second Edition, 2006.

15UME108	ENGINEERING GRAPHICS (Common to ALL Branches)	L	T	P	C
		3	2	0	4

COURSE OBJECTIVES:

- To develop in students graphic skill for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings
- To impart knowledge in development of surfaces, isometric and perspective projections

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)	1

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, PROJECTION OF POINTS, LINES AND PLANESURFACES	9+5

Plane Curves: (Not for Examination)

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.

Projections:

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 II	PROJECTION OF SOLIDS	9+6

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to Horizontal plane (HP)only.

UNIT III	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES	9+6

Sectioning of above solids in simple vertical position by cutting planes inclined to Horizontal plane (HP) and perpendicular to the VP – Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solidsinclined to Horizontal plane(HP) only – Prisms, pyramids, cylinders and cones.

UNIT IV	ISOMETRIC AND PERSPECTIVE PROJECTIONS	9+6

Isometric Projections

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones when cutting plane inclined to Horizontal plane (HP) only.

Perspective Projections (Not for Examination)

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

UNIT V	ORTHOGRAPHIC PROJECTION	9+6

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 of multiple views from pictorial views of objects.

TOTAL 45 (L) + 30 (T) = 75 Periods

COURSE OUTCOMES:

After successful completion of this course the students will be able to

- Discuss first angle projection to project straight line, planes and solids.
- Illustrate simple solids like prisms, pyramids, cylinder and cone.
- Construct section of solids and development of surfaces for engineering applications.
- Prepare isometric views of objects like truncated solids and frustums.

- Prepare orthographic views from isometric drawings.

TEXT BOOKS:

1. Natarajan K.V., “A Text book of Engineering Graphics”, Dhanalakshmi Publishers, (2006).
2. Bhatt N.D., “Engineering Drawing”, 46th Edition, Charotar Publishing House, (2003).

REFERENCE BOOKS:

1. Venugopal K., and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, (2008).
2. Gopalakrishnan K.R., “Engineering Drawing” (Vol .I&II), Subhas Publications,(1998).
3. DhananjayA.Jolhe, “Engineering Drawing with an introduction to Auto CAD”, Tata McGraw Hill Publishing Company Limited, (2008).

15UCS109	COMPUTER PROGRAMMING LABORATORY (Common to ALL Branches)	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES :

- To make the students to work with Office software.
- To familiarize the implementation of programs in C.

LIST OF EXPERIMENTS

a) **Word Processing**

Document creation, Formatting, Table Creation, Mail merge

b) **Spread Sheet**

Chart - Line, XY, Bar and Pie, Formula - formula editor.

c) **C Programming**

- Programs using simple statements
- Programs using decision making statements
- Programs using looping statements
- Programs using one dimensional and two dimensional arrays
- Solving problems using string functions
- Programs using user defined functions and recursive functions
- Programs using pointers
- Programs using structures and unions

TOTAL: 30Periods

COURSE OUTCOMES:

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

- Create the document in Word Processing software.
- Write programs using control constructs.
- Apply functions to reduce redundancy.
- Design and implement C programs for simple applications.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS

HARDWARE

LAN SYSTEM WITH 30 NODES (OR) STANDALONE PCS – 30 NOS.

SOFTWARE

OS – UNIX CLONE **(License free Linux)**

APPLICATION PACKAGE – OFFICE SUITE

COMPILER – C

15UCS111	ENGINEERING FUNDAMENTALS LABORATORY (Common to CSE, ECE & IT)	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES :

- To demonstrate the hardware components of a computer.
- To train the students to assemblethe hardware components of a computer.
- To train the students to install software.
- To demonstrate residential house wiring, fluorescent lamp wiring, measurement of earth resistance, colour coding of resistors, logic gates and soldering.

LIST OF EXPERIMENTS

GROUP A (COMPUTER)

I)COMPUTER ENGINEERING PRACTICE 15

a) Demonstration on basic Hardware Components of Computer
b) Assembling of Hardware Components of Computer
c) Installation of Operating Systems (Windows Xp, Windows 7)
d) Installation of Drivers for Windows xp
e) Installation of Application software
f) Installation of Anti Virus Software
g) Preventive maintenance of a PC
h) Install and configure network interface card in LAN system

GROUP B (ELECTRICAL & ELECTRONICS)

II)ELECTRICAL ENGINEERING PRACTICE 7

(a) Residential house wiring using switches, fuse, indicator, lamp and energy meter and Stair case wiring
(b) Fluorescent lamp wiring.
(c) Measurement of resistance to earth of electrical equipment.

III) ELECTRONICS ENGINEERING PRACTICE 8

(a) Study of Electronic components and equipments – Resistor, colour coding measurement of AC Signal parameter (peak-peak, rms, period, frequency) using CRO.
(b) Study of logic gates AND, OR, EX-OR and NOT Gate.
(c) Soldering practice – Components, Devices and Circuits – Using general purpose PCB.

TOTAL: 30Periods

COURSE OUTCOMES:

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

- Identify the Hardware Components of Computer.
- Perform installation of software.
- Demonstrate the basic network settings.

- Execute the basic wiring, soldering etc.
- Solve the problems that are encountered in basic engineering work.

EQUIPMENTREQUIREMENTS

ELECTRICAL ENGINEERING

Sl. No.	Nameoftheequipment/software	QuantityRequired
	Assorted electrical components for housewiring	15sets
2	Electricalmeasuringinstruments	10sets
3	Megger(250V/500V)	1No.
	Study purpose items: Iron box, fan andregulator,emergencylamp	Oneeach
5	PowerTools: (a)RangeFinder	2No.

ELECTRONICS ENGINEERING

Sl. No.	Nameoftheequipment/software	QuantityRequired
1	Logictrainerkit	2
2	CRO,AFO	2each
3	SmallmultipurposePCBs	10No.
4	Solderingguns	10
5	Multimeters	5No.
6	Assorted electronic components for makingcircuits	Requiredquantity

HARDWARE COMPONENTS

MOTHER BOARD, RAM, ETHERNET CARD, CMOS BATTERY, SMPS, PROCESSOR, WIFI CARD, LAN CABLES,

SOFTWARE

OS – WINDOWS XP, WINDOWS 7

DRIVER SOFTWARES (ANY)

APPLICATION PACKAGE (ANY)

15UGS112	BASIC SCIENCES LABORATORY- I (Common to ALL Branches)	L	T	P	C
		0	0	2	1

PHYSICS LABORATORY

COURSE OBJECTIVES :

- To create scientific Temper among the students.
- To know how to execute experiments properly, presentation of observations and arrival of conclusions.
- To view and realize the theoretical knowledge acquired by the students through experiments

LIST OF EXPERIMENTS:

1. Laser – determination of particle size and wavelength of laser source using diode laser.
2. Ultrasonic interferometer - determination of velocity of sound and compressibility of liquid.
3. Poiseuille's method - determination ofCoefficientofviscosity of liquid.
4. Spectrometer – determination of dispersive power of a prism.
5. Compound pendulum – determination of the acceleration due to gravity
6. Air wedge method - determination of thickness of a thin wire.

- **A minimum of five experiments shall be offered.**

COURSE OUTCOMES:

After the successful completion of this course, the student shall be able to

- Determine the thickness of various micro level objects using air wedge method.
- Analyze the viscous properties of various liquids using Poiseuille's method.
- Compare the velocity of ultrasonic waves in various liquids by ultrasonic interferometer method.

CHEMISTRY LABORATORY

COURSE OBJECTIVES :

- To impart knowledge on basic concepts in application of chemical analysis
- Train the students to handle various instruments.
- To acquire knowledge on the chemical analysis of various metal ions.

LIST OF EXPERIMENTS:

(Common to ECE, EEE, CSE. IT, &Biomedical Engineering Branches)

1. Preparation of molar and normal solutions of the following substances – Oxalic acid , Sodium Carbonate , Sodium Hydroxide and Hydrochloric acid
2. Conductometric Titration of strong acid with strong base
3. Estimation of Iron by potentiometry
4. Determination of Strength of given acid using pH metry
5. Determination of molecular weight of polymer by viscometry
6. Comparison of the electrical conductivity of two samples-conductometric method
7. Estimation of copper in brass by EDTA method

COURSE OUTCOMES:

After the successful completion of this course, the student shall be able to

- Estimate the ions present in the given sample
- Determine the rate of corrosion, molecular weight and amount of solids in water
- Asses the water quality parameters

A minimum of FIVE experiments shall be offered for every course

TOTAL: 30Periods

SEMESTER-II

Semester II

Course Code	Course Title	L	T	P	C
THEORY					
15UEN201	Business English and Presentation skills (Common to ALL Branches)	3	0	0	3
15UMA202	Engineering Mathematics – II (Common to ALL Branches)	3	2	0	4
15UPH205	Semi Conductor Physics and Opto Electronics (Common to CSE, ECE &IT)	3	0	0	3
15UCY207	Environmental Science (Common to ALL Branches)	3	0	0	3
15UCS208	Digital Principles and System Design (Common to CSE & IT)	3	0	0	3
15UCS209	Programming and Data Structures	3	0	0	3
PRACTICAL					
15UGS210	Basic Sciences Laboratory -II (Common to ALL Branches)	0	0	2	1
15UCS211	Programming and Data Structures Laboratory	0	0	2	1
	TOTAL	**18**	**2**	**4**	**21**

Semester II

15UEN201	BUSINESS ENGLISH AND PRESENTATION SKILLS (Common to ALL Branches)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To use linguistic tools confidently in an English speaking context
- To listen and speak during normal business activities such as interviews, meetings, telephone conversations and negotiations.
- To write business letters, emails, reports, articles and comprehend information on the Internet and other media.
- To gain language skills for real business life situations

UNIT I		9

Grammar- Numerical Adjective; **Vocabulary** - Job title and describing jobs; **Listening** - Listening to company culture; **Reading** - Quiz; **Writing** - Writing formal and semi formal business letters; **Speaking** – Personal information, Companies and products.

UNIT II		9

Grammar –Modals; Vocabulary – Collocations; Listening - Business Proceedings; Reading - Designing websites and e– mail ; Writing – Memo - Speaking - Role play on various business situation.

UNIT III		9

Grammar – prepositions – Articles; Vocabulary –Jargons related to Shares and stock; Listening – Interviews of celebrities; Reading – Shares and stock exchange transactions; Writing – Business report – Minutes of the Meeting; Speaking – Presentations, Making a business talk.

UNIT IV		9

Grammar - Connectives; **Vocabulary**–Words related to finance; **Listening** - Listening to statistical information; **Reading** - Interpreting business related bar charts; **Writing** - Letters to express interest in new products; **Speaking** - Presenting a summary of an article.

UNIT V		9

Grammar - Reported speech; **Vocabulary** – Words related to employment ; **Listening**-Listening to audio and video speech of business people; **Reading** - Reading News paper article/magazine articles on business; **Writing** - Writing a Proposal; **Speaking** - Discussing company policies.

TOTAL: 45Periods

COURSE OUTCOMES:

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

- Use business vocabulary effectively to present the ideas.
- Accomplish verbal and written communications.
- Write effectively in a wide range of business letters.
- Prepare Business Proposals and Business Reports for various business purposes.
- Make a presentation in English in various business avenues.

TEXT BOOKS:

1. M.Dhanasekaran: *Technical English*, Rathna Arts,Sivakasi, 2018.

REFERENCE BOOKS:

1. Elankathiravan B.A, Business English and Presentation Skills, Sivakasi, Wakeup Publications, 2017.
2. Allan Pease, Body Language, New Delhi,Sudha Publications(P) Ltd,2005.
3. Malcolm Goodale, Professional Presentations, NewDelhi, Cambridge University Press,2006.
4. Randolph Hudson. H,BernardSelzler.J,Business Communication, Jaico Publishing House,2006.

15UMA202	ENGINEERING MATHEMATICS – II (Common to ALL Branches)	L	T	P	C
		3	2	0	4

COURSE OBJECTIVES:

- To develop an understanding of the basics of vector calculus comprising of gradient, divergence and curl, and line, surface and volume integrals and the classical theorems involving them.
- To acquaint the student with the concepts of analytic functions and their interesting properties which could be exploited in a few engineering areas, and be introduced to the host of conformal mappings with a few standard examples that have direct application.
- To make the student acquire sound knowledge of Laplace transform and its properties and sufficient exposure to the solution of certain linear differential equations using the Laplace transform technique.

UNIT I	ANALYTICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS	8+6

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Applications of ODE (Bacterial growth, Population growth, Decayed problems).

UNIT II	VECTOR CALCULUS	8+6

Gradient Divergence and Curl – Directional derivative – Irrotational and Solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopiped.

UNIT III	ANALYTIC FUNCTIONS	8+6

Functions of a complex variable – Analytic function – Necessary and Sufficient Conditions (excluding Proofs) – Harmonic function - Properties of an analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: w = z+c, cz, 1/z, and Bilinear transformation.

UNIT IV	COMPLEX INTEGRATION	9+6

Statement and applications of Cauchy's integral theorem, Cauchy's integral formula and Cauchy Residue Theorem – Taylor's and Laurent's expansions – Applications of residue theorem to evaluate real integrals – Unit circle and semi-circular contour (excluding Poles on the real axis).

UNIT V	LAPLACE TRANSFORM	9+6

Existence conditions – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function, impulse function andperiodic function - Inverse Laplace transform – Convolution theorem (excluding Proof) –Solution of linear ODE of second order with constant coefficients.

SUPPLEMENT TOPIC (for internal evaluation only) **3**

Evocation / Application of Mathematics,Arithmetical, Ability – Time and Work – Time and Distance.

TOTAL : 45 (L) + 30 (T) = 75 Periods

COURSE OUTCOMES:

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

- Solve first and higher order ordinary differential equations analytically and apply in real life engineering problems.
- Calculate the gradients and directional derivatives of functions of several variables.
- Find the image of a region under conformal mapping and construct analytic functions using its properties.
- Apply the knowledge of standard techniques of complex variables for evaluating different functions
- Apply Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs.

TEXT BOOKS:

1. VEERARAJAN.T "Engineering Mathematics" Tata McGraw Hill Publishing Company, New Delhi, vol 15.
2. BALI N. P and MANISH GOYAL, "Text book of Engineering Mathematics", Laxmi Publications (P) Ltd., New Delhi, 3rd Edition, (2008).

REFERENCE BOOKS:

1. RAMANA B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 11th Reprint, (2010).
2. KREYSZIG. E, "Advanced Engineering Mathematics", John Wiley & Sons, New York, 10th Edition, (2011).
3. JAIN R.K and IYENGAR S.R.K, "Advanced Engineering Mathematics", Narosa Publishing House Pvt. Ltd., New Delhi, 3rd Edition, (2007).
4. AGARWAL R.S., "Quantitative Aptitude", S. Chand Publications, New Delhi, 7th Edition, (2008), pp. 341-370, 384-404.
5. GREWAL. B.S,"Higher Engineering Mathematics", Khanna Publications, New Delhi, 43rd Edition, (2014).

15UPH205	SEMICONDUCTOR PHYSICS AND OPTO ELECTRONICS (Commonto CSE,ECE& IT Branches)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To introduce the essential principles of physics for information science and related Engineering applications.
- To demonstrate the concepts of conduction in conductors.
- To apply fundamental knowledge in the area of fiber optics.
- To enable the students to understand the dielectric and superconducting materials.

UNIT I	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 II	TRANSPORT PROPERTIES OF SEMICONDUCTORS AND MAGNETIC MATERIALS	9

Introduction- Types of semiconductor –Electron and hole concentration (Qualitative)-Intrinsic Carrier Concentration–Expression for electrical conductivity of a semiconductor- Hall effect-Origin of magnetic moment – Bohr magnetron – comparison of Dia, Para and Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials .

UNIT III	DIELECTRICS AND SUPERCONDUCTING MATERIALS	9

Introduction- Types of polarization -Local or Internal field- Types of Dielectric Materials- Classification of electrical insulating materials- Applications- Introduction of superconductors- Properties- Types of superconductors- High temperature superconductors- Applications of superconductors-– SQUID – Maglev.

UNIT IV	OPTOELECTRONICS	9

Introduction -Modulations- Pulse code modulation- Franz- Keldysh and stark effect eletroabsorbtion modulators- Optical switching- Self electro optic effect device(SEED)- Bipolar controller- Applications of Bipolar controller.

UNIT V	FIBRE OPTICS	9

Introduction- Principle and propagation of optical fibres - Types of optical fibre- Losses in fibres- Advantages of opicalfibre-Fibre optic communication systems (Block diagram)- Light sources for fibre optics (LCD & LED)- Splicing- Fusion and Mechanical splicing- Fibre optic sensors – Temperature and pressure sensor.

TOTAL: 45Periods

COURSE OUTCOMES:

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

- Summarize the structure, properties, performance, and processing of conductors to solve engineering problems.
- Understand how semiconducting and magnetic materials are influencing engineering design.
- Discuss the various polarization mechanisms in dielectrics.
- Familiarize with the basics of optoelectronic materials and their applications.
- Outline the principle of Fibre optical communication.

TEXT BOOKS:

1. William D. Callister, Jr. “Material Science and Engineering”, Seventh Edition, John Wiley & Sons Inc.New Delhi, 2010.
2. Dr. Mani.P, “Engineering Physics II”, Dhanam Publications, Edition ,2014, Chennai.
3. Rajendran.V, “Engineering,Physics”, Tata Mc-Graw Hill Publishing Company limited, New Delhi, Revised Edition 2013.

REFERENCE BOOKS:

1. Raghuvenshi G.S., “Engineering Physics”, PHI Learning Private Limited, New Delhi, Revised Edition 2014.
2. Arul doss .G., “Engineering Physics”, PHI Learning Limited, New Delhi, Revised Edition 2013.
3. Marikani .A., “Engineering Physics”, PHI Learning Private Limited, New Delhi, Revised Edition 2012.
4. Sankar B.N., and Pillai .S.O., “Engineering Physics – I”, New Age International Publishers Private Limited, New Delhi, Revised Edition 2015.

15UCY207	ENVIRONMENTAL SCIENCE (Common to ALL Branches)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Understanding the concepts of ecosystem and biodiversity.
- Acquire knowledge about the impact of environmental pollution.
- Awareness on various types of resources.
- Understand the importance of environmental issues in the society.
- Awareness about the impact of environment related to human health.

UNIT I	ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY	10

Definition, scope and importance of environment – Need for public awareness – Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity – Definition: genetic, species and ecosystem diversity – Biogeographical 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 II	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 III	FUTURE POLICY AND ALTERNATIVES	9

Future policy and alternatives-fossil fuels-nuclear energy-solar energy-wind energy-hydroelectric energy-geothermal energy-tidal energy-sustainability-green power-nanotechnology-international policy.

UNIT IV	SOCIAL ISSUES 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 – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation – Public awareness.

UNIT V	HUMAN POPULATION AND THE ENVIRONMENT	8

Population growth, variation among nations – Population explosion – Family welfare programme – Environment and human health – Human rights – Value education – HIV / AIDS – Women and child welfare – Role of information technology in environment and human health

TOTAL: 45Periods

COURSE OUTCOMES:

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

- Comprehend the importance of environmental impact on ecosystem and biodiversity
- Understand current environmental challenges like pollution and its management.
- Remembering the fundamentals of physical and biological principles that govern natural processes.
- Perform their role in protecting the environment from social issues.
- Learn the importance of population explosion and its controlling measures.

TEXT BOOKS

1. AnubhaKaushik, kaushik C.P., "Environmental Science and Engineering", Third Edition, New Age International, New Delhi, 2009.

2. Benny Joseph "Environmental Science and Engineering", Tata Mc-Graw Hill, New Delhi, 2006.

REFERENCE BOOKS:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', Pearson Education,Upper saddle River, New Jersey, 2008.
2. Miller T.G. Jr., Environmental Science", Wadsworth Publishing Company, Belmont, California, 2005.
3. De A.K., "Environmental Chemistry", Wiley Eastern Ltd., New Delhi, 2001.
4. Trivedi R.K., Goel P.K., "Introduction to Air Pollution", Techno-Science Publication, Jaipur, 2005.

15UCS208	DIGITAL PRINCIPLES AND SYSTEM DESIGN (Common to CSE & IT)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To familiarize the concepts of various number systems, Boolean algebra and various logic gates.
- To explain the concepts in designing and analyzing various combinational and sequential circuits.
- To impart the knowledge about the programmable memory logics.

UNIT I	BOOLEAN ALGEBRA AND LOGIC GATES	8

Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates – NAND and NOR Implementations.

UNIT II	COMBINATIONAL LOGIC	10

Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations- Binary Adder, Binary Subtractor , Binary Multiplier , BCD Adder, Serial Adder / Subtractor , Parallel Adder / Subtractor ,Magnitude Comparator- Code Conversion – binary to gray, gray to binary, BCD to excess 3 code - Introduction to Hardware Description Language(HDL).

UNIT III	DESIGN WITH MSI DEVICES	8

Decoders and encoders - Multiplexers and De Multiplexers - Memory and programmable logic - Implementation of combinational logic using ROM, PAL and PLA.

UNIT IV	SYNCHRONOUS SEQUENTIAL LOGIC	10

Sequential Circuits – Flip Flops – Analysis and Design Procedures – State Reduction and State Assignment – Shift Registers – Counters:Synchronous - Up, Down and Up/Down, Asynchronous - Up, Down and Up/Down.

UNIT V	ASYNCHRONOUS SEQUENTIAL LOGIC	9

Types of Asynchronous Sequential Circuits - Analysis and Design of Fundamental Mode Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards.

TOTAL: 45Periods

COURSE OUTCOMES:

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

- Applysimplification techniques to implement Boolean expression.
- Illustrate the design of combinational circuits for arithmetic operations and code conversions.
- Design memory devices using MSI.
- Analyze and design synchronous sequential digital circuits.
- Minimize the states and flow tables in designing asynchronous sequential circuits.

TEXT BOOKS:

1. Morris Mano M, Michael D. Ciletti, “Digital Design”, IV Edition, Pearson Education, 2008.
2. John F. Wakerly, “Digital Design Principles and Practices”, Fourth Edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. AtulP.Godse and DeepaliA.Godse, “Digital Principles and System Design”, First Edition,Technical Publication, 2014.
2. S. Salivahanan and S. Arivazhagan, ‘Digital Circuits and Design’, 3rdedition, Vikas Publishing House Pvt. Ltd, New Delhi.
3. Charles H. Roth Jr, “Fundamentals of Logic Design”, Fifth Edition – Jaico Publishing House,Mumbai, 2003.
4. Kharate G. K., “Digital Electronics”, Oxford University Press, 2010.

15UCS209	PROGRAMMING AND DATA STRUCTURES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart knowledge in pointers, structures,unions and files concept in c programming.
- To familiarize the basic operations of linear data structures.

UNIT I	STRUCTURES AND UNIONS	9

Introduction-Defining a Structure- Declaring Structure Variables – Accessing Structure Members- Structure Initialization- Arrays of Structures- Arrays within Structures – Nested Structures – Self Referential Structures- Structures and Functions – Unions.

UNIT II	POINTERS	10

Introduction-Declaring Pointer Variables-Accessing a Variable through its Pointers-Pointer Expressions-Pointers and Arrays-Pointers and Character Strings-Array of Pointers-Pointers as Function Arguments-Functions Returning Pointers-Pointers and Structures-Dynamic Memory Allocation.

UNIT III	FILE MANAGEMENT IN C	8

Introduction-Defining and Opening a File-Closing a File- Input / Output Operations on File- Error Handling During I/O Operations-Random Access to Files-Command Line Arguments.

UNIT IV	LINEAR DATA STRUCTURES – LIST	9

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists- circularly linked lists- doubly-linked lists – applications of lists- Polynomial Manipulation.

UNIT V	LINEAR DATA STRUCTURES – STACKS, QUEUES	9

Stack ADT – Evaluating arithmetic expressions- other applications- Queue ADT – circular queue implementation – Double ended Queues – applications of queues.

TOTAL: 45Periods

COURSE OUTCOMES:

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

- Apply constructs to pack related data items for manipulation.
- Write programs with direct access to memory locations.
- Manipulate files.
- Employ linked list concepts to organize the list of data.
- Apply stack operations for appropriate applications.
- Use appropriate queue structure for queuing problems.

TEXT BOOKS :

1. Balagurusamy, E, “Programming in AnsiC”,Third Edition, Tats McGraw-Hill Publishing Company Limited, New Delhi, 2005.
2. Byron S Gottfried,” Programming with C”, Schaum’s Outlines, Tata McGraw-Hill, Second Edition, 2006.
3. Krishnamoorthy,R, IndiraniKumaravel,G, “Data Structures using C”, Tata McGrraw-Hill Publishing Company Limited.
4. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, 2nd Edition, Pearson Education,1997.

REFERENCE BOOKS :

1. Yashavant P. Kanetkar. “ Let Us C”, BPB Publications, 2011.
2. Kernighan.B.W ,Ritchie.D.M, “The C Programming language”, Pearson Education, Second Edition, 2006.
3. Stephen G.Kochan, “Programming in C”, Pearson Education India, Third Edition,2005.
4. ReemaThareja, “Data Structures Using C”, Oxford University Press, 2011.
5. Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education,1983.

15UGS210	BASIC SCIENCES LABORATORY –II (Common to ALL Branches)	L	T	P	C
		0	0	2	1

PHYSICS LABORATORY
(Common to CSE, ECE, EEE, EIE, IT& Bio-Medical Branches)

COURSE OBJECTIVES:

- To introduce the experimental procedure for the Band gap of a semiconductor, B-H curve and Potentiometer.
- To demonstrate the working of Spectrometer and Lee's Disc apparatus.

LIST OF EXPERIMENTS

1. Laser – Determination of numerical aperture and acceptance angle of an optical fibre.
2. Carey Foster's Bridge – Determination of specific resistance of the given coil.
3. Spectrometer – Determination of wavelength of mercury source using grating.
4. Newton's ring – Determination of radius curvature ofPlanoconvex lens.
5. B-H curve - Study of Hysteresis Loop
6. Determination of Band gap of a semiconductor.

COURSE OUTCOMES:

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

- Analyze the thermal conductivities of bad conductors and also the properties of semiconductors.
- Know the elastic properties of materials using uniform&non-uniform bending method of young's modulus.
- Understand the theory behind the signal communication through laser in optical fiber.

CHEMISTRY LABORATORY
(Common to ALL Branches)

COURSEOBJECTIVES:

- Apply the theoretical concepts to perform lab experiments.
- To assess the water quality parameters.
- To acquire knowledge on water quality parameters for the analysis of industrial effluents.

LIST OF EXPERIMENTS

1. Estimation of hardness of water by EDTA method.
2. Estimation of alkalinity of water sample.
3. Estimation of Chloride in water sample (Argentometric method)
4. Determination of DO in water
5. Estimation of silver ion by Dichrometry
6. Determination of quality of Surface water (River/pond/lake) and Ground water (well/ bore well) with respect to Hardness, TDS, Chloride and pH.
7. Determination of acidity of industrial effluents.

COURSE OUTCOMES:

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

- Analyse the properties of water by applying the chemical concepts.
- Determine the amount of acid in the industrial effluents.
- Use specific methods to analyse the Dissolved oxygen in water.

A minimum of FIVE experiments shall be offered

TOTAL: 30Periods

15UCS211	PROGRAMMING AND DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To impart the knowledge on implementation of Structures, Unions, Pointers and Files.
- To familiarize the implementation of different linear data structures.

LIST OF EXPERIMENTS

C Programming

- Programs using Structures and Unions.
- Programs using Pointers
- Programs using Files.

Linear Data Structures

- Implementation of singly linked lists.
- Implementation of doubly linked lists.
- Implementation of queue.
- Implementation of stack.
- Implementation of Circular queue.
- Implementation of double-ended queue (dequeue).

TOTAL: 30Periods

COURSE OUTCOMES:

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

- Develop programs using structures and union.
- Demonstrate the ability of pointers.
- Develop simple applications using files.
- Implement singly and doubly linked list.
- Use stack and queue data structures for appropriate applications.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS

Standalone desktops with C compiler 30 Nos.

(or)

Server with C compiler supporting 30 terminals or more.

SEMESTER-III

Semester III

Course Code	Course Title	L	T	P	C
THEORY					
15UMA322	Probability, Statistics and Queueing Systems (Common to CSE & IT)	3	2	0	4
15UCS302	Data Structures	3	0	0	3
15UCS303	Computer Organization and Architecture (Common to CSE & IT)	2	2	0	3
15UCS304	Object Oriented Programming with C++	3	0	0	3
15UIT305	Operating Systems (Common to CSE & IT)	3	0	0	3
15UCS306	Database System Concepts	3	0	0	3
PRACTICAL					
15UCS307	Object Oriented Programming and Data Structures Laboratory	0	0	2	1
15UCS308	Database Systems Laboratory	0	0	2	1
15UIT309	Operating Systems Laboratory (Common to CSE & IT)	0	0	2	1
	TOTAL	**17**	**4**	**6**	**22**
Total No. of Credits – 22					

SEMESTER-III

15UMA322	PROBABILITY, STATISTICS AND QUEUEING SYSTEMS (Common to CSE & IT)	L	T	P	C
		3	2	0	4

COURSE OBJECTIVES :

- To make the student acquire sound knowledge of standard distributions that can describe real life phenomena.
- To acquire skills in handling situations involving more than one random variable and functions of random variables.
- To provide the basic characteristic features of a queuing system and develop the skills in analyzing queuing models.

UNIT I	PROBABILITY & STATISTICAL DISTRIBUTIONS	9 + 6

Axioms of probability - Conditional probability - Total probability - Baye's theorem – Discrete and continuous random variables - Moments - Moment generating functions and their properties. Binomial, Poisson, Normal, Geometric, Uniform, Exponential and Gamma distributions.

UNIT II	TWO DIMENSIONAL RANDOM VARIABLES	9 + 6

Joint probability distributions - Marginal and Conditional distributions – Covariance - Correlation and Regression - Transformation of random variables - Central limit theorem.

UNIT III	DESIGN OF EXPERIMENTS	9 + 6

Completely Randomized Design – Randomized Block Design – Latin Square Design.

UNIT IV	QUEUING THEORY	9 + 6

Definitions – Basic terms of Queueing theory - Markovian models – Birth and Death Queuing models - Steady state results: Single and multiple server queuing models - Little's Formula - Queues with finite waiting rooms - Finite source models.

UNIT V	NON-MARKOVIAN QUEUES AND QUEUE NETWORKS	9 + 6

M/G/1 Queue - Pollaczek- Khintchine formula. Series Queues - Open and Closed Jackson networks.

TOTAL : 45 (L) + 30 (T) = 75 Periods

COURSE OUTCOMES:

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

- Apply the acquired knowledge of standard distributions in real life phenomena.
- Find the relationship involving more than one random variable and analyze the functions.
- Design and analyze a process, to evaluate which process inputs have a significant impact on the process output using design of experiments.
- Study the basic characteristic features of a queuing system and acquire skills in analyzing queuing models.
- Apply basic probability techniques and models to analyze the performance of systems.

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TEXT BOOKS:

1. OLIVER C. IBE, "Fundamentals of Applied probability and Random processes", Elsevier, Lowell, Massachusetts, first Indian Reprint (2007).
2. GROSS D, and HARRIS C.M., "Fundamentals of Queuing Theory", Wiley Students, India, 3rd Edition, (2004).
3. DR.J.RAVICHANDRAN ,"Probability and Statistics for Engineers" Wiley New delhi-2 first 2010 (Regulation 2015)
4. RICHARD .K.WILLIAMS ,"Probability, Statistics and Random Process for Engineers", Cengage Learning , New Delhi-2 , first Indian Reprint (2009).
5. WILLIAMS MENDEN KALL, ROBERT J.BEAVER , BARABARA M.BEAVER"Probability Statistics", college learning 2013 14th Edison **,** New Delhi

REFERENCE BOOKS:

1. VEERARAJAN T. "Probability, Statistics and Random Process", Tata McGraw Hill, New Delhi, 2ndEdition, (2003).
2. ALLEN.A.O, "Probability, Statistics and Queuing Theory with Computer Applications", Elsevier, New Delhi, 2nd Edition, (2005).
3. TAHA.H. A., "Operations Research-An Introduction", Pearson Education, New Delhi, 9th Edition, (2010).
4. TRIVEDI.K. S., "Probability & Statistics with Reliability, Queuing & Computer Science Applications", Prentice Hall of India, New Delhi, 2nd Edition, (2009).
5. JOHNSON R.A, and GUPTA C.B.,"Miller and Freund's Probability and Statistics for Engineers", Pearson Education, New Delhi, 8thEdition, (2011).
6. VEERARAJAN T. "Probability, Statistics and Random Process with Queueing theory and Queueing Networks ", Tata McGraw Hill Education, New Delhi-6, 4thEdition, (2006).

15UCS302	DATA STRUCTURES	L	T	P	C
		3	0	0	3

PRE-REQUISITE: PROGRAMMING AND DATA STRUCTURES

COURSE OBJECTIVES :

- To impart knowledge on non-linear data structures such as Trees, Graphs and Hash Structures.
- To familiarize the operations on Trees, Graphs and Hash Structures.

UNIT I	TREE STRUCTURES	9

Introduction-Terminologies-General Tree- Representations-Binary Tree- Representations-Traversal-Operations on a Binary Tree-Conversion of General Tree to Binary Tree-Threaded Binary Tree.

UNIT II	SEARCH TREE STRUCTURES	10

Introduction-Binary Search Trees-Operations on Binary Search Tree-AVL Trees-Splay Tree-Red Black Tree-B-Tree.

UNIT III	SPECIAL TREE STRUCTURES	9

Heap Trees –Deaps-Huffman Tree- Decision Trees-Game Tree.

UNIT IV	HASH STRUCTURES	8

Hashing – Separate chaining – open addressing – Linear Probing-Quadratic Probing-Double Hashing-rehashing – extendible hashing- Applications.

UNIT V	GRAPH STRUCTURES	9

Introduction-Terminologies-Representations-Traversals-Applications-Dijkstra'sSingle source shortest Path Problem – Topological Sort-Minimum Spanning Trees- Network Flow Problem.

TOTAL:45Periods

COURSE OUTCOMES:

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

- Organize hierarchical data into binary tree.
- Identify appropriate search tree for the given problem.
- Demonstrate the operations of special tree structures.
- Use hash technique for indexing.
- Apply graph algorithms to solve real world problems.

TEXT BOOKS:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education,2009.
2. Krishnamoorthy,R, IndiraniKumaravel,G, "Data Structures using C", Tata McGrraw-Hill Publishing Company Limited, 2008.

REFERENCE BOOKS:

1. ISRD Group, “Data Structures using C”, 2nd Edition, McGrraw-Hill Education (India) Private Limited, 2013.
2. ReemaThareja, “Data Structures Using C”, Oxford University Press, 2011.
3. Gilberg. R. F, Forouzan. B. A, “Data Structures”, Thomson India Edition, Second Edition, 2005.
4. Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education,1983.

15UCS303	COMPUTER ORGANIZATION AND ARCHITECTURE (Common to CSE & IT)	L	T	P	C
		2	2	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To familiarize the components of computer system and Instructions.
- To discuss in detail the operation of the arithmetic unit.
- To explain the concept of pipelining and superscalar operation.
- To give knowledge on memory and I/O systems.

UNIT I	OVERVIEW AND INSTRUCTIONS	10+10

Components of a computer system - Basic Operational Concepts - operations and operands – representing instructions– Logical operations – control operations – Instruction and instruction sequencing - Addressing and addressing modes

UNIT II	ARITHMETIC OPERATIONS AND PIPELINING	10+10

ALU - Addition and subtraction of signed numbers – Multiplication of unsigned and signed numbers – Fast Multiplication – Integer division - Floating point numbers and operations. Pipelining – Data hazards – Instruction Hazards – Superscalar Operation.

UNIT III	MEMORY AND I/O SYSTEMS	10+10

Memory hierarchy - Memory technologies – Cache basics – Measuring and improving cache performance - Virtual memory, TLBs- Memory Management Requirements - Input/output system, DMA and interrupts, Buses.

TOTAL : 30(L)+30(T)=60 Periods

COURSE OUTCOMES:

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

- Describe the instruction sets with various addressing modes.
- Solve arithmetic operations for signed and unsigned numbers.
- Explain pipelined control unit.
- Compare the performance of memory systems.

TEXT BOOKS:

1. Carl Hamacher, ZvonkoVranesic and SafwatZaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill, 2002.
2. David A. Patterson and John L. Hennessey, “Computer organization and design the hardware / software interface’, Morgan Kauffman / Elsevier, Fifth edition, 2014.

REFERENCE BOOKS:

1. William Stallings “Computer Organization and Architecture” , Seventh Edition , Pearson Education, 2006.
2. Vincent P. Heuring, Harry F. Jordan, “Computer System Architecture”, Second Edition, Pearson Education, 2005.
3. Govindarajalu, “Computer Architecture and Organization, Design Principles and Applications'', first edition, Tata McGraw Hill, New Delhi, 2005.
4. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.

15UCS304	OBJECT ORIENTED PROGRAMMING WITH C++	L	T	P	C
		3	0	0	3

PRE-REQUISITE : COMPUTER PROGRAMMING

COURSE OBJECTIVES:

- To explain OOP principles in C++.
- To introduce generic programming and exception handling mechanism.
- To enable the students to work with files and STL.

UNIT I	INTRODUCTION TO OBJECT ORIENTED PROGRAMMING	9

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – polymorphism. Introduction to C++ – classes – access specifiers – function and data members – objects - default arguments – inline functions – friend function – friend class - static members.

UNIT II	CONSTRUCTORS AND OVERLOADING	9

Constructors – default constructor – parameterized constructors – constructor with dynamic allocation – copy constructor – destructors – function overloading - operator overloading with member function and friend function – unary operator overloading - binary operator overloading – overloading assignment operator – overloading insertion and extraction operator.

UNIT III	INHERITANCE AND POLYMORPHISM	9

Inheritance – public, private, and protected derivations – types of inheritance - virtual base class – pointers to members & objects - composite objects - Runtime polymorphism – virtual functions – pure virtual functions - abstract class.

UNIT IV	TEMPLATES AND EXCEPTIONS	9

Function and class templates - Exception handling – try-throw-catch paradigm – catching multiple exceptions – exception specifications – rethrowing an exception.

UNIT V	I/O AND FILES	9

Streams and formatted I/O – I/O manipulators - file handling – random access – namespaces - Standard Template Library.

Case Study : Design and develop

- Student Information System
- Library Management System

TOTAL : 45 Periods

COURSE OUTCOMES:

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

- Design the class with data and function members for a given problem.
- Design the class with constructors and static polymorphism.
- Apply inheritance and run time polymorphism.
- Use templates and handle exceptions.
- Manipulate data in file and STL.

TEXT BOOKS :

1. RohitKhurana, Object Oriented Programming with C++,Vikas Publishing House, ITLESL, 2008
2. Ashok N. Kamthane, Object Oriented Programming, Pearson Education India Edition, 2003.

REFERENCE BOOKS:

1. Robert Lafore, Object Oriented Programming in C++, Pearson, 4th Edition, 2002.
2. Ira Poh, “Object Oriented Programming using C++”, Pearson Education, Second Edition,Reprint, 2004.
3. Lippman.S.B, JoseeLajoie, Barbara E. MooC++ Primer”, Pearson Education,,fourth Edition, 2005.
4. Stroustrup.B, The C++ Programming language”, Pearson Education, Third Edition, 2004.

15UIT305	OPERATING SYSTEMS (COMMON TO CSE & IT)	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To have an overview of different types of operating systems
- To study about process management
- To have a thorough knowledge of deadlock and memory management
- To know file sharing and virtual memory
- To learn the basic concepts of I/O and file systems

UNIT I	INTRODUCTION	9

Introduction : Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes.

UNIT II	PROCESS MANAGEMENT	10

Threads: Overview – Threading issues - CPU Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Process Synchronization: The Critical-Section Problem – Synchronization Hardware – Semaphores –Classic problems of Synchronization – Critical regions – Monitors.

UNIT III	DEADLOCK AND MEMORY MANAGEMENT	9

System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management: Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

UNIT IV	VIRTUAL MEMORY AND FILE SHARING INTERFACE	8

Virtual Memory: Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File System Interface: File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection.

UNIT V	FILE SYSTEM STRUCTURE AND STORAGE STRUCTURE	9

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management- IO Systems- Kernel I/O Subsystems – Mass Storage Structure: Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management.

TOTAL:45Periods

COURSE OUTCOMES:

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

- Apply the knowledge of operating systems structures and functions in system engineering
- Apply the suitable algorithms for Various Problems related to Process management
- Identify, formulate and analyze deadlock problems for better memory management techniques.
- Analyze the possibilities of memory extensions using virtual memory in the modern computing environment.
- Apply the knowledge of file management concepts in the design of operating systems.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne,"Operating System Concepts"John Wiley & Sons (ASIA) Pvt. Ltd, 9th Edition,2010.

2. D M Dhamdhere,"Operating Systems: A Concept-based Approach", Tata McGraw-Hill Education, 2nd Edition, 2007.

REFERENCE BOOKS:

1. I.A.Thotre,"Operating Systems", Technical publications, 1st Edition, 2013.
2. Harvey M. Deitel,"Operating Systems", Pearson Education Pvt. Ltd, 1st Edition, 2007.
3. Andrew S. Tanenbaum,"Modern Operating Systems", Prentice Hall of India Pvt. Ltd, 3rd Edition, 2007.
4. William Stallings,"Operating System", Prentice Hall of India, 3rd Edition, 2008

15UCS306	DATABASESYSTEM CONCEPTS	L	T	P	C
		3	0	0	3

PRE –REQUISITE:

COURSE OBJECTIVES :

- To impart the knowledge in Database Management Systems.
- To inculcate knowledge in SQL and Normalization techniques.
- To familiarize in transaction management.
- To discuss the storage and retrieval mechanismsin Databases.
- To learn query evaluation techniques.

UNIT I	INTRODUCTION TO DBMS	9

Introduction - Purpose of Database System –View of Data–Database Languages -Relational Databases– Database Architecture - Relational Algebra - Entity-Relationship model - Extended ER model.

UNIT II	SQL &NORMALIZATION	9

Introduction to SQL –Intermediate SQL – Advanced SQL: Functions and Procedures, Triggers– Relational Database Design: Good Relational Design – Normalization - Atomic Domains and 1NF, 2NF, 3NF and BCNF – Functional Dependency Theory.

UNIT III	TRANSACTION PROCESSING AND CONCURRENCY CONTROL	9

Introduction-Properties of Transaction- Serializability–Implementation of Isolation Levels - Concurrency Control – Lock based Protocols–Timestamp based Protocols –Recovery System: Failure Classification – Recovery and Atomicity.

UNIT IV	DATA STORAGE	9

Overview of Physical Storage Media – Magnetic Disks – RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – Static Hashing – Dynamic Hashing.

UNIT V	QUERY PROCESSING	9

Query Processing: Measures of Query cost – Selection Operation – Sorting – Join Operation – Evaluation of expressions. Query Optimization: Transformation of Relational Expressions – Estimating statistics of expression results – Choice of Evaluation Plans.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Design Database applications using the concepts of Relational model and ER diagrams.
- Illustrate normalization techniques to SQL queries.
- Demonstrate concurrency control and recovery mechanisms.
- Summarize various data storage techniques.

- Apply the query optimization techniques to optimize query cost.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, “Database System Concepts”, McGraw Hill Education (India) Private Limited, Sixth Edition, 2013.

REFERENCE BOOKS:

1. RamezElmasriandShamkantB.Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2008.
2. Raghu Ramakrishnan, “Database Management Systems”, Fourth Edition, Tata McGraw Hill, 2010.
3. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Pearson Education, Eighth Edition, 2006.
4. AtulKahate, “Introduction to Database Management Systems”, Pearson Education, New Delhi, 2006.
5. Alexis Leon and Mathews Leon, “Database Management Systems”, Vikas Publishing House Private Limited, New Delhi, 2003.

15UCS307	OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	2	1

PRE-REQUISITE :

COURSE OBJECTIVES:

- To demonstrate the features of Object Oriented Programming.
- To demonstrate non-linear data structures.

LIST OF EXPERIMENTS

OBJECT ORIENTED PROGRAMMING

1. Program using classes with primitive data members and objects
2. Program to design classes with constructors & destructor
3. Program to perform function overloading
4. Program to perform operator overloading.
5. Program to implement multiple inheritance
6. Program to illustrate dynamic polymorphism
7. Program to implement the concept of templates
8. Program to demonstrate STL

DATA STRUCTURES

1. Implementation of Binary Search Tree.
2. Implementation of Heap Tree.
3. Implementation of collision resolution in index table with open addressing.
4. Implementation of Dijkstra's single source shortest path algorithm.

Mini Project (any one):

- Develop an application for super market.
- Develop an application for railway ticket reservation
- Library management system
- Banking system
- Student Information system
- Phone directory
- Any other

List of Sample exercises :

1. Define a class to represent a bank account to include the following members.
   Data Members: Name of the depositors, Account number, Type of account, Balance amount in the account.
   Member functions: To initialize values to data members, To deposit an amount, To withdraw an account after checking the balance, To display the name and the balance.
2. Define a class to represent a shape. Define the member function area() to find the area of different shapes square, rectangle, triangle and circle using function overloading. Include necessary data members.
3. Define a supplier class. Assume that the items supplied by any given supplier are different and varying in number. Use dynamic memory allocation in the constructor function to achieve the solution.
4. Define an examiner class. Provide all necessary data and function members to provide the following: The examiner must access answer sheets of at least one subject; He may examine answer sheets of multiple subjects; The examiner represents a college and also a university; Most of the examiners are local and represent local university; and have

more than one constructor including one default and one with default argument. Provide a meaningful copy constructor.

5. For a supermarket, define a bill class. All the bill objects will contain bill number, name of clerk preparing the bill, each item with quantity and price and total amount to be paid. Total items in the bill are varying. Define dynamic memory allocation constructor for bill class such that any number of items from 1 to 50 can be accommodated in a single bill. There is an array describing each item with a price. The price is to be picked up from that array. Now overload = operator and provide reason for the need of such operator**.**
6. Develop a class to represent person and include data members to represent name, date of birth and age. Design a class called employee which is derived from person and include data members to represent employee id, designation, date of joining, experience and salary. Create a class to represent faculty from employee and accommodate necessary data members. Declare necessary member functions to get and display all the details. Write the main function to test the class.

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Develop solutions to a given problem using object oriented programming concepts in C++.
- Solve problems using generic programming and STL.
- Handle files and exceptions in C++.
- Apply suitable non-linear structure to characterize the data.
- Develop solutions for real world problems with non-linear structures.

HARDWARE AND SOFTWARE REQUIRMENTS

HARDWARE REQUIREWMENTS:
Personal Computers – 30 Numbers

SOFTWARE REQUIREMENTS:
Operating System: Linux (any flavor) / Windows
Any C++ compiler compatible with Linux / Windows

15UCS308	DATA BASE SYSTEMS LABORATORY	L	T	P	C
		0	0	2	1

PRE-REQUISITE :

COURSE OBJECTIVES:

- To demonstrate the creation and usage of database.

LIST OF EXPERIMENTS

1. Creation of a database with necessary Integrity constraints using DDL commands.
2. Working with DML commands to insert, delete and update records.
3. Working with aggregate functions and library functions.
4. Working with nested queries and join queries.
5. Creation of Views, Synonyms, Sequence, Indexes, Save point.
6. Study of control structures used in PL/SQL.
7. Write a PL/SQL block using Procedures and functions.
8. Write a PL/SQL block that handles all types of exceptions and triggers.
9. Mini project (Application Development using Oracle / MySQL / VB)
    a. Inventory Control System.
    b. Hospital Management System.
    c. Railway Reservation System.
    d. Hotel Management System.
    e. Personal Information System.

TOTAL: 30 Periods

COURSE OUTCOMES:

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

- Design a database schema for a given application.
- Manipulate and query a database.
- Work with views.
- Manipulate tables using PL/SQL.
- Develop database applications.

SOFTWARE AND HARDWARE REQUIREMENT
LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS
HARDWARE:

Standalone desktops 30 Nos. (or)Server supporting 30 terminals or more.

SOFTWARE:

Front end: VB or Equivalent
Back end: Oracle / SQL / MySQL / PostGress / DB2 or Equivalent

15UIT309	OPERATING SYSTEMS LABORATORY (Common to CSE & IT)	L	T	P	C
		0	0	2	1

PRE-REQUISITE :

COURSE OBJECTIVES:

- To demonstrate process management and CPU schedulingconcepts
- To demonstrate memory management schemes
- To demonstrate disk scheduling

LIST OF EXPERIMENTS

1. Development of routines for inter process communication
2. Process creation and management
3. Simulation of CPU scheduling algorithms I
4. Simulation of CPU scheduling algorithms II
5. Simulation of Producer-Consumer problem using semaphores
6. Implementation of deadlock avoidance and prevention algorithms
7. Implementation of memory management scheme I
8. Implementation of memory management scheme II
9. Implementation of Page replacement algorithms
10. Analysis of file allocation algorithms
11. Working with file system commands
12. Simulation of disk scheduling algorithms

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Apply the knowledge of process management and control to create solutions for system.
- Select and apply various scheduling algorithm to schedule processor
- Identify, formulate and analyze complex deadlock problem using various techniques.
- Apply the knowledge of various memory management techniques in memory management
- Apply the knowledge of disk scheduling algorithm to schedule disk

HARDWARE AND SOFTWARE REQUIRMENTS

HARDWARE REQUIREMENTS:

Computer Required: 30 No's

Minimum Requirement: Processor: Pentium IV, Ram: 1 GB, Hard Disk: 80 GB

SOFTWARE REQUIREMENTS:

Operating System: Linux (Ubuntu / Fedora / Debian / MintOS) / Windows

Turbo C Version 3 or GCC Version Unit III UNIT III4 / Built in Linux / DEVC++

SEMESTER-IV

Semester IV

Course Code	Course Title	L	T	P	C
THEORY					
15UMA421	Discrete Mathematics (Common to CSE & IT)	3	2	0	4
15UCS402	Java Programming (Common to CSE & IT)	3	0	0	3
15UCS403	Design and Analysis of Algorithms	2	2	0	3
15UCS404	Computer Communication and Networks	3	0	0	3
15UCS405	Software Engineering	3	0	0	3
15UEC426	Microprocessors and Microcontrollers	3	0	0	3
15UGS431	Reasoning and Quantitative Aptitude (Common to ALL Branches)	1	0	0	1
PRACTICAL					
15UCS407	Java Programming Laboratory (Common to CSE & IT)	0	0	2	1
15UCS408	Data Communication and Networks Laboratory	0	0	2	1
15UEC429	Digital and Microprocessors Laboratory	0	0	2	1
	TOTAL	**18**	**4**	**6**	**23**
Total No. of Credits – 23					

SEMESTER-IV

15UMA421	DISCRETE MATHEMATICS (Common to CSE & IT)	L	T	P	C
		3	2	0	4

COURSE OBJECTIVES :

- To make the student acquire sound knowledge to test the logic of program.
- To familiarize the student to be aware of generating functions.
- To develop an understanding of the concepts of graphs and Trees.
- To acquaint the student with the concepts and properties of Lattices.

UNIT I	LOGIC AND PROOFS	9 + 6

Propositional Logic – Propositional equivalences - Predicates and quantifiers – Nested Quantifiers - Rules of inference - Introduction to Proofs - Proof Methods and Strategy.

UNIT II	COMBINATORICS	9 + 6

Permutations and Combinations - Mathematical inductions - Strong induction and well ordering - The basics of counting – The pigeonhole Principle –Recurrence relations – Solving Linear recurrence relations - Generating functions - Inclusion and exclusion and applications..

UNIT III	GRAPHS	9 + 6

Graphs and graph models - Graph terminology and special types of graphs – Representing graphs and graph isomorphism – Connectivity - Euler and Hamilton paths - Trees, Spanning Trees (Definitions and properties only).

UNIT IV	ALGEBRAIC STRUCTURES	9 + 6

Algebraic systems - Semi groups and Monoids – Groups - Subgroups and Homomorphisms - Cosets and Lagrange's theorem - Ring & Fields (Definitions and examples).

UNIT V	LATTICES AND BOOLEAN ALGEBRA	9 + 6

Partial ordering – Posets - Lattices as Posets - Properties of lattices - Lattices as Algebraic systems – Sub lattices – Direct product and Homomorphism - Some Special lattices - Boolean Algebra.

TOTAL : 45 (L) + 30 (T) = 75 Periods

COURSE OUTCOMES:

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

- Apply the acquired knowledge of the concepts needed to test the logic of the program.
- Synthesize induction hypotheses and simple induction proofs which is a very important tool in computer science engineering.
- Identify the basic properties of graphs, trees and use these concepts to model simple applications.
- Analyze the structures on many levels.

- Apply the acquired knowledge of partial order, Lattices and Boolean algebra which play an important role in many disciplines of computer science**.**

TEXT BOOKS:

1. KENNETH H.ROSEN, "Discrete Mathematics and its Applications", Special Indian Edition,Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 5th Edition, (2008).
2. TREMBLY J.P and MANOHAR R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 35th Re-print, (2008).

REFERENCE BOOKS:

1. RALPH. P. GRIMALDI, "Discrete and Combinatorial Mathematics: An Applied Introduction", Pearson Education, New Delhi, 4th Edition, (2002).
2. TAMILARASI.A, and NATARAJAN.A.M, "Discrete Mathematics and its Applications", Khanna Publishers, New Delhi, 3rd Edition, (2008).
3. SEYMOUR LIPSCHUTZ and MARK LIPSON, "Discrete Mathematics", Schaum's Outlines, Tata McGraw-Hill, New Delhi, 2nd Edition, (2007).
4. VEERARAJAN, T. "Discrete Mathematics with Graph Theory and Combinatorics", Tata McGraw-Hill, New Delhi, 7th Edition, (2008).
5. SENGADIR.T "Discrete Mathematics and Combinatorics", first imprision (2009), Pearson education , New Delhi
6. R.K.BISHT, K.S.DHAM, "Discrete methods", Oxford University Press , 5th Edision, New Delhi(2015).

15UCS402	JAVA PROGRAMMING (COMMON TO CSE & IT)	L	T	P	C
		3	0	0	3

PRE –REQUISITE:COMPUTER PROGRAMMING

COURSE OBJECTIVES:

- To explain Java fundamentals.
- To introduce generic programming and exception handling mechanism.
- To impart knowledge in i/o and file systems.
- To learn the basic concepts of collections and GUI programming.

UNIT I	JAVA FUNDAMENTALS	9

Introduction to Java –review of language constructs - Introducing classes, objects, and Methods: constructors- this keyword– garbage collections - A closer look at methods and classes: Access Specifiers – overloading – Static Members – Arrays – Strings.

UNIT II	INHERITANCE AND INTERFACES	9

Inheritance: Basics – Member access and inheritance – Constructors and Inheritance – using super – Multilevel Inheritance – Superclass references and subclass objects – method overriding – abstract class – final keyword – object class – Interfaces: Interface fundamentals – extending interface – multiple intertfaces – nested interface .

UNIT III	EXCEPTION HANDLING AND GENERIC PROGRAMMING	9

Exception Handling: Exception Hierarchy – Exception Handling fundamentals — multiple catch clause – catching subclass exception – nested try blocks – throwing an exception – throwable – using finally – using throws – Built-in exceptions – Creating our own exception -Generics: Fundamentals – Bounded Types – Wildcard Arguments – Bounded Wildcards – Generic methods – Generic Constructors – Generic Class Hierarchy.

UNIT IV	COLLECTIONS AND I/O	9

Collections: overview - List Interface – Queue Interface – Collection Classes: LinkedList class – Accessing collection via iterator – Enumeration Interface – Stack – Using I/O: Byte Streams and character streams – Byte stream classes – character stream classes – predefined streams – using byte streams – File using byte streams – using character based streams – File I/O using character based streams: File Reader – File Writer

UNIT V	GUI PROGRAMMING WITH SWING	9

Swing Fundamentals: Components and Containers – Layout Managers – Event Handling – Swing Controls: JTextField – Jlabel – Jbutton – Check boxes – Radio Buttons – JscrollPane – Jlist - JComboBox – Working with Menus: Menu Basics – JmenuBar – Jmenu – JmenItem – Create a Main Menu – Dialogs.

TOTAL:45Periods

COURSE OUTCOMES:

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

- Design classes and create objects for a given problem in Java.
- Illustrate inheritance and interfaces.
- Employ exception handling mechanisms in the solution to a problem and implement generic programming.
- Use collections to manipulate data for the given problem and Read/Write data from/into a file
- Create GUI based applications.

TEXT BOOKS:

1. Herbert Schildt, and Dale Skrien, “Java Fundamentals – A Comprehensive Introduction”, Tata McGraw Hill Education Private Limited, Special Indian Edition, 2013.

REFERENCE BOOKS:

1. Paul J. Deitel, and Harvey M. Deitel, “Java for Programmers”, Pearson Education,2nd Edition, 2012.
2. Cay Horstmann, and Gary Cornell, “Core Java Volume - I Fundamentals”, Prentice Hall, 9th Edition, 2011.
3. Herbert Schildt, “The Complete Reference JAVA 2” , Tata McGraw Hill, 5th Edition, 2002.
4. Trail: Learning the Java Language, http://docs.oracle.com/javase/tutorial/java/

15UCS403	DESIGNANDANALYSIS OFALGORITHMS	L	T	P	C
		2	2	0	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To give knowledge on algorithm analysis techniques.
- To explain different algorithm design techniques.
- To summarize the limitations of Algorithm power.

UNIT I	INTRODUCTION, BRUTE FORCE, DIVIDE-AND-CONQUER AND DECREASE-AND-CONQUER	10+10

Notion of an Algorithm–Fundamentals of Algorithmic Problem Solving–Fundamentals of the Analysis of Algorithm Efficiency– Analysis Framework– Asymptotic Notations and its properties–Mathematical analysis for Recursive and Non-recursive algorithms-BruteForce–Bubble Sort - Sequential Search - Divide and conquer methodology– Merge sort– Quick sort– Binary search- Decrease and Conquer – Insertion sort – Algorithms for Generating Combinatorial Objects.

UNIT II	DYNAMIC PROGRAMMING, GREEDY TECHNIQUE AND ITERATIVE IMPROVEMENT	10+10

Dynamic Programming- Computing a Binomial Coefficient–Warshall's and Floyd's algorithm– Knapsack Problem.

Greedy Technique–Job sequencing with deadlines – Optimal storage on tapes.

Iterative Improvement- The Simplex Method-The MaximumFlowProblem–Maximum Matching in Bipartite Graphs- The Stable marriage Problem.

UNIT III	COPING WITH THE LIMITATIONS OFALGORITHMPOWER	10+10

Limitations of Algorithm Power-Lower Bound Arguments - P, NP and NP-Complete Problems-Coping with the Limitations – Backtracking – n-Queens problem – Hamiltonian Circuit Problem– Subset Sum Problem- Branch and Bound– Assignment problem–Knapsack Problem – Traveling Salesman Problem.

TOTAL:30(L)+30(T)= 60 Periods

COURSE OUTCOMES:

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

- Compute the time complexity of recursive and non-recursive algorithms.
- Describe the methodology of various algorithm design technique.
- Analyze the time complexity of the algorithms with different design techniques.
- Employ algorithm design techniques to solve NP problems.

TEXT BOOKS:

1. AnanyLevitin, "Introduction to the Design and Analysis of Algorithms", Third Edition,Pearson Education, 2012.
2. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, Computer Algorithms/ C++, second edition, universities press, 2007.

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. Sara Baase and Allen Van Gelder, “Computer Algorithms-Introduction to design andAnalysis”,Pearson Education Asia,2003.
3. A.V.Aho,J.E.Hopcroft and J.D.Ullman, “The Design and Analysis Of ComputerAlgorithms”,Pearson Education Asia,2003
4. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”,Pearson Education, Reprint 2006.

15UCS404	COMPUTER COMMUNICATION AND NETWORKS	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To impart the knowledge on networking layers.
- To familiarize with various networking protocols.
- To acquire the knowledge on applications of networks.

UNIT I	NETWORK MODELS AND PHYSICAL MEDIA	9

Data Communications-Networks – Protocols and Standards - Layered Tasks – The OSI Model – Layers – TCP/IP Protocol suite – Addressing – Performance – Multiplexing – Spread Spectrum – Transmission Media.

UNIT II	DATALINK LAYER-I	9

Error detection and correction – Data link Control – Multiple Access – Ethernet – Token ring- Wireless LAN.

UNIT III	DATALINK LAYER-II	9

Connecting Devices – Backbone Networks – Virtual LANs – Cellular Telephony – Satellite Networks – Frame Relay – ATM – ATM LANs.

UNIT IV	NETWORK LAYER	9

Circuit switching vs. packet switching / Packet switched networks – Network Layer : Logical Addressing- Internet Protocols – Address Mapping – ICMP – IGMP – ICMP v6 – Delivary – Forwarding- Routing Protocols.

UNIT V	TRANSPORT LAYER AND APPLICATION LAYER	9

Transport Layer: Process-To-Process Delivery - UDP – TCP – Congestion Control and QoS.

Application Layer : Name Space – Domain Name Space – Distribution of Name Space – DNS in the Internet - Telnet- Email – FTP – WWW and HTTP - SNMP.

TOTAL :45 Periods

COURSE OUTCOMES:

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

- Illustrate the fundamentals of networking.
- Demonstrate error detection and correction in data link layers.
- Outline the functionalities of connecting networks.
- Solve addressing and routing problems.
- Explain congestion control mechanisms.
- Describe various Application Layer protocols.

TEXT BOOKS:

1. Behrouz A. Forouzan, “Data communications and networking”, McGraw-Hill Higher education, fourth Edition, 2010.
2. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Morgan Kauffmann Publishers Inc, Third Edition, 2007.

REFERENCE BOOKS:

1. James F. Kuross, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Addison Wesley, Third Edition, 2004.
2. Nader F. Mir,”Computer and Communication Networks”, Pearson Education, 2007.
3. Comer, “Computer Networks and Internets with Internet Applications”, Pearson Education, Fourth Edition, 2007.
4. Andrew S. Tanenbaum, “Computer Networks”, Fourth Edition, 2003.

15UCS405	SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To give knowledge on generic models of software development process.
- To impart the concepts of requirements engineering.
- To know different design techniques and their implementation.
- To learn various testing and maintenance measures.

UNIT I	SOFTWARE PROCESS	9

Introduction to Software Engineering, Software Process, Perspective process models - Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models and Specialized Process Models -Component-Based Development, The Formal Methods Model, Aspect-Oriented Software Development. **Process improvement:** The CMMI process improvement framework.

UNIT II	REQUIREMENTS ENGINEERING	9

Software Requirements: Functional and Non-Functional Requirements, Software Requirements Document,Requirements specification ,Requirement Engineering Process: Requirements elicitation and analysis, requirements validation, requirements management.

UNIT III	SOFTWARE DESIGN	9

Design process – Design Concepts-Design Model– Architectural Design –Architectural styles, Architectural Design, User Interface Design: The Golden Rules,, Interface Design Steps– Component level Design: Designing Class based components, traditional Components.

UNIT IV	TESTING	9

SOFTWARE TESTING STRATEGIES

A Strategic Approach to Software Testing ,Test Strategies for Conventional Software , Unit Testing , Integration Testing, Validation Testing, System Testing, The Art of Debugging.

TESTING CONVENTIONAL APPLICATIONS

Software Testing Fundamentals , Internal and External Views of Testing , White-Box Testing , Basis Path Testing , Control Structure Testing , Black-Box Testing –Requirement based testing.

UNIT V	SOFTWARE PROJECT ESTIMATION	9

Decomposition techniques-LOC based, FP based – Problems. Empirical estimation models-structure of estimation models-COCOMO II Model- Problems.

TOTAL :45 Periods

COURSE OUTCOMES :

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

- Determine the appropriate life cycle model based on the project.
- Identify the customer requirements.
- Develop an effective design for implementation.
- Apply the suitable testing methodology.
- Estimate resources required for project completion.

TEXT BOOKS:

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Seventh Edition,McGraw-Hill International Edition, 2010. UNIT-I, UNIT-III, UNIT-IV, UNIT-V

2. Ian Sommerville, “Software Engineering”, 9th Edition, Pearson Education Asia, 2011.UNIT-II.

REFERENCE BOOKS:

1. Rajib Mall, “Fundamentals of Software Engineering”, Third Edition, PHI Learning Private Limited, 2009.
2. PankajJalote, “Software Engineering, A Precise Approach”, Wiley India, 2010.
3. Kelkar S.A., “Software Engineering”, Prentice Hall of India Pvt Ltd, 2007.
4. Stephen R.Schach, “Software Engineering”, Tata McGraw-Hill Publishing Company Limited, 2007.

15UEC426	MICROPROCESSORS AND MICROCONTROLLERS	L	T	P	C
		3	0	0	3

PRE-REQUISITES :

COURSE OBJECTIVES :

- To develop an in-depth understanding of the operation of microprocessors and Microcontrollers, assembly language programming & interfacing techniques.
- To introduce the hardware architecture, instruction set, programming of 8051 microcontroller and PIC microcontroller.

UNIT I	8086 CPU- H/W ARCHITECTURE, INSTRUCTION SET AND PROGRAMMING	9

Intel 8086 internal architecture-Minimum and Maximum mode signals -8086 addressing modes-Assembler directives-Instruction set-8086 Assembly language programming-Interrupts.

UNIT II	PERIPHERAL INTERFACING	9

Interfacing Serial I/O (8251)- parallel I/O (8255) -Keyboard and Display controller (8279) – Programmable Interval Timer(8253/8254) – Interrupt Controller(8259)-DMA Controller.

UNIT III	8051 MICROCONTROLLER- H/W ARCHITECTURE, INSTRUCTION SET AND PROGRAMMING	9

8051 Micro controller hardware- I/O pins, ports and circuits- External memory -Counters and Timers-Serial Data I/O- Interrupts-Interfacing to external memory and 8255- 8051 instruction set - Addressing modes - Assembly language programming - I/O port programming -Timer and counter programming - Serial Communication - Interrupt programming.

UNIT IV	8051 INTERFACING AND APPLICATIONS	9

8051 Interfacing: LCD, ADC, DAC, Sensors, Stepper Motor and Keyboard.Case studies – Traffic light control, washing machine control.

UNIT V	PIC MICROCONTROLLER	9

PIC Microcontroller 16F877A- Architecture – memory organization – addressing modes – instruction set —I/O port Programming, Data Conversion, RAM & ROM Allocation, Timers, PWM, PIC programming in Assembly Language.

TOTAL : 45 Periods

COURSE OUTCOMES:

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

- Describe the architecture of 8086 and its programming
- Explain peripheral interfacing to Microprocessor
- Describe the architecture of microcontroller and its interfacing
- Analyze the architectural differences between Microprocessor and Microcontroller
- Design and Develop code for Microprocessor/Microcontroller based applications

TEXT BOOKS:

1. Douglas V Hall, “Microprocessors and Interfacing, Programming and Hardware”,Tata McGraw Hill,2006.
2. Kenneth J Ayala, “The 8051 Microcontroller Architecture Programming and Application” , Penram International Publishers (India), 2nd Edition,1996

REFERENCE BOOKS:

1. Ramesh S Gaonkar, “Microprocessor Architecture, Programming and Application with 8085”, Penram International Publishing, 4th Edition, New Delhi, 2000
2. John .B.Peatman, “Design with PIC Microcontroller”, Prentice hall, 1997.
3. Mohammed Ali Mazidi and Janice Gillispie Mazidi,“The 8051 Microcontroller and Embedded Systems” ,Pearson Education Asia, New Delhi, 2003
4. Krishna Kant, “Microprocessors and Microcontrollers Architecture, programming and system design using 8085, 8086, 8051 and 8096”,PHI, 2007

15UGS431	REASONING AND QUANTITATIVE APTITUDE	L	T	P	C
		1	0	0	1

PRE-REQUISITE :

COURSE OBJECTIVES :

- To make the student acquire sound knowledge of the characteristic of quantitative and qualitative aptitude.
- To familiarize the student with various principles involved in solving mathematical problems.
- To develop an understanding of the basic concepts of reasoning skills.

UNIT I	QUANTITATIVE APTITUDE	8

Numbers – HCF and LCM - Arithmetic and Geometric Progression – Averages –Percentages – Problems on ages – Profit and Loss – Simple and Compound Interest - Ratio and Proportion – Time – Speed –Distance- Work – Pipes and Cistern – Problems on Trains – Permutation and Combination – Clocks – Calendars.

UNIT II	VERBAL AND NON VERBAL REASONING	7

Analytical Reasoning – Circular and Linear arrangement – Direction problems – Blood relations – Analogy – Odd Man Out – Venn Diagrams – Statement and Conclusion, Statement and Implications – Letter series & arrangement – Alpha Numeric Series – Syllogism - Coding – Decoding.

TOTAL : 15 Periods

COURSE OUTCOMES:

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

- Solve the problems on commercial mathematics.
- Solveproblems on Ratio and Proportions.
- Choose appropriate statistical tools for data analysis.
- Interpret the graphical and numerical data.
- Solve many Brain Teasers problems.

WEBSITES:

www.tcyonline.com , www.m4maths.com, www.indiabix.com ,

www.fresherworld.com, www.careerbless.com

TEXT BOOKS:

1. Dr. R.S.AGARWAL, “Quantitative Aptitude”, S. Chand Publications, New Delhi, 17th Edition, (2010).
2. TRISHNA KNOWLEDGE SYSTEMS, “Quantitative Aptitude”, Pearson Education, South Asia, 2nd Edition, (2009).

REFERENCE BOOKS:

1. ABIJIT GUHA, “Quantitative Aptitude for Competitive Examinations”, Tata McGraw Hill Publication, New Delhi, 4th Edition, (2011).
2. Dr.V.A.SATHGURUNATH’S “A Guide for Campus Recruitment”, Sagarikka Publications, Thiruchirapalli, 3rd Edition, (2011).
3. NISHIT K.SINHA “Quantitative Aptitude for CAT”, Pearson Publication, New Delhi, 2nd Edition, (2009).
4. Dr.N.K.SINGH, “Quantitative Aptitude Test”, UpkarsPrakashan Publications, Agra, Revised Edition, (2013).

15UCS407	JAVA PROGRAMMING LABORATORY (Common to CSE & IT)	L	T	P	C
		0	0	2	1

PRE –REQUISITE:

COURSE OBJECTIVES :

- To demonstrate various features of Java.

LIST OF EXPERIMENTS

1. Write a java program to illustrate constructors.
2. Write a java program to demonstrate arrays and strings.
3. Write a java program to implement inheritance
4. Write a java program to demonstrate interface.
5. Write a java program to illustrate exception handling.
6. Write a java program to demonstrate generic programming
7. Write a java program to use collection.
8. Write a java program to perform File I/O.
9. Write a java program to design a Form with menus using Swing.
10. Write a java program to demonstrate Dialogs.

TOTAL: 30 Periods

COURSE OUTCOMES:

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

- Write a Java code to implement constructors, arrays and strings.
- Use inheritance in the design of solution to problems.
- Use Exception handling and generic programming in solutions to problems.
- Employ Collections and File I/O to solve problems
- Design GUI based applications

SOFTWARE AND HARDWARE REQUIREMENT

Hardware: COMPUTERS REQUIRED – 30 Nos.

Software:

1. OPERATING SYSTEM – WINDOWS 2000 / XP / NT OR LINUX
2. Java SE or Equivalent Edition.
3. Text Editor

15UCS408	DATA COMMUNICATION AND NETWORKS LABORATORY	L	T	P	C
		0	0	2	1

PRE-REQUISITE :

COURSE OBJECTIVES:

- To demonstrate various Networking Protocols.

LIST OF EXPERIMENTS

1.Implementation of Data Encryption and Decryption
2. Implementation of CRC
3. Implementation of Domain Name System
4. Implementation of sliding window protocol
5. Implementation of Stop and Wait protocol
6. Implementation of Distance Vector Routing protocol and Link State Vector Routing protocol
7. Write a program for Hamming Code generation for error detection and correction.
8. Implementation of ARP/RARP
9. Programs using TCP andUDPSockets (like date and time server & client, echo server &client,DNS etc.)
10. Study of Glomosim / OPNET

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Write programs for data encryption and Decryption.
- Implement the functionality of protocols in various layers.
- Identify appropriate error detection and correction techniques to improve QoS.
- Write client-server applications using sockets.
- Explain about network simulators like Glomosim / OPNET**.**

HARDWARE AND SOFTWARE REQUIRMENTS

HARDWARE: COMPUTERS REQUIRED – 30 Nos.
SOFTWARE:C++ Compiler, J2SDK (Freeware), Network simulators, NS2/Glomosim/OPNET (Freeware)

15UEC429	DIGITAL AND MICROPROCESSOR LABORATORY	L	T	P	C
		0	0	2	1

PRE-REQUISITE :

COURSE OBJECTIVES:

- To demonstrate the knowledge in design and implementation of digital logic circuits.
- To introduce the basics of microprocessor and microcontroller Programming and their interfacing.

LIST OF EXPERIMENTS

DIGITAL EXPERIMENTS

1. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
2. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices
3. Design and implementation of magnitude comparator.
4. Design and implementation of application using multiplexers/ Demultiplexers.
5. Design and implementation of Shift registers .
6. Design and implementation of Synchronous and Asynchronous counters .

MICROPROCESSORS EXPERIMENTS

1. Programs for 16 bit Arithmetic operations
2. Programs for Sorting and Searching
3. Interfacing ADC and DAC
4. Interfacing and Programming 8279
5. Interfacing of Stepper Motor

TOTAL: 30Periods

COURSE OUTCOMES:

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

- Design combinational and sequential circuits.
- Design the different functional units in a digital computer system.
- Develop assembly language programs to perform arithmetic and logical operation using 8085 and 8086
- Construct peripheral interface with microprocessor

HARDWARE REQUIREMENT

S.No.	Description of Equipment	Quantity required
1.	IC trainer Kit(with built- in Power supply)	15
2.	Digital Multimeter	5

HARDWARE REQUIREMENT

1. 8086 Trainer Kit -15
2. 8279 Interfacing Card -3
3. ADC Interfacing card -3
4. DAC Interfacing Card -3
5. Stepper motor Interfacing card -3

SEMESTER-V

Semester V

Course Code	Course Title	L	T	P	C
THEORY					
15UCS501	Internet and Web Technology (Common to CSE & IT)	3	0	0	3
15UCS502	Object Oriented Analysis and Design	2	0	0	2
15UIT503	Graphics and Multimedia (Common to CSE & IT)	3	0	0	3
15UCS504	Theory of Computation	3	2	0	4
	Professional Elective – I	3	0	0	3
	Professional Elective – II	3	0	0	3
PRACTICAL					
15UCS507	Internet and Web Technology Laboratory (Common to CSE & IT)	0	0	2	1
15UCS508	Case Tools Laboratory	0	0	2	1
15UIT509	Graphics and Multimedia Laboratory (Common to CSE & IT)	0	0	2	1
15UGS531	Soft Skills and Communication Laboratory (Common to CSE,ECE,EEE & IT)	0	0	2	1
	TOTAL	**17**	**2**	**8**	**22**
Total No. of Credits – 22					

SEMESTER-V

15UCS501	INTERNET AND WEB TECHNOLOGY (COMMON TO CSE & IT)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES :

- To introduce the various protocols and technologies behind internet
- To impart designing web sites
- To develop interactive web pages
- To write programs for server side

UNIT I	INTERNETWORKING AND HTML	9

Working with TCP/IP - IP address –URL - WWW –HTTP –MIME - HTML Basics: Basic HTML– Headers - Linking - Images - Ordered and Unordered Lists - HTML Tables-HTML Frames-Basic HTML Forms.

UNIT II	CSS AND HTML5	9

Basic CSS - CSS Properties - More CSS Syntax - Page Layout - Styling Page Sections - Introduction To Layout - Floating Elements - Sizing And Positioning. HTML5 Basics: Basic HTML5 New Elements–HTML5 Graphics – Canvas – SVG - CSS For Styling.

UNIT III	JAVASCRIPT AND DOM	9

JavaScript: JavaScript Syntax - Program Logic - Arrays–Strings – Functions - The Document Object Model (DOM): Global DOM Objects - DOM Element Objects - The DOM Tree.

UNIT IV	PHP	9

PHP: Server-Side Basics - PHP Basic Syntax - Arrays - Strings–Functions - Forms: Form Basics - Form Controls - Submitting Data - Processing Form Data In PHP - Querying a database in PHP: connecting to a database performing queries.

UNIT V	AJAX AND XML	9

AJAX: AJAX concepts - using XML HttpRequest to fetch data - Integrating PHP and AJAX - XML: What is XML - XML Document structure, Schemas and DTDs - Processing XML data – XSLT.

COURSE OUTCOMES:

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

- Design web pages using HTML.
- Make stylistic decisions with CSS and HTML5.
- Create interactive websites with JavaScript and DOM.
- Use PHP for server side programming.
- Enhance interactive websites with AJAX and XML.

TEXT BOOKS:

1. Jeffrey C. Jackson, “Web Technologies: A Computer Science Perspective”, Prentice Hall, 2007
2. Deitel and Deitel and Nieto, “Internet and World Wide Web - How to Program”, Prentice Hall,5th Edition, 2011.

REFERENCE BOOKS:

1. Marty Stepp, Jessica Miller, and Victoria Kirst , “Web Programming”, Step by Step Publication, 2nd edition, 2009
2. Robin Nixon, “Learning PHP, MySQL, JavaScript, CSS & HTML5 - A Step-by-Step Guide to Creating Dynamic Websites”, O'Reilly Media, 3rd Edition , 2014
3. Douglas E Comer, “Internet Book, The: Everything You Need to Know About Computer Networking and How the Internet Works”, 4/E, Prentice Hall, 2007
4. Kogent Learning Solutions Inc. , “Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book”, Dreamtech Press.

15UCS502	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
		2	0	0	2

PRE-REQUISITE :

COURSE OBJECTIVES:

- To familiarize the OOAD concepts and system design using UML diagrams.
- To explain the fundamental design patterns for object-oriented analysis.
- To learn the techniques of conceptual UML modeling.

UNIT I	UML DIAGRAMS	10

Introduction to OOAD - Unified Process - UML diagrams - Use Case - Class Diagrams- interaction Diagrams - State Diagrams - Activity Diagrams - Package, component and Deployment Diagrams.

UNIT II	DESIGN PATTERNS	10

GRASP: Designing objects with responsibilities - Creator - Information expert - Low Coupling- High Cohesion - Controller - Design Patterns - creational - factory method - structural - Bridge - Adapter - Behavioural – Strategy - observer-Applying GoF design patterns

UNIT III	DYNAMIC MODELING	10

Domain Models - Finding conceptual classes and description classes - Domain model refinement - Finding conceptual class Hierarchies - Logical architecture and UML package diagrams -Logical architecture refinement - Mapping design to code- OO Testing.

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Prepare requirements for a given problem using Unified Modeling Language.
- Apply design patterns for software development.
- Employ dynamic modeling concepts in software system design.

TEXT BOOKS:

1. Craig Larman, "Applying UML and Patterns: An Introduction to object- oriented Analysis and Design and iterative development", Third Edition, Pearson Education, 2005.
2. MichealBlaha, James Rambaugh, "Object-Oriented Modeling and Design with UML", Second Edition, Prentice Hall of India Private Limited, 2007.

REFERENCE BOOKS:

1. Grady Booch, “Object Oriented Analysis and Design with application”, Pearson Education, Third Edition, 2012.
2. Martin Fowler, UML Distilled, PHI/Pearson Education, 2002.
3. Stephen R. Schach, Introduction to Object Oriented Analysis and Design, Tata McGraw-Hill, 2003.

15UIT503	GRAPHICSANDMULTIMEDIA (COMMON TO CSE & IT)	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To impart the concept of output primitives, 2D Transformations and clipping algorithms.
- To instruct the basics of 3D object representation, viewing and its transformation.
- To introduce the concept of color models and applications of animation.
- To illustrate the concept of fractal and self-similarity objects
- To impart the fundamentals of Multimedia and its compression technique
- To instruct the basics of multimedia communication system and its applications

UNIT I	2DTRANSFORMATION	9

Output primitives – Line Drawing Algorithms – Two dimensional Geometric transformation – Pivot Point Rotation – Homogenous Coordinates – Two dimensional viewing – Clipping and Windowing – Line clipping algorithms (Cohen – Sutherland)

UNIT II	3D TRANSFORMATIONS ANDVIEWING	9

Three Dimensional Concepts – Three -Dimensional object representations Polygons, Curved lines, Splines, Quadric Surfaces – Visualization of data sets – Three-Dimensional geometric and modeling transformations – Three-Dimensional viewing – visible surface detection

UNIT III	COLORMODELS &SELF SIMILARITY CURVES	9

Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Key frame, Introduction to Shading models – Flat and Smooth shading – Adding texture of faces – Fractals and Self similarity – Mandelbrot sets.

UNIT IV	MULTIMEDIACOMPRESSION	9

Multimedia – Media and data Streams – Medium and Traditional Data streams – sound and audio –MIDI Concepts – Image and Graphics –based –JPEG compression- H.261-DVI.

UNIT V	MULTIMEDIASYSTEMSANDAPPLICATIONS	9

Optical Storage Systems – Multimedia Communication Systems – Database System – Synchronization issues – Applications – Video conferencing – Virtual reality.

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TOTAL:45Periods

COURSE OUTCOMES:

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

- Apply the knowledge of two dimensional transformation & clipping algorithm to draw output primitives .
- Apply knowledge of three dimensional transformations to represent & viewing of objects.
- Describe the concept of color models & principles of shading models.
- Implement Compression technique using multimedia concepts.
- Develop the multimedia Application like video Conferencing, virtual Reality.

TEXT BOOKS:

1. DonaldHearnandM.PaulineBaker, “Computer GraphicsC Version”,Pearsoned.,2nd Edition.,2004.
2. Andleigh, P.Kand Kiran Thakrar, “MultimediaSystems and Design”, 3rd Edition, 2015

REFERENCE BOOKS:

1. F.S.HillJr,StephenKelley, “ComputerGraphicsusingOPENGL",PrenticeHallEducation3rd Edition,2007.
2. Foley,Vandam,Feiner andHuges, “ComputerGraphics:PrinciplesandPractice",PearsonEducation,,2nd Edition,2003.
3. TayVaughan,,”Multimedia:Makingitwork”,TataMcGraw-HillPublishingCompanyLimited,7th Edition,2008.
4. Raff Steinmetz, KlaraNahrstedt,”Computing,Communication and Application – Multimedia ”,Pearson Education, 5th Edition.,2009

15UCS504	THEORY OF COMPUTATION	L	T	P	C
		3	2	0	4

PRE-REQUISITE:

COURSE OBJECTIVES :

- To impart knowledge on Computing models like Finite State Machine, Pushdown Automata, and Turing Machine.
- To explain computational complexity of various problems.

UNIT I	FINITE AUTOMATA	9+6

Introduction- Concepts of Automata theory- Deterministic Finite Automata- Nondeterministic Finite Automata-Finite Automata with Epsilon-Transitions-Applications.

UNIT II	REGULAR EXPRESSIONS AND LANGUAGES	9+6

Regular Expressions-Finite Automata and Regular Expressions-Algebraic Laws of Regular Expressions-Equivalence and Minimization of Automata-Proving Languages not to be Regular, Closure Properties of Regular Languages.

UNIT III	CONTEXT FREE GRAMMAR	9+6

Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols - Unit productions - Null productions –Chomsky normal form- Greibach Normal form.

UNIT IV	PUSHDOWN AUTOMATA	9+6

Pushdown Automata- Definitions – Moves – Instantaneous descriptions – Languages of a Pushdown Automata - Equivalence of Pushdown automata and CFG- Deterministic Pushdown automata – Closure Properties of CFL - Pumping lemma for CFL.

UNIT V	TURING MACHINE AND COMPUTATIONAL COMPLEXITY	9+6

Turing Machines- Introduction-Turing Machine as Acceptors – Turing Machine as Transducers-Turing Machine constructions – programming techniques of Turing Machine.

Undecidability- Basic definitions- Decidable and undecidable problems - Properties of Recursive and Recursively enumerable languages – Introduction to Computational Complexity: Definitions-Time and Space complexity of TMs – The classes P and NP.

TOTAL : 45 (L)+30 (T)=75 Periods

COURSE OUTCOMES:

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

- Relate different types of Automata.
- Convert Finite state machines to regular expressions and vice versa.
- Employ normal forms in CFG.
- Design Push Down Automata for language and grammar.
- Sketch Turing Machine for Recursively Enumerable language and mathematical computation.

TEXT BOOKS:

1. Hopcroft J.E., Motwani R. and Ullman J.D, “Introduction to Automata Theory,Languages and Computations”, Third Edition, Pearson Education, 2008.

REFERENCE BOOKS:

1. John.C.Martin, “Introduction to Languages and the Theory of Computation”,McGraw-Hill Education, 01-May-2010.
2. Michael Sipser, “Introduction to the Theory of Computation” Cengage Learning, 2012.
3. Peter Linz , “An introduction to formal languages and automata”, Jones &Bartlett Learning, 2001.

15UCS507	INTERNET AND WEB TECHNOLOGY LABORATORY (COMMON TO CSE & IT)	L	T	P	C
		0	0	2	1

PRE-REQUISITE:

COURSE OBJECTIVES:

- To design web pages
- To develop interactive web pages
- To process client requeststhrough server scripts

LIST OF EXPERIMENTS

1. Create a web page using HTML and CSS
2. Validate a webpage using Java Script.
3. Demonstrate manipulation of DOM objects of a web page
4. Design a web form and process data while maintaining session using PHP
5. Handle database using PHP
6. Exchange data using XML in AJAX application
7. Manipulate data using XSLT in AJAX application
8. Mini Project (Minimum 3 Sessions or 10 Hours should be allocated).

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Design web pages using HTML and CSS
- Manipulate web pages using JavaScript and DOM
- Process client requests and generate web based responses
- Exchange and Manipulate XML data in AJAX applications
- Create and deploy web applications

HARDWARE / SOFTWARE REQUIREMENTS

Hardware:

- Pentium P4, 2.8 GHz or higher
- 512MB (or higher) RAM
- 40 GB (or higher) HD;
- Windows XP with SP2 (or higher)

Software:

- Apache Web Server
- PHP
- MySQL
- AJAX
- XMLParser
- Notepad++

15UCS508	CASE TOOLS LABORATORY	L	T	P	C
		0	0	2	1

PRE-REQUISITE:

COURSE OBJECTIVES:

- To demonstrate the process of object-oriented analysis and design to software development using CASE tools.

LIST OF EXPERIMENTS

Develop a mini project based on the following

1. To develop a problem statement.
2. Identify Use Cases and develop the Use Case model.
3. Identify the conceptual classes and develop a domain model with UML Class diagram.
4. Using the identified scenarios, find the interaction between objects and represent them usingUML Sequence diagrams.
5. Draw relevant state charts and activity diagrams.
6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered,logical architecture diagram with UML package diagram notation.
7. Develop and test the Technical services layer.
8. Develop and test the Domain objects layer.
9. Develop and test the User interface layer.

SUGGESTED LIST OF MINI PROJECTS

1. Passport automation system.
2. Banking System
3. Library Management System
4. Online course reservation system
5. E-ticketing
6. Student Information System
7. Conference Management System
8. Recruitment System

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Design the projects using OO concepts.
- Use the UML graphical notations for the appropriate diagrams.
- Use the UML analysis and design models.
- Apply appropriate design patterns
- Convert design into code.

HARDWARE AND SOFTWARE REQUIRMENTS

HARDWARE :Computer Required - 30 Nos

SOFTWARE: A working computer system with either Windows or Linux
Rational Rose Software or Visual Paradigm Software

15UIT509	GRAPHICSANDMULTIMEDIA LABORATORY (COMMON TO CSE & IT)	L	T	P	C
		0	0	2	1

PRE-REQUISITE:

COURSE OBJECTIVES:

- To demonstrate the 2D,3D and geometric transformation
- To review graphics programming with OpenGL
- To familiarize with implementation of Mutli media applications

LIST OF EXPERIMENTS

1. Implementation of Line drawing Algorithm
2. Implementation of 2D Transformations, 2D Viewing and Clipping
3. Implementation of 3D Transformations
4. Implementation of color models(RGB, YIQ)
5. Generating Fractal images
6. Draw at least four basic graphics primitives using OpenGL
7. Draw 3D objects and scenes using OPENGL
8. Implementation of text compression algorithm using RLE and Static Huffman.
9. Implement image compression using Huffman algorithm
10. Perform animation using any Animation software (Macromedia Flash, Blender, Crea Toetc)

TOTAL: 30 Periods

COURSE OUTCOMES:

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

- Implement line drawing algorithm for 2D transformation and clipping
- Make use of 3D concepts to produce realistic display
- Implement OpenGL programming concepts to create interactive computer graphics
- Apply compression techniques on images
- Develop the Multimedia applications

SOFTWARE AND HARDWARE REQUIREMENT

Hardware: Standalonedesktops -30Nos.ORServersupporting 30 terminalsormore

Software:C / C++, OpenGL 3.7 (precompiled GLUT libraries 3.7 – Open source) ,Any open source software like GIMP 2.6/ Flash 8.0 /Adobe Photoshop/Blender 2.5

15UGS531	SOFT SKILLS AND COMMUNICATION LABORATORY	L	T	P	C
	(Common to CSE, ECE, EEE & IT)	0	0	2	1

PRE–REQUISITE:

COURSE OBJECTIVES :

- To develop a requisite knowledge in soft skills and communication skills.
- To enhance the students' acumen in sharpening the skills to meet the global challenges and industrial needs.

UNIT I		6

Communication – Types of communication – Communication network – Communication Techniques- Barriers of Communication.

UNIT II		6

Listening – Types of listening – Listening & Note Talking – Listening strategies – Barriers of Listening – Conversation & Oral skills – Improving fluency & self expression- Good Pronunciation.

UNIT III		6

Reading comprehension – Enriching Vocabulary (restricted to 1000 words) – Error analysis – Visual perception – Transcoding – Formal and Informal letters – Resume writing – Report writing.

UNIT IV		6

Attitude – Self Confidence – Leadership Qualities – Effective Time Management – Surviving stress (Emotional Intelligence) – Overcoming failure- Professional Ethics – Interpersonal Skills.

UNIT V		6

Body Language – Types of Interview: Online interview, Mock Interview, Telephonic interview – GD - Presentation.

TOTAL:30 Periods

COURSE OUTCOMES:

After the successful completion of this course, the student will be able to:

- Present ideas and in a flexible manner and differentiate & eliminate the ambiguity
- Write well-structured and easily readable reports, e-mails and articles on complex topics in an appropriate style
- Comprehend any address in English face to face and through different media like telephone and public announcement

REFERENCE BOOKS:

1. Allan Pease, Body Language, New Delhi, Sudha Publications (P) Ltd, 2005
2. Dr.Rathan Reddy, Team Development & Leadership, Mumbai, Jaico Publishing House, 2006
3. Chand.S, Soft Skills, New Delhi, S.Chand & Company Ltd, 2011
4. Career Press Editors, 101 Great Resumes, Mumbai, Jaico Publishing House, 2006

SEMESTER-VI

Semester VI

Course Code	Course Title	L	T	P	C
THEORY					
15UCS601	Principles of Compiler Design	2	2	0	3
15UIT602	Mobile Applications Development (Common to CSE & IT)	3	0	0	3
15UCS603	Artificial Intelligence	3	0	0	3
	Professional Elective – III	3	0	0	3
	Professional Elective IV	3	0	0	3
	Open Elective – I	3	0	0	3
PRACTICAL					
15UCS607	Technical Project	0	0	6	3
15UIT608	Mobile Applications Development Laboratory (Common to CSE & IT)	0	0	2	1
	TOTAL	**17**	**2**	**8**	**22**
Total No. of Credits – 22					

SEMESTER-VI

15UCS601	PRINCIPLES OF COMPILER DESIGN	L	T	P	C
		2	2	0	3

PRE-REQUISITE : THEORY OF COMPUTATION

COURSE OBJECTIVES:

- To learn the design techniques of lexical analyzer for a language.
- To give knowledge on various parsing techniques.
- To familiarize three address codes for source language.
- To study various optimization and code generation techniques. .
- To introduce the concepts of parallelizing compilers.

UNIT I	LEXICAL ANALYSIS AND SYNTAX ANALYSIS	10+10

Introduction-Compilers– Phases of a compiler -Role of Lexical Analyzer – Input Buffering. Specification and Recognition of Tokens – Compiler Construction Tools –
Role of the parser —Top Down parsing – Recursive Descent Parsing –Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing — LR Parsers **–** SLR Parser.

UNIT II	INTERMEDIATE CODE GENERATION AND CODE GENERATION	10+10

Three address code –Translation of Expression – Control flow- Back patching.
Issues in Design of a Code Generator-Runtime Storage management – Basic Blocks and Flow Graphs -A simple code generator.

UNIT III	CODE OPTIMIZATION AND PARALLELIZING COMPILER	10+10

Principal Sources of Optimization- Optimization of Basic Blocks –Peephole optimization-Introduction to Data Flow Analysis.
Basic concepts – Iteration spaces – Affine array indexes – Data reuse – Array data dependence - Finding synchronization free parallelism – Synchronization between parallel loops - Locality optimizations.

TOTAL: 30(L)+30(T)=60 Periods

COURSE OUTCOMES:

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

- Construct Finite Automata for recognizing the token.
- Design top down and bottom up parser for a given grammar.
- Translate parsed source statements into three address statements.
- Apply the optimization techniques for target code generation.
- Describe the concepts in parallelizing compiler.

TEXT BOOKS:

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D.Ullman, “Compilers: Principles, Techniques and Tools”, Second Edition, Pearson Education, 2008.
2. Holub, Allen I, “Compiler Design in C”, PHI, 2003.

REFERENCE BOOKS:

1. Randy Allen, Ken Kennedy, “Optimizing Compilers for Modern Architectures: A Dependence-based Approach”, Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, “Advanced Compiler Design and Implementation, “Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, “Engineering a Compiler”, Morgan Kaufmann Publishers Elsevier Science, 2004.
4. Charles N. Fischer, Richard. J. LeBlanc, “Crafting a Compiler with C”,Pearson Education,2008.

15UIT602	MOBILE APPLICATIONS DEVELOPMENT (Common To CSE & IT)	L	T	P	C

		3	**0**	**0**	**3**

PRE-REQUISITE :

COURSE OBJECTIVES:

- To understand the essentials of mobile apps development
- To understand the fundamental concepts of designing and developing
- To learn the major considerations of graphics and multimedia.
- To learn the various testing process.

UNIT I	**GETTING STARTED WITH MOBILE APPS**	**7**

Mobile platforms, Mobile apps development, Setting up an Android Studio Development Environment, Creating an Example Android App in Android Studio, A Tour of the Android Studio User Interface, Creating an Android Virtual Device (AVD) in Android Studio, Testing Android Studio Apps on a Physical Android Device, An Overview of the Android Architecture, The Anatomy of an Android Application.

UNIT II	**ELEMENTS OF DESIGS**	**10**

Understanding Android Application and Activity Lifecycles, Handling Android Activity State Changes with examples, Saving and Restoring the State of an Android Activity, Understanding Android Views, View Groups and Layouts, Android Table Layout and Table Row Tutorial Designing a User Interface using the Android Studio Designer Tool. Introduction to Android Fragments, Creating and Managing Overflow Menus on Android .

UNIT III	**PROGRAMMING WITH MOBILE APPS**	**9**

Creating an Android User Interface in Java Code, Using the Android Grid Layout Manager in Android Studio Designer, Working with the Android Grid Layout using XML Layout Resources, An Overview and Example of Android Event Handling, Android Touch and Multi-touch Event Handling, Detecting Common Gestures using the Android Gesture Detector Class, Implementing Custom Gesture and Pinch Recognition on Android.

UNIT IV	**ADVANCED MOBILE APPS AND ANIMATION**	**11**

An Overview of Android Intents - Android Explicit Intents - A Worked Example, Android Implicit Intents - A Worked Example, Android Broadcast Intents and Broadcast Receivers, A Basic Overview of Android Threads and Thread Handlers, An Overview of Android Started and Bound Services, Overview of Android SQLite Databases, Understanding Android Content Providers, Implementing an Android Content Provider in Android Studio.

UNIT V	**DATA BASE CONNECTIVITY AND TESTING**	**8**

Implementing Video Playback on Android using the Video View and Media Controller Classes - Video Recording and Image Capture on Android using Camera Intents - Android Audio Recording and Playback using Media Player and Media Recorder - Working with the Google Maps Android API in Android Studio - Handling Different Android Devices and Displays - Signing and Preparing an Android Application for Release.

TOTAL: 45 Periods

COURSE OUTCOMES

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

- Apply appropriate key techniques and tools for developing and maintaining mobile Applications.
- Identify the user interface requirements for mobile platforms and analyze the appropriate strategies for Development and deployment.
- Apply the Knowledge of advanced Java competency in mobile application development.
- Identify, review and analyze the appropriate UI layout for the mobile application development.

- Develop mobile apps using Android as development platform with key focus on user experience design.

TEXT BOOKS:

1. Neil Smyth ,"Andriod Studio Development Essentials. ", Andriod 6 the Edition,2015.
2. Barry A Burd,"Android Application Development All-in-One For Dummies, 2nd Edition ", Wiley ,2015.

REFERENCE BOOKS:

1. Lauren Darcey and Shane Conder," Teach Yourself Android Application Development In 24 Hours Edition:I", SAMS,2012. .
2. Mike VanDrongelen,"Andriod Studio Cook Book", Packt Publishing, , 2015.
3. Clifton Craig and Adam Gerfer ,"Learn Androd Studio ", 1st Edition, , 2015.
4. Kevin Grant and Chris Haseman ,"Beginning Andriod Programming Development and Design", Peachpit Press , 2014.

15UCS603	ARTIFICIAL INTELLIGENCE	L	T	P	C

		3	**0**	**0**	**3**

PRE-REQUISITE:

COURSE OBJECTIVES :

- To introduce the fundamental concepts in Artificial Intelligence.
- To impart the make the students to apply the artificial intelligence techniques in applications which involve perception, reasoning and learning.
- To give an idea about the basics of designing intelligent agents that can solve general purpose problems.

UNIT I	**PROBLEM SOLVING**	**9**

Introduction – Agents – Problem formulation – uninformed search strategies – heuristics– informed search strategies – Heuristic functions.

UNIT II	**LOGICAL REASONING**	**9**

Logical agents – propositional logic – inferences – first-order logic – inferences in first order logic – Knowledge engineering in FOL -unification – forward chaining – backward chaining –resolution.

UNIT III	**PLANNING**	**9**

Planning with state-space search – partial-order planning – planning graphs - Planning and acting in the real world - Hierarchical planning.

UNIT IV	**UNCERTAIN KNOWLEDGE AND REASONING**	**9**

Uncertainty – review of probability - Inference using full joint distribution-probabilistic Reasoning – Bayesian networks –Syntax and semantics of Bayesian networks –Bayesian nets with continuous variable - Exact inference in Bayesian networks.

UNIT V	**LEARNING**	**9**

Forms of learning - Learning from observations, Supervised learning - Learning decision trees, Statistical Based Learning- Artificial neural networks - Support vector machine

TOTAL : 45 Periods

COURSE OUTCOMES:

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

- Compute a solution to the problem using searching techniques.
- Use the knowledge and the process of inference to derive new representations
- Derive actions for planning problems.
- Build network models using reasoning with in-complete and/or Uncertain Knowledge.
- Choose appropriate learning algorithms to sample data.

TEXT BOOKS:

1. S. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, Second Edition, Pearson Education, 2003.
2. D. Poole and A. Mackworth. Artificial Intelligence:Foundations of Computational Agents,Cambridge University Press, 2010.

REFERENCE BOOKS:

1. David Poole, Alan Mackworth, Randy Goebel, ”Computational Intelligence : a logical approach”, Oxford University Press, 2004.

2. G. Luger, “Artificial Intelligence: Structures and Strategies for complex problem solving”, Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, “Artificial Intelligence: A new Synthesis”, Elsevier Publishers, 1998.
4. R. Brachman, H. Levesque. KnowledgeRepresentation and Reasoning, MorganKaufmann, 2004.

15UCS607	TECHNICAL PROJECT	L	T	P	C
		0	0	6	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To engage the student in integrated activities of reading, research, discussion and presentation around a designated subject.

This course is introduced to enrich the communication skills of the student and to create awareness on recent development in computer science and engineering through technical presentation. In this course, a student has to present at least two technical papers or recent advances in engineering/technology that will be evaluated by a committee constituted by the Head of the Department.

COURSE OUTCOMES:

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

- Communicate the technical information effectively in oral presentation and report writing.
- Analyze small technical problems and develop proto type model.

15UIT608	MOBILE APPLICATIONS DEVELOPMENT LABORATORY	L	T	P	C

		0	**0**	**2**	**1**

PRE –REQUISITE:JAVA PROGRAMMING LABORATORY

COURSE OBJECTIVES:

- To demonstrate and develop the Mobile Application using various Tools and Techniques

LIST OF EXPERIMENTS

1. Develop a mobile application for student registration using GUI components demonstrate the following UI layouts.
    i. Linear Layout
    ii. Relative Layout
    iii. Table Layout
2. Develop a mobile application to demonstrate simple event handling (Calculator application)
3. Develop a mobile application to demonstrate Intent and Intent filters.
4. Develop a mobile application customized Sending Email, Sending SMS and Phone calls using intent.
5. Develop a mobile application to implement a custom design Action Bar.
6. Develop a mobile application for image Gallery Using Grid view.
7. Develop a mobile application to demonstrate List View and Web View.
8. Develop a mobile application to demonstrate Broadcast receiver.
9. Develop a mobile application to demonstrate SQlite Database.
10. Develop a simple media player like application using service.
11. Develop a mobile application to demonstrate location based services.
12. Develop a mobile application to integrate with Facebook and Twitter.
13. Develop a mobile application to demonstrate the firebase features.
14. Develop a simple Remainder application.
15. Develop a customized android chat application

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Demonstrate basic skills of using an integrated development environment (Android Studio) and Android Software Development Kit (SDK) for implementing Android applications.
- Demonstrate through a simple application the understanding of the basic concepts of Android
- Develop a working knowledge of the custom UI elements and positioning
- Use the Java programming language to build Android apps
- Store and manipulate data using Content Providers, Shared Preferences and Notifications

SOFTWARE AND HARDWARE REQUIREMENT (For a batch of 30 students)

Standalone desktops with Windows, Android or iOS or Equivalent Mobile Application Development Tools with appropriate emulators and debuggers - 30 Nos

SEMESTER-VII

Semester VII

Course Code	Course Title	L	T	P	C
THEORY					
15UME701	Project Management and Finance (Common to ALL Branches)	3	0	0	3
15UCS702	Insight into Cloud Computing (Common to CSE & IT)	3	0	0	3
15UCS703	Data Science	3	0	0	3
	Professional Elective V	3	0	0	3
	Open Elective – II	3	0	0	3
PRACTICAL					
15UCS706	Cloud Computing Laboratory (Common to CSE & IT)	0	0	2	1
15UCS707	Data Science Laboratory	0	0	2	1
	TOTAL	**15**	**0**	**4**	**17**
Total No. of Credits – 17					

SEMESTER-VII

15UME701	PROJECT MANAGEMENT AND FINANCE (Common to MECH, CSE, ECE, EEE, IT ,& EIE)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES :

- To impart knowledge to find solutions and approaches for various projects.
- To familiarize the utilization of project within time, resource and financial constraints.

UNIT I	PROJECT MANAGEMENT CONCEPTS	9

Concept and characteristics of a project, importance of project management, types of project, project organizational structure, project life cycle, Statement of Work, Work Breakdown Structure.

UNIT II	PROJECT PLANNING	9

Project Planning and Scheduling techniques - developing the project network using CPM/PERT, Limitations of CPM/PERT, Precedence Diagramming Method, constructing diagram and computations using precedence diagramming method, PERT/CPM simulation, reducing project duration.

UNIT III	RESOURCE SCHEDULING & CRITICAL CHAIN SCHEDULING	9

Resource Scheduling - Resource allocation method, splitting and multitasking, Multi project resources scheduling - Critical Chain Scheduling -Concept of critical chain scheduling - critical chain scheduling method, application of Critical chain scheduling and limitations.

UNIT IV	PROJECT QUALITY MANAGEMENT	9

Concept of project quality, responsibility for quality in projects, quality management at different stages of project, tools and techniques, Quality Management Systems, TQM in projects - Project Performance Measurement and Control - Monitor and assess project performance, schedule, and cost.Earned Value Management, performance measurement methods to monitor, evaluate and control planned cost and schedule performance - Project Closure/ Termination - Meaning of closure/ termination, project audit process, termination steps, final closure.

UNIT V	FINANCIAL ACCOUNTING	9

Balance sheet and related concepts - Profit & Loss Statement and related concepts - Financial Ratio Analysis - Cash flow analysis - Funds flow analysis – Comparative financial statements. Investments - Average rate of return - Payback Period - Net Present Value - Internal rate of return.

TOTAL :45 Periods

COURSE OUTCOMES :

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

- Explain the concept and characteristics of project management.
- Make use of CPM and PERT concepts to construct the project network.
- Utilize Theory of Constraints and Heuristic methods for allocating resources to a project.
- Demonstrate the various tools and techniques at different stages of Quality management.
- Design the balance sheet using trading, profit and loss account.

TEXT BOOKS:

1. Prasanna Chandra, "'Fundamentals of Financial Management' ", Tata Mcgraw-Hill Publishing Ltd, 2005.
2. Jack Meredith, Samuel J.Mantel, "Project Management- A Managerial Approach", John Wiley and Sons.

REFERENCE BOOKS:

1. Clifford F Gray, Erik W Larson, "Project Management-The Managerial Process ", Tata Mcgraw-Hill Publishing Co Ltd.
2. John M Nicholas, "Project Management For Business And Technology", Prentice Hall of India Pvt Ltd.
3. Paresh Shah, "Basic Financial Accounting for Management", Oxford University Press, 2007.

15UCS702	INSIGHT INTO CLOUD COMPUTING (COMMON TO CSE & IT)	L	T	P	C
		3	0	0	3

PRE-REQUISITES : COMPUTER COMMUNICATION AND NETWORKS

COURSE OBJECTIVES:

- To introduce the essentials of building fully featured applications on various cloud models.
- To familiarize the concepts of designing and developing various service models (IaaS, PaaS and SaaS) and deployment models (Public, Private and Hybrid clouds).
- To impart the knowledge of Multi-cloud management systems and business clouds.

UNIT I	OVERVIEW OF CLOUD COMPUTING	8

Introduction to Cloud Computing- Cloud Computing in a Nut Shell, Roots of Cloud Computing, Desired Features of a Cloud,Cloud service models (IaaS, PaaS&SaaS). Cloud deployment models (Public, Private, Hybrid and Community Cloud), Benefits and Challenges of Cloud Computing.

UNIT II	INFRASTRUCTURE AS A SERVICE	9

Basics of Virtualization, Virtualization technologies,Server Virtualization,VM migration techniques, Role of virtualization in Cloud Computing.Anatomy of Cloud infrastructures, Distributed Management of Virtual Infrastructures, Scheduling Techniques for advance reservation of Capacity.

UNIT III	PLATFORM AS A SERVICE/SOFTWARE AS A SERVICE	10

Aneka – Technologies and Tools for Cloud Computing, Aneka Cloud Platform, Aneka Resource Provisioning Service, Hybrid Cloud implementation, Workflow engine for clouds – Workflow management Systems and Cloud, Architecture, Utilizing Cloud for workflow execution, The MapReduce Programming model and Implementation – MapReduce Programming model, Major MapReduce implementation for the cloud, Case Studies

UNIT IV	CLOUD SECURITY	9

Security concerns in Traditional IT, Challenges in Cloud Computing in terms of Application Security, Server Security, and Network Security. Security reference model, Abuse and Nefarious Use of Cloud Computing, Insecure Interfaces and APIs, Malicious Insiders, Shared Technology Issues, Data Loss or Leakage, Account or Service Hijacking, Unknown Risk Profile, Different vendors offering Cloud Security for public and private clouds.

UNIT V	MULTI-CLOUD MANAGEMENT SYSTEMS AND BUSINESS CLOUDS	9

Concept of multi-cloud management, Challenges in managing heterogeneous clouds, benefits and advantages of multi-cloud management systems.

Cloud Computing in Business, Various Biz Clouds focused on industry domains (Retail, Banking and Financial sector, Life Sciences, Social networking, Telecom, Education).

TOTAL :45 Periods

COURSE OUTCOMES:

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

- Explain the concepts of Cloud Computing and the various deployment and service models of Cloud Computing.
- Apply the virtualization techniques to provide IaaS.
- Apply Aneka tools and other techniques to provide PaaS and SaaS.
- Identify issues of security concerns in Cloud Computing.
- Describe Multi-Cloud management System for various applications.

TEXT BOOKS:

1. Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski," Cloud Computing: Principles and paradigms", Wiley 2013.

REFERENCE BOOKS:

1. Ronald L.Krutz and Russell Dean Vines: Cloud Security – A Comprehensive Guide to Secure Cloud Computing, Wiley 2010.
2. Anthony T Velte,Cloud Computing: A practical Approachǁ, Tata McGraw Hill, 2009.
3. Michael Miller,"Cloud Computing", Pearson Education, New Delhi, 2009.
4. Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper, "Cloud Computing For Dummies", Wiley 2010.

15UCS703	DATA SCIENCE	L	T	P	C
		3	0	0	3

PRE-REQUISITE: KNOWLEDGE OF STATISTICS AND PROBABILITY, JAVA AND XML IS PREFERRED

COURSE OBJECTIVES:

- Learn about the basics of data Science and to understand the various supervised and unsupervised learning techniques
- Bringing together several key technologies used in manipulating, storing, and analyzing big
- data from different perspectives.
- Understanding the Hadoop architecture and implementation of MapReduce Application

UNIT I	INTRODUCTION TO DATA SCIENCE	9

Introduction of Data Science – Basic Data Analytics using R – R Graphical User Interfaces – Data Import and Export – Attribute and Data Types – Descriptive Statistics – Exploratory Data Analysis – Visualization Before Analysis – Dirty Data – Visualizing a Single Variable – Examining Multiple Variables – Data Exploration Versus Presentation.

UNIT II	ANALYTICAL THEORY AND METHODS	9

Overview of Clustering – K-means – Use Cases – Overview of the Method – Perform a K-means Analysis using R – Classification – Decision Trees – Overview of a Decision Tree – Decision Tree Algorithms – Evaluating a Decision Tree – Decision Tree in R – Bayes' Theorem – Naïve Bayes Classifier – Smoothing – Naïve Bayes in R.

UNIT III	BIG DATA FROM DIFFERENT PERSPECTIVES	9

Big data from business Perspective: Introduction of big data-Characteristics of big data-Data in the warehouse and data in Hadoop- Importance of Big data- Big data Use cases: Patterns for Big data deployment. Big data from Technology Perspective: History of Hadoop-Components of Hadoop-Application Development in Hadoop-Getting your data in Hadoop-other Hadoop Component.

UNIT IV	HADOOP DISTRIBUTED FILE SYSTEM ARCHITECTURE	9

HDFS Architecture – HDFS Concepts – Blocks – NameNode – Secondary NameNode – DataNode - HDFS Federation – Basic File System Operations – Data Flow – Anatomy of File Read – Anatomy –of File Write.

UNIT V	PROCESSING YOUR DATA WITH MAPREDUCE	9

Getting to know MapReduce – MapReduce Execution Pipeline – Runtime Coordination and Task Management – MapReduce Application – Hadoop Word Count Implementation.

Total: 45 Periods

COURSE OUTCOMES:

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

- Describe the concepts of Big data analytics to provide solutions for data analysis.
- Apply the classification techniques to provide solution for various scenarios.
- Illustrate the impact of big data for business decisions and strategy.
- Describe Hadoop Distributed File System (HDFS) to load and process big data.
- Demonstrate Map Reduce algorithms to provide solution for business use cases.

TEXT BOOKS:

1. David Dietrich, Barry Heller and Beibei Yang, “Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data”, Wiley, ISBN 13:9788126556533, 2015.
2. Paul Zikopoulos, Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, “Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data”, The McGraw-Hill Companies, ISBN : 978-0-07-179054-3, 2012.
3. Tom White, "Hadoop: The Definitive Guide", 4th Edition, O'Reilly, ISBN: 9789352130672,2015.
4. Biris Lublinsky, Kevin T. Smith and Alexey Yakubovich, “Professional Hadoop Solutions”,Wiley, ISBN 13:9788126551071, 2015.

REFERENCE BOOKS:

1. Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications, 2014.
2. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2014.
3. Mark Gardener, “Beginning R - The Statistical Pr ogramming Language”, John Wiley & Sons, Inc., 2012
4. W. N. Venables, D. M. Smith and the R Core Team, “An Introduction to R”, 2013.
5. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, “Practical Data Science Cookbook”, Packt Publishing Ltd., 2014.
6. Nathan Yau, “Visualize This: The FlowingData Guide to Design, Visualization, and Statistics”, Wiley, 2011.
7. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
8. http://bigdatauniversity.com/

15UCS706	CLOUD COMPUTING LABORATORY (COMMON TO CSE & IT)	L	T	P	C
		0	0	2	1

PRE-REQUISTIE :

COURSE OBJECTIVES:

- To demonstrate how to use Cloud Services.

LIST OF EXPERIMENTS

1. Study and Usage of Google Apps.
2. Implement Virtual OS using virtual box.
3. Simulate VM allocation algorithm using CloudSim
4. Simulate Task Scheduling algorithm using CloudSim
5. Simulate Energy-conscious model using CloudSim
6. Setup a Private Cloud Using Open Stack or Eucalyptus.
7. Install and configure Open Stack Object Storage - Swift in Ubuntu
8. Implement Open Stack Nova-Compute
9. Implement Open Stack Image services – Glance.
10. Implement Map Reduce concept for an application.

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Analyze the use of Cloud Applications
- Apply resource allocation and scheduling algorithms.
- Implement Energy-conscious model.
- Create virtual machines from available physical resources.
- Design a private cloud.

HARDWARE AND SOFTWARE REQUIRMENTS

HARDWARE: COMPUTERS REQUIRED – 30 Nos.

SOFTWARE: Eucalyptus or Open Nebula or Cloudsim or equivalent

15UCS707	DATA SCIENCE LABORATORY	L	T	P	C
		0	0	2	1

PRE-REQUISTIE :Knowledge of Statistics and Probability, Java and XML is preferred

COURSE OBJECTIVES :

- To familiarize the implementation of programs in R and Hadoop.

LIST OF EXPERIMENTS

1. Basic Data Analytic Methods using R
2. Preparing and training data based on K-means clustering analysis using R
3. Preparing and training data based on Decision Tree Classification analysis using R
4. Preparing and training data based on Naïve Bayes Classification analysis using R
5. Hadoop Distributed File System Commands
6. Hadoop Word Count Implementation using MapReduce
7. Implementation of Matrix Multiplication using MapReduce

TOTAL : 30 Periods

COURSE OUTCOMES:

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

- Work with data analytic methods to provide solution for data visualization.
- Implement clustering and classification methods to real world problems using R.
- Manipulate naïve classification analysis for real time prediction problem using R.
- Work with hadoop commands to provide distributed storage and computation.
- Implement map reduce techniques in large scale data intensive applications.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS

HARDWARE

LAN SYSTEM WITH 30 NODES (OR) STANDALONE PCS – 30 NOS.

SOFTWARE

OS – UNIX CLONE **(License free Linux) / WINDOWS**

SEMESTER-VIII

Semester VIII

Course Code	Course Title	L	T	P	C
THEORY					
15UME801	Professional Ethics (Common to ALL Branches)	2	0	0	2
	Professional Elective VI	3	0	0	3
	Open Elective – III	3	0	0	3
PRACTICAL					
15UCS804/ 15UGE810	Project Work/ Multidisciplinary Project Phase II	0	0	24	12
	TOTAL	**8**	**0**	**24**	**20**
Total No. of Credits – 20					

SEMESTER-VIII

15UME801	PROFESSIONAL ETHICS (Common to ALL Branches)	L	T	P	C
		2	0	0	2

PRE-REQUISTIE :

COURSE OBJECTIVES :

- To impart knowledge on a values-based approach and provide a method of thinking about and dealing with ethical issues in the work place.
- To explain what a profession is and what it means to act professionally.

UNIT I	ENGINEERING ETHICS	9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.

UNIT II	ENGINEERING AS SOCIAL EXPERIMENTATION	10

Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger-Assessment of safety and risk - Risk Benefit analysis - Professional Rights - Employee rights - Intellectual Property Rights.

UNIT III	GLOBAL ISSUES	11

Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development– Engineers as Managers – Consulting Engineers – Honesty – Moral Leadership – Sample Code of Conduct.

TOTAL : 30 Periods

COURSE OUTCOMES:

After successful completion of this course the students will be able to:

- Illustrate the basic perception of profession, professional ethics and various oral issues.
- Describe the code of ethics and role of professional ethics in engineering field.
- Apply ethical principles to resolve global and cross cultural issues that arise in professional career.

TEXT BOOKS:

1. Subramanian. R , "Professional Ethics", Oxford University press India, New Delhi First edition, 2013.
2. DhineshBabu.S, "Professional Ethics and Human Values", Laxmi Publications, New Delhi, Reprint, 2016.

REFERENCE BOOKS:

1. Jayakumar.V, "Professional Ethics in Engineering", Lakshmi Publications, Chennai.
2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, 2003.
3. Edmund G Seebauer, Robert L Barry "Fundamentals of Ethics for Scientists and Engineers", OxfordUniversity Press, 2001.
4. David Ermann, Michele S Shauf "Computers, Ethics and Society", Oxford University Press, 2003.

15UCS804	PROJECT WORK	L	T	P	C
		0	0	24	12

PRE-REQUISITE :

COURSE OBJECTIVES:

- To deepen comprehension of principles by applying them to a new problem which may be the design and manufacture of a device, research investigation, a computer based project or management project.

Project work time can be utilized by the students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project. The progress of the project is evaluated based on a minimum of three reviews.

COURSE OUTCOMES:

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

- Develop a system using comprehension of concepts.
- Evaluate the designed system with respect to different performance criteria.
- Analyze the variety of issues in design concept through environmental issues and quality.
- Explain the systematic way of organizing various resources for completing the project in time.
- Engage in independent learning for effective implementation of the project.

PROFESSIONAL ELECTIVES

Course Code	Course Title	L	T	P	C
15UCS901	Multicore Programming	3	0	0	3
15UCS902	Information Storage Management*	3	0	0	3
15UCS903	Network Analysis and Management	3	0	0	3
15UCS904	Data Mining	3	0	0	3
15UCS905	Distributed Computing	3	0	0	3
15UCS906	Game Programming	3	0	0	3
15UCS907	Knowledge Based Decision Support Systems	3	0	0	3
15UCS908	C# and .NET Framework	2	0	2	3
15UCS909	Natural Language Processing	3	0	0	3
15UCS910	Building Internet of Things	3	0	0	3
15UCS911	Grid Computing	3	0	0	3
15UCS912	Nano Computing	3	0	0	3
15UCS913	Cyber Forensics	3	0	0	3
15UCS914	Quantum Computing	3	0	0	3
15UCS915	Principles of Software Architecture	3	0	0	3
15UCS916	Cryptography	2	0	2	3
15UCS917	Semantic Web Paradigm	3	0	0	3
15UCS918	Information Retrieval	3	0	0	3
15UCS919	Human Computer Interaction	3	0	0	3
15UCS920	Green Computing	3	0	0	3
15UCS921	E-Learning Techniques	3	0	0	3
15UCS922	Neural Networks and its Applications	3	0	0	3
15UCS923	Fuzzy logic	3	0	0	3
15UCS924	Mobile computing	3	0	0	3

Course Code	Course Title	L	T	P	C
15UCS925	Business Intelligence and its applications*	3	0	0	3
15UCS926	Web Services and Service Oriented Architecture	3	0	0	3
15UCS927	Machine Learning Algorithms	3	0	0	3
15UIT910	Building Enterprise Applications*	3	0	0	3
15UIT911	Software Testing*	3	0	0	3
15UIT924	Agile Software Development*	3	0	0	3
15UGE710	Multidisciplinary Project Phase I*	3	0	0	3

PROFESSIONAL ELECTIVES

15UCS901	MULTICORE PROGRAMMING	L	T	P	C
		3	0	0	3

PRE-REQUISITES: COMPUTER ORGANIZATION AND ARCHITECTURE

COURSE OBJECTIVES:

- To introduce the concepts of programming in serial processors and parallel processors.
- To review the challenges in parallel and multi-threaded programming.
- To give an idea about the parallel programming paradigms.

UNIT I	INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES	9

Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models –- Symmetric and distributed shared memory architectures – Performance Issues – Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture.

UNIT II	PARALLEL PROGRAMMING	9

Fundamental concepts – Designing for threads – Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading APIs.

UNIT III	OPENMP PROGRAMMING	9

OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and live locks – Non-blocking algorithms – Memory and cache related issues.

UNIT IV	MPI PROGRAMMING	9

MPI Model – collective communication – data decomposition – communicators and topologies – point-to-point communication – MPI Library.

UNIT V	MULTITHREADED DEBUGGING TECHNIQUES	9

General Debug Techniques, Debugging Multi-threaded Applications in Windows: Threads Window, Trace points, Breakpoint Filters, Naming Threads, Multi-threaded Debugging Using GDB..

TOTAL : 45 Periods

COURSE OUTCOMES:

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

- Describe different multi core architectures.
- Explain the fundamental concepts of parallel programming .
- Discuss various issues in parallel programming.

- Write a parallel algorithm and implement it using MPI and OpenMP.
- Review multithreaded debugging Techniques

TEXT BOOKS:

1. ShameemAkhter and Jason Roberts, “Multi-core Programming”, Intel Press, 2006.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Macgraw Hill, 2003.

REFERENCE BOOKS:

1. John L. Hennessey and David A. Patterson, “ Computer architecture – A quantitative approach”, Morgan Kaufmann/Elsevier Publishers, 4th. edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, “Parallel computing architecture : A hardware/ software approach” , Morgan Kaufmann/Elsevier Publishers, 1999.
3. Wesley Petersen and Peter Arbenz, “Introduction to Parallel Computing”, Oxford University Press, 2004.
4. Darryl Gove, “Multicore Application Programming: For Windows, Linux, and Oracle Solaris”,Pearson, 2011.

15UCS902	INFORMATION STORAGE MANAGEMENT	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSE OBJECTIVES :

- To introduce storage architectures and key data center elements in classic, virtualized, and cloud environments
- To explain storage networking technologies such as FC SAN, IP SAN, FCoE, NAS, and object-based and unified storage
- To impart the knowledge of Backup and Archive in virtualized and non-virtualized environment

UNIT I	STORAGE SYSTEMS	8

Introduction to information storage - evolution of storage architecture, key data center elements, virtualization, and cloud computing - Data center environment - Details key data center elements – host (or compute), connectivity, storage, and application in both classic and virtual environments- RAID - RAID implementations, techniques, and levels along with the impact of RAID on application performance - Intelligent storage system - Details components of intelligent storage systems. It also covers virtual storage provisioning and intelligent storage system implementations.

UNIT II	STORAGE NETWORKING TECHNOLOGIES	12

Fibre Channel Storage Area Network (FC SAN) - FC SAN components, connectivity options, and topologies including access protection mechanism „zoning". IP SAN and Fibre Channel over Ethernet (FCoE) - iSCSI and FCIP protocols for storage access over an IP network. Converged protocol FCoE and its components. Network Attached Storage (NAS) - File sharing technology using NAS and covers its benefits, components, and implementations. File level storage virtualization. Object based and Unified Storage - Emerging areas of object-based storage and unified storage solutions. Content addressed storage (CAS) as an implementation of an object-based solution.

UNIT III	BACKUP, ARCHIVE, AND REPLICATION	10

Introduction to Business Continuity - information availability and business continuity solutions in both virtualized and non-virtualized environments. Backup and Archive - Backup and recovery in both virtualized and non-virtualized environments - Deduplication technology to optimize data backups along with archival solutions to address fixed content storage requirements. Local Replication - Local replications of data along with data restore and restart considerations. Remote Replication - Remote replication technologies in virtualized and non-virtualized environments. Three-site replication and continuous data replication.

UNIT IV	CLOUD COMPUTING	7

Cloud Computing - Cloud computing, its benefits, characteristics, deployment models and services. Cloud challenges and migration considerations.

UNIT V	SECURING AND MANAGING STORAGE INFRASTRUCTURE	8

Securing the Information Infrastructure - Framework and domains of storage security along with covering security implementation at storage networking. Security in virtualized and cloud environments. Managing the Information Infrastructure - storage infrastructure monitoring and management - storage tiering, information lifecycle management (ILM), and cloud service management activities.

TOTAL:45Periods

COURSE OUTCOMES:

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

- Discuss the various storage system principles.
- Describe Storage Networking technology requirements and solutions.
- Explain about the data replication techniques.
- Demonstrate cloud deployment models and services.
- Identify parameters for managing and monitoring storage infrastructure.

TEXT BOOKS:

1. EMC Corporation, Information Storage and Management", Wiley, ISBN number: 04702942134.
2. Robert Spalding , "Storage Networks: The Complete Reference ", Tata McGraw Hill, Osborne, 2003.

REFERENCE BOOKS:

1. G. Somas Sundaram, AlokShrivastava, , " Information Storage and Management ", Wiley, India,.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, " Storage Network explained : Basic and application of fiber channels, SAN, NAS, iSESI, INFINIBAND and FCOE ", Wiley, India,.
3. Marc Farley," Building Storage Networks ", Tata McGraw Hill, , Osborne, 2001.
4. Meeta Gupta," Storage Area Network Fundamentals ", Pearson Education Limited, 2002.

15UCS903	NETWORK ANALYSIS AND MANAGEMENT	L	T	P	C
		3	0	0	3

PRE-REQUISITES:COMPUTER COMMUNICATION AND NETWORKS

COURSE OBJECTIVES:

- To give an idea about the network services, Requirement analysis and Flow analysis.
- To familiarize the concepts of network management and security.
- To give knowledge on addressing, routing and network management standards.

UNIT I	A SYSTEM APPROACH TO NETWORK DESIGN AND REQUIREMENT ANALYSIS	9

Introduction-Network Service and Service based networks- Systems and services- characterizing the services. Requirement Analysis: Concepts – Background – User Requirements- Application Requirements- Host Requirements-Network Requirements – Requirement Analysis: Guidelines – Requirements gathering and listing- Developing service metrics to measure performance – Characterizing behavior- developing performance threshold – Distinguish between service performance levels. Requirement Analysis: Practice –Template, table and maps –simplifying the requirement analysis process –case study.

UNIT II	FLOW ANALYSIS: CONCEPTS, GUIDELINES AND PRACTICE	9

Background- Flows- Data sources and sinks- Flow models- Flow boundaries- Flow distributions- Flow specifications- Applying the flow model-Establishing flow boundaries-Applying flow distributions- Combining flow models, boundaries and distributions- Developing flow specifications- prioritizing flow-simplifying flow analysis process –examples of applying flow specs- case study.

UNIT III	LOGICAL DESIGN: CHOICES, INTERCONNECTION MECHANISMS, NETWORK MANAGEMENT AND SECURITY	9

Background- Establishing design goals- Developing criteria for technology evolution- Making technology choices for design-case study- Shared Medium- Switching and Routing: Comparison and contrast- Switching- Routing-Hybrid Routing/Switching Mechanisms – Applying Interconnection Mechanism to Design – Integrating Network management and security into the Design- Defining Network Management- Designing with manageable resources- Network Management Architecture- Security- Security mechanism- Examples- Network Management and security plans- Case study.

UNIT IV	NETWORK DESIGN: PHYSICAL, ADDRESSING AND ROUTING	9

Introduction- Evaluating cable plant design options – Network equipment placement- diagramming the physical design- diagramming the worksheet –case study. Introduction to Addressing and routing- establishing routing flow in the design environments- manipulating routing flows- developing addressing strategies- developing a routing strategy- case study.

UNIT V	NETWORK MANAGEMENT AND SNMP PROTOCOL MODEL	9

Network and System management, Network management system platform; Current SNMP Broadband and TMN management, Network management standards. SNMPV1, SNMPV2 system architecture, SNMPV2, structure of management information. SNMPV2 – MIB – SNMPV2 protocol, SNMPV3-Architecture, Application, MIB, security user based security model, access control RMON.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Explain the key concepts in requirement analysis and network design
- Summarize fundamental concepts in dataflow analysis.
- Discuss management and security issues in networks
- Review the design concepts involved in physical addressing and routing
- Illustrate various network management standards and protocols.

TEXT BOOKS:

1. James.D.McCabe, “Practical Computer Network Analysis and Design”, 1st Edition, Morgan Kaufaman, 1997. (UNIT I, UNIT II, UNIT III, UNIT IV)
2. Mani Subramanian, “Network Management – Principles & Practice” – 2nd Edition Prentice Hall, 2012. (UNIT V)

REFERENCE BOOKS:

1. J.Radz, “Fundamentals of Computer Network Analysis and Engineering: Basic Approaches for Solving Problems in the Networked Computing Environment”, Universe, 2005.
2. Mark Newman, “Networks: An Introduction”,Kindle Edition,2010.
3. Laura Chappel and Gerald Combs,“Wireshark 101: Essential Skills for Network Analysis”,Kindle Edition,2013.
4. William Stallings., “SNMP, SNMP2, SNMP3 and RMON1 and 2”, Pearson Education, 2004.
5. DawSudira, “Network Management”, Sonali Publications, 2004.

15UCS904	DATA MINING	L	T	P	C
		3	0	0	3

PRE-REQUISITE: DATABASE SYSTEM CONCEPTS

COURSE OBJECTIVES:

- To provide a foundation on data mining concepts.
- To learn the various data mining techniques.
- To familiarize various tools and techniques in data mining.

UNIT I	INTRODUCTION TO DATA MINING	8

Introduction- Data mining on Different Kind of Data - Data Mining Functionalities-Steps in DataMining Process-Architecture of a Typical Data Mining Systems- Classification of Data Mining Systems – DataMining Task Primitives - Integration of a Data Mining System with a Database or Data Warehouse System.

UNIT II	DATA PREPROCESSING AND GENERALIZATION	9

Data Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, AttributeOriented Induction – An Alternative Method for Data Generalization and Concept Description.

UNIT III	ASSOCIATION RULE MINING	9

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

UNIT IV	CLASSIFICATION	10

Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

UNIT V	CLUSTERING	9

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods - Density-Based Methods - Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Explain the basics of data mining systems.
- Apply data preprocessing methods for faster mining of data.
- Write association rule for decision making.
- Employ classification techniques for various data mining problems.
- Describe various clustering methods.

TEXT BOOKS:

1. Jiawei Han and MichelineKamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.
2. Margaret H.Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education, 2006.

REFERENCEBOOKS:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining", Pearson Education, 2007.
2. K.P. Soman, ShyamDiwakar 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", Wiley-Inderscience, 2006.

15UCS905	DISTRIBUTED COMPUTING	L	T	P	C
		3	0	0	3

PRE –REQUISITE: OPERATING SYSTEM

COURSE OBJECTIVES :

- To introduce all forms of computing, information access, and information exchange
- To impart the knowledge of theory, algorithms, and systems aspects of distributed computing

UNIT I	INTRODUCTION	9

Definition - Relation to computer system components – Motivation - Relation to parallel multiprocessor/multicomputer systems - Message-passing systems versus shared memory systems -Primitives for distributed communication - Synchronous versus asynchronous executions - Design issues and challenges

UNIT II	MODEL OF DISTRIBUTED COMPUTATIONS	9

A distributed program - A model of distributed executions - Models of communication networks - Global state of a distributed system - Cuts of a distributed computation - Past and future cones of an event -Models of process communications - A framework for a system of logical clocks - Scalar time - Vector time - Efficient implementations of vector clocks - Jard–Jourdan's adaptive technique - Matrix time - Virtual time - Physical clock synchronization: NTP

UNIT III	MESSAGE ORDERING AND GROUP COMMUNICATION	9

Message ordering paradigms - Asynchronous execution with synchronous communication - Synchronous program order on an asynchronous system - Group communication - Causal order (CO) -A nomenclature for multicast - Propagation trees for multicast - Classification of application-level multicast algorithms - Semantics of fault-tolerant group communication - Distributed multicast algorithms at the network layer

UNIT IV	DISTRIBUTED MUTUAL EXCLUSION ALGORITHMS	9

Introduction – Preliminaries - Lamport's algorithm - Ricart–Agrawala algorithm - Singhal's dynamic information-structure algorithm - Lodha and Kshemkalyani's fair mutual exclusion algorithm - Quorum-based mutual exclusion algorithms - Maekawa's algorithm - Agarwal–El Abbadi quorum-based algorithm - Token-based algorithms - Suzuki–Kasami's broadcast algorithm - Raymond's tree-based algorithm

UNIT V	DISTRIBUTED SHARED MEMORY	9

Abstraction and advantages - Memory consistency models - Shared memory mutual exclusion - Wait-freedom - Register hierarchy and wait-free simulations - Wait-free atomic snapshots of shared objects

TOTAL: 45 Periods

COURSE OUTCOMES:

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

- Explain the concepts underlined in distributed computing.
- Describe models in distributed computing.
- Discuss the message ordering and group communication
- Summarize various distributed mutual exclusion algorithms.
- Realize the shared memory concept in distributed computing

TEXT BOOKS:

1. Ajay D. Kshemkalyani, Mukesh Singhal, “Distributed Computing Principles, algorithms, and Systems”, Cambridge University Press 2008.

REFERENCE BOOKS:

1. Kai Hwang, Geoffrey C. Fox, and Jack J. Dongarra, “Distributed and Cloud Computing: From parallel processing to the Internet of Things”, Morgan Kaufmann, 2012 Elsevier Inc.
2.John F. Buford, Heather Yu, and Eng K. Lua, “P2P Networking and Applications”, Morgan Kaufmann, 2009 Elsevier Inc.
3.Galli, Doreen L.. Distributed Operating Systems: Concepts and Practice. 1st ed, 2000.

15UCS906	GAME PROGRAMMING	L	T	P	C
		3	0	0	3

PRE –REQUISITE:

COURSE OBJECTIVES:

- To introduce the concept of Game design and development.
- To explain the core architectures of Game Programming.
- To summarize Game programming platforms, and frameworks.

UNIT I	3D GRAPHICS FOR GAME PROGRAMMING	9

3D Pipeline- 3D Math- C++ Math Classes -3D vertex and pixel shaders-3D Scenes: Scene graph basics – special scene graph nodes.

UNIT II	GAME ARCHITECTURE	9

Game architecture - Applying the Game architecture - Application Layer - Game Logic - Game view for the human player - Game view for AI Agents – Networked Game architecture.

UNIT III	GAME PROGRAMMING	9

Game Initialization and Shutdown - Game Actors and Component architecture - controlling the main loop - loading and caching game data - User Interface management - Game event management.

UNIT IV	GAMING PLATFORMS AND FRAMEWORKS	9

Scripting with Lua – A brief history of Game Programming Languages – Using a Scripting Languages - Scripting Languages Integration Strategies – A Crash Course in Lua – Object -Oriented Programming with Lua – Memory Management – Game Audio.

UNIT V	GAME AI	9

An Introduction to Game AI – Network Programming for multiplayer Games – Introduction to Multiprogramming.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Apply 3D Graphics techniques to design the game.
- Explain Game Architecture.
- Describe the processes in Game programming.
- Write game program using different Game programming platforms.
- Discuss the basics of Game AI.

TEXT BOOKS:

1. Mike McShaffrfy and David Graham, “Game Coding Complete”, Fourth Edition, Cengage Learning, PTR, 2012.

REFERENCE BOOKS:

1. Ernest Adams and Andrew Rollings, “Fundamentals of Game Design”, 2nd Edition Prentice Hall /New Riders, 2009.
2. Eric Lengyel, “Mathematics for 3D Game Programming and Computer Graphics”, 3rd Edition,Course Technology PTR, 2011.
3. Jesse Schell, The Art of Game Design: A book of lenses, 1st Edition, CRC Press, 2008.
4. David H. Eberly, “3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics” 2nd Editions, Morgan Kaufmann, 2006.

15UCS907	KNOWLEDGE BASED DECISION SUPPORT SYSTEMS	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To impart the basic concepts of decision-making support systems.
- To summarize the learning process involved in DSS development and fundamentals of communications and collaboration.
- To give an idea about the basic concepts of Management Support System (MSS) modeling and the concepts of optimization, simulation and heuristics.

UNIT I	DECISION MAKING AND COMPUTERIZED SUPPORT	9

Decision Making and computerized support: Management support systems. Decision making systems modeling- support.

UNIT II	DECISION SUPPORT SYSTEMS	9

Decision Support Systems –Data Warehousing, Access, Analysis, Mining, Visualization - Modeling and Analysis - Decision Support System Development.

UNIT III	COLLABORATION, COMMUNICATION, ENTERPRISE DECISION SUPPORT SYSTEMS, AND KNOWLEDGE MANAGEMENT	9

Collaborative Computing Technologies- Enterprise decision support system–knowledge management.

UNIT IV	INTELLIGENT DECISION SUPPORT SYSTEMS	9

Knowledge based Systems- AI & Expert Systems– Knowledge Acquisition, Representation and Reasoning.

UNIT V	MANEGEMENT SUPPORT SYSTEM	9

Implementing and Integrating Management Support System – Impacts of Management Support System.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Explain the concepts of decision making and support systems.
- Apply data mining concepts for decision support system development.
- Discuss the concepts of knowledge management.
- Describe Intelligent Decision Support Systems.
- Use implementation strategies to design MSS.

TEXT BOOKS:

1. Efrain Turban, Jay E.Aronson, “Decision Support Systems and Intelligent Systems” 6th Edition, Pearson Education, 2001.
2. George M.Marakas, “Decision Support System”, Prentice Hall, India, 2003.

REFERENCE BOOKS:

1. Ganesh Natarajan, SandhyaShekhar, “Knowledge management – Enabling Business Growth”, Tata McGraw-Hill, 2002.
2. EfremA.Mallach, “Decision Support and Data Warehouse Systems”, Tata McGraw-Hill,2002.
3. Daniel J.Power, “ Decision Support Systems–Concepts and Resources for managers”,QUORUMBOOKS,An imprint of Greenwood Publishing Group,2002.
4. V.S. Janakiraman& K. Sarukesi ,”Decision Support Systems”, Prentice Hall, India,2006.
5. Ramesh Sharda, DursunDelen, Efraim Turban, Business Intelligence and Analytics: Systems for Decision Support, 10/E, Pearson Education,2013

15UCS908	C# AND .NET FRAMEWORK	L	T	P	C
		2	0	2	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To familiarize the technologies of .NET framework.
- To explain object oriented aspects of C#.
- To demonstrate the application development procedure in .NET.

UNIT I	INTRODUCTION TO C#	9

Review of OOP Concepts -Overview of .NET Framework - Basic Elements of C# -Program Structure and simple Input and Output Operations –Operators and Expressions –Statements –Arrays and Structures.

UNIT II	OBJECT ORIENTED ASPECTS OF C#	9

Inheritance -Namespace –Polymorphism –Interface and Overloading –Multiple Inheritance –Property –Indexes – Delegates –Publish/Subscribe Design Patterns-Operator Overloading-Method Overloading.

UNIT III	CORE ADO .NET	12

ADO.NET Overview - Using Database Connections - Commands - Fast Data Access: The Data Reader Asynchronous Data Access: Using Task and Await - Managing Data and Relationships: The DataSet Class - XML Schemas: Generating Code with XSD - Populating a DataSet Persisting DataSet Changes Working with ADO.NET. Web Services – Web Application Development.

LAB EXPERIMENTS

1. Write a Program in C# to find the sum of all the elements present in a jagged array of 3 inner arrays.
2. Program in C# to demonstrate Polymorphism.
3. Program in C# to demonstrate Multiple inheritance
4. Program in C# to demonstrate Operator overloading.
5. Using Try, Catch and Finally blocks- program in C# to demonstrate error handling.
6. Program in C# to build a class which implements an interface which already exists.
7. Program to illustrate the use of different properties in C#.
8. Demonstrate arrays of interface types with a C# program.
9. Develop a web based application using Datagrid control and ADO.Net
10. Develop a C#.Net application to perform timer based quiz of 20 questions.

TOTAL : 30 (L)+30 (P)=60 Periods

COURSE OUTCOMES:

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

- Apply the knowledge of C# program construct to create console applications.
- Explain object oriented concepts in C#.
- Write C# programs using files, multithreading and multitasking.
- Develop web based Applications in .NET platform.
- Design web services in ASP.NET. Platform.

TEXT BOOKS:

1. S.ThamaraiSelvi and R. Murugesan, “A Textbook on C#”, Pearson Education, 2012.
2. Christian Nagel et al. “Professional C# 2012 with .NET 4.5”, Wiley India, 2012.

REFERENCE BOOKS:

1. Jesse Liberty, “Programming C#”, Second Edition, OReilly Press, 2002.
2. Herbert Schildt, “The Complete Reference: C# 4.0”, Tata McGraw Hill, 2012.
3. Stephen C. Perry “ Core C# and .NET”, Pearson Education,2006.
4. Robinson et al, “Professional C#”, Fifth Edition, Wrox Press, 2002.

HARDWARE AND SOFTWARE REQUIRMENTS

SOFTWARE:

Microsoft Visual Studio .NET or .NET framework recent version in Open Source

HARDWARE:

Standalone desktops - 30 Nos

15UCS909	NATURAL LANGUAGE PROCESSING	L	T	P	C
		3	0	0	3

PRE-REQUISITE: PRINCIPLES OF COMPILER DESIGN

COURSE OBJECTIVES :

- To introduce the techniques in natural language processing.
- To explain the natural language generation and machine translation.
- To review the information retrieval techniques.

UNIT I	OVERVIEW AND LANGUAGE MODELING	8

Overview**:** Origins and challenges of NLP-Language and Grammar-Processing Indian Languages-NLP Applications-Information Retrieval. Language Modeling**:** various Grammar- based Language Models-Statistical Language Model.

UNIT II	WORD LEVEL AND SYNTACTIC ANALYSIS	9

Word Level Analysis: Regular Expressions-Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging.
Syntactic Analysis:Context-free Grammar-Constituency- Parsing-Probabilistic Parsing.

UNIT III	SEMANTIC ANALYSIS AND DISCOURSE PROCESSING	10

Semantic Analysis: Meaning Representation-Lexical Semantics- Ambiguity-Word Sense Disambiguation. Discourse Processing: cohesion-Reference Resolution- Discourse Coherence and Structure.

UNIT IV	NATURAL LANGUAGE GENERATION AND MACHINE TRANSLATION	9

Natural Language Generation: Architecture of NLG Systems- Generation Tasks and Representations- Application of NLG. Machine Translation: Problems in Machine Translation-Characteristics of Indian Languages- Machine Translation Approaches-Translation involving Indian Languages.

UNIT V	INFORMATION RETRIEVAL AND LEXICAL RESOURCES	9

Information Retrieval**:** Design features of Information Retrieval Systems-Classical, Non-classical, Alternative Models of Information Retrieval – valuation.
Lexical Resources**:** World Net-Frame Net- Stemmers-POS Tagger- Research Corpora.

TOTAL : 45 Periods

COURSE OUTCOMES:

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

- Explain language modeling.
- Employ the word level and syntactic analysis techniques in word classes.
- Illustrate semantic analysis techniques.
- Discuss architecture of NLG systems.
- Apply information retrieval techniques.

TEXT BOOKS:

1. TanveerSiddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”,

Oxford University Press, 2008.
2. James Allen, “Natural Language Understanding”, 2nd edition, Benjamin /Cummings publishing company, 1995.

REFERENCE BOOKS:

1. Daniel Jurafsky and James H Martin, “Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, 2nd Edition, Prentice Hall, 2008.
2. AksharBharati, VineetChaitanya, Rajeev Sangal,” Natural Language processing a Paninian perspective” PHI Learning, 1996.
3. LucjaM.Iwanska,Stuart C. Shapiro,” Natural Language processing and knowledge representation” MIT press, Cambridge USA , 2000.
4. Michael A. Covington, “Natural Language processing for Prolog Programmers”, Prentice Hall, 1996.

15UCS910	BUILDING INTERNET OF THINGS	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To summarize the basic issues, policy and challenges in the Internet.
- To explain the components and the protocols in Internet.
- To demonstrate the various modes of communications with internet.

UNIT I	INTRODUCTION	9

Definition – phases – Foundations – Policy– Challenges and Issues - identification – security – privacy. Components in internet of things**:** Control Units – Sensors – Communication modules – Power Sources – Communication Technologies – RFID – Bluetooth – Zigbee –Wifi – Rflinks – Mobile Internet – Wired Communication.

UNIT II	PROGRAMMING THE MICROCONTROLLER FOR IOT	9

Basics of Sensors and actuators – examples and working principles of sensors and actuators – Cloud computing and IOT – Arduino/Equivalent Microcontroller platform –Setting up the board - Programming for IOT – Reading from Sensors.

Communication: Connecting microcontroller with mobile devices – communication through bluetooth and USB – connection with the internet using wifi / Ethernet.

UNIT III	RESOURCE MANAGEMENT IN THE INTERNET OF THINGS	9

Clustering - Software Agents - Data Synchronization - Clustering Principles in an Internet of Things Architecture - The Role of Context - Design Guidelines -Software Agents for Object - Data Synchronization- Types of Network Architectures - Fundamental Concepts of Agility and Autonomy-Enabling Autonomy and Agility by the Internet of Things-Technical Requirements for Satisfying the New Demands in Production - The Evolution from the RFIDbased EPC Network to an Agent based Internet of Things- Agents for the Behaviour of Objects.

UNIT IV	BUSINESS MODELS FOR THE INTERNET OF THINGS	9

The Meaning of DiY in the Network Society- Sensor-actuator Technologies and Middleware as a Basis for a DiY Service Creation Framework - Device Integration – Middleware Technologies Needed for a DiY Internet of Things Semantic Interoperability as a Requirement for DiY Creation -Ontology- Value Creation in the Internet of Things-Application of Ontology Engineering in the Internet of Things-Semantic Web-Ontology – The Internet of Things in Context of EURIDICE - Business Impact.

UNIT V	FROM THE INTERNET OF THINGS TO THE WEB OF THINGS	9

Resource-oriented Architecture and Best Practices- Designing REST ful Smart Things -Web-enabling Constrained Devices - The Future Web of Things - Set up cloud environment– send data from microcontroller to cloud – Case studies – Open Source e-Health sensor platform – Be Close Elderly monitoring – Other recent projects.

TOTAL : 45 Periods

COURSE OUTCOMES :

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

- Describe the components of IOT.
- Summarize web of things.
- Illustrate the use of micro controllers for communications in IOT.
- Explain the resource management techniques in IOT.
- Discuss the applications of IOT in real time scenarios.

TEXT BOOKS:

1. CharalamposDoukas , Building Internet of Things with the Arduino, Create space,April 2002.
2. Dieter Uckelmann et.al, “Architecting the Internet of Things”, Springer, 2011.

REFERENCE BOOKS:

1. Luigi Atzor et.al, “The Internet of Things: A survey, “, Journal on Networks, Elsevier Publications, October, 2010.
2. http://postscapes.com/.
3. http://www.theinternetofthings.eu/what-is-the-internet-of-things.

15UCS911	GRID COMPUTING	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To learn the concepts of grid computing.
- To summarize the anatomy and road map in grid environment.
- To familiarize the applications of Grid computing.
- To explain open grid services architecture**.**

UNIT I	INTRODUCTION	9

Early Grid activities- current Grid activities- An overview of Grid business areas- Grid Applications- Grid infrastructure.

UNIT II	GRID COMPUTING WORLDWIDE INITIATIVES	9

Grid computing organizations and their roles- organizations developing Grid standards and best practice guidelines- organizations developing Grid computing toolkits and the framework- organizations building and using Grid-based solutions to solve computing, data and network requirements- commercial organizations building and using Grid-based solutions.

UNIT III	GRID COMPUTING ANATOMY and ROAD MAP	8

The Grid problem- The concept of virtual organizations- Grid architecture- Grid architecture and relationship to other distributed technologies- The Grid computing road map.

UNIT IV	GRID COMPUTING APPLICATIONS	10

Merging the Grid services architecture with web services architecture-service-oriented architecture-web service architecture-XML,related technologies and the relevance to web services-XML Messages and enveloping-service message description mechanisms-relationship between web service and grid service-web service interoperability and the role of the WS-I organization.

UNIT V	OPEN GRID SERVICES ARCHITECTURE(OGSA)	9

Introduction-OGSA Architecture and goal-Open grid services infrastructure(OGSI)-Technical Details of OGSI specification-Grid service: Naming and change management recommendations- OGSA basic services- CMM- policy architecture- security architecture- metering and accounting.

TOTAL:45Periods

COURSE OUTCOMES:

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

- Classify the Grid activities.
- Summarize Grid computing organizations and their roles.
- Describe the Grid architecture.
- Explain the applications in Grid environment.
- Discuss the OGSA platform components.

TEXT BOOKS:

1. Joshy Joseph and Craig Fellenstein, “Grid Computing”, Pearson Education, 2004.

REFERENCE BOOKS

1. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons, 2005.
2. Ian Foster , Carl Kesselman,"The Grid 2 – Blueprint for a New Computing Infrastructure", Morgan Kaufman , 2004.
3. Fran Berman, Geoffrey Fox, Anthony J.G.Hey, "Grid Computing: Making the Global Infrastructure a reality", John Wiley and sons, 2003.
4. P.Venkata Krishna, M.RajasekharaBabu, V.Saritha, "Principles of Grid computing – Concepts & Applications", Ane Books Pvt Ltd, 2010.
5. Ahmar Abbas, "Grid Computing: A Practical Guide to Technology and Applications", Charles River Media, 2003.

15UCS912	NANOCOMPUTING	L	T	P	C
		3	0	0	3

PRE –REQUISITE:

COURSE OBJECTIVES :

- To introduce the concepts of NanoComputing.
- To explain reliability evaluation strategies in Nano Computing.
- To impart the knowledge in nano scale quantum computing, Molecular computing and Optimal computing.

UNIT I	NANOCOMPUTING-PROSPECTS AND CHALLENGES	9

Introduction - History of Computing - Nanocomputing - Quantum Computers – Nanocomputing Technologies - Nano Information Processing - Prospects and Challenges - Physics of Nanocomputing : Digital Signals and Gates - Silicon Nanoelectronics - Carbon Nanotube Electronics – Carbon Nanotube Field-effect Transistors – Nanolithography.

UNIT II	NANOCOMPUTING WITH IMPERFECTIONS	9

Introduction -Nanocomputing in the Presence of Defects and Faults - Defect Tolerance – Towards Quadrillion Transistor Logic Systems.

UNIT III	RELIABILITY OF NANOCOMPUTING	9

Markov Random Fields - Reliability Evaluation Strategies - NANOLAB - NANOPRISM – Reliable Manufacturing and Behavior from Law of Large Numbers.

UNIT IV	NANOSCALE QUANTUM COMPUTING	9

Quantum Computers - Hardware Challenges to Large Quantum Computers - Fabrication, Test, and Architectural Challenges - Quantum-dot Cellular Automata (QCA) - Computing with QCA – QCA Clocking - QCA Design Rules.

UNIT V	QCADESIGNER SOFTWARE AND QCA IMPLEMENTATION	9

Basic QCA Circuits using QCA Designer - QCA Implementation - Molecular and Optical Computing: Molecular Computing - Optimal Computing - Ultrafast Pulse Shaping and Tb/sec Data Speeds.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Describe nano computing challenges.
- Identify the imperfections in nanocomputing.
- Discuss the reliability evaluation strategies.
- Summarize the concepts of QCA.
- Demonstrate the design principles of QCA Circuits.

TEXT BOOKS:

1. Sahni V. and Goswami D., Nano Computing, McGraw Hill Education Asia Ltd. (2008), ISBN (13): 978007024892.
2. Sandeep K. Shukla and R. Iris Bahar., Nano, Quantum and Molecular Computing, Kluwer Academic Publishers 2004, ISBN: 1402080670.

REFERENCE BOOKS:

1. James J Y Hsu,NanocomputingComputational Physics for Nanoscience and Nanotechnology, Pan standfordPublishing, 2009.
2. Sahni V, Quantum Computing, McGraw Hill Education Asia Ltd. 2007.
3. Jean-Baptiste Waldner, Nanocomputers and Swarm Intelligence, John Wiley & Sons, Inc. 2008, ISBN (13): 978-1848210097.
4. James J.Y. Hsu, Nanocomputing: Computational Physics for Nanoscience and Nanotechnology, Volume 53, Issue 3, 2012.

15UCS913	CYBER FORENSICS	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To know the principles and methods of computer forensics technology
- To learn different types of computer forensics system
- To introduce computer forensics services

UNIT I	OVERVIEW OF COMPUTER FORENSICS TECHNOLOGY	10

Introduction - Use of Computer Forensics in Law Enforcement - Assistance to Human Resources - Employment Proceedings - Services - Types of Computer Forensics Technology , Military Computer Forensic Technology -Types of Law Enforcement - Types of Business Computer Forensic Technology - Specialized Forensics Techniques – Specialized Forensics Techniques - Hidden Data and How to Find It - Spyware and Adware - Encryption Methods and Vulnerabilities - Protecting Data from Being Compromised - Internet Tracing Methods - Security and Wireless Technologies.

UNIT II	TYPES OF COMPUTER FORENSICS SYSTEMS	9

Internet Security Systems - Intrusion Detection Systems - Firewall Security Systems - Storage Area Network Security Systems - Network Disaster Recovery Systems - Public Key Infrastructure Systems - Wireless Network Security Systems - Satellite Encryption Security Systems - Instant Messaging (IM) Security Systems - Net Privacy Systems - Identity Management Security Systems - Identity Theft - Biometric Security Systems - Homeland Security Systems.

UNIT III	VENDOR AND COMPUTER FORENSICS SERVICES	8

Occurrence of Cyber Crime - Cyber Detectives - Fighting Cyber Crime with Risk-Management Techniques - Computer Forensics Investigative Services - Forensic Process Improvement.

UNIT IV	COMPUTER FORENSICS EVIDENCE AND CAPTURE	9

Data Recovery - Data Recovery Defined - Data Backup and Recovery - The Role of Backup in Data Recovery - The Data-Recovery Solution - Hiding and Recovering Hidden Data - Evidence Collection and Data Seizure - Collection Options – Obstacles - Types of Evidence - The Rules of Evidence - Volatile Evidence - General Procedure -Collection and Archiving - Methods of Collection – Artifacts.

UNIT V	COMPUTER FORENSICS ANALYSIS	9

Electronic Document Discovery: A Powerful New Litigation Tool - Identification of Data - Timekeeping - Forensic Identification and Analysis of Technical Surveillance Devices - Reconstructing Past Events - How to Become a Digital Detective - Useable and Unusable File Formats - Converting Files.

TOTAL :45 Periods

COURSE OUTCOMES:

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

- Determine what data to analyze in Computer forensics investigation.
- Identify the appropriate computer forensics system for the investigation of crime.
- Apply how to fight with cyber crime with risk-management techniques.
- Analyze the evidences collected from various sources.
- Select suitable Computer forensics tool to analyze forensic data.

TEXT BOOKS:

1. John R. Vacca, “Computer Forensics”, Firewall Media, New Delhi,2009.

REFERENCE BOOKS:

1. Keith J. Jones, Richard Bejtlich, Curtis W. Rose, “Real Digital Forensics”, Addison Wesley Pearson Education, 2005.
2. Christopher L.T.Brown, “Computer Evidence - Collection & Preservation”, Firewall Media, Second Edition,2009
3. Jesus Mena, “Homeland Security - Techniques & Technologies”, Firewall Media, 2007.
4. Robert M.Slade, “Software Forensics Collecting Evidence from the scene of a Digital Crime”, Tata McGraw Hill, 2005.

15UCS914	QUANTUM COMPUTING	L	T	P	C
		3	0	0	3

PRE-REQUISTIES :

COURSE OBJECTIVES:

- To introduce the building blocks of a quantum computer and design techniques of simple quantum circuits.
- To explain the quantum algorithms.
- To learn about quantum computational complexity.

UNIT I	FOUNDATION	9

Overview of traditional computing – Church-Turing thesis – circuit model of computation – reversible computation – quantum physics – quantum physics and computation – Dirac notation and Hilbert Spaces – dual vectors – operators – the spectral theorem – functions of operators – tensor products – Schmidt decomposition theorem.

UNIT II	QUBITS AND QUANTUM MODEL OF COMPUTATION	9

State of a quantum system – time evolution of a closed system – composite systems – measurement – mixed states and general quantum operations – quantum circuit model – quantum gates –universal sets of quantum gates – unitary transformations – quantum circuits.

UNIT III	QUANTUM ALGORITHMS – I	9

Superdense coding – quantum teleportation – applications of teleportation – probabilistic versus quantum algorithms – phase kick-back – the Deutsch algorithm – the Deutsch- Jozsa algorithm –Simon's algorithm – Quantum phase estimation and quantum Fourier Transform – eigenvalue estimation.

UNIT IV	QUANTUM ALGORITHMS – II	9

Order-finding problem – eigen value estimation approach to order finding – Shor's algorithm for order finding – finding discrete logarithms – hidden subgroups – Grover's quantum search algorithm –amplitude amplification – quantum amplitude estimation – quantum counting – searching without knowing the success probability.

UNIT V	QUANTUM COMPUTATIONAL COMPLEXITY AND ERROR CORRECTION	9

Computational complexity – black-box model – lower bounds for searching – general black-box lower bounds – polynomial method – block sensitivity – adversary methods – classical error correction –classical three-bit code – fault tolerance – quantum error correction – three- and nine-qubit quantum codes – fault-tolerant quantum computation.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Explain the fundamental concepts of quantum computing.
- Discuss quantum model computation.
- Summarize quantum algorithms.
- Solve order finding problem.
- Describe Error correcting mechanism for quantum computing.

TEXT BOOKS:

1. P. Kaye, R. Laflamme, and M. Mosca, “An introduction to Quantum Computing”, Oxford University Press, 1999.
2. Michael A. Nielsen, Isaac L. Chuang,Cambridge,”Quantum Computation and Quantum Information”, University press,2010.

REFERENCE BOOKS:

1. V. Sahni, “Quantum Computing”, Tata McGraw-Hill Publishing Company, 2007.
2. AnirbanPathank,” Elements of Quantum Computation and Quantum Communication”,CRC Press,2013.
3. Eleanor G. Rieffel and Wolfgang H. Polak,” Quantum Computing:A Gentle Introduction”, MIT press,2011.
4. Dan.C.Marinescu, Gabriela M. Marinescu,” Approaching Quantum Computing”, Pearson Publication,2007.

15UCS915	PRINCIPLES OF SOFTWARE ARCHITECTURE	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSE OBJECTIVES :

- To introduce software architectural requirements.
- To give knowledge on various architectural views, styles.
- To impart the knowledge on architectural design and software documentation.

UNIT I	ARCHITECTURAL STYLES	10

Introduction – Standard Definitions of Software Architecture– Architecture Business Cycle - Architectural structures and views - An Engineering Discipline for Software – The status of Software Architecture- Architectural Styles – Pipes and Filters – Data Abstraction and Object oriented Organization – Event based ,Implicit invocation, Layered Systems – Repositories – Interpreters- Process Control – Case Study.

UNIT II	SHARED INFORMATION SYSTEMS	8

Shared Information Systems – Database Integration – Integration in Software Development Environments –Integration in the Designing of Buildings – Architectural Structure for shared information systems.

UNIT III	QUALITY ATTRIBUTES	10

Functionality and Architecture – Architecture and Quality Attributes – System Quality Attributes – Quality attribute Scenarios in Practice - Introducing Tactics – Availability Tactics – Modifiability Tactics – Performance Tactics - Security Tactics – Testability Tactics – Usability Tactics – Relationship of Tactics to Architectural Patterns – Architectural Patterns and Styles – Case Study.

UNIT IV	ARCHITECTURAL DESIGN	8

Architecture in the Life Cycle – Designing the Architecture – Forming the team Structure – Creating a Skeletal System – Case Study – Tools for Architectural Design.

UNIT V	DOCUMENTING SOFTWARE ARCHITECTURES	9

Uses of Architectural Documentation – Views – Choosing the relevant Views – Documenting a View – Documentation across views – Unified Modeling Language.

TOTAL:45Periods

COURSE OUTCOMES:

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

- Explain the concepts in software architecture.
- Discuss Architectural Structure for shared information systems
- Distinguish various tactics in architectural patterns.
- Explain the concepts in architectural design.
- Choose various views related documentation.

TEXT BOOKS:

1. Len Bass, Paul Clements, and Rick Kazman, “Software Architectures Principles and Practices”, 2nd Edition, Addison-Wesley, 2003.
2. Mary shaw and David Garlan, “Software Architecture – Perspectives on an emerging discipline”, Pearson education,1996.

REFERENCE BOOKS:

1. Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Reed Little, Paulo Merson, Robert Nord, and Judith Stafford, “Documenting Software Architectures. Views and Beyond”, 2nd Edition, Addison-Wesley, 2010.
2. Anthony J Lattanze, “Architecting Software Intensive System. A Practitioner's Guide”, Auerbach Publications, 2010.
3. Paul Clements, Rick Kazman, and Mark Klein, “Evaluating software architectures: Methods and case studies. Addison-Wesley, 2001.

15UCS916	CRYPTOGRAPHY	L	T	P	C
		2	0	2	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To know the principles and methods of conventional encryption algorithms.
- To familiarize the design concepts of cryptography.

UNIT I	INTRODUCTION AND NUMBER THEORY	9

Computer Security Concepts - Attacks – Services – Mechanisms - Model for Network Security - Classical Encryption Techniques - Symmetric Cipher – Substitution, Transposition Techniques , Euclidean algorithm - Modular Arithmetic - Prime numbers - Fermat's and Euler's theorem - Testing for primality - The Chinese remainder theorem.

UNIT II	DES ,AES AND PUBLIC KEY CRYPTOGRAPHY	10

Block Cipher Principles– block cipher modes of operation- Data Encryption Standard (DES) - DES Example - Triple DES – Advanced Encryption Standard (AES). Principles of public key cryptosystems-The RSA algorithm-Key management – DiffieHellman.Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT III	HASH FUNCTIONS AND NETWORK SECURITY	11

HASH FUNCTIONS - Cryptographic Hash Functions, Message authentication codes - NETWORK SECURITY – SSL,TLS,HTTPS- IP Security

LAB EXPERIMENTS

1. Implement the Classical Cipher Techniques.
2. Implement the Simple Data Encryption Standard (SDES) Algorithm.
3. Implement RSA Algorithm.
4. Implement Diffie–Hellman key exchange algorithm.
5. Implement elliptic curve point addition for polynomial basis form.
6. Implement MD5 algorithm.
7. Implement SHA algorithm.

TOTAL : 30 (L)+30 (P)=60 Periods

COURSE OUTCOMES:

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

- Apply the knowledge of conventional encryption algorithms using number theory.
- Apply symmetric algorithms for security applications.
- Employ asymmetric algorithms for security applications.
- Apply the knowledge of hash algorithms for authentication based applications.
- Apply the knowledge of network security.

TEXT BOOKS:

1. William Stallings, Cryptography and Network security Principles and Practices, 5th edition, Pearson Education, 2014.

REFERENCE BOOKS:

1. William Stallings, Network security essentials – Application and Standards, Prentice Hall of India, 2010.

2. Charles P.Fleeger, Shari Lawrence P.Fleeger, Security in computing, Prentice Hall of India, 2009.
3. W. Mao, Modern Cryptography – Theory and Practice, Pearson Education, 2007.Wade Trappe, Lawrence C Washington, Introduction to Cryptography with coding theory, Pearson Education, 2007.

HARDWARE & SOFTWARE REQUIREMENT:

SOFTWARE:

C / C++ / Java or equivalent compiler, open source OS

HARDWARE:

Standalone desktops - 30 Nos.(or) Server supporting 30 terminals or more.

15UCS917	SEMANTIC WEB PARADIGM	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES::

- To learn the basic architectures of Semantic web and fundamentals of Ontology.
- To familiarize the Language of Semantic web and Ontologies.
- To explain the taxonomy of Ontology for Semantic web.
- To impart the knowledge on applications of Semantic web.

UNIT I	INTRODUCTION	9

Components – Types – Ontological Commitments – Ontological Categories – Philosophical Background - Knowledge Representation Ontologies – Top Level Ontologies – Linguistic Ontologies– Domain Ontologies.

UNIT II	LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES	10

Web Documents in XML – RDF - Schema – Web Resource Description using RDF- RDF Properties– Topic Maps and RDF –- TraditionalOntology Languages – LOOM– Flogic Ontology Markup Languages – DAML + OIL- OWL.

UNIT III	ONTOLOGY LEARNING FOR SEMANTIC WEB	9

Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning –Importing and Processing Ontologies and Documents – Ontology Learning Algorithms.

UNIT IV	ONTOLOGY METHODOLOGY AND TOOLS	9

Overview – development methods and methodologies –The CYC method, uschold and kings,cactus,sensus based method,Methontology. Evolution – Development of Tools and Tool Suites – Ontology Merge Tools – Ontology based Annotation Tools.

UNIT V	APPLICATIONS	8

Web Services – E-learning - Case Study for specific domain – current trends.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Explain the categories of Ontology with its background and the layers of Semantic web.
- Develop applications in semantic web using ontology languages.
- Compare the different ontology learning algorithms.
- Apply ontology tools for ontology development.
- Employ ontology as case study for specific domain.

TEXT BOOKS:

1. Asuncion Gomez-Perez, Oscar Corcho, Mariano Fernandez-Lopez,Ontologicalengineering: with examples from the areas of Knowledge Management, e- Commerce and the Semantic Web" Springer, 2004.
2. Grigoris Antoniou, Frank van Harmelen, "A Semantic Web Primer (Cooperative Information Systems)", The MIT Press, 2004.

REFERENCE BOOKS:

1. AlexanderMaedche, “Ontology Learning for the Semantic Web”,Springer; 1 edition, 2002.
2. John Davies, Dieter Fensel, Frank Van Harmelen, “Towards the Semantic Web:Ontology – Driven Knowledge Management”, John Wiley & Sons Ltd., 2003.
3. DieterFensel (Editor), Wolfgang Wahlster, Henry Lieberman, James Hendler,“Spinning the Semantic Web: Bringing the World Wide Web to Its Full Potential”, The MIT Press, 2002.
4. Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, “The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management”, Wiley, 2003.
5. SteffenStaab (Editor), Rudi Studer, “Handbook on Ontologies (InternationalHandbooks on Information Systems)”, Springer 1st edition, 2004.

15UCS918	INFORMATION RETRIEVAL	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES::

- To learn the information retrieval models.
- To familiarize the concepts in Web Search Engine.
- To impart the knowledge of link analysis.
- To explain document text mining techniques.

UNIT I	INTRODUCTION	9

Introduction –Basic IR system Architecture –Other search Applications-Other IR search Applications-Working with Electronic Text-Open source Search engine Frameworks –Lucene,Indiri,Wumpus.

UNIT II	INFORMATION RETRIEVAL MODELS	

Boolean and vector-space retrieval models- Term weighting - TF-IDF weighting-Language Model based IR - Probabilistic IR – Relevance feedback and query expansion.

UNIT III	WEB SEARCH ENGINE – CRAWLING AND INDEXING	9

Web search overview, web structure, search engine – Web Search Engine Architecture - crawling the web-crawling Documents and email- web indexes –- Index Compression-Index Construction.

UNIT IV	WEB SEARCH – LINK ANALYSIS	9

Link Analysis –hubs and authorities – Page Rank algorithms -Searching and Ranking-Queries and users-Static ranking-Dynamic ranking-Evaluating web search.

UNIT V	DOCUMENT TEXT MINING	9

Text Mining -Text classification and clustering - Categorization algorithms: naive Bayes and nearest neighbor – Clustering algorithms: Flat clustering-Clustering in information retrieval; k-means; Model basedClustering.

TOTAL:45Periods

COURSE OUTCOMES:

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

- Explain the importance of IR.
- Apply information retrieval models.
- Describe Web Search Engine.
- Use Link Analysis and ranking in web serach.
- Apply document text mining techniques.

TEXT BOOKS:

1. C.Manning, P. Raghavan, and H. Schütze, Introduction to Information Retrieval, CambridgeUniversity Press, 2008.
2. Ricardo Baeza -Yates and BerthierRibeiro - Neto, Modern Information Retrieval: The Concepts and Technology behind Search 2nd Edition, ACM Press Books 2011.

REFERENCE BOOKS:

1. Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack, Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.
2. Bruce Croft, Donald Metzler and Trevor Strohman, Search Engines: Information Retrieval in Practice, 1st Edition Addison Wesley, 2009.
3. OphirFrieder “Information Retrieval: Algorithms and Heuristics: The Information Retrieval Series “,2ndEdition, Springer, 2004.
4. Manu Konchady, “Building Search Applications: Lucene, Ling Pipe”, and First Edition, Gate Mustru Publishing, 2008.
5. Mark Levene, An Introduction to Search Engines and Web Navigation, 2nd Edition Wiley, 2010.

15UCS919	HUMAN COMPUTER INTERACTION	L	T	P	C
		3	0	0	3

PRE –REQUISITE:

COURSE OBJECTIVES :

- To introduce the foundations of Human Computer Interaction.
- To explain the models and theories of HCI.
- To review the guidelines for user interface.

UNIT I	FOUNDATIONS OF HCI	9

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

UNIT II	DESIGN & SOFTWARE PROCESS	9

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT III	MODELS AND THEORIES	9

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

UNIT IV	MOBILE HCI	9

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools

UNIT V	WEB INTERFACE DESIGN	9

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Describe the foundations of Human Computer Interaction.
- Explain Design rules and prototyping.
- Discuss various models and theories in Human Computer Interaction.
- Apply user interface design concepts in Mobile.
- Explain how to develop interface for web based applications.

TEXTBOOKS:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, “Human Computer Interaction”, 3rd Edition, Pearson Education, 2004 (UNIT I,II&III).
2. Brian Fling, “Mobile Design and Development”, First Edition , O’Reilly Media Inc., 2009(UNIT–IV).
3. Bill Scott and Theresa Neil, “Designing Web Interfaces”, First Edition, O’Reilly, 2009.(UNIT-V).

REFERENCE BOOKS:

1. Ben Shneiderman and Catherine Plaisant, Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition), 5th ed., Pearson Addison-Wesley, 2009.
2. Donald A. Norman, The Design of Everyday Things, Basic Books, 2002.
3. Alan Cooper, About Face 3: The Essentials of Interaction Design, 3rd edition, Wiley 2007.
4. Jenny Preece, Yvonne Rogers, and Helen Sharp: Interaction Design: Beyond Human-Computer Interaction, 3nd ed., Wiley, 2011.

15UCS920	GREEN COMPUTING	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To study about green IT fundamentals and strategies.
- To learn environmentally responsible business strategies.

UNIT I	FUNDAMENTALS	9

Trends and reasons to go green: Overviews and issues-Current initiatives and standards - Organization planning for Green computing-Policies-metrics-The acorns diagram Consumption Issues: Minimizing power usage-Cooling-Going paperless-recycling-Hardware consideration.

UNIT II	GREEN ASSETS AND MODELING	9

Green Assets: Buildings, data centers, networks and devices – Green business process management: Modeling, optimization and collaboration – Green enterprise architecture – Environmental intelligence – Green supply chains – Green information systems: Design and development models.

UNIT III	GRID FRAMEWORK	9

Virtualizing of IT systems – Role of electric utilities, telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for green PC – Green data center – Green grid framework.

UNIT IV	GREEN COMPLIANCE	9

Socio-cultural aspects of green IT – Green enterprise transformation roadmap – Green Compliance: protocols, standards and audits – Emergent carbon issues: technologies and future.

UNIT V	CASE STUDIES	9

The Environmentally Responsible Business Strategies (ERBS) – Case study scenarios for trial runs – Case studies – Applying green IT strategies and applications to a home, hospital, packaging industry and telecom sector.

TOTAL: 45 Periods

COURSE OUTCOMES:

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

- Explain the impact of green computing in IT.
- Identify green assets and model them.
- Illustrate the green grid framework.

- Discuss green compliance and standards.
- Describe green business management tools.

TEXT BOOKS:

1. BhuvanUnhelkar, “Green IT Strategies and Applications-Using Environmental Intelligence”, CRC Press, June 2011
2. Woody Leonhard, Katherrine Murray, “Green Home computing for dummies”, August 2009.

REFERENCE BOOKS:

1. Alin Gales, Michael Schaefer, Mike Ebbers, “Green Data Center: steps for the Journey”, Shoff/IBM rebook, 2011.
2. John Lamb, “The Greening of IT”, Pearson Education, 2009.
3. Jason Harris, “Green Computing and Green IT- Best Practices on regulations & industry”, Lulu.com, 2008.
4. Carl speshocky, “Empowering Green Initiatives with IT”, John Wiley & Sons, 2010.
5. Wu Chun Feng (editor), “Green computing: Large Scale energy efficiency”, CRC Press, 2012.
6. Toby J.Velte, Anthony T.Velte,RobertElsenPeter, Green IT, McGrawHill, 2008.

15UCS921	E-LEARNING TECHNIQUES	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To explore the basics and goals of E-Learning.
- To explain E-Learning technologies.
- To give knowledge on assessment and evaluation of E-Learning.
- To introduce various design concepts of E-Learning.
- To discuss tools for implementing E-Learning contents.

UNIT I	THE CONCEPTUAL FRAMEWORK	9

Introduction-Theoreticalconcepts-Text based communication-Community of inquiry-Social Presence-Cognitive presence-Teaching Presence.

UNIT II	INSTRUCTIONAL TECHNOLOGIES, BLENDED LEARNING AND GUIDELINES	9

E-learning Technologies,Web 2.0,Teaching and Technology,Blendedlearning,LearningActivities,Teaching-Learning Guidelines.

UNIT III	ASSESSMENT , EVALUATION AND ORGANIZATIONAL ISSUES	9

Assessing E-learning, Course Evaluation, Strategic Innovation, Infrastructure, Leadership.

UNIT IV	E-LEARNING DESIGN CONCEPTS AND CONSIDERATIONS	9

Role of the tutor,InstructionalDesign,Cognitive apprenticeships, Design Issues, Types of Learning Engagement.

UNIT V	TOOLS	9

E learning technologies-Usability-Learning objects and reusability-Digital rights and Copy rights – powerful tools for learning-Assistive technology issues and technology, Design for accessibility, Evaluation of assistive technologies.

TOTAL: 45 Periods

COURSE OUTCOMES:

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

- Describe the features of E-Learning
- Employ suitable E-Learning technology for a given domain.

- Explain the process of assessment and evaluation of E-Learning.
- Discuss the design concepts of E-Learning.
- Develop E-Learning solutions using tools.

TEXT BOOKS:

1. D.Randy Garrison “E-Learning in the 21st century a framework for research and practice”, Second edition, Taylor and Francis, 2011.
2. John Gardner, Bryn Holems, “E-Learning : Concepts and practice” SAGE Publications, 2006.

REFERENCE BOOKS:

1. R.C.Clark and R.E.Mayer, “E-Learning and the science of instruction”, Pfeiffer Wiley, 2011.
2. Mark J Rosenberg, “E-Learning: strategies for delivering knowledge in the Digital Age”, McGraw- Hill, 2001.
3. Kjell E. (Erik) Rudestam , Judith Schoenholtz-Read, “Handbook of Online Learning”, Sage Publications Inc., Second Edition, 2009.

WEB REFERENCES:

1. http://www.talentlms.com/elearning/technologies_used_in_elearning
   http://www.talentlms.com/elearning/
2. http://hippocampus.org
3. http://www.youtube.com/user/eLearnerEngaged
4. http://www.articulate.com/rapid-elearning/instructional-design/

15UCS922	NEURAL NETWORKS AND ITS APPLICATIONS	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES:

- To impart the knowledge of neural network and its architectures
- To familiarize the concepts of single layer and multilayer perceptron network
- To learn neuro-dynamical models.

UNIT I	INTRODUCTION	9

What is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks.

UNIT II	SINGLE LAYER PERCEPTRONS	9

Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception – convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment.

UNIT III	MULTILAYER PERCEPTRON	9

Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection, BACK PROPAGATION- back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning – Convolutional Networks.

UNIT IV	SELF ORGANIZATION MAPS	9

Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive pattern classification, Hierarchal Vector quantization, contextual Map.

UNIT V	NEURO DYNAMICS	9

Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors' as a recurrent network paradigm.

TOTAL : 45 Periods

COURSE OUTCOMES :

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

- Explain the architecture of neural networks.

- Summarize the features of single layer perceptrons
- Discuss the concepts of multilayer perceptron networks.
- Describe Self organizing map.
- Illustrate neurodynamical models.

TEXT BOOKS :

1. Neural Networks A Comprehensive Foundation, Simon Haykin, Pearson Education 2nd Edition 2004.

REFERENCE BOOKS :

1. Artificial Neural Networks - B.Yegnanarayana Prentice Halll of India P Ltd 2005.
2. Neural Networks in Computer intelligence, LiMin Fu, McGraw – Hill International Editions 1994.
3. Neural Networks Algorithms, applications and Programming Techniques, James A Freeman, David M Skapura, Pearson Education 2004

15UCS923	FUZZY LOGIC	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To introduce the concepts of Crisp and Fuzzy sets, Fuzzy Relation.
- To familiarize the principles of decision making with fuzzy information.
- To summarize the applications of Fuzzy Logic.

UNIT I	CRISP SETS AND FUZZY SETS	9

Introduction - Classical Sets - Operations on Classical Sets - Properties of Classical (Crisp) Sets - Mapping of Classical Sets to Functions - Fuzzy Sets - Fuzzy Set Operations - Properties of Fuzzy Sets, Alternate fuzzy set operation.

UNIT II	CLASSICAL RELATION AND FUZZY RELATIONS	9

Cartesian product -Crisp Relations -Cardinality of Crisp Relations -Operations on Crisp Relations - Properties of Crisp Relations - Composition - Fuzzy Relations - Cardinality of Fuzzy Relations - Operations on Fuzzy Relations -Properties of Fuzzy Relations - Fuzzy Cartesian Product and Composition - Tolerance and Equivalence Relations -Crisp Equivalence Relation - Crisp Tolerance Relation - Fuzzy Tolerance and Equivalence Relations .

UNIT III	MEMBERSHIP FUNCTION, FUZZIFICATION & DEFUZZIFICATION	9

Introduction- linguistic variables -Features of membership function- Types of membership function- fuzzy rule base –fuzzification process – defuzzification process – methods

UNIT IV	DECISION MAKING WITH FUZZY INFORMATION	9

Fuzzy Synthetic Evaluation - Fuzzy Ordering – Non-transitive Ranking - Preference and Consensus – Multi-objective Decision Making - Fuzzy Bayesian Decision Method - Decision Making Under Fuzzy States and Fuzzy Actions

UNIT V	APPLICATIONS	9

Applications in Natural, life and social sciences- Engineering – Medicine – Management and Decision making – computer Science- Systems Science – other applications

TOTAL: 45 Periods

COURSE OUTCOMES:

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

- Apply operations on fuzzy sets.
- Discuss fuzzy relations and the properties of these relations.
- Explain fuzzification and defuzzification process.
- Describe fuzzy decision making.
- Employ the fuzzy logic in real time applications.

TEXT BOOKS:

1. Timothy J.Ross, “Fuzzy Logic with Engineering applications”,JohnWileyand Sons, 2010.

REFERENCE BOOKS:

1. Jang J.S.R. Sun C.T., MizutaniE.,”Neuro fuzzy and Soft Computing”, PHI Learning Pvt. Ltd.,2012.
2. Klir G.J. &Folger T.A., “Fuzzy sets, Uncertainty and Information” Prentice – Hall of IndiaPvt. Ltd. , New Delhi, 2008.
3. George J. Klir, TinaFolger A., “Fuzzy sets Uncertainty & Information”, PHILearningPvt.Ltd, 2010.
4. Fuzzy Sets and Fuzzy Logic: Theory and Applications, George Klir and Bo Yuan, Prentice Hall, 1995.

15UCS924	MOBILE COMPUTING	L	T	P	C
		3	0	0	3

PRE-REQUISITE:COMPUTER COMMUNICATION ANS NETWORKS

COURSE OBJECTIVES:

- To introduce the basic concepts of mobile computing and mobile telecommunication system.
- To familiarize with network protocol stack.
- To explain about mobile Ad-Hoc networks.
- To give knowledge on different mobile platforms and application development.

UNIT I	INTRODUCTION	9

Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

UNIT II	MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER	9

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

UNIT III	MOBILE TELECOMMUNICATION SYSTEM	9

Frequencies – Signals – Antennas – Signal propagation –cellular networks- Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS)-Beyond 3G Network Architectures.

UNIT IV	MOBILE AD-HOC NETWORKS	9

Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security.

UNIT V	MOBILE PLATFORMS AND APPLICATIONS	9

Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce– Structure – Pros & Cons – Mobile Payment System – Security Issues.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Solve MAC issues in a given scenario.
- Discuss the concept of mobile internet protocol.
- Explain the basics of mobile telecommunication systems.
- Analyze various mobile Ad-hoc routing protocols.
- Design simple mobile application.

TEXT BOOKS:

1. Prasant Kumar Pattnaik, Rajib Mall, “Fundamentals of Mobile Computing”, PHI Learning Pvt.Ltd, New Delhi – 2012.
2. Jochen H. Schller, “Mobile Communications”, Second Edition, Pearson Education, New Delhi, 2007.

REFERENCE BOOKS:

1. Dharma PrakashAgarval, Qing and An Zeng, "Introduction to Wireless and Mobilesystems",Thomson Asia Pvt Ltd, 2005.
2. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, “Principles of MobileComputing”, Springer, 2003.
3. William.C.Y.Lee,“Mobile Cellular Telecommunications-Analog and Digital Systems”, SecondEdition,TataMcGraw Hill Edition ,2006.
4. Martin Sauter “3G, 4G and Beyond: Bringing Networks, Devices and the Web Together, 2nd Edition, Wiley, 2013
5. C.K.Toh, “AdHoc Mobile Wireless Networks”, First Edition, Pearson Education, 2002.
6. Android Developers : http://developer.android.com/index.html
7. Apple Developer : https://developer.apple.com/
8. WindowsPhoneDevCenter : http://developer.windowsphone.com
9. BlackBerry Developer : http://developer.blackberry.com/

15UCS925	BUSINESS INTELLIGENCE AND ITS APPLICATIONS	L	T	P	C
		3	0	0	3

PRE –REQUISITE: DATABASE SYSTEM CONCEPTS

COURSE OBJECTIVES:

- To introduce business intelligence terminologies and framework
- To impart the knowledge on basics of data integration (**E**xtraction **T**ransformation **L**oading)
- To explain the concepts of multi-dimensional data modeling.
- To review the basics of enterprise reporting different data analysis tools and techniques.

UNIT I	INTRODUCTION TO BUSINESS INTELLIGENCE	9

Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities.

UNIT II	BASICS OF DATA INTEGRATION (EXTRACTION TRANSFORMATION LOADING)	9

Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL using SSIS, Introduction to data quality, data profiling concepts and applications.

UNIT III	INTRODUCTION TO MULTI-DIMENSIONAL DATA MODELING	9

Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. Multi-dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS.

UNIT IV	BASICS OF ENTERPRISE REPORTING	9

Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to SSRS Architecture, enterprise reporting using SSRS.

UNIT V	FUTURE OF BUSINESS INTELLIGENCE	9

Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Describe the need for Business Intelligence.
- Demonstrate technology and processes associated with Business Intelligence framework.
- Identify the metrics, indicators and make recommendations to achieve the business goal in a given business scenario.
- Design an enterprise dashboard that depicts the key performance indicators which helps in decision making
- Illustrate the concepts for the future of business intelligence.

TEXT BOOKS:

1. R. N. Prasad, Seema Acharya, “Fundamentals of Business Analytics” ,Second Edition, Wiley 2011.

REFERENCE BOOKS:

1. Larissa T. Moss, S. Atre, “Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making”, Addison Wesley, 2003.
2. David Loshin Morgan, Kaufman, “Business Intelligence: The Savvy Managers Guide”, Second Edition, 2012.
3. CindiHowson, “Successful Business Intelligence: Secrets to Making BI a Killer App”, McGraw-Hill, 2007.
4. Mike Biere, “Business intelligence for the enterprise”, IBM Press.

15UCS926	WEB SERVICES AND SERVICE ORIENTED ARCHITECTURE	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To introduce the fundamental concepts of Web services.
- To learn the concepts in SOA Technology.
- To impart the knowledge of XML based web services.

UNIT I	WEB FUNDAMENTALS	9

History of Web–Protocols–Web Applications-Web servers-Web Browsers-HTTP-Java Network Programming-HTML-CCS.

UNIT II	WEB SERVICES BUILDING BLOCK	9

Transport protocols for web services–messaging with web services–protocols–SOAP–describing web services–WSDL–Anatomy of WSDL–manipulating WSDL–web service policy–Discovering web services–UDDI–Anatomy of UDDI.

UNIT III	SERVICE ORIENTED ARCHITECTURE	9

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation.

UNIT IV	ARCHITECTING WEB SERVICES	9

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task- centric business service design.

UNIT V	XML BASED WEB SERVICES	9

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE).

TOTAL : 45 Periods

COURSE OUTCOMES:

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

- Develop web pages using HTML and CSS.
- Describe basic building blocks of Web Services and SOAP
- ExplainService Oriented Architecture.
- Discuss the concepts of architecting web services.
- Employ XML security in web development.

TEXT BOOKS:

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

REFERENCE BOOKS:

1. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.
2. SandeepChatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers,2005.

15UCS927	MACHINE LEARNING ALGORITHMS	L	T	P	C
		3	0	0	3

PRE –REQUISITE:

COURSE OBJECTIVES :

- To introduce students to the basic concepts and techniques of Machine Learning.
- To familiarize the concepts of Supervised and Unsupervised learning techniques
- To study the various probability based learning techniques
- To impart the knowledge on graphical models of machine learning algorithms

UNIT I	INTRODUCTION	9

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

UNIT II	LINEAR MODELS	9

Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines

UNIT III	TREE AND PROBABILISTIC MODELS	9

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map

UNIT IV	DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS	9

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process

UNIT V	GRAPHICAL MODELS	9

Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

TOTAL: 45 Periods

COURSE OUTCOMES:

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

- Distinguish between, supervised, unsupervised and semi-supervised learning
- Apply the apt machine learning strategy for any given problem
- Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
- Design systems that uses the appropriate graph models of machine learning

- Modify existing machine learning algorithms to improve classification efficiency

TEXT BOOKS:

1. Stephen Marsland, —Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Tom M Mitchell, —Machine Learning, First Edition, McGraw Hill Education, 2013.

REFERENCE BOOKS:

1. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.
2. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014
3. Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014

15UIT910	BUILDING ENTERPRISE APPLICATIONS	L	T	P	C
		3	0	0	3

PRE-REQUISITE:SOFTWARE ENGINEERING

COURSE OBJECTIVES :

- To familiarize functional / nonfunctional requirements, business scenario and document the use case diagrams in the given template.
- To demonstrate logical architecture for the given business scenario documented in use case
  diagrams.
- To import data architecture for the given logical architecture.

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	DESIGN PHASE	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	ARCHITECTURE DESIGN	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	IMPLEMENTATION METHODOLOGIES	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	VALIDATION	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:45Periods**

COURSE OUTCOMES:

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

- Apply the knowledge of software engineering methodologies in the development of an enterprise application
- Build the requirement analysis for an enterprise with consideration of public health, safety and environmental
- Formulate an architectural design for a new enterprise applicationimportance of application framework and designing components
- Apply the appropriate techniques to perform code review and code analysis

TEXT BOOKS:

1. AnubhavPradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, VeerakumarEsakimuthu" Raising Enterprise Applications ", John Wiley.

2. Brett McLaughlin , ” Building Java Enterprise Applications ”, O'Reilly Media.

REFERENCE BOOKS:

1. SorenLauesen ,” Software Requirements: Styles & Techniques”, Addison-Wesley Professional,2002.
2. Brian Berenbach,” Software Systems Requirements Engineering: In Practice ”, McGraw-Hill/Osborne Media,2009.
3. Dean Leffingwell, Don Widrig ” Managing Software Requirements: A Use Case Approach”, Pearson Education, 2003.
4. VasudevaVarma, VarmaVasudeva,” Software Architecture: A Case Based Approach”, Pearson Education India, 2009.

15UIT911	SOFTWARE TESTING	L	T	P	C
		3	0	0	3

PRE –REQUISITE:

COURSE OBJECTIVES:

- To understand complete software testing life cycle
- To demonstrate understanding of various terms and technologies used in testing domain.
- To demonstrate understanding of usage of testing framework, process and test management

UNIT I	TESTING BASICS	9

Testing as an engineering activity – Role of process in software quality – Testing as a process – Basic definitions – Software testing principles – The tester's role in a software development organization – Origins of defects – Defect classes – The defect repository and test design – Defect examples – Developer / Tester support for developing a defect repository

UNIT II	TEST CASE DESIGN	9

Introduction to testing design strategies – The smarter tester – Test case design strategies – Using black box approach to test case design – Random testing – Equivalence class partitioning – Boundary value analysis – Other black box test design approaches – Black box testing and COTS – Using white box approach to test design – Test adequacy criteria – Coverage and control flow graphs – Covering code logic – Paths – Their role in white box based test design – Additional white box test design approaches- Evaluating test adequacy criteria

UNIT III	EXECUTION OF ADEQUACY TEST	9

Life Cycle–Based Testing - Model-Based Testing- Integration Testing- System Testing- Object-Oriented Testing- Model-Based Testing for Systems of Systems- Exploratory Testing

UNIT IV	BASICS OF AUTOMATION TESTING	9

ATLM- ATLM's Role in the Software Testing Universe- Software Testing Careers Decision to Automate Test- Automated Test Tool Evaluation and Selection- Test Team Management

UNIT V	TESTING APPLICATIONS	9

Testing Internet Applications-Basic E-Commerce Architecture-Testing Challenges-Testing Strategies-Mobile Application Testing-Testing Approaches-Sample Extreme Testing Application

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Illustrate the software testing principles and its defects
- Develop test cases to exercise a software
- Compare the levels of Testing
- Make use of Automated Testing Tools
- Demonstrate and Understanding of testing applications

TEXT BOOKS:

1. Paul C. Jorgensen, "Software Testing: A Craftsman's Approach||, ", 4thedition, CRC Press,2013.

2. Elfriede Dustin, “Implementing Automated Software Testing: How to Save Time and Lower Costs While Raising Quality”, 1stEdition,Addison-Wesley Professiona, 2009
3. Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black, ”Foundations of software testing ”, John Wiley & Sons,2012.

REFERENCE BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh,”Software Testing – Principles and Practices”, Pearson education, 2006.
2. Glenford J.Myers, Tom Badgett, Corey Sandler,”The Art of Software Testingll”, 3rd edition, John Wiley & Sons publication2012
3. Boris Beizer,”Software Testing Techniques”, Second Edition,Dreamtech, 2003.
4. Ilene Burnstein,”Practical Software Testing”, Springer International Edition, 2003

15UIT924	AGILE SOFTWARE DEVELOPMENT	L	T	P	C
		3	0	0	3

PRE –REQUISITE:

COURSE OBJECTIVES:

- To learn how to immediately start producing software incrementally regardless of existing engineering practices or methodologies
- To learn how to simplify the implementation of Agile processes
- To learn how to simplify XP implementation through a Scrum wrapper
- To learn why Agile processes work and how to manage them
- To understand the theoretical underpinnings of Agile processes

UNIT I	FUNDAMENTALS OF AGILE	9

The Genesis of Agile, Introduction and background, Agile manifesto and Principles, overview of Scrum, Extreme Programming, Feature Drive development, Lean Software Development, Agile project Management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, user Stories, Agile Testing, Agile Tools.

UNIT II	AGILE SCRUM FRAMEWORK	9

Introduction to scrum, project phases, Agile Estimation, planning game, product backlog, sprint backing iteration planning, user story definition, characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily Scrum, Scrum roles- product owner, Scrum Team, Scrum case study, Tools for Agile project management

UNIT III	AGILE TESTING	8

The Agile lifecycle and its impact on testing, Test-Driven Development (TDD) , X unit framework and tools for TDD, Testing user stories-acceptance tests and scenarios, planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile project management.

UNIT IV	AGILE SOFTWARE DESIGN AND DEVELOPMENT	10

Agile design practices, role of design principles including single Responsibility principle, open closed principle, Liskov Substitution Principle, interface Segregation principles, Dependency inversion principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, continuous integration, Automated build tools, Version control.

UNIT V	INDUSTRY TRENDS	9

Market scenario and adoption of Agile, Agile ALM, Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and mitigation, Agile projects on cloud, Balancing Agility with Discipline, Agile rapid development technologies

TOTAL: 45Periods

COURSE OUTCOMES:

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

- Understand the agile paradigm to software development.
- Demonstrate Scrum Framework for Agile software development.

- Explain various testing methods to test the agile design and development.
- Demonstrate the applicability of design principles and refactoring to achieve Agility.
- Explain current trends in industry towards agile software development.

TEXT BOOKS:

1. Ken Schawber, Mike Beedle, ”Agile Software Development with Scrum ”, Pearson , 2002.
2. Robert C. Martin , Micha Martin, ” Agile Software Development, Principles, Patterns and Practices ”, Pearson, , 2007

REFERENCE BOOKS:

1. Lisa Crispin, Janet Gregory, ”Agile Testing: A Practical Guide for Testers and Agile Teams ”, Addison Wesley, , 2008.
2. Alistair Cockburn, ” Agile Software Development: The Cooperative Game ”, Addison Wesley, 2006
3. Mike Cohn, ” User Stories Applied: For Agile Software”, Addison Wesley , 1st Edition
4. http://martinfowler.com/agile.html
5. www.it-ebooks.info/tag/agile

INTERDISCIPLINARY COURSES

INTERDISCIPLINARY COURSES

Course Code	Course Title	L	T	P	C
15UGM953	Embedded Programming	3	0	0	3

INTERDISCIPLINARY COURSES

15UGM953	EMBEDDED PROGRAMMING	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES:

- Learn the architecture and programming of ARM processors.
- To give an idea of embedded systems and its relation with microprocessors.

UNIT I	Introduction to Embedded Systems and ARM processors	10

Introduction: Embedded Systems – evaluation of ARM processors-ARM 7 processor architecture and organization-TDMI (ARM7 CPU features)- ARM peripherals: General purpose I/O-Timers and counters-PWM modulator-RTC- watchdog timer-UART-I2C Interface-SPI Interface-A/D converter-D/A Converter-Interrupt Registers-3 stage pipeline.

UNIT II	Embedded programming	8

Difference between C and Embedded C – structure of embedded C program and examples.-ARM registers for programming- data types in embedded C for ARM 7-IF, IF-else, else if ladder statements- while, for loop –break and continue statements.

UNIT III	ARM 7 Interfacing	9

GPIO programming- I/O Direction setting – PIN function control- Interfacing of LEDs, Interfacing of Switches with interrupt mechanism-Interfacing of Relays, LCD,7 segment display-stepper motor and DC motors(PWM control)- timer interfacing

UNIT IV	ARM 9 and Porting RTOS to ARM Cortex Microcontrollers	9

Interfacing of ADC configuring ADC registers - Interfacing DAC and configuring DAC registers Interfacing RTC and configuring RTC registers – Interfacing of GSM-serial communication-sensor interfacing. Building root file system, Kernel Compilation for ARM, Porting of OS to ARM. Overview of open source RTOS (Chibi-OS / Free RTOS / Micro C-OS etc.),

UNIT V	Case Study	9

Microwave oven-Anti-lock Breaking system (ABS)-Intruder alarm system-power saving system in Air-conditioners-water level monitoring and controlling system.

Total:45 Peroids

COURSE OUTCOMES:

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

- Describe the architecture and peripherals of ARM processor.
- Apply the fundamental embedded C programming knowledge to write embedded application programs.
- Apply the knowledge of GPIO and Timer programming to interface simple devices.
- Gather and apply the knowledge of RTOS programming to interface with ARM peripherals.
- Analyze the software and hardware components needed to design embedded system for any real time applications

TEXT BOOKS:

1. Muhammad Ali Mazidi , "ARM Peripherals Programming and Interfacing: Using C Language for ARM Cortex (ARM books Book 2)", pearson education, 2nd edition, 2011.
2. Jonathan W. Valvano, " Embedded Systems: Introduction to Arm® CortexTM-M Microcontrollers, Fifth Edition (Volume 1)", CreateSpace Independent Publishing Platform; 5th edition (May 26, 2012).
3. David Seal, " ARM architecture Reference Manual", Addison Wesley, 2000.
4. The Definitive Guide to the ARM Cortex M3, Joseph Yiu, Newnes

REFERENCE BOOKS:

1. Marilyn Wolf, "Computers as Components – Principles of Embedded Computing System Design", Third Edition "Morgan Kaufmann Publisher (An imprint from Elsevier), 2012.
2. Yury Magda, " ARM programming for beginners with interactive simulation", Amazon Digital Services LLC, 2011.
3. Steve Ferber, " ARM system on-chip architecture", Addison Wesley, 2nd Edition 2011.
4. Assembly language Programming ARM Cortex-M3, Vincent Mahout, Wiley

OPEN ELECTIVES

OPEN ELECTIVES

Course Code	Course Title	L	T	P	C
15UCS971	Programming with C++	3	0	0	3
15UCS972	Programming with Java	3	0	0	3
15UCS973	Cloud Architecture and its Services	3	0	0	3
15UCS974	Massive Dataset Analytics	3	0	0	3
15UCS975	Fundamentals of Software Engineering	3	0	0	3
15UCS976	Internet of Things	3	0	0	3

OPEN ELECTIVES

15UCS971	PROGRAMMING WITH C++	L	T	P	C
		3	0	0	3

PRE-REQUISITE : COMPUTER PROGRAMMING

COURSE OBJECTIVES:

- To introduce the concepts of C++ programming.
- To impart the knowledge in exceptions and files.

UNIT I	INTRODUCTION	9

Introduction to C++ – Structure of C++ program – C++ data types – Operators – Statements – Control Structures – functions – parameter passing mechanism - function overloading – Arrays.

UNIT II	OBJECT ORIENTED PROGRAMMING	9

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – polymorphism - classes – access specifiers – function and data members – Objects - default arguments – inline functions – friend functions - static members.

UNIT III	CONSTRUCTORS AND OVERLOADING	9

Constructors – default constructor – parameterized constructors – copy constructor – constructor overloading - destructors - operator overloading with member function and friend function – unary operator overloading - binary operator overloading – overloading assignment operator.

UNIT IV	INHERITANCE AND POLYMORPHISM	9

Inheritance – public, private, and protected derivations – types of inheritance - virtual base class – abstract class – pointers to objects - Runtime polymorphism – virtual functions – pure virtual functions.

UNIT V	EXCEPTION HANDLING AND FILES	9

Exception handling – try-catch-throw paradigm – exception specification – multiple catch – catching multiple exceptions – rethrowing exception – user defined exceptions - Streams and formatted I/O – I/O manipulators - file handling – random access.

Case Study : Design and develop

- Student Information System.
- Banking System.

TOTAL : 45 Periods

COURSE OUTCOMES :

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

- Write programs using basic constructs and functions in C++.
- Design class with data and function members for a given problem.
- Apply function overloading and constructors in class for the given problem.
- Employ inheritance and run time polymorphism.
- Manipulate files and exception handling in C++.

TEXT BOOKS :

1. Ashok N. Kamthane, Object Oriented Programming, Pearson Education India Edition, 2003.
2. RohitKhurana, Object Oriented Programming with C++, Vikas Publishing House, ITLESL, 2008.

REFERENCE BOOKS :

1. Robert Lafore, Object Oriented Programming in C++ Pearson, 4th Edition, 2002.
2. Ira Poh “Object Oriented Programming using C++”, Pearson Education, Second Edition, Reprint, 2004.
3. Lippman.S.B, JoseeLajoie, Barbara E. MooC++ Primer”, Pearson Education,,fourth Edition, 2005.
4. Stroustrup.B, The C++ Programming language”, Pearson Education, Third Edition, 2004.

15UCS972	PROGRAMMING WITH JAVA	L	T	P	C
		3	0	0	3

PRE-REQUISITE : COMPUTER PROGRAMMING

COURSE OBJECTIVES:

- To introduce programming language constructs in Java.
- To illustrate OOP concepts in Java.
- To introduce GUI development in Java.

UNIT I	FUNDAMENTALS	9

The Java Language – Key attributes of Object Oriented Programming – Java Development Kit – First Simple Program – Data types and operators – Program control statements – Arrays.

UNIT II	OBJECT ORIENTED PROGRAMMING	9

Introducing classes, objects and methods – Closer look at methods and classes – Inheritance – Interface – packages.

UNIT III	EXCEPTION HANDLING AND I / O	9

Exception Hierarchy – Exception Handling fundamentals – consequences of uncaught exceptions – Multiple catch clauses – sub class exceptions – nested try blocks – throwing an exception – Using finally – using throws – java's built-in exceptions – Streams – Byte Streams and Character streams – Console Input and output using byte and character streams – File Input and output using byte and character streams.

UNIT IV	GUI PROGRAMMING	9

Swing Fundamentals – Swing Controls – Working with Menus.

UNIT V	JAVA API LIBRARY	9

String handling – String fundamentals – String constructors –String methods –java.lang package – Type wrappers – Object class – Class class – java.lang interfaces – java.util package – Working with Date and Time – Formatting output with formatter – The Scanner class.

TOTAL: 45Periods

COURSE OUTCOMES:

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

- Write java programs for simple problems.
- Create classes and objects involved in the given problem.
- Handle exceptions that may arise in the problem.
- Develop GUI based applications.
- Use java API library to solve the problems.

TEXT BOOKS:

1. Herbert Schildt& Dale Skrien. Java Programming: A Comprehensive introduction. 1st Edition, Tata McGraw-Hill Education, 2012.

REFERENCE BOOKS :

1. Deitel Paul J., &Deitel Harvey. Java How to Program: Early Objects. 10th edition,Pearson Education Limited, 2016.
2. Kathy Sierra & Bert Bates. Head First Java: Your Brain on Java – A Learner's Guide. 2nd edition, Shroff/O'Reilly, 2005.
3. Daniel Liang Y. Introduction to Java Programming: Brief Version. 9th edition, Pearson Education, 2014.
4. DrNageswaraRao R. Core Java: An Integrated Approach. New Delhi: dreamtech Press, 2015.

15UCS973	CLOUD ARCHITECTURE AND ITS SERVICES	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES:

- To introduce the phases of journey to the cloud.
- To impart fundamental concepts in the area of cloud computing.
- To give knowledge in services of cloud computing.

UNIT I	OVERVIEW OF COMPUTING PARADIGM	9

Recent trends in Computing -Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, and Cloud Computing- Evolution of cloud computing-Business driver for adopting cloud computing.

UNIT II	CLOUD COMPUTING AT A GLANCE	9

Cloud Computing (NIST Model)-Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers-Properties, Characteristics & Disadvantages-Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid – computing-Role of Open Standards.

UNIT III	CLOUD COMPUTING ARCHITECTURE	9

Cloud Computing Architecture-Cloud computing stack-Service Models (XaaS)-Infrastructure as a Service(IaaS)-Platform as a Service(PaaS)-Software as a Service(SaaS)-Deployment Models-Public cloud-Private cloud-Hybrid cloud-Community cloud.

UNIT IV	CLOUD SERVICES	9

Infrastructure as a Service(IaaS)-Introduction to IaaS-IaaS definition, Introduction to -virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM)-Resource Virtualization-storage as a service, Data storage in cloud computing(storage as a service)-Examples-Amazon EC2-Renting, EC2 Compute Unit, Platform and Storage, pricing, customers-Eucalyptus-Platform as a Service(PaaS)-Introduction to PaaS-Cloud Platform and Management-Examples-Google App Engine-Microsoft Azure-SalesForce.complatform-Software as a Service(PaaS)-Web services-Web 2.0-Web OS-Case Study on SaaS.

UNIT V	CLOUD SECURITY	9

Cloud Security-Network level security, Host level security, Application level security-Data security and Storage-Data privacy and security Issues, Jurisdictional issues raised by Data location-Identity & Access Management-Access Control-Trust, Reputation, Risk-Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations.

TOTAL :45 Periods

COURSE OUTCOMES:

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

- Discuss various Computing Paradigm.
- Explain the economics of outsourcing IT to the cloud.
- Illustrate the architecture, challenges and reference models of cloud computing.
- Summarize different Cloud Platforms and Application.
- Describe the key dimensions of the challenges of Cloud Computing.

TEXT BOOKS:

1. RajkumarBuyya, Christian Vecchiola and ThamariSelvi S —Mastering in Cloud Computing, McGraw Hill Education (India) Private Limited, 2013.
2. Barrie Sosinsky, Cloud Computing Bible, Wiley-India, 2010.

REFERENCE BOOKS:

1. James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier/Morgan Kaufmann, 2005.
2. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly
3. Ronald L. Krutz, Russell Dean Vines, “Cloud Security – A comprehensive Guide to Secure Cloud Computing”, Wiley – India, 2010.
4. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.

15UCS974	MASSIVE DATASET ANALYTICS	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To explain fundamental concepts of big data.
- To familiarize the processes of data analytics, tools and methods.
- To introduce the concepts of Hadoop.

UNIT I	INTRODUCTION	9

What Is Big Data and Why Does It Matter? - Web Data: The Original Big Data - A Cross-section of Big Data Sources and the Value They Hold.

UNIT II	EVOLUTION OF ANALYTICS	9

The Evolution of Analytic Scalability - The Evolution of Analytic Processes - The Evolution of Analytic Tools and Methods.

UNIT III	BIG DATA ANALYTICS	9

What Makes a Great Analysis? - What Makes a Great Analytic Professional? - What Makes a Great Analytics Team?

UNIT IV	INNOVATION IN ANALYTICS	9

Enabling Analytic Innovation- Creating a Culture of Innovation and Discovery.

UNIT V	HADOOP FRAMEWORK	9

History of Hadoop - HDFS – Components of Hadoop – Developing map reduce application - Setting up a Hadoop cluster - Cluster specification - Cluster setup and installation – Hadoop configuration - Security in Hadoop - Administering Hadoop.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Explain big data and its applications.
- Distinguish data analysis tools and methods.
- Describe the methods in analysis.
- Employ innovation in analytics.
- Discuss frameworks in Big Data analysis.

TEXT BOOKS:

1. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics”, John Wiley & sons, 2012.
2. Tom White “Hadoop: The Definitive Guide”, O’reilly Media, Third Edition, 2012.

REFERENCE BOOKS:

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. AnandRajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012
3. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O‟Reilly, 2011.
4. Jiawei Han, MichelineKamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.
5. Stephen Few, “Now You See it: Simple Visualization Techniques for Quantitative Analysis”, Analytics Press, 2009.

15UCS975	FUNDAMENTALS OF SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3

PRE-REQUISITE:

COURSE OBJECTIVES :

- To introduce the fundamental concepts of software engineering.
- To learn the concepts of requirements engineering.
- To impart the knowledge in design and testing process of software.

UNIT I	SOFTWARE PROCESS	9

Introduction to Software Engineering, Software Process, Perspective process models - Waterfall Model , Incremental Process Models , Evolutionary Process Models , Concurrent Models and Specialized Process Models.

UNIT II	REQUIREMENTS ENGINEERING	9

Software Requirements: Functional and Non-Functional Requirements, Software Requirements Document ,Requirements specification ,Requirement Engineering Process: Requirements elicitation and analysis, requirements validation, requirements management.

UNIT III	SOFTWARE DESIGN	9

Design process – Design Concepts-Design Model– Architectural Design –Architectural styles, Architectural Design, Component level Design: Designing Class based components, traditional Components.

UNIT IV	TESTING	9

Software Testing Fundamentals , Internal and External Views of Testing , White-Box Testing -Basis Path Testing , Control Structure Testing , Black-Box Testing.

UNIT V	SOFTWARE PROJECT ESTIMATION	9

Decomposition techniques-LOC based, FP based. Empirical estimation models-structure of estimation models-COCOMO II Model.

TOTAL:45 Periods

COURSE OUTCOMES :

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

- Determine the appropriate life cycle model based on the project.
- Identify the customer requirements.
- Develop an effective design for implementation.
- Apply the suitable testing methodology.
- Apply the principles, tools and practices of IT project management.

TEXT BOOKS:

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Seventh Edition,McGraw-Hill International Edition, 2010. UNIT-I, UNIT-III, UNIT-IV, UNIT-V.

2. Ian Sommerville, “Software Engineering”, 9th Edition, Pearson Education Asia, 2011.
UNIT-.II

REFERENCE BOOKS:

1. Rajib Mall, “Fundamentals of Software Engineering”, Third Edition, PHI Learning Private Limited, 2009.
2. PankajJalote, “Software Engineering, A Precise Approach”, Wiley India, 2010.
3. Kelkar S.A., “Software Engineering”, Prentice Hall of India Pvt Ltd, 2007.
4. Stephen R.Schach, “Software Engineering”, Tata McGraw-Hill Publishing Company Limited, 2007.

15UCS976	INTERNET OF THINGS	L	T	P	C
		3	0	0	3

PRE-REQUISITE :

COURSE OBJECTIVES :

- To understand the basics of internet of things.
- To develop arduino applications for IoT.
- To familiarize with resource management in internet of things.

UNIT I	INTRODUCTION TO THE INTERNET OF THINGS	9

Definition – phases – Foundations – Policy– Challenges and Issues - identification – security – privacy. Components in internet of things: Control Units – Sensors – Communication modules – Power Sources – Communication Technologies – RFID – Bluetooth – Zigbee –Wifi – Rflinks – Mobile Internet – Wired Communication

UNIT II	PROGRAMMING THE MICROCONTROLLER FOR IOT	9

Basics of Sensors and actuators – examples and working principles of sensors and actuators– Cloud computing and IOT–Arduino/Equivalent Microcontroller platform –Setting up the board - Programming for IOT– Reading from Sensors.

Communication: Connecting microcontroller with mobile devices – communication through bluetooth and USB – connection with the internet using wifi / Ethernet.

UNIT III	TOOLKIT APPROACH	9

From Internet to Internet of Things, Problems and Challenges, Towards a Participatory Approach, Innovations to Users via Toolkits, Existing Toolkits.

UNIT IV	WEB OF THINGS	9

From the Internet of Things to the Web of Things, Designing RESTful Smart Things, Web-enabling Constrained Devices, Physical Mashups: Recomposing the Physical World, Advanced Concepts: The Future Web of Things.

UNIT V	RESOURCE MANAGEMENT IN THE INTERNET OF THINGS	9

Introduction, Clustering, Software Agents, Data Synchronization, Clustering for Scalability, Software Agents for Object Representation. Data Synchronization.

TOTAL:45Periods

COURSE OUTCOMES:

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

- Describe the components of IOT.
- Develop arduino sketches for IoT applications.
- Demonstrate sketches with toolkits.
- Discuss various resources management techniques in IoT.
- Discuss web of things.

TEXT BOOKS:

1. CharalamposDoukas , Building Internet of Things with the Arduino, Create space, April 2002.
2. Dieter Uckelmann et.al, “Architecting the Internet of Things”, Springer, 2011.

REFERENCE BOOKS:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”,TMH, 2009.
4. Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India, 2011.
5. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly
6. James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier/Morgan Kaufmann, 2005.
7. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, “Grid and Cloud Computing – A Business Perspective on Technology and Applications”, Springer.
   Ronald L. Krutz, Russell Dean Vines, “Cloud Security – A comprehensive Guide to Secure Cloud Computing”, Wiley – India, 2010

LIST OF 1-CREDIT COURSES OFFERES BY INDUSTRY

LIST OF ONE CREDIT COURSES OFFERED BY INDUSTRY

Course Code	Course Title	L	T	P	C
15UCS861	Software Project Management	1	0	0	1
15UCS862	Multimedia	1	0	0	1
15UCS863	PYTHON Programming	1	0	0	1
15UCS864	PHP	1	0	0	1
15UCS865	ASP.NET	1	0	0	1
15UCS866	R Programming	1	0	0	1
15UCS867	Windows System Administration	0	0	2	1

1-CREDIT COURSES

15UCS861	SOFTWARE PROJECT MANAGEMENT	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- To familiarize the students with the characteristics of a project and project management principles.
- To summarize competency in the management of a project plan, especially in monitoring and controlling the project schedule and tracking project progress.

UNIT I	PROJECT EVALUATION AND PROJECT PLANNING	5

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Stepwise Project Planning.

UNIT II	ACTIVITY PLANNING	5

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method.

UNIT III	PROJECT MANAGEMENT AND CONTROL	5

Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

TOTAL: 15Periods

COURSE OUTCOMES:

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

- Explain the process involved in software project management.
- Prepare the activity plan to manage real-world challenges.
- Apply appropriate mechanisms for tracking the software projects.

TEXT BOOKS :

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCE BOOKS :

1. Robert K. Wysocki “Effective Software Project Management” – Wiley Publication, 2011.
2. Walker Royce: “Software Project Management”- Addison-Wesley, 1998.
3. Gopalaswamy Ramesh, “Managing Global Software Projects” – McGraw Hill Education (India), Fourteenth Reprint 2013.

15UCS862	MULTIMEDIA	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- To know the basic concepts of Photoshop.
- To learn the fundamentals of animation and interactivity using Flash.
- To impart the knowledge in Maya software.

UNIT I	ADOBE PHOTOSHOP	5

Introduction to Adobe Photoshop CS6, Getting Started with Photoshop, Working with Images, Working With Basic Selections, Getting Started With Layers, Painting In Photoshop, Photo Retouching, Introduction to Color Correction, Working With The Pen Tool , Creating Special Effects.

UNIT II	ADOBE FLASH	5

Introduction to Adobe Flash CS6, Drawing and Color, Animation Basics, Tweening, Libraries and Symbols, Working with Audio, Working with video, Basic Action Script for website, Basic Action Script for games.

UNIT III	MAYA	5

Introduction to MAYA,Working with Viewport,Polygon and Surface Modeling, Exterior design, Texturing,Basic Animation,Rendering.

TOTAL:15Periods

COURSE OUTCOMES:

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

- Describe the major functions of Photoshop.
- Use Flash drawing tools, symbols, and layers to design a character.
- Prepare animation using MAYA software.

TEXT BOOKS :

1. DanaeDayley, Brad Dayle, " Adobe Photoshop CS6 Bible",Wiley publications, June 2012.
2. Kogent Learning Solutions ,"After Effects CS6 in Simple Steps", Dream tech Press,Feb 2013.

REFERENCE BOOKS :

1. Kogent Learning Solutions, "Photoshop CS6 in Simple Steps ",Dream tech Press, Dec 2012.

15UCS863	PYTHON PROGRAMMING	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- To introduce the style of programming in Python.
- To learn the usage of sequences in Python.
- To familiarize classes and objects in Python.

UNIT I	INTRODUCTION TO PYTHON	5

Python features – Versions – Types of information – operators – string literals - print statement / function – Sequences : strings, lists, tuples, dictionary, set – decision making – looping – break – continue – pass.

UNIT II	MODULAR PROGRAMMING	5

Introduction to functions – built-in functions : len, str, tupil, list, dict, max, min, count, sorted, functions available in sequences – User defined functions – document string - passing parameter to functions - default arguments – key based arguments – arbitrary parameters – anonymous functions / lambda– module – built-in modules: os, sys, math, date – import – reload – package.

UNIT III	OOP PROGRAMMING	5

Introduction to OOP – classes – objects – properties – methods – constructors – operator overloading – inheritance – method overriding.

TOTAL: 15 Periods

COURSE OUTCOMES:

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

- Write scripts in Python to solve problems.
- Apply modular programming approach in the design of Python code.
- Create classes and objects according to the given problem.

TEXT BOOKS :

1. Mark Lutz, “Learning Python”, 5th Edition, O’Reilly Media, 2013.

REFERENCE BOOKS :

1. Bill Lubanovic, “Introducing Python – Modern Computing in Simple Packages”, O’Reilly Media, 2014.
2. Vernon L. Ceder, “The Quick Python Book”, 2nd Edition, Manning Publications, Jan 2010.
3. Alex Martelli, “Python in a Nutshell”, O'reilly Publications, 3rd edition, July 2010.
4. James O. Knowlton, “Python: Create-Modify-Reuse”, Wiley Publishing Inc, 2008.

15UCS864	PHP	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- To introduce the fundamental concepts of PHP.
- To explain the basic concepts of MYSQL.

UNIT I	EXPLORING DATA TYPES AND CONTROL STRUCTURES IN PHP	5

What is PHP-The history of PHP-Why choose PHP- Variables-Strings-String functions-Numbers part one: Integers-Numbers part two: Floating points-Arrays-Associative arrays-Array functions-Booleans-Constants-If statements, Else and else ifstatements,Logicaloperators,Switchstatements,Whileloops,For loops,Foreachloops,Continue,Break-User Defined Functions.

UNIT II	BUILDING WEB PAGES WITH PHP	5

Links and URLs,Using GET values,Encoding GET values,Encoding for HTML,Including and requiringfiles,Modifyingheaders,Pageredirection,Buildingforms,Detecting form submissions,Single-page form processing,Validating form values,Problems with validation logic,Displaying validation errorsCustom validation functions,Single-page form with validations-Cookies,Sessions.

UNIT III	USING PHP TO ACCESS MySQL	5

Database APIs in PHP,Connecting to MySQL with PHP,Retrieving data from MySQL,Working with retrieved data,Creating records with PHP,Updating and deleting records with PHP.

TOTAL:15 Periods

COURSE OUTCOMES:

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

- Explain the primitives of PHP.
- Design Dynamic Web page.
- Write scripts in PHP to manipulate data in MySQL.

REFERENCE BOOKS:

1. Joel Murach , Ray Harris, “PHP and MySQL”, Second Edition, Murach Books, Dec 2014.
2. Paul Hudson, “PHP in a Nutshell”, 1st Edition,Author, O'Reilly Media, Oct 2005.

15UCS865	ASP.NET	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- To introduce the concepts of ASP.NET.
- To familiarize different validation controls.
- To know about ASP.NET model, view and controller**.**

UNIT I	ASP.NET AND STANDARD CONTROLS	5

Overview of the ASP.NET- .NET Framework Class Library - Common Language Runtime(CLR)- Displaying information- Accepting User Input- Displaying Images.

UNIT II	FORM VALIDATION CONTROLS	5

Required Field Validator Control-Regular Expression Validator Control-Compare Field Validator Control-Range Validator Control-Validation Summary Control-Custom Validator Control.

UNIT III	ASP.NET MVC	5

Razor View- Controller- Model - Page & State Management-Overview of events in page.

TOTAL:15 Periods

COURSE OUTCOMES:

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

- Explain the concepts of ASP.NET.
- Describe various validation controls in ASP.NET and Java Script.
- Write application to display the user's informations.

TEXT BOOKS:

1. Matthew MacDonald, "Asp.net The Complete Reference", 1st Edition, Pearson Education, 2002.
2. Bill Evjen, Scott Hanselman, Devin Rader, "Professional ASP.NET 4 in C# and VB, WroxLibrary books, Mar 2010.

15UCS866	R PROGRAMMING	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- To familiarize the concepts of R programming to compute statistics and generate graphs and other data representations.

UNIT I	INTRODUCTION TO R	5

What is R?-R and Statistics-R history-Why R?-Where to get R and its documentation?-R console-Getting Help-R environment-Creating, listing and deleting objects in memory-Customizing the environment with RGui editor-Text Editors and Integrated Development Environment (IDE) for R- R Studio-Working with Projects in RStudio-Writing and executing R Scripts.

UNIT II	DATA STRUCTURE AND PROGRAMMING CONCEPTS	5

Variables and assignment-Data Types – variable data types, tables, vector, matrix, lists, data frame. Time series-Indexing, sub-setting - Vectorized calculations-Control structures-Scoping rules-Writing functions-Directing console output to a file-Reading from a csv/ fixed-width file and writing to an external fileDebugging.

UNIT III	GRAPHS AND PREDICTIVE MODELLING TECHNIQUES	5

Graphical devices-Partitioning a graphic-High-level commands-Low-level commands -Boxplots, pie charts, histograms, line charts, frequency polygons, Lorenz curve, Packages – grid and lattice-Predictive Modelling Techniques Hypothesis testing-ANOVA -Monte Carlo Simulation-Linear & Logistic Regression-Clusters in R .

TOTAL:15 Periods

COURSE OUTCOMES:

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

- Describe the concepts in R programming.
- Write simple R Programs.
- Create simple graphs and charts used in introductory statistics.

TEXT BOOKS :

1. Garrett Grolemund , “Hands-On Programming with R” , O'Reilly Media , Jun 2014.
2. Dr. Joshua F. Wiley, Larry A. Pace, “Beginning R: The Statistical Programming Language”, Apress, Oct 2015.

REFERENCE BOOKS :

1. Paul Teetor, “R Cookbook”, O'Reilly Media, Mar 2011.

15UCS867	WINDOWS SYSTEM ADMINISTRATION	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To demonstrate the procedures for installation, configuration and maintenance of windows server and workstation operating systems.

LIST OF EXPERIMENTS

1. Installing VirtualBox.
2. Installing Windows Client (Windows 7).
3. Configuring Control Panel Tasks and Managing User Accounts in Windows 7.
   -Meet the Control Panel-Common Customization Tasks-Advanced Customization Tasks Setting Accessibility Options- Customizing User Accounts
4. Configuring and Managing Network in Windows7
   -Overview of Networking-Other Networking Tasks- Advanced Networking Tasks-Wireless Networking
5. Maintaining and Optimizing in Windows 7 using Disk Checkup, Defragmentation Tools
6. Installing and Configuring Basic Hardware and Software
   -The Basics of Managing Software- Advanced Software Management
   Managing Hardware- Advanced Hardware Management
7. Installing Windows Server 2008
8. Configuring and Managing Server Role (DNS, DHCP, WSUS, etc.)

TOTAL: 30 Periods

COURSE OUTCOMES:

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

- Install and configure both the windows server and windows workstation operating systems.
- Configure server side services including.
- Configure workstation settings including:

SOFTWARE AND HARDWARE REQUIREMENT

Processor :Minimum i3 Processor

RAM Capacity : 4 GB

Hard Disk Capacity :Minimum 500 GB

Operating System :Windows 7

COURSES OFFERES TO OTHER PROGRAMMES

COURSES OFFERED TO OTHER PROGRAMMES

Course Code	Course Title	L	T	P	C
B.E. (ECE)					
15UCS429	Programming with C Laboratory	0	0	2	1
B.E. (EEE)					
15UCS627	Problem Solving Using C	0	0	2	1
B.E. (EEE)					
15UCS955	Data Structures and Algorithm Analysis in C	3	0	0	3

SYLLABUS FOR OTHER PROGRAMMES

15UCS429	PROGRAMMING WITH C LABORATORY (B.E. ECE)	L	T	P	C
		0	0	2	1

PRE-REQUISITE:

COURSE OBJECTIVES :

- To familiarize the concepts of arrays, structures and union in C language
- To learn to access memory using pointers
- To know the manipulation of data in permanent storage

LIST OF EXPERIMENTS

- Programs using one dimensional and two dimensional arrays
- Programs using user defined functions and recursive functions
- Programs using pointers and dynamic memory allocation
- Programs using structures and unions
- Programs using text files
- Programs using binary files

TOTAL: 30Periods

Listof Sample Exercises :

1. An election is contested by 5 candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case, a number read is outside the range 1 to 5, the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballots.
2. A company ABC pays their employers on a monthly basis. It pays their employers with DA=60% of BASIC PAY, HRA=20% of BASIC PAY, Allowance=Rs.2000.The company needs to automate the salary computation based on the basic pay. Develop an application to compute the gross salary of an employee given their basic pay
3. A banking application need to be developed for a bank. The operational features contain a list of the transactions that can be performed. These transactions are as follows:
    - Deposit funds to an account
    - Withdraw funds from an account
    - Transfer funds from one account to another
    - Query the balance ofany account

    Develop an application to automate the above operational features.

4. A class contains a total strength of 60 in which there 35 girls and 25 boys. The department needs to assign roll number for the students based on their names in alphabetical order. Develop a software to automate the task

5. A telephone directory contains information such as name, phone number and address. For advertising a product a company needs software to get the phone number of the people in a specific location and display their name and phone number in sorted order
6. Write a program to declare a structure called cricket that contain the following information

- Player name
- Team name
- batting average
- highest score
- no. of matches.

Using cricket structure display the above details of 10 players.

7. Define a structure called hotel that contain the following members, name, address, average room charge, no. of rooms, etc.,. Write functions to perform the following
    - Display the details of 5 hotels
    - Display the details of the hotels with room charge less than a given value.
8. Declare a union data type time to maintain the time in hour, minutes and seconds. Develop a program to get a time from the user and display the time in the following format: 3:19:20.
9. C Program to Compare two Binary Files, Printing the First Byte Position where they Differ
10. C Program to Create Employee Record and Update it

COURSE OUTCOMES:

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

- Manipulate data stored in arrays.
- Access data in memory using pointers.
- Manipulate data stored on permanent storage
- Design and implement C programs for simple applications.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS

HARDWARE

LAN SYSTEM WITH 30 NODES (OR) STANDALONE PCS – 30 NOS.

SOFTWARE

OS – UNIX CLONE **(License free Linux)**

APPLICATION PACKAGE – OFFICE SUITE

COMPILER – C

15UCS627	PROBLEM SOLVING USING C (B.E. EEE)	L	T	P	C
		0	0	2	1

PRE-REQUISITE: COMPUTER PROGRAMMING

COURSE OBJECTIVES :

- To familiarize the concepts of arrays, structures and unions in C language.
- To learn to access memory using pointers
- To know the manipulation of data in permanent storage

LIST OF EXPERIMENTS

- Programs using one dimensional and two dimensional arrays
- Programs using user defined functions and recursive functions
- Programs using pointers and dynamic memory allocation
- Programs using structures and unions
- Programs using files
- Programs for sorting and searching

Total: 30 Periods

Listof Sample Exercises :

1. An election is contested by 5 candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a 'C' program to read the ballots and count the votes cast for each candidate using an array variable count. In case, a number read is outside the range 1 to 5, the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballots.
2. A company ABC pays their employers on a monthly basis. It pays their employers with DA=60% of BASIC PAY, HRA=20% of BASIC PAY, Allowance=Rs.2000.The company needs to automate the salary computation based on the basic pay. Develop an application in 'C' to compute the gross salary of an employee given their basic pay
3. A banking application need to be developed for a bank. The operational features contain a list of the transactions that can be performed. These transactions are as follows:
    - Deposit funds to an account
    - Withdraw funds from an account
    - Transfer funds from one account to another
    - Query the balance ofany account

    Develop an application in 'C' to automate the above operational features.
4. A class contains a total strength of 60 in which there 35 girls and 25 boys. Write a program in 'C' to assign roll number for the students based on their names in alphabetical order.
5. A telephone directory contains information such as name, phone number and address. For advertising a product a company needs to get the phone number of the people in a specific location and display their name and phone number in sorted order. Write a 'C' program for the problem.
6. Write a 'C' program to display the day of the given date.
7. Write a'C' program to find a greater digit in that number.
8. Write a 'C' program to declare a structure called cricket that contain the following information
    - Player name
    - Team name
    - batting average

- highest score
- no. of matches.

Using cricket structure Find the players who have the maximum and minimum highest score among'n' players.

9. Define a structure called hotel that contain the following members, name, address, average room charge, no. of rooms, etc.,. Write functions to perform the following
    - Display the details of 5 hotels
    - Display the details of the hotels with room charge less than a given value.
10. Declare a union data type time to maintain the time in hour, minutes and seconds. Develop a 'C' program to get a time from the user and display the time in the following format: 3:19:20.
11. Write a 'C' Program to Compare two text Files, Printing the character Position where they Differs.
12. Write a 'C' program using pointers to accept the height of a person in centimetre and categorize the person based on height as taller, shorter and average height person. Create array dynamically to store person's height detail.

COURSE OUTCOMES:

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

- Manipulate data stored in arrays
- Access data in memory using pointers
- Use data stored on file for manipulation
- Employ structure to access records
- Design C programs to solve real world problems

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS

HARDWARE

LAN SYSTEM WITH 30 NODES (OR) STANDALONE PCS – 30 NOS.

SOFTWARE

OS – UNIX CLONE **(License free Linux)**
APPLICATION PACKAGE – OFFICE SUITE, COMPILER – C

15UCS955	DATA STRUCTURES AND ALGORITHM ANALYSIS IN C	L	T	P	C
		3	0	0	3

PRE-REQUISITE: COMPUTER PROGRAMMING

COURSE OBJECTIVES :

- To impart knowledge on linear and non-linear data structures.
- To familiarize various algorithm design and analysis techniques.

UNIT I	LINEAR DATA STRUCTURES	9

Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – Singly and doubly linked lists – applications of lists – Stack ADT – Queue ADT – Applications of stacks and queues

UNIT II	TREE STRUCTURES	9

Need for non-linear structures – Tree ADT – tree traversals – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT.

UNIT III	BALANCED SEARCH TREES AND INDEXING	9

AVL trees – Binary Heaps – B-Tree – Hashing – Separate chaining – open addressing – Linear probing.

UNIT IV	GRAPH STRUCTURES	9

Introduction-Terminologies-Representations-Traversals-Applications-Dijkstra'sSingle source shortest Path Problem – Topological Sort-Minimum Spanning Trees.

UNIT V	ALGORITHM DESIGN AND ANALYSIS	9

Greedy algorithms – Divide and conquer – Dynamic programming – backtracking – branch and bound – Randomized algorithms – algorithm analysis – asymptotic notations – recurrences – NP-complete problems.

TOTAL:45 Periods

COURSE OUTCOMES:

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

- Employ suitable linear data structures to organize the data.
- Organize hierarchical data into binary tree.
- Use hash technique for indexing.
- Apply graph algorithms to solve real world problems.
- Analyze the time complexity of an algorithm.

TEXT BOOKS:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education,2009.
2. ISRD Group, "Data Structures using C", 2nd Edition, McGrraw-Hill Education (India) Private Limited, 2013.

REFERENCE BOOKS:

1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
2. R. F. Gilberg, B. A. Forouzan, "Data Structures: A Pseudocode approach with C", Second Edition, Thomson India Edition, 2005.
3. Sara Baase and A. Van Gelder, "Computer Algorithms", Third Edition, Pearson Education, 2000.
4. T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms", Second Edition, Prentice Hall of India Ltd, 2001.
5. AnanyLevitin, "Introduction to the Design and Analysis of Algorithms", Third Edition,Pearson Education, 2012.

MANDATORY COURSE

Course Code	Course Title	L	T	P	C
15UGS331	Value Education and Human Rights	2	0	0	P/F

15UGS331	VALUE EDUCATION AND HUMAN RIGHTS	L	T	P	C
		2	0	0	P/F

COURSE OBJECTIVES :

- To inculcate the values of Humanism, Culture and to have an awareness of Human Rights.
- To impart knowledge and develop a sensitivity to the diverse Indian culture.

UNIT I		66

Introduction – Value education - Definition - Why values? - need for inculcation - sources of values- Personal values, Social values, Professional values, Moral values and Behavioral values.

UNIT II		6

Values needed for life - love & Compassion, Truth & Tolerance, Fairness & Obedience – Respect Empathy – Protection – Humility & Harmony – Principles of happy living – Stress management

UNIT III		6

Social values and personality – Role models – National leaders – freedom fighters, Social reformers & Value based anecdotes

UNIT IV		6

Social values-Five responsibilities: to self family, environment, society and universe- peace within, family & universe; Unethical standards in words and how to correct in deeds, in thought, its deleterious effects in society, deterioration of culture and traditional values- remediation for better understanding of such values and its implications

UNIT V		6

Human Rights – Universal Declaration of human rights - Human Rights violation - National Integration – Peace and non violence – the role of media in value building - Consumer awareness-Case Study

TOTAL: 30 Periods

COURSE OUTCOMES:

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

- Acquire a holistic vision and growth to become an integrated personality.
- Imbibe the essence of spirituality by which they will manifest the noble virtues of a universal brotherhood and benevolence

TEXT BOOKS:

1. Ignachimuthu .S, Values for Life, St.Paul Publications, Mumbai, 1994

REFERENCE BOOKS:

1. Frankena, W.K., “Ethics ”, Prentice Hall of India,,New Delhi, 1990.
2. Meron Theodor,“Human Rights and International Law Legal Policy Issues”, Oxford University Press, First Edition, New Delhi, 2000.
3. Shukla .R.P, “Value Education and Human Rights, Sarup and Sons Publishing, New Delhi, 2004.
4. Yogesh Kumar Singh and Reschika Nath. “Value Education”. APH Publishing Corporation, New Delhi, 2005.