Dr. Mahalingam College of Engineering and Technology

(An Autonomous Institution)

Pollachi - 642 003

Curriculum and Syllabus for
B.E. COMPUTER SCIENCE AND ENGINEERING

SEMESTERS I to VIII
With effect from 2011 – 12

REGULATIONS 2011

DR MAHALINGAM
MCET
COLLEGE OF ENGINEERING AND TECHNOLOGY
Enlightening Technical Minds

Programme : B.E. – Computer Science and Engineering
Curriculum and Syllabus : Semesters – I to VIII
Approved by Academic Council

Action	Responsibility	Signature of Authorized Signatory
Designed and Developed by	BoS Computer Science and Engineering	
Compiled by	Office of the Controller of Examinations	
Approved by	Principal	

Department of Computer Science and Engineering

Regulation – 2011

Curriculum and Syllabus for B.E Computer Science and Engineering

SEMESTER I

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CO101	Technical English	2	0	2	3	100
11CO102	Engineering Mathematics - I	3	1	0	4	100
11CO103	Engineering Physics	3	0	0	3	100
11CO104	Engineering Chemistry	3	0	0	3	100
11CO105	C Programming	3	0	0	3	100
11AU106	Basics of Electrical and Electronics Engineering	3	0	0	3	100
PRACTICAL						
11CO108	Engineering Practices Laboratory (Electrical, Electronics and PC hardware)	0	0	3	2	100
11CO210	Engineering Physics and Chemistry Laboratory (Annual Pattern)	0	0	3	-	-
11CO109	Engineering Graphics	2	0	3	3	100
11CO110	C Programming Laboratory	0	0	3	2	100
	TOTAL	**19**	**1**	**14**	**26**	**900**

SEMESTER II

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CO201	Communication Skills	2	0	2	3	100
11CO202	Engineering Mathematics – II	3	1	0	4	100
11CO203	Material Science	3	0	0	3	100
11CO204	Environmental Science	3	0	0	3	100
11CS205	Object Oriented Programming Concepts	3	0	0	3	100
11CS206	Basics of Civil and Mechanical Engineering	3	0	0	3	100
PRACTICAL						
11CO207	Engineering Practices Laboratory	0	0	3	2	100
11CO210	Engineering Physics and Chemistry Laboratory (Annual Pattern)	0	0	3	2	100
11CS210	Object Oriented Programming Laboratory	0	0	3	2	100
	TOTAL	**17**	**1**	**11**	**25**	**900**

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SEMESTER III

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11AU301	Engineering Mathematics– III	3	1	0	4	100
11CS301	Digital System Design	3	0	0	3	100
11CS302	Principles of Communication Engineering	3	0	0	3	100
11CS303	Data Structures	3	0	0	3	100
11CS304	Java Programming	3	0	0	3	100
11CS306	Operating Systems	3	0	0	3	100
PRACTICAL						
11CS307	Digital Design Laboratory	0	0	3	2	100
11CS308	Data Structures Laboratory	0	0	3	2	100
11CS309	Operating Systems Laboratory	0	0	3	2	100
	TOTAL	**18**	**1**	**9**	**25**	**900**

SEMESTER IV

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CS401	Discrete Mathematics	3	1	0	4	100
11CS402	Microprocessor Systems and Interfacing	3	0	0	3	100
11CS403	Design and Analysis of Computer Algorithms	3	0	0	3	100
11CS404	Database Systems	3	0	0	3	100
11CS405	UNIX Internals	3	0	0	3	100
11CS406	Principles of Software Engineering	3	0	0	3	100
PRACTICAL						
11CS407	Microprocessor Systems and Interfacing Laboratory	0	0	3	2	100
11CS408	Design and Analysis of Computer Algorithms Laboratory	0	0	3	2	100
11CS409	Database Systems Laboratory	0	0	3	2	100
	TOTAL	**18**	**1**	**9**	**25**	**900**

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SEMESTER V

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CS501-R	Computer Networks	3	0	0	3	100
11CS502	Formal Languages and Automata Theory	3	0	0	3	100
11CS503	System Software Design	3	0	0	3	100
11CS504	Computer Architecture	3	0	0	3	100
11CS505	Web Technologies	3	0	0	3	100
11CS506	Data warehousing and Mining	3	0	0	3	100
PRACTICAL						
11CS507	Computer Networks Laboratory	0	0	3	2	100
11CS508	System Software Design Laboratory	0	0	3	2	100
11CS509	Web Technologies Laboratory	0	0	3	2	100
	TOTAL	**18**	**0**	**9**	**24**	**900**

SEMESTER VI

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CS601	Artificial Intelligence	3	0	0	3	100
11CS602	Compiler Design	3	0	0	3	100
11CS603	Software Quality Assurance and Testing	3	0	0	3	100
11CS604	Object Oriented System Design	3	0	0	3	100
XXX	Elective – I	3	0	0	3	100
XXX	Elective – II	3	0	0	3	100
PRACTICAL						
11CS607	Compiler Design Laboratory	0	0	3	2	100
11CS608	Object Oriented System Design Laboratory	0	0	3	2	100
11CS610	Mini Project	0	0	3	2	100
	TOTAL	**18**	**0**	**9**	**24**	**900**

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ELECTIVES I & II

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CS961	TCP/IP	3	0	0	3	100
11CS962	Multimedia Systems and Applications	3	0	0	3	100
11CS963	Advanced Data Structures	3	0	0	3	100
11CS964	Network Security	3	0	0	3	100
11CS965	Big Data	3	0	0	3	100
11CS966	Probability and queuing theory	3	0	0	3	100

SEMESTER VII

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CS701 / 11EC801	Engineering Economics and Financial Accounting	3	0	0	3	100
11CS702-R	Open Source Software Development	3	0	0	3	100
11CS703	Graphics and Visualization	3	0	0	3	100
XXX	Elective – III	3	0	0	3	100
XXX	Elective – IV	3	0	0	3	100
PRACTICAL						
11CS706-R	Open Source Software Development Lab	0	0	3	2	100
11CS707	Graphics and Visualization Lab	0	0	3	2	100
11CS810	Project Work (Annual Pattern)	0	0	3	-	100
	TOTAL	**15**	**0**	**9**	**19**	**800**

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SEMESTER VIII

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CS801	Principles of Management	3	0	0	3	100
XXX	Elective – V	3	0	0	3	100
XXX	Elective – VI	3	0	0	3	100
PRACTICAL						
11CS810	Project Work (Annual Pattern)	0	0	12	8	200
	TOTAL	**9**	**0**	**12**	**17**	**500**

ELECTIVES III & IV

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CS970	Professional Ethics	3	0	0	3	100
11CS971	High Speed Networking	3	0	0	3	100
11CS972	User Interface Design	3	0	0	3	100
11CS973	Neural Network and Fuzzy Logic	3	0	0	3	100
11CS974	Digital Image Processing	3	0	0	3	100
11CS975	Optimization Techniques	3	0	0	3	100
11CS976	Virtualization	3	0	0	3	100
11CS977	Social Network Analysis	3	0	0	3	100
11CS979	Agile Software Development	3	0	0	3	100

ELECTIVES V & VI

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
THEORY						
11CS981	Distributed Systems Design	3	0	0	3	100
11CS982	Mobile and Pervasive Computing	3	0	0	3	100
11CS983	Information Retrieval Techniques	3	0	0	3	100
11CS984	Graph Theory	3	0	0	3	100
11CS985	Cyber Security and Cyber Laws	3	0	0	3	100
11CS986	Business Intelligence	3	0	0	3	100
11CS987	Information Visualization	3	0	0	3	100
11CS988-R	Cloud Technology	3	0	0	3	100

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SEMESTER I

Course Code: 11CO101	**Course Title:** TECHNICAL ENGLISH (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 2 : 0 : 2 : 3 : 100
Type: Lecture	**Total Contact Hours:** 60

Prerequisites: NIL

Course Outcomes:

At the end of the course the student should be able to:
CO1. Employ appropriate vocabulary in different academic and professional contexts.
CO2. Comprehend lectures and technical oriented passages.
CO3. Apply suitable reading strategies to any science texts.
CO4. Speak effectively in real life and work related situations
CO5. Write grammatically correct sentences.

Course Content:

UNIT I FUNCTIONAL ENGLISH GRAMMAR 6 + 6

Mechanical and grammatical structures of written English-Errors in writing mechanics -Errors in spelling-Usage and punctuation–Cohesion and Discourse-Sequencing of jumbled sentences using connectives-Embedded questions-Incorrect English (Indian Scenario).

UNIT II LISTENING - PHONETICS 6 + 6

Sounds of language -Sounds-phonemes -Organs of speech-Articulation-Consonants-vowels-International Phonetic Alphabets (IPA)-Stress and Tones Stress, pause & intonation-Transcription-Listening Comprehension.

UNIT III SPEAKING 6 + 6

Language for social purpose – Conversation-Making Introductions -Inviting questions and responses-Expressing Opinions-Individual Presentation-Extempore-Telephonic conversation.

UNIT IV GRAMMAR 6 + 6

Prepositions -Sentence Pattern-Concord –Tenses-Articles -Active & Passive Voice-Comparative adjectives-Nominal Compounds-Modal Verbs-Writing definitions -Expressions of use and purpose-Expressions forcompare and contrast- Phrasal verbs.

UNIT V WRITING 6 + 6

Instructions –Recommendations -Sequencing of Sentences-Paragraph Writing-Transcoding data -Note Making.

TEXT BOOK:

1. NiraKonar, "Communication Skills for Professionals" , PHI Learning Private Limited, New Delhi, 2009.

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REFERENCES:

1. Peter Roach, "English Phonetics and Phonology", Cambridge University Press, United Kingdom, 2004.
2. M.A.K.Halliday, "An introduction to Functional English Grammar", Edward Arnold Publishers Ltd. U.S.A, 1985.
3. Walter.E.Oliu., "Writing That Works- How to Write Effectively on the Job", St.Martin's Press, New York,1980.
4. Raymond Murphy, "Murphy's English Grammar", Cambridge University Press, United Kingdom, 2004.
5. Martin Hewings , "Advanced English Grammar", Cambridge University Press, 1999.

WEB REFERENCES:

- https://onlinecourses.nptel.ac.in/noc16_hs01
- www.pearsonlongman.com/technicalenglish
- https://en.wikipedia.org/wiki/Simplified_Technical_English
- https://technicalenglish.com/en

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Course Code: 11CO102	**Course Title:** ENGINEERING MATHEMATICS I (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 1 : 0 : 4 : 100
Type: Lecture	**Total Contact Hours:** 60

Prerequisites: NIL

Course Outcomes:

At the end of the course the student should be able to:
CO1. Use Eigen values and Eigen vectors of a real matrix to reduce quadratic form to canonical form.
CO2. Write equations of sphere and cylinder under various geometrical conditions.
CO3. Use differential calculus concepts to derive equations of evolutes of curves.
CO4. Apply partial derivatives to calculate maxima and minima for functions of several variables.
CO5. Apply multiple integrals to find area of plane curves and volume of solids.

Course Content:

UNIT I MATRICES 9+3

Rank of a matrix (Revision)-Solution of system of equations-Characteristic equations-Eigen values and Eigen vectors of a real matrix-Geometrical meaning-Significance- Diagonalization by orthogonal transformation-Quadratic forms and Canonical forms-Transformation of quadratic forms to canonical forms through orthogonal transformation.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 9+3

Direction cosines- Direction ratios-The plane and the straight line (Revision) - Sphere-Plane section of a sphere-Equation of a sphere through a circle-Tangent plane- Orthogonal spheres -Cylinder-Right circular cylinder.

UNIT III DIFFERENTIAL CALCULUS 9+3

Curvature in Cartesian and polar co-ordinates-Centre and radius of curvature-Circle of curvature-Evolutes of some standard curves (Parabola, Ellipse, Hyperbola, Astroid, Cycloid) – Envelopes.

UNIT IV FUNCTIONS OF SEVERAL VARIABLES 9+3

Partial derivatives (Revision)- Euler's theorem for homogenous functions-Total derivatives- Jacobians - Taylor's expansions- Maxima and minima for functions of two variables-Method of Lagrange's multipliers

UNIT V MULTIPLE INTEGRALS 9+3

Double integration-Cartesian and polar coordinates-Change of order of integration-Transformation from Cartesian to polar, spherical and cylindrical coordinates-Triple integration in Cartesian Coordinates-Applications: Evaluating area and volume using multiple integrals.

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TEXT BOOKS:

1. Veerarajan.T, "Engineering Mathematics", Updated 2nd Edition, Tata McGraw Hill, New Delhi, 2010.
2. Ramakrishna Prasad.A, " Kreyszig's Engineering Mathematics I " , 1st Edition, Wiley India Pvt. Ltd., India, 2011.

REFERENCES:

1. Venkatraman.M.K, "Engineering Mathematics-Volume I", 4th edition, National publishing company, Chennai, 2008.
2. Kandasamy.P, Thilagavathy. K., Gunavathy. K.,"Engineering Mathematics", Revised 9th Edition, S. Chand and Company Ltd., New Delhi, 2011.
3. Grewal.B.S. "Higher Engineering Mathematics", 40th Edition, Khanna Publications, New Delhi, 2007.
4. Louis.C.Barrett, Ray Wylie.C, "Advanced Engineering Mathematics", 6th Edition, McGraw-Hill Publishing Company Ltd, New Delhi, 2003.

WEB REFERENCES:

- https://www.edx.org/
- www.iitk.ac.in/gate/gate2012/pdffiles/xea.pdf

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Course Code: 11CO103	**Course Title:** ENGINEERING PHYSICS (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

At the end of the course the student should be able to:
CO1. Know the production and detection of ultrasonics.
CO2. Know the working of laser and its applications
CO3. Know the types of fibers, fabrication and its applications.
CO4. Know the behavior of particle.
CO5. Solve the miller indices and to know the crystal defects.

Course Content:

UNIT I ACOUSTICS AND ULTRASONICS 9

Acoustics: Sound intensity – Decibel - Reverberation - Sabines' formula. Factors affecting acoustics of buildings and remedies, Noise pollution and control, Noise control in machines. Ultrasonics: Magnetostriction and Piezoelectric generators. Detection and Properties of Ultrasonics – Cavitation - Industrial applications: Drilling, welding, soldering and cleaning – NDT: Pulse echo system, through transmission, resonance system - A, B and C scan displays with respect to flaw detection.

UNIT II LASERS 9

Laser principles: Stimulated and spontaneous emissions of radiations - Population inversion and pumping methods – Properties of lasers - Nd: YAG laser - He-Ne gas laser - CO_2 molecular laserand semiconductor lasers – Applications of Lasers: welding, drilling, cutting and heat treatment of materials. Holography: construction, reconstruction and applications - Medical applications of lasers (qualitative).

UNIT III FIBER OPTICS 9

Principle of light propagation in optical fibres - Numerical aperture and acceptance angle -Types of fibres: based on material, refractive index, and mode of propagation. Fabrication of fibre using double crucible technique, splicing - Light sources: LD & LED. Detectors: PN, PIN & Avalanche photo diodes. Fibre optical communication systems and its advantages - Fibre optic sensors: temperature and displacement - Endoscope.

UNIT IV QUANTUM PHYSICS 9

Schrodinger's wave equations : Time independent and time dependent - Physical significance of the wave function - Particle in a potential box - Electron microscopes: Scanning electron, transmission electron and Scanning transmission electron microscope.

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UNIT V CRYSTAL STRUCTURE 9

Amorphous and Crystalline materials.Lattice - Unit cell - Bravais lattices. Crystal structures: SC, BCC, FCC and HCP – Calculation of number of atoms per unit cell, Coordination number, nearest neighbor distance, Atomic radius and packing factor - Diamond, NaCl structures. Miller indices – Interplanar distance Crystal defects: point, line and surface defects and their influence on the properties of materials (Qualitative)

TEXT BOOK:

1. Avadhanulu.M.N and Kshirsagar.P.G, "Text Book of Engineering Physics", S. Chand & Company Ltd., New Delhi, 2009.

REFERENCES:

1. Palanisamy.P. K, "Engineering Physics", Scitech Publishers, Chennai, 2006.
2. Jayakumar.S, "Engineering Physics"', R.K. Publishers, Coimbatore, 2008.
3. Rajendran.V, "Engineering Physics", Tata McGraw-Hill Co, New Delhi, 2007.
4. Arthur Beiser, "Modern Physics", Tata McGraw-Hill Co, New Delhi, 2003

WEB REFERENCES:

- https://physics.stanford.edu/undergraduate-program/bs-engineering-physics
- http://ocw.mit.edu/courses/physics/
- http://provost.illinois.edu/programsofstudy/2013/fall/programs/undergrad/engin/engin_physics.html

BoS Chairman

Course Code: 11CO104	**Course Title:** ENGINEERING CHEMISTRY (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Explain the chemistry of water and specify the water treatment processes

CO2. Determine the rate of corrosion of a metal in a given environment and identify appropriate control techniques to avoid corrosion

CO3. Describe the efficiency of fuels in different states based on its composition and calorific value

CO4. Select a polymeric material for a specific engineering application

CO5. Select batteries based on the life cycle, working principle and their applications

Course Content:

UNIT I WATER TREATMENT TECHNOLOGY 9

Introduction - Impurities in water- Effect of impurities in natural waters-hardness –estimation of hardness by EDTA method (problems). Boiler feed water – disadvantages of using hard water in boilers. Internal conditioning (phosphate, calgon and carbonate conditioning methods), External conditioning – demineralization process – desalination (reverse osmosis). Domestic and waste water treatment

UNIT II CORROSION AND ITS CONTROL 9

Chemical corrosion – Pilling - Bedworth rule – electrochemical corrosion –different types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion, Corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors-protective coatings– metallic coatings – electroplating (Au) and electroless (Ni) plating. Paint- drying action of paint and its constituents

UNIT III SURFACE CHEMISTRY AND INSTRUMENTAL METHODS OF ANALYSIS 9

Surface chemistry: Adsorption- types – adsorption isotherm – Freundlich, Langmuir, application of adsorption technology in industries (ion exchange adsorption and adsorption chromatography).
Instrumental methods of Analysis: Beer –Lambert's Law –UV- VISIBLE, Flame Photometry, AAS, principle and Instrumentation (Block diagram only)

UNIT IV FUELS AND LUBRICANTS 9

Coal – classification – Calorific value -proximate and ultimate analysis of coal (method only)- metallurgical coke – manufacture by Otto-Hoffmann method -Ordinary, Premium, White and Speed Petrol - Knocking – octane number and cetane number - Gaseous fuels- water gas, producer gas, CNG and LPG. Flue gas analysis – Orsat method.
Lubricants – classification and properties- (viscosity, viscosity index, flash and fire points, cloud and pour points)

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UNIT V ENGINEERING MATERIALS AND ENERGY STORAGE DEVICES 9

Abrasives –natural and synthetic abrasives – diamond, silicon carbide and boron carbide (properties and uses only).Engineering Plastics- classification – preparation and uses of PVC, Teflon, polycarbonate, polyurethane, nylon-66, PET- Biodegradable plastics.Energy storage devices – Dry cell–alkaline batteries–lead–acid, nickel–cadmium and lithium ion batteries. Fuel cells – (Hydrogen –oxygen fuel cell).

TEXT BOOK:

1. Jain. P.C and Monica Jain, "Engineering Chemistry" DhanpatRai Pub, Co., New Delhi, 2002.

REFERENCES:

1. Sharma.B.K, "Engineering chemistry" Krishna Prakasan Media (P) Ltd., Meerut, 2001.
2. Sivasankar.B, "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2008.
3. Roop Chand Bansal and MeenakshiGoyal, "Activated Carbon Adsorption", Taylor & Francis Group, LLC, 2005 .
4. Rajput.R.K, "Engineering Materials", S. Chand & Co. Pub. New Delhi, 2006.
5. Samir Sarkar, "Fuels and Combustion", Orient Longman, India, 1996.

WEB REFERENCES:

- http://nptel.ac.in/courses/122106028/
- http://nptel.ac.in/courses/122101001/
- http://www.learnerstv.com/Free-Chemistry-Video-lectures-ltv044-Page1.htm
- http://www.myopencourses.com/subject/engineering-chemistry-i-1

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Course Code: 11CO105	**Course Title:** C PROGRAMMING (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

At the end of the course the student should be able to:
CO1. Enumerate the significant aspects of software development and problem solving techniques
CO2. Exhibit the various types of control flow in C language
CO3. Illustrate the effective usage of arrays, functions and structures in C.
CO4. Demonstrate the implementation of pointers in arrays, structures and functions.
CO5. Analyze file access methods and the features of preprocessor directives

Course Content:

UNIT I INTRODUCTION 9

Introduction to computers – Computer Software – Software development life cycle - Need for studying Computer Programming Languages - Problem Definition and Analysis -Flow Chart, Developing algorithm - Procedural Programming (modular and structural)- Compilers and Interpreters - Program compilation, execution, debugging, testing - C program development environment.

UNIT II C LANGUAGE BASICS 9

Overview of C – Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision Making - Branching and Looping. Enumerated Data type, Renaming Data type with typedef – Type Casting.

UNIT III ARRAYS, FUNCTIONS AND STRUCTURES 9

ARRAYS: Definition- Declaration- Initialization- Assignment- Processing array- Passing array to a function- Two and multi dimensional array.

FUNCTIONS: Defining a function- Accessing a function-Passing argument to functions- Function prototypes- Nested function call - Storage classes. Handling of character strings.

STRUCTURES: Definitions - processing structure-User defined data types- - Passing structure to functions –Self referential structures- Nested structures. Defining a Union- Processing union- Structures and unions comparison- Bit fields.

UNIT IV POINTERS 9

Pointer variable declaration- Initialization and assignment- Pointers to a function- Pointers and one dimensional array and multi dimensional array- Operating a pointers- Array of pointers- Passing function to other functions. Structures and pointers – Linked Lists.

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UNIT V FILES 9

Introduction to files-File access-File organization-File operations (open, close, read, write, etc.)- Command line arguments. C Preprocessors – Features – Macro Expansion – File inclusion- Conditional compilation – Miscellaneous Directives – simple Header files functions.

TEXT BOOKS:

1. Byron Gottfried, "Schaum's Outline of Programming with C", 2nd Edition, (Indian Adapted Edition), TMH publications, New Delhi, 2006.
2. YashwantKanetkar, "Let Us C", 5th Edition, BPB Publications, New Delhi, 2004.

REFERENCES:

1. Balagurusamy.E, "Programming in ANSI C" Tata McGRaw-Hill Publishing Company Limited, New Delhi 2007 .
2. Herbert Schildt, "C – The Complete Reference", 4th Edition, Tata McGraw Hill publishing Company, New Delhi, 2005.
3. Behrouz.A.Forouzan and Richard.F.Gilberg, "A Structured Programming Approach Using C", 2nd Edition, Brooks-Cole Thomson Learning Publications,UK, 2007.
4. Ashok.N.Kamthane, "Computer Programming", Pearson Education (India), New Delhi, 2008.

WEB REFERENCES:

- Introduction to programming in C. URL: http://nptel.ac.in/courses/106104128/
- Practical Programming in C URL: http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/lecture-notes/

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Course Code: 11AU106	**Course Title:** BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (Common to MECH, AUTO, CIVIL, CSE & IT)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: Nil

Course Outcomes:

At the end of the course the student should be able to:
CO1. Solve simple problems using fundamental laws on DC and AC circuits.
CO2. Understand the basics of electrical machines and their working principles.
CO3. Comprehend the fundamentals of basic electronic devices and its applications.
CO4. Appreciate the difference between various types of measuring instruments.
CO5. Learn the basic techniques used in communication systems.

Course Content:

UNIT I ELECTRIC CIRCUITS 9

Characterization of electrical power: nature of electric power (AC/DC), charge, voltage, current, active power, reactive power and apparent power - Electric circuit elements (R, L & C) - Voltage and current relationship - Ohm's law and Kirchoff's laws- Voltage and current division rules - Series and parallel connections - AC fundamentals: average and RMS values of sinusoidal waveform - Power factor - R, L & C connected to AC source - Phasor diagram.

UNIT II ELECTRICAL MACHINES 9

Introduction to magnetic circuits: permanent magnet, electromagnet, self-inductance, mutual inductance - Fleming's Right and Left hand rules - Construction and principle of operation of DC motors, DC generators- Transformers - Single phase induction motors - Three phase induction motors - Typical applications for the electrical machines - Introduction to transmission and distribution system - Layout of a typical power supply system (Block diagram only).

UNIT III ELECTRONICS 9

Basic electronics: semiconductors, PN junction, biasing characteristics of PN junction, breakdown voltage, knee voltage - Rectifiers: half wave, full wave and bridge rectifier - Inverters (Qualitative treatment only) - Zener diode and voltage regulator - Transistor: types, working of PNP and NPN transistor-Transistor configuration: CB, CE and CC - Input and output characteristics of CE configuration - Transistor as a switch and amplifier - Oscillators - Applications of electronic devices.

UNIT IV BASIC MEASURING INSTRUMENTS 9

Units and standards - Essentials of indicating instruments - Meters: MC and MI instruments - operation of regulated power supply, CRO and function generator (qualitative study only).

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UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 9

Types of Signals: Analog and Digital signals - Modulation and Demodulation: amplitude and frequency modulations - Communication Systems: radio, TV, satellite and optical fiber (block diagram approach only) - Wireless and mobile networks: structure and function of wireless networks, performance of wireless networks.

TEXT BOOK:

1. Vincent Del Toro, "Electrical Engineering Fundamentals", Prentice Hall of India, New Delhi (India), 1999.
2. Metha.V.K, "Principles of Electronics", S.Chand and Company Ltd, New Delhi (India), 1999.

REFERENCES:

1. Jegathesan.V, VinothKumar.K, and Saravanakumar.R, "Basic Electrical and Electronics Engineering", Wiley India Pvt. Ltd., New Delhi (India), 2011.
2. Theraja.B.L and Theraja.A.K, "A Text book of Electrical Technology", (Volume I and II), S.Chand and Company Ltd., New Delhi (India), 2001.
3. MurugeshKumar.K, "Basic Electrical Science and Technology", Vikas Publishing House Pvt. Ltd., New Delhi (India), 2002.
4. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, New York (US), 2001.
5. Theodore.S.Rappaport, "Wireless Communications", Pearson Education, New Delhi (India), 2002.

WEB REFERENCES:

- Basic Circuit Analysis Method (KVL and KCL Method) URL: http://www.learnerstv.com/video/Free-video-Lecture-861-Engineering.htm
- Useful laws in Basic Electronics.URL: http://www.learnerstv.com/video/Free-video-Lecture-1681-Engineering.htm

BoS Chairman

Course Code: 11CO108	**Course Title:** ENGINEERING PRACTICES LABORATORY (Common to MECH, AUTO, CIVIL, CSE & IT)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Prerequisites: Nil

Course Outcomes:

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

CO1. Understand the basic electrical symbols, measuring instruments, protecting equipment and home appliances.
CO2. Solve simple faults in electric circuits in home appliances and their components.
CO3. Study the basic electronic symbols and troubleshoot electronic components like CRO, function generator etc.,
CO4. Identify hardware parts of a computer and assemble them

List of Experiments:

ELECTRICAL ENGINEERING PRACTICE

1. Electrical symbols, safety aspects of electrical wiring and earthing practices.
2. Introduction to the connection of voltmeter, ammeter and multimeter.
3. Stair case wiring, assembling and testing of a fluorescent lamp circuit & fault finding.
4. Domestic lighting circuits and use of megger.
5. Diagnosing simple faults in grinder, mixie, iron box, ceiling & table fans.
6. Introduction to types of fuses, MCB and types of wires and cables.

ELECTRONICS ENGINEERING PRACTICE

1. Symbols of basic electronic components and equipments.
2. Color coding of resistors and identification of capacitor values.
3. Study and method of using CRO, function generator, power supply units with fault identification and trouble shooting.
4. Study of AC signal parameters (amplitude, frequency, phase) using CRO.
5. Logic gates (AND, OR, NOT, NAND, NOR, EX-OR).
6. Soldering and testing a given simple electronic circuits using PCB.

COMPUTER HARDWARE

1 a) Study of PC hardware
  b) Assembling the computer system
2 a) Formatting and Partitioning HDD
  b) Configuring CMOS-Setup
  c) Installation of OS

BoS Chairman

Course Code: 11CO109	**Course Title:**ENGINEERING GRAPHICS (Common to MECH, AUTO, CIVIL, CSE & IT)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 2 : 0 : 3 : 3 : 100
Type: Lecture & Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1. Sketch different engineering curves
CO2. Generate multiple views of planes and solids using orthographic projection technique
CO3. Prepare development of lateral surfaces of objects
CO4. Prepare Drawings using CAD Package

Course Content:

UNIT I INTRODUCTION TO ENGINEERING GRAPHICS 15

Importance of graphics in engineering applications – General principles of engineering graphics – principles of orthographic projection – angles of projection - multiple views and their placement – layout of views.
Use of conventional drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning- Methods of Dimensioning.

Geometric shapes of objects - Mathematical representation of geometrical shapes - their engineering applications – Construction of polygonal shapes, their importance and application.

Conics sections – Construction of ellipse, Parabola and hyperbola by eccentricity method – construction of cycloid and involutes of square and circle – construction of spirals and helices – Meaning of tangents and normal to the above curves.

UNIT II PROJECTION OF LINES, PLANES AND SOLIDS 15

Projection of points and lines - Concept of polygonal surfaces and circular lamina inclined to both reference planes – Concept of true lengths and true inclinations.
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to two reference plane.

UNIT III DEVELOPMENT OF SURFACES AND SECTIONS OF SOILDS 15

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones.
Need for sectioning of solids – Sectioning of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by cutting planes inclined to one reference plane and perpendicular to the other. – Orthographic views of sections of simple solids.

UNIT IV ORTHOGRAPHIC AND ISOMETRIC PROJECTION OF SOLIDS 15

Orthographic projection of solids – Practices on three view projection of solids.
Isometric Projection of solids – practices on simple solids

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UNIT V SOLID MODELING AND CIVIL DRAWINGS 15

Need and advantages of modeling software over conventional drawing methods - Representation of three Dimensional objects –3D modeling techniques – constructive solid geometry (CSG) and boundary representation (BRep) techniques - Boolean operations, extrude, revolve, mirror, array, etc. Modelling of isometric views of engineering components.
Introduction to perspective projection .Meaning of house plans-different types representation of different details-meaning of area of a house and site.

TEXT BOOK:

1. Natrajan.K.V, "A text book of Engineering Graphics", Dhanalakshmi Publisher, Chennai, 2006

REFERENCES:

1. Dhananjay.A.Jolhe, "Engineering Drawing with an introduction to AutoCAD", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Bhatt.N.D, "Engineering Drawing "46th Edition, Charotar Publishing House, Gujarat, India, 2003
3. Basant Agarwal and Agarwal.C.M, "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
4. Gopalakrishnan.K.R, "Engineering Drawing" (Vol. I&II), Subhas Publications, Chennai, 1998.
5. Manuals of 2D and 3D Modeling software packages.

WEB REFERENCES:

- http://www.engineeringdrawing.org
- http://nptel.ac.in
- http: //iitd.ac.in

BoS Chairman

Course Code: 11CO110	**Course Title:** C PROGRAMMING LABORATORY (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1. Evaluate complex expressions using apt operators and data types.
CO2. Differentiate the types of control flow in a program using decision making and looping statements.
CO3. Be expertise in handling complex data types and operations using structures, arrays and functions.
CO4. Design applications using file operations and pointers.

List of Experiments:

1. Program to process Data types, formatting inputs and outputs.
2. Program using operators and Expression Evaluation
3. Program using decision making
4. Program using looping Statements.
5. Program using Functions
6. Program using Arrays
7. Program for String Handling
8. Program using Structures
9. Program using Pointers
10. Program on basic File Operations
11. Develop a mini project implementing the concepts from 1 to 10.

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SEMESTER II

Course Code: 11CO201	**Course Title:** COMMUNICATION SKILLS (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 60

Prerequisites: The student should have undergone the course(s):
11CO101 TECHNICAL ENGLISH

Course Outcomes:

At the end of the course the student should be able to:
CO1. Use listening skills for academic and professional purposes
CO2. Inculcate and develop the habit of reading.
CO3. Speak effectively in real life situations.
CO4. Write letters and reports effectively in formal & business situations.
CO5. Use appropriate vocabulary in different business contexts.

Course Content:

UNIT I LISTENING 6+6

Listening to fill up gapped texts -Listening to identify context and Speaker's opinion-Note Taking-Listening to Conversation

UNIT II READING 6+6

Exposure to different reading techniques-Skimming, identifying the topic sentence and its role in each paragraph-Scanning - Inferring and identifying the lexical and textual message-Comprehension & Note Making

UNIT III SPEAKING 6+6

Verbal and Non-verbal Communication-Introducing Oneself-Describing objects and Situations-Expressing opinions - Agreement & Disagreement-Group Discussion- Mock interview-Power Point Presentation-Soft Skills-Behavioral attitude, Dress code, Dining etiquette

UNIT IV TECHNICAL REPORT WRITING 6+6

Writing Business Messages (Advertisement), Caption, Slogan Writing- Documentation-Preparation of Brochure, Pamphlets, notices, agenda, minutes- Writing Business Letters- calling for quotations, placing orders, a letter of complaint regarding manufacturing defects, seeking permission to use certain facilities in a company-Preparation of comparative statements- Letter of application - content, format & Resume writing-E-Mail, Memos & Proposals-Process Description, Analytical Writing, Argumentative Writing-Writing Instructions-Proof Reading

UNIT V VOCABULARY 6+6

Word formation-prefixes &suffixes - Abbreviations and Acronyms - Foreign Words and Phrases - British & American English - Idioms and phrases (computer- related) - Scientific and technical terms-jargons-Technical Register-Pairs of confused words

BoS Chairman

TEXT BOOK:

1. Sangeetha Sharma &Binod Mishra, "Communication Skills for Engineers and Scientists", PHI Learning Private Limited, New Delhi, 2009.

REFERENCES:

1. M.A.K.Halliday, "An introduction to Functional English Grammar", Edward Arnold Publishers Ltd., U.S.A, 1985.
2. Walter.E.Oliu., "Writing That Works- How to Write Effectively on the Job", St.Martin's Press, New York, 1980.
3. Joe Ayres, "Effective Public Speaking", Brown Company Publishers, 1983.
4. Richard Huseman, "Business Communication-Strategies and Skills", Alger Press, 1988.
5. Herta. A. Murphy, "Effective Business Communication", McGraw-Hill Ryerson, 1990.
6. Martin Hewings, "Advanced English Grammar", Cambridge University Press, 1999.

WEB REFERENCES:

- http://nptel.ac.in/courses/109104031/
- https://www.businesstrainingworks.com/onsite-training-courses-directories/communication-skills-training-courses-directory
- http://www.ilsc.in/communication-courses

BoS Chairman

Course Code: 11CO202	**Course Title:** ENGINEERING MATHEMATICS II (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 1 : 0 : 4 : 100
Type: Lecture	**Total Contact Hours:** 60

Prerequisites: The student should have undergone the course(s):
11CO102 ENGINEERING MATHEMATICS I

Course Outcomes:

At the end of the course the student should be able to:
CO1. Solve second and higher order linear ordinary differential equations.
CO2. Understand the concepts of vector differentiation and integration.
CO3. Use the functions of a complex variable and construct analytic functions.
CO4. Use the concept of complex integration to solve contour integrals.
CO5. Apply the Laplace transform techniques to solve differential equations.

Course Content:

UNIT I DIFFERENTIAL EQUATIONS 9+3

Second and third order linear differential equations with constant coefficients -Method of variation of parameters-Cauchy and Legendre's linear equations for variable coefficients-Simultaneous first order linear equations with constant coefficients.

UNIT II VECTOR CALCULUS 9+3

Gradient, divergence and curl, irrotational and solenoidal vector fields- Directional derivatives-Green's theorem in a plane (without proof)-Gauss divergence theorem (without proof) - Stoke's theorem (without proof)-Verification and evaluation of integrals using Green's, Gauss's and Stoke's theorem.

UNIT III ANALYTIC FUNCTIONS 9+3

Function of a complex variable-Analytic function -Singular points –Cauchy Riemann equations-Sufficient conditions (without proof) – Properties-Construction of analytic functions-Conformal mapping: Bilinear transformation, Special mappings: $w = z + c$, $w = c z$, $w = 1/z$.

UNIT IV COMPLEX INTEGRATION 9+3

Taylor and Laurent expansions- Types of singularity -Cauchy's fundamental theorem (without proof) – Residues-Cauchy Residue theorem-Evaluation of integrals –Applications: Evaluation of real integrals using Contour integration with no poles on the real axis.

UNIT V LAPLACE TRANSFORM 9+3

Laplace transform-Conditions for existence-Transform of elementary functions- Properties Transform of derivatives, integrals, unit step function and unit impulse function – Transformation of periodic functions-Inverse Laplace transform-Convolution theorem-Initial and final value theorems-Solution of linear ODE of second order with constant coefficients using Laplace transform.

BoS Chairman

TEXT BOOKS:

1. Veerarajan T, "Engineering Mathematics", Updated 2nd Edition, Tata McGraw Hill, NewDelhi, 2010.
2. Ramakrishna Prasad. A, "Kreyszig's Engineering Mathematics I", 1st Edition, Wiley India Pvt. Ltd., India, 2011.

REFERENCES:

1. Venkatraman M K, "Engineering Mathematics-Volume II", 4th edition, National publishingcompany, Chennai, 2008.
2. Kandasamy P, "Engineering Mathematics", Volume I (First semester), 6th Edition, S. Chandand Company Ltd., New Delhi, 2006.
3. Grewal B S, "Higher Engineering Mathematics", 40th Edition, Khanna Publications, NewDelhi, 2007.
4. Louis C Barrett, C Ray Wylie, "Advanced Engineering Mathematics", 6th Edition, McGraw Hill Publishing Company Ltd, New Delhi, 2003.

WEB REFERENCES:

- https://www.edx.org/
- www.iitk.ac.in/gate/gate2012/pdffiles/xea.pdf

BoS Chairman

Course Code: 11CO203	**Course Title:** MATERIAL SCIENCE (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CO103 ENGINEERING PHYSICS

Course Outcomes:
At the end of the course the student should be able to:
CO1. Know the properties of conducting and semiconducting materials
CO2. Know the properties and applications of magnetic and superconducting materials
CO3. Know the types of dielectric materials and its applications
CO4. Know the behavior of particle.
CO5. Know the new engineering materials and its applications

Course Content:

UNIT I CONDUCTING MATERIALS 9

Formation of bands (qualitative) - Classification of solids based on bands – Classical free electron theory, Expression for electrical and thermal conductivity, Weidmann Franz law - Sources of resistivity - Mattheissen's rule. - Low and high resistivity materials and their applications.

UNIT II SEMICONDUCTING MATERIALS 9

Intrinsic and extrinsic semiconductors - Expression for carrier concentration - Variation of carrier concentration and Fermi level with temperature for n – type - Elemental and compound semiconductors - Hall effect : Hall coefficient in extrinsic semiconductors, experimental determination of Hall coefficient and applications of Hall effect, LDR, Solar Cells and strain gauges

UNIT III MAGNETIC MATERIALS AND SUPERCONDUCTORS 9

Introduction to magnetic materials - Ferromagnetic materials - Properties - Domain theory of ferromagnetism - Hysteresis - Hard and soft magnetic materials - Ferrites: structure and applications. Magnetic storage devices: magnetic recording and magneto optical recording – Materials for permanent magnets. Superconductors – Properties - Types of superconductors - High Tc superconductors - Applications: SQUID - Cryotron – Magnetic levitation.

UNIT IV DIELECTRIC MATERIALS 9

Polarization – Polarizability – Polarization vector, Electrical susceptibility, Dielectric constant - Polarization mechanisms (Qualitative) –Internal Field- Clausius Mossotti relation-Frequency and temperature dependence of polarization - Dielectric loss - Dielectric breakdown mechanisms – Ferro electric materials, Classification and its Properties –Piezoelectric materials – classification of Insulating materials.

UNIT V MODERN ENGINEERING MATERIALS 9

Shape Memory alloys (SMA): Characteristics, properties of NiTi alloy. Applications of SMA. Metallic glasses: Preparation, properties and applications. Nano Materials: Top down processes: Ball Milling - Bottom up processes: Physical vapor deposition, Nanomaterials, properties and applications (Qualitative). Carbon nanotubes: Fabrication - CVD, electric arc discharge method, Properties and applications.

BoS Chairman

TEXT BOOKS:

1. William D CallisterJr,"Material Science and Engineering – An Introduction", John Wiley and Sons Inc., 6th Edition, New York, 2007.
2. S. Jayakumar, "Materials science"', R.K. Publishers, Coimbatore, 2008.

REFERENCES:

1. PK Palanisamy, "Materials science", Scitech publications, Chennai, 2004.
2. S.O. Kasap, "Principles of Electronics Materials and Devices", McGraw Hill Higher Education, NewDelhi, 2002.
3. V Rajendran, "Engineering Physics", Tata McGraw-Hill Co, New Delhi, 2007.
4. M N Avadhanulu, "Engineering Physics", S. Chand, New Delhi, 2009.

WEB REFERENCES:

- http://ocw.mit.edu/courses/materials-science-and-engineering/
- https://www.ox.ac.uk/admissions/undergraduate/courses-listing/materials-science?wssl=1
- https://www.imperial.ac.uk/study/ug/courses/materials-department/materials/

BoS Chairman

Course Code: 11CO204	**Course Title:** ENVIRONMENTAL SCIENCE (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CO104 ENGINEERING CHEMISTRY

Course Outcomes:
At the end of the course the student will be able

CO1. Describe the ways to maintain ecological balance and preserve bio-diversity.
CO2. Explain the causes of pollution and the methods to reduce & recycle.
CO3. Describe the way from unsustainable to sustainable development through effective usage & conservation of energy.
CO4. Describe the global environmental issues and the laws passed to control it.
CO5. Describe the role of man & technology in environmental management

Course Content:

UNIT I ENVIRONMENTAL SCIENCE AND BIO SYSTEMS 9

Multidisciplinary nature of Environmental studies – Definition, Scope and Importance of Environmental studies – Natural resources– Over exploitation of resources and impacts Ecosystem – Structure and function of an ecosystem – concept, structure and function with relevant examples- Food chain, Food web and Ecological pyramids Biodiversity – Endemic, endangered and extinct species – Habitat – Hotspots – values of biodiversity -threats to biodiversity - conservation of biodiversity.

UNIT II ENVIRONMENTAL POLLUTION 9

Causes, effects and control of – Air pollution, Water pollution, Marine pollution, Thermal pollution, Noise pollution- solid waste management – types and sources of solid waste- 3R principles, advantages of recycling and waste utilization, E –waste, hazardous waste management.

UNIT III ENERGY AND SUSTAINABILITY 9

Energy resources- types - the role of renewable sources of energy- Principle involved in energy conversion advantages and limitations of hydro energy, solar energy, wind energy, bio energy, geothermal energy, ocean energy. Sustainable development – equitable use of resources for sustainable development.

UNIT IV GLOBAL ENVIRONMENTAL ISSUES AND LAWS 9

Facts and impacts of - Climate change, Global warming, ozone layer depletion, waste lands. Environmental disasters - disaster management approach. International Conventions, protocols for environmental protection. Environmental ethics - Environmental protection act in India - Role of Pollution control boards.

UNIT V HUMAN POPULATION AND ENVIRONMENT 9

Population growth, population explosion, environment and human health, Role of technology in environmental management. Public awareness, Eco-labeling. Role of NGO's in environmental management. Case studies.

BoS Chairman

TEXT BOOKS:

1. Kaushik Anubha & Kaushik C P, "Environmental Science and Engineering", New Age International Publishers, 3rd edition, reprint 2010, New Delhi.

REFERENCES:

1. William P. Cunningham – "Principles of Environmental Science", Tata McGraw Hill, New Delhi, 2007.
2. Linda.D.Williams – "Environmental Science Demystified", Tata McGraw Hill Publishing Company Limited , 2005.
3. Shyam Divan, Armin Rosencranz – "Environmental Law and Policy in India –Cases, materials and Statutes", Oxford University Press, New Delhi, 2001.
4. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 'Prentice Hall of India private limited, New Delhi –2nd edition, 2004.
5. G. Tyler Miller, JR _ "Environmental Science ", Thomson, 2004.

WEB REFERENCES:

- http://www.environmentalscience.org/
- http://uncw.edu/career/environmentalscience.html
- http://www.ensci.iastate.edu/

BoS Chairman

Course Code: 11CS205	**Course Title:** OBJECT ORIENTED PROGRAMMING CONCEPTS (Common to CSE and EEE)
Core/Elective: Core	**Credits (L:T:P:C:M) –** 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CO105-C PROGRAMMING

Course Outcomes:

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

CO1. Describe Object-oriented paradigm with their fundamentals
CO2. Implement OO concepts in C++
CO3. Implements the concepts of basic exception handling mechanisms
CO4. Outlines the file organization and the usage of file systems
CO5. Defines the fundamentals of Java programming.

Course Content:

UNIT I INTRODUCTION **9**

Object-oriented paradigm, elements of object oriented programming – Merits and demerits of OO methodology – C++ fundamentals – data types, operators and expressions- control flow- arrays- strings- pointers and functions.

UNIT II PROGRAMMING IN C++ **9**

Classes and objects – Access Specifiers - Constructors and Destructors- Inheritance– Polymorphism- Operator overloading-Virtual functions.

UNIT III TEMPLATES AND EXCEPTION HANDLING **9**

Function and class templates - Exception handling – try-catch-throw paradigm – exception specification – terminate and unexpected functions – Uncaught exception.

UNIT IV FILE HANDLING **9**

C++ streams – console streams – console stream classes-formatted and unformatted console I/O operations, manipulators - File streams - classes file modes file pointers and manipulations file I/O.

UNIT V JAVA FUNDAMENTALS **9**

An overview of Java, data types, variables and arrays, operators, control statements, classes, objects, methods – Inheritance-Exception Handling.

TEXT BOOK:

1. Herbert Schildt, "The Complete Reference: C++", 4th edition, Tata McGraw Hill, Noida, 2007.
2. Deitel.H.M, Deitel.P.J, "Java: How to program", 5th edition, Prentice Hall of India private limited, New Delhi, 2009.

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REFERENCES:

1. Ira Pohl, "Object oriented programming using C++", Pearson Education Asia, 2007.
2. Malik. D.S, "C++ Programming from Problem Analysis to Program Design", 3rd Edition, Thomson course Technology, New Delhi, 2007.
3. John.R.Hubbard, "Programming with C++", Schaums outline series, Tata McGraw Hill, New Delhi,2003.
4. Herbert Schildt, "The Complete Reference: Java2", 5th edition, Tata McGraw Hill, Noida, 2007.

WEB REFERENCES:

- Introduction to C++ URL : http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-096-introduction-to-c-january-iap-2011/lecture-notes/,
- Java lectures URL: http://www.cse.iitb.ac.in/~nlp-ai/java%20ppt/

BoS Chairman

Course Code: 11CS206	**Course Title:** BASICS OF CIVIL AND MECHANICAL ENGINEERING (Common to CSE & IT)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: Nil

Course Outcomes:

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

CO1. Outline the various Civil Engineering materials used in field and understand the importance of surveying

CO2. Identify the principle behind architectural aspects involved in construction and Illustrate the techniques involved in construction of substructure and superstructure

CO 3. Recognize the various manufacturing process for making a product.

CO 4. Decide various parameters in designing air conditioning and refrigeration systems.

CO 5. Define the fundamentals of I.C Engine and its principle of working.

Course Content:

CIVIL ENGINEERING

UNIT I CIVIL ENGINEERING MATERIALS & SURVEYING 8

Infrastructure projects- Role of civil Engineers, Basic areas in Civil Engineering and its scope - Civil Engineering Materials and classification - stones, bricks, sand, aggregate, cement & types of cement, mortar, concrete, concrete grades, types of concrete, Plain cement concrete (PCC) - Reinforcement cement concrete(RCC), surveying objectives and types, common methods and instruments for distance and angle measurements

UNIT II PRINCIPLES OF ARCHITECTURAL DESIGN 7

Aesthetic qualities in building to include, unity, proportion, scale, balance, symmetry and rhythm – study of examples, Factors in architectural design, such as: requirements, circulation, anthropometrics, site & landscape, climate, space standards, safety regulations, layout regulations, building rules , Basic services – basics of interior design and landscaping, Integration of building services.

UNIT III BUILDING COMPONENTS 8

Sub structure: Nature of soil – problems with soil, selection of foundation based on soil condition – functions of foundation, Bearing capacity - requirement of good foundations. Super structure: types of masonry – brick masonry, stone masonry, Beams, columns, Lintels & floors.

B. MECHANICAL ENGINEERING

UNIT IV MANUFACTURING PROCESSES 8

Metal Forming - Forging, Rolling, Extrusion processes. Metal Casting - Foundry – Moulding and Casting Processes, Welding, Metal Machining – Turning, Milling, Grinding, Shaping, Planning

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UNIT V REFRIGERATION AND AIR CONDITIONING 7

Refrigeration: Principle of vapor compression system – Layout of typical domestic refrigerator, Refrigerants – types and properties.
Air Conditioning: Air conditioning – Definition, working principle of Window and Split type room air conditioners.

UNIT VI IC ENGINES 7

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Two stroke and Four stroke cycles – Comparison of two stroke and four stroke engines.

TEXT BOOKS:

1. Jayagopal.L.S&Rudramoorthy.R, "Basic Civil and Mechanical Engineering", Vikas Publishing House, New Delhi, 2001.
2. Shanmugam.G and Palanichamy.M.S, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi, 1996.
3. Ramesh Babu.V, "Basic Civil and Mechanical Engineering", Anuradha Agencies, Kumbakonam 2001.

REFERENCES:

1. Bindra.S.P and Arora.S.P, "The text book of Building construction", DhanpatRai Publications (P) Ltd., New Delhi, 2011.
2. Francis.D.K.Ching, " Architecture: Form, Space and Order ", VNR, New York, 1999.
3. Ananthanarayanan.P, "Basic Refrigeration and Air Conditioning",Tata McGraw Hill Publishing Co., New Delhi, 2003.
4. Srinivasan. S, "Automotive engineering",Tata McGraw Hill Publishing Co., New Delhi, 2003.

WEB REFERENCES:

- http://nptel.ac.in/courses/112105128/
- http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Ref%20and%20Air%20Cond/New_index1.html
- http://www.engineeringcivil.com/
- http://www.bmtpc.org/
- http://www.aboutcivil.org/engineering-materials.html

BoS Chairman

Course Code:11CO207	**Course Title:** ENGINEERING PRACTICES LABORATORY (Common to CSE & IT)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1. Know the use of hand tools and equipments used in fabrication workshop.
CO2. Select the various tools and equipments used in the fabrication workshop.
CO3. Make various models in carpentry, fitting, sheet metal, welding and plumbing.
CO4. Demonstrate the working of domestic appliances.

Course content:

List of Experiments:

I. Civil Engineering Practices

(a) Building: Study of plumbing and carpentry components of residential and Industrial buildings & Safety aspects.

(b) Plumbing Works:

1. Study of pipe line joints, its locations and functions: Valves, tape, couplings, unions, reducers and elbows in house hold fittings.
2. Hands on Exercise on Basic Pipe Connections-Mixed Pipe Material Connection-Pipe Connections with Different Joining Components.
3. Study of Pipe Connections Requirements for Pumps and Turbines.

(c) Carpentry Works:

1 Study of the Joints in Roofs, Doors, Windows and Furniture.
2 Hands-on-Exercise: Wood Work, Joints by Sawing, Planning and Cutting.
3 Demonstration on Carpentry using Power Tools.

II. Mechanical Engineering Practice

(a) Welding:

1. Study of Welding Processes, Tools and Safety Aspects.
2 Hands on Exercise for making: Butt Joint, Lap Joint, Tee Joint using arc welding
3 Hands on Exercise on Gas Welding Practice

(b) Sheet Metal Work:

1 Study of Sheet Metal Works, Tools and Measuring Instruments.
2 Hands on Exercise on:
(i) Forming & Bending.
(ii) Model Making: Trays, Cones, Funnels etc

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(c) Machine Assembly Practice:

Centrifugal Pump

(d) Demonstration on:

1. Turing &Drilling Practice
2. Smithy Operation: Upsetting, Swaging, Setting Down, and Bending example.
3. Foundry operations like Mould Preparation for Gear and Step Cone Pulley
4. Fitting-Preparation of Square Fitting and Vee-Fitting Models.
5. Air-Conditioner.
6. I.C. Engines

REFERENCES:

1. Jeyachandran.K, Natarajan.S & Balasubramaniam.S, "A Primer on Engineering Practices Laboratory", Anuradha Publications, 2007.
2. Rajendra Prasad. A & Sarma. P.M.M.S, "Workshop Practice", SreeSai Publications, 2002.
3. Kannaiah.P & Narayana.K.L, "Manual on Workshop Practice", Scitech Publications, 1999.

BoS Chairman

Course Code:11CS210	**Course Title:** OBJECT ORIENTED PROGRAMMING LABORATORY (Common to CSE and EEE)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CO110 C PROGRAMMING LABORATORY

Course Outcomes:

At the end of the course the student should be able to:
CO1. Experiment the possible ways of using member variables and function definitions within a class.
CO2. Demonstrate the significance of compile time and run time polymorphism.
CO3. Generate and handle exceptions effectively in complex programs using C++ and Java.
CO4. Create C++ and Java applications using inheritance and file operations.

Course content:

List of Experiments:

A. C++ Programming

1. Programs Using Functions
   a. Functions with default arguments
   b. Implementation of Call by Value, Call by Address and Call by Reference
2. Implementation of Classes for understanding objects, member functions and Constructors
   a. Classes with primitive data members
   b. Classes with arrays as data members
   c. Classes with pointers as data members – String Class
   d. Classes with constant data members
   e. Classes with static member functions
3. Compile time Polymorphism
   a. Operator Overloading including Unary and Binary Operators.
   b. Function Overloading
4. Runtime Polymorphism
   a. Virtual functions
   b. Virtual Base Classes
5. Templates
6. Exception Handling
7. File Handling
   a. Sequential Access
   b. Random access

BoS Chairman

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B. JAVA Programming

8. Java applications
   - for understanding reference to an instance of a class (object), methods
   - Handling Strings in Java
9. Inheritance
10. Exception Handling Mechanism in Java
    - Handling pre-defined exceptions
    - Handling user-defined exceptions

REFERENCES:

1. Herbert Schildt, "The Complete Reference:C++", 4th edition, Tata McGraw Hill, Noida, 2007.
2. Deitel.H.M, Deitel.P.J, "Java: How to program", 5th edition, Prentice Hall of India private limited, New Delhi, 2009.
3. Ira Pohl, "Object oriented programming using C++", Pearson Education Asia, 2007.
4. Herbert Schildt, "The Complete Reference: Java2", 5th edition, Tata McGraw Hill, Noida, 2007.

BoS Chairman

Course Code:11CO210	**Course Title:** ENGINEERING PHYSICS AND CHEMISTRY LABORATORY (Common to all Branches)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1. Measure optical parameters of laser and optical fiber.
CO2. Estimate electrical properties of metal and semiconductor.
CO3. Measure corrosion rate of a mild metal.
CO4. Determine concentration of a solution through electrical method.

Course content:

A. ENGINEERING PHYSICS LAB

List of Experiments:

1. Velocity of ultrasonic waves and compressibility of given liquid - ultrasonic interferometer
2. Wavelength of laser and particle size determination using laser
3. Insulation of thin wire – Interference technique
4. Thermal conductivity of insulator - Lee' disc method
5. Band gap of a Thermistor – Post office box
6. Resistivity of metal and alloy – Carey Foster's bridge
7. Band gap of a diode – Reverse characteristics
8. Thermal conductivity of metallic wire - Meter bridge method
9. Numerical aperture of the given optical fiber
10. Hysteresis Loss of a ferromagnetic material
11. Study of characteristics of given LDR
12. Efficiency of Solar Cell
13. Rigidity modulus of metallic wire -Torsional pendulum method
14. Young's modulus of the material - Cantilever method
15. Co-efficient of viscosity of the liquids
16. Hall coefficient determination
17. Dielectric constant determination

TEXT BOOKS/ MANUAL:

1. Lab manual by Physics department

BoS Chairman

B. CHEMISTRY LABORATORY

WEIGHING AND PREPARATION OF STANDARD SOLUTIONS

Preparation of molar and normal solutions of oxalic acid, sodium carbonate and standard hard water.

WATER ANALYSIS

i) Determination of total, temporary and permanent hardness of water sample by EDTA method.
ii) Determination of Dissolved oxygen content by Winkler's method
iii) Determination of COD of waste water by dichromate method
iv) Determination of heavy metals in water by spectrophotometry (any one-Iron, Cr, Hg)

VISCOMETRY

v) Determination of molecular weight of a polymer

ELECTROCHEMISTRY

vi) To determine the strength of given acid – pH metrically
vii) To determine the amount of ferrous ions by potentiometry
viii) Determination of emf of electrochemical cell
ix) Determination of corrosion rate – weight loss method
x) Determination of inhibitor efficiency – corrosion

REFERENCES:

1. Jeffery.G.H, Bassett.J, Mendham.J and Denny.R.C, Vogel's "Text book of quantitative Chemical Analysis", Oxford, ELBS, London, 2002.
2. Shoemaker.D.P and Garland.C.W, "Experiments in Physical Chemistry", Tata McGraw-Hill Pub. Co. Ltd., London, 2003.

BoS Chairman

SEMESTER III

Course Code: 11AU301	**Course Title:** ENGINEERING MATHEMATICS III (Common to AUTO, CSE, EEE, E&I , ICE and MECH)
Core/Elective: Core	**Credits (L:T:P:C:M) –** 3 : 1 : 0 : 4 : 100
Type: Lecture	**Total Contact Hours:** 60

Prerequisites: The student should have undergone the course(s):
11CO202 ENGINEERING MATHEMATICS II

Course Outcomes:

At the end of the course the student should be able to:
CO1. Describe vector spaces and its properties.
CO2. Compute the Fourier series expansion for given periodic functions.
CO3. Calculate Fourier transform for aperiodic functions.
CO4. Determine the solution of first and second order PDE.
CO5. Solve one dimensional wave equation, one dimensional heat and two dimensional heat flow equations.

Course Content:

UNIT I LINEAR ALGEBRA 9+3

Vector spaces, subspaces, basis and dimension - Systems of linear equations, linear transformations - Kernel and Image - Geometric ideas - Inner product spaces - Orthogonality - Orthogonal basis - Reflections and Orthogonal maps of the plane - Orthogonal complements and Projections.

UNIT II FOURIER SERIES 9+3

Fourier series – Dirichlet's conditions - Half range Fourier cosine and sine series - Parseval's identity - Fourier series in complex form - Harmonic analysis.

UNIT III FOURIER TRANSFORMS 9+3

Fourier transforms - Fourier cosine and sine transforms - inverse transforms - convolution theorem and Parseval's identity for Fourier transforms - Finite cosine and sine transforms.

UNIT IV PARTIAL DIFFERENTIAL EQUATIONS 9+3

Formation of partial differential equations- Lagrange's linear equation – Solutions of standard types of first order partial differential equations- Linear partial differential equations of second and higher order with constant coefficients.

UNIT V APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATION 9+3

Solutions of one-dimensional wave equation - One-dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction (insulated edges excluded) - Fourier series solutions in Cartesian coordinates.

BoS Chairman

14-45

TEXT BOOKS:

1. Venkataraman, M.K., 'Engineering Mathematics Vol.4', National publishing company, 2004.
2. Veerarajan, T., "Transforms and Partial Differential Equations", Tata McGraw Hill, 2012.
3. David C. Lay., "Linear Algebra and its applications," Pearson Education, 2003.

REFERENCES:

1. Grewal. B. S., "Higher Engineering Mathematics", Khanna Publishers,2000.
2. Ramana.B.V. "Higher Engineering Mathematics",Tata Mc-Graw Hill Publishing Company Limited, New Delhi.
3. Erwin kreyszig, "Advanced Engineering Mathematics",Wiley India, 8th edition, 2007.

WEB REFERENCES:

- http://nptel.ac.in/courses/122107037/19
- http://nptel.ac.in/courses/111108066/
- http://freevideolectures.com/Course/2349/Networks-and-Systems/7
- http://freevideolectures.com/Course/2300/Multivariable-Calculus/15
- http://nptel.ac.in/courses/111103021/

BoS Chairman

Course Code: 11CS301	**Course Title:** DIGITAL SYSTEM DESIGN
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Demonstrate the simplification of Boolean functions by employing Boolean algebra & K-map method and to implement digital circuits using universal logic gates.

CO2. Design and analyze a combinational logic circuit

CO3. Devise state diagram for designing clocked sequential circuit and design asynchronous sequential circuit

CO4. Describe knowledge of the nomenclature and technology in the area of memory devices: ROM, RAM, PROM, PLD,

CO5. Analyses different instruction set architectures and their relationship to the CPU design.

Course Content:

UNIT I NUMBER SYSTEMS AND BOOLEAN ALGEBRA 9

Review of binary, octal and hexadecimal number systems - Conversion methods-Number representations - signed, unsigned, fixed point, floating point numbers- One's complement - Two's complement -addition, subtraction- Computer codes - BCD, Gray code - parity codes- Hamming codes- Boolean algebra – basic postulates, theorems , Boolean functions, canonical forms-logic gates.

UNIT II COMBINATIONAL LOGIC DESIGN 9

Standard representation of logic functions- Simplification of logic functions through K-maps and tabulation method- Implementation using logic gates – Adder, subtractor, decoder, encoder, multiplexer and demultiplexer.

UNIT III SEQUENTIAL CIRCUITS 9

Introduction to sequential circuits- Flip-flops- latches - Level triggering, edge triggering- Master slave configuration - Design and analysis of synchronous sequential circuits- Shift registers - Ring counter - Johnson counter -up/down, binary and modulus counters -Introduction to asynchronous sequential circuits.

UNIT IV MEMORY ORGANIZATION AND TRANSISTOR LOGIC 9

Input/output Organization: Asynchronous Data Transfer - Interrupt initiated I/O - DMA transfer. Memory Organization: Main Memory - ROM, RAM and its types - Programmable memory (PLA and PAL), TTL and ECL.

UNIT V COMPUTER ORGANIZATION AND DESIGN 9

Instruction Code – Computer Instruction – Timing and Control - Instruction Cycle - Memory reference instructions - Input/output Instructions - Design of Basic Computer. Central Processing Unit: General Register Organization -Stack Organization –Instruction Format- Addressing Modes.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOKS:

1. Morris Mano M, "Digital Design ", Prentice-Hall of India, New Delhi, 2006.
2. Morris Mano M, "Computer System Architecture", Prentice Hall of India, New Delhi, 2007.

REFERENCES:

1. Floyd T. L., "Digital Fundamentals ", Charles E. Merrill publishing Company, 10th edition, USA, 2009
2. Tocci R. J., "Digital Systems: Principles and applications", Prentice Hall of India, New Delhi, 2001.
3. William I Fletcher, "An Engineering Approach to Digital Design ", Prentice-Hall of India, New Delhi, 1980.

WEB REFERENCES:

- https://www.cl.cam.ac.uk/teaching/0708/DigElec/Digital_Electronics_pdf.pdf
- http://ocw.utm.my/file.php/48/7-Combinational_Logic_Design_2.pdf

BoS Chairman

Course Code: 11CS302	**Course Title:** PRINCIPLES OF COMMUNICATION ENGINEERING
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11AU106 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcomes:

At the end of the course the student should be able to:
CO1. Design simple systems for generating and demodulating amplitude modulated signals
CO2. Analyse analog and digital communication system
CO3. Describe the use of controlled interference to achieve maximum data rate
CO4. Identify the various standards used in data communication
CO5. Evaluate the techniques in spread spectrum and multiple access techniques

Course Content:

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9

Basic schemes of modern communication system-Need for modulation-Types. Basics of amplitude modulation (Definition, Am waveforms, Equation, Frequency spectrum and bandwidth, Modulation index and power distribution).Angle Modulation-Frequency Modulation, Equation of FM wave, Effect of Noise in FM Noise, Pre-Emphasis and De-Emphasis, Comparison of AM and FM signals.
Phase Modulation-Definition and equation of a PM wave.

UNIT II DIGITAL COMMUNICATION 9

Introduction, Shannon limit for information capacity, bits, bit rate, baud. ASK-FSK, FSK Transmitter, Receiver, phase shift keying – binary phase shift keying QPSK, Quadrature Amplitude modulation (Principle, transmitter and Receiver block diagram only). Bandwidth efficiency, carrier recovery and clock recovery, DPSK.

UNIT III DIGITAL TRANSMISSION 9

Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise ratio – companding (analog and digital)- Vocoders-, delta modulation, adaptive delta modulation, differential pulse code modulation, Inter-symbol interference, eye patterns.

UNIT IV DATA COMMUNICATIONS 9

Introduction-Network architecture, protocol and standards-Layered network architecture-OSI- Data communication circuits and Networks, Data communication codes-Baudot, ASCII and EBCDIC only- Error Detection, Error correction-DTE,DCE- UART(Principle and transmitter and receiver block diagram only)-serial interface- RS232 only- parallel interfaces- Data communication modems.

UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9

DS spread spectrum with coherent binary PSK, Processing gain, FH spread spectrum, multiple access techniques – TDMA, FDMA and CDMA in wireless communication systems.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOKS:

1. Wayne Tomasi, "Advanced Electronic Communication Systems", 6/e, Pearson Education, 2007.
2. B.Sklar,"Digital Communication Fundamentals and Applications",2/e Pearson Education 2007.

REFERENCES:

1. Taub. H., Schilling .D.L, Saha. G.,"Principles of Communication",3/e,2007.
2. Lathi. B.P.,"ModernAnalog and Digital Communication systems", 3/e, Oxford University Press, 2007
3. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
4. Simon Haykin, "Communication Systems", 4th Edition, John Wiley &Sons. 2001.
5. Simon Haykin, "Digital Communication", 4th Edition, John Wiley &Sons.2001.

WEB REFERENCES:

- http://nptel.ac.in/courses/106108098/LearningDataCommunication.pdf
- http://ncert.nic.in/NCERTS/l/leph207.pdf

BoS Chairman

Course Code:11CS303	**Course Title:** DATA STRUCTURES
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS205 OBJECT ORIENTED PROGRAMMING CONCEPTS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Comprehend the working of linear data structures and identify their applications
CO2. Understand the organization of various tree data structures and apply them for efficient retrieval of data
CO3. Apply heaps for solving problems and evaluate various hashing techniques
CO4. Develop algorithms to implement various searching and sorting techniques
CO5. Employ graph data structure for solving real world problems.

Course Content:

UNIT I LINEAR STRUCTURES **10**

Abstract Data Types (ADT) – List ADT – array-based implementation – linked list Implementation: singly - doubly- circularly linked lists – applications of lists – Stack ADT (Array and List implementation) – Queue ADT (Array and list implementation) – circular queue implementation – Applications of stacks and queues

UNIT II TREE STRUCTURES **10**

Tree ADT- Preliminaries – Binary Tree ADT- Tree traversals – expression trees – binary search tree ADT – AVL tree ADT – B-Trees

UNIT III HEAPS AND HASHING **8**

Heaps: binary heaps – applications of binary heaps
Hashing: General idea – Hash function – Separate Chaining – Open Addressing – Rehashing – Double Hashing

UNIT IV SEARCHING AND SORTING **8**

Searching :Linear search – Binary Search - Sorting : Preliminaries – Insertion sort – Shell sort – Heap sort – Merge sort – Quick Sort – External Sorting.

UNIT V GRAPHS **9**

Definitions – Topological sort – breadth-first traversal –Depth-first traversal - shortest-path algorithms: Unweighted Shortest Paths - Dijkstra's algorithm - minimum spanning tree : Prim's and Kruskal's algorithms – biconnectivity – Euler circuits

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in Java", 3rd Edition, Pearson Education, 2011.

REFERENCES:

1. SartajSahni, "Data Structures, algorithms and applications in Java", 2nd Edition, Universities Press, 2005.
2. Mark Allen Weiss, "Data Structures & Problem Solving using Java", Pearson/Addison Wesley, 2010.
3. Yedidyah Langsam, Moshe Augenstein, Aaron M.Tenenbaum, "Data Structures using Java TM", 4th Edition 2009.

WEB REFERENCES:

- NPTEL "Data Structures and Algorithms" Course Content:. URL: http://nptel.ac.in/courses/106102064/1
- Lecture Notes based on Mark Allen Weiss book. URL: http://faculty.simpson.edu/lydia.sinapova/www/cmsc250/LN250_Weiss/Contents.htm
- Data Structures and Algorithm Visualizations. URL: http://visualgo.net/

BoS Chairman

Course Code: 11CS304	**Course Title:** JAVA PROGRAMMING
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS205- OBJECT ORIENTED PROGRAMMING CONCEPTS

Course Outcomes:

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

CO1. Enumerate the principles of object orientation and Java fundamentals.
CO2. Demonstrate user and predefined exception handling mechanisms and Multithreading concept in Java.
CO3. Investigate the existing Java utilities and their functionalities.
CO4. Determine suitable file handling mechanisms for Java applications.
CO5. Construct applet based applications using interfaces, event handling and AWT controls.

Course Content:

UNIT I INTRODUCTION **8**

Introduction – Object Oriented Concepts - Java Language Fundamentals – Operators, Expressions and Control Structures – Classes and Objects – Inheritance

UNIT II PACKAGES, EXCEPTIONS AND THREADS **9**

Packages- Interfaces – Exception Handling – Exception Types - Java Thread Model – Multithreading – Thread Priorities - Synchronization.

UNIT III JAVA UTILITIES **9**

Collection Interfaces – Collection Classes – Using Iterator – Comparators – legacy classes and interfaces- string tokenizer – Date – Calendar – Gregorian calendar- Time

UNIT IV INPUT OUTPUT STREAMS **9**

I/O Classes and interfaces – Handling Files – Byte Streams – Character Streams – Serialization – String Handling

UNIT V APPLET AND AWT **10**

Applet Basics - Event handling – Event Class – Event Listener interfaces – AWT basics- AWT controls

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOKS:

1. Herbert Schildt,"The Complete Reference JAVA2", 7th edition, Tata McGraw-Hill, 2007.
2. Deitel. M. and Deitel, "Java How to Program", 7/e, Prentice Hall Publications, 2009.

REFERENCES:

1. Julio Sanchez, Maria P.Canton, "JAVA Programming for Engineers", CRC Press, 2002.
2. James Gosling, Bill Joy, Guy Steele, Gilad Bracha, "The Java Language Specification", 2nd Edition, Addison-Wesley, 2000.

WEB REFERENCES:

- Introduction to Programming in Java URL: http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-092-introduction-to-programming-in-java-january-iap-2010/
- Java Preparation URL: http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-092-java-preparation-for-6-170-january-iap-2006/lecture-notes/
- Java lectures URL: http://www.cse.iitb.ac.in/~nlp-ai/java%20ppt/

BoS Chairman

Course Code: 11CS306	**Course Title:** OPERATING SYSTEMS
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Classify computer based systems and understand different components of operating systems.
CO2. Compare and analyze various scheduling algorithms, synchronization problems and solutions and deadlock handling methods.
CO3. Explain the various memory management concepts including allocation, paging, segmentation and virtual memory.
CO4. Describe file systems and the major mechanisms for File Management in an operating system.
CO5. Examine and discuss the Linux OS based on operating system concepts and fundamentals.

Course Content

UNIT I INTRODUCTION **9**

Main frame Systems, Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time systems – Hand held Systems, Operating Systems Structures: System Components – Operating System Services – System calls – System Programs – Process Concepts – Process Scheduling – Operation on Process – Co-Operating process – Inter Process Communication.

UNIT II PROCESS MANAGEMENT **10**

CPU scheduling: Basic Concepts – Scheduling Algorithms. Process Synchronization: The Critical Section Problem – Synchronization Hardware – Semaphores – classical problem of Synchronization – Monitors – Deadlock: Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.

UNIT III MEMORY MANAGEMENT **9**

Background – Swapping – Contiguous Memory Allocation – Paging – Segmentation – Segmentation with paging – Virtual Memory: Demand paging – Page Replacement – Thrashing. Buddy Systems – Storage Compaction.

UNIT IV FILE SYSTEMS **9**

File Concepts – Access methods – Directory Structure – File Protection – File System Implementation: File System Structure and Implementation – Directory Implementation – Allocation methods Free Space Management – Recovery – Disk Structure – Disk Scheduling.

UNIT V CASE STUDY – LINUX **8**

The Linux System – Design Principles – Kernel modules – Process Management – Scheduling – Memory Management – File Systems – I/O – Security.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. AviSilberschatz, Galvin. P.B., Gagne. G. "Operating System Concepts", 7th edition, John Wiley & Sons, 2007.

REFERENCES:

1. Pradeep K.Sinha, "Distributed Operating System: Concepts and Design", IEEE computer Society Press, PHI, 2004.
2. Andrew S. Tanenbaum , "Modern Operating Systems", PHI , 2nd Edition, 2001

WEB REFERENCES:

- Operating System Engineering | Electrical Engineering and Computer Science | MIT OpenCourseWare. URL: http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-828-operating-system-engineering-fall-2012/
- NPTEL : Computer Science and Engineering - Operating System. URL: http://www.nptel.ac.in/courses/106108101/

BoS Chairman

Course Code:11CS307	**Course Title:** DIGITAL SYSTEM DESIGN LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

CO1. Explain the basic electronics of logic circuits and be able to use integrated IC packages.
CO2. Construct and troubleshoot digital circuits.
CO3. Demonstrate theoretical device operation can be implemented in properly connected digital circuits.
CO4. Design combinational and sequential circuits can be implemented using logic gates.
CO5. Analyse and test a digital circuit using computer software application.

List of Experiments:

1. Study of Gates & Flip-flops
2. Half Adder and Full Adder
3. Magnitude Comparator (2-Bit)
4. Encoders and Decoders
5. Multiplexer and Demultiplexer
6. Code Converter
7. Synchronous Counters
8. Ripple Counter
9. Mod - N Counter
10. Shift Register - SISO & SIPO
11. Verilog HDL based design of combinational circuits and sequential circuits

TOTAL: 45

BoS Chairman

Course Code: 11CS308	**Course Title:** DATA STRUCTURES LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

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

CO1. Implement linear data structures using array and linked list representations and use these in various applications.
CO2. Develop implementations of binary search trees, AVL trees and heap
CO3. Devise programs for sorting, searching and hashing operations with appropriate visualizations
CO4. Solve the shortest path problem and visualize the process

List of Experiments:

1. Implementation of linked lists
2. Applications of linked lists
3. Stack Implementation
4. Applications of stack
5. Queue Implementation
6. Implementation of binary search tree
7. Implementation of AVL trees
8. Implementation of binary heaps
9. Implementation of Hashing
10. Implementation of searching
11. Implementation of sorting (Visualization using Applet)
12. Implementation of shortest path algorithms (Visualization using Swing Components)

Note: Object Oriented Programming, Multithreading, exception handling concepts should be included in relevant programs.

TOTAL: 45

BoS Chairman

Course Code:11CS309	**Course Title:** OPERATING SYSTEMS LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

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

CO1. Simulate basic operations of UNIX using system calls.
CO2. Implement and analyze CPU scheduling algorithms.
CO3. Demonstrate problems related to synchronization by simulation.
CO4. Implement and analyze memory allocation strategies.

List of Experiments

- Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
- Write programs using the I/O system calls of UNIX operating system open, read, write, etc
- Write C programs to simulate UNIX commands like ls, grep, etc.
- Implementation of the following Scheduling algorithms with the given details.
- List of processes, their CPU burst times and arrival times, display/print the Gantt chart for all the algorithms. For each of the scheduling policies given below, compute and print the average waiting time and average turnaround time.
    a. FCFS
    b. SJF
    c. Priority
    d. Round robin
- Implementation of Synchronization problems.
- Simulate the following memory allocation strategies.
    a. First fit
    b. Worst fit
    c. Best fit

TOTAL: 45

BoS Chairman

SEMESTER IV

Course Code: 11CS401	**Course Title:** DISCRETE MATHEMATICS
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 1 : 0 : 4 : 100
Type: Lecture	**Total Contact Hours:** 60

Prerequisites: The student should have undergone the course(s):
11AU3O1 ENGINEERING MATHEMATICS III

Course outcomes:

At the end of the course the student should be able to:
CO1: Apply the basics of logic in programming languages.
CO2: Use the concepts of relations and functions in algorithms.
CO3: Apply the concept of number theory in encryption and decryption algorithms
CO4: Develop the concept of algebraic structures which applies in network security.
CO5: Solve the real time problems using the knowledge of probability and standarddistributions

Course Content:

UNIT I MATHEMATICAL LOGIC **9 + 3**

Propositional logic-connectives-tautology and contradiction-Normal forms-equivalences and implications-Inference theory-Predicate calculus-Quantifiers- equivalences and implications-Inference theory.

UNIT II RELATIONS AND FUNCTIONS **9 + 3**

Sets-Cartesian product-Relations-Equivalence relation-partial ordering relations-Functions-Types of functions-Special functions: Permutation function-Hashing function-Recursive function

UNIT III NUMBER THEORY **9 + 3**

Prime and composite numbers-Relative primes-Seive of Eratosthenes-Fundamental theorem of arithmetic-Euler's theorem-Congruence modulo-Fermat's little theorem-Chinese remainder theorem.

UNIT IV GROUP THEORY **9 + 3**

Semigroup-Group-Abelian Group- Cyclic and permutation Group-Sub Group-Cosets-Normal Subgroup-Lagrange's theorem-Rings-Division rings-Commutative ring-Field-Finite field.

UNIT V PROBABILITY **9 + 3**

Basic concepts of Probability-Sum and Product rule-Conditional Probability-Total Probability-Baye's theorem-One dimensional random variable-Mean and Variance-Discrete, Binomial, Poission and Geometric distributions.

L: 45 T: 15 TOTAL: 60

BoS Chairman

TEXT BOOKS:

1. Tremblay. J.P., Manohar. R., Discrete Mathematical Structures with Applications to computer science, Tata Mc-GrawHill Publishing Company limited, New Delhi.
2. Hsiung. C.Y., Elementory theory of numbers, Allied Publishers, 1995
3. Kandasamy. P., Thilagavathi. K., Gunavathi. K., Probability, Random Variables and Random Process, S.Chand& Co, 2003.

REFERENCES:

1. Ross, S., "A first course in probability", 6th Edition, Pearson Education, Delhi, 2002.
2. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, Delhi, 2002.

WEB REFERENCES:

- http://nptel.ac.in/video.php?subjectId=106106094
- http://nptel.ac.in/syllabus/syllabus.php?subjectId=111104028
- http://nptel.ac.in/syllabus/syllabus.php?subjectId=111106052
- http://www.nptelvideos.in/2012/11/discrete-mathematical-structures.html
- http://nptel.ac.in/courses/111103020/

BoS Chairman

Course Code: 11CS402	**Course Title:** MICROPROCESSOR SYSTEMS AND INTERFACING
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS301 DIGITAL SYSTEM DESIGN

Course Outcomes:

At the end of the course the student should be able to:
CO1. Understand the architecture and basic function of the microcontroller
CO2. Visualize the programmer's model of ARM processor.
CO3. Understand and analyze the instruction set associated with various ARM processors.
CO4. Design, develop and interface complete microprocessor based systems to peripheral devices and systems, at chip level.
CO5. Realize the usage of Communication interface in ARM processor

Course Content:

UNIT I INTRODUCTION TO MICROPROCESSORS & MICROCONTROLLERS 9

History of Microprocessors-Architecture of 8086 Microprocessor–8051 Microcontroller Architecture– Signals – Operational features – Memory and I/O addressing – Interrupts – Instruction set-Serial Communication Interfacing.

UNIT II HIGH PERFORMANCE RISC ARCHITECTURE – ARM 9

Introduction to ARM processors and RISC Architecture-Organization of CPU – Bus architecture –Memory management unit- ARM Organization and implementation.

UNIT III PROGRAMMING ARM PROCESSOR 9

ARM instruction set- Thumb Instruction set- addressing modes – Programming the ARM processor. Simple programs.

UNIT IV ARM BASIC PERIPHERAL INTERFACING 9

I/O interface concepts-interrupts-types of interrupts-ARM interrupts-serial communication-real-time clock and simple digital LED interface - LCD display interfacing- GLCD display interfacing – TFT display interfacing -the keyboard interfacing-the touch screen interfacing

UNIT V ARM COMMUNICATION INTERFACING 9

Synchronous and asynchronous data transfer- UART based communication- I2c Protocol basics -serial communication using using I2c bus: RTC Interfacing, EEPROM data transfer - Ethernet communication – I2S voice bus interface communication.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. Steve Furber ," ARM System –On –Chip architecture ", Addision Wesley , 2000
2. Kenneth J.Ayala, "The 8051 microcontroller Architecture, Programming and applications", 4th edition, Penram international, 2008

REFERENCES:

1. Andrew Sloss, Dominic Symes& Chris Wright, "ARM system Developer's guide", Elsevier.2005.
2. Ray and Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw Hill Publishing Company, New Delhi, 2nd Edition, 2006.
3. Todd D. Morton, "Embedded Microcontrollers", Prentice Hall, 2001.
4. John Peatman, Design with Microcontroller McGraw Hill Publishing Co Ltd, New Delhi, 2nd Edition,2005.

WEB REFERENCES:

- http://www.daenotes.com/electronics/digital-electronics/Intel-8085-8-bit-microprocessor
- http://www.engineersgarage.com/microcontroller
- http://infocenter.arm.com/help/index.jsp
- http://www.arm.com/

BoS Chairman

Course Code: 11CS403	**Course Title:** DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course:
11CS303–DATA STRUCTURES

Course Outcomes:

At the end of the course the student should be able to:
CO1. Understand the steps in designing an algorithm and the notations used in analysis.
CO2. Develop recursive and non-recursive algorithms and analyze their complexity.
CO3. Apply Divide & Conquer and Decrease & Conquer approaches for solving problems.
CO4. Design algorithms using Greedy method and Dynamic Programming approach.
CO5. Analyze the limitations of algorithm power and design solutions using Backtracking, Branch & Bound approach.

Course Content:

UNIT I BASIC CONCEPTS OF ALGORITHMS 8

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT II MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS 8

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

UNIT III SIMPLE ALGORITHMIC DESIGN TECHNIQUES 9

Brute Force: String Matching – Exhaustive Search -Divide-and-Conquer: Strassens's Matrix Multiplication - Closest-pair and Convex-Hull Problems – Decrease-and –Conquer: Insertion sort

UNIT IV GREEDY METHOD AND DYNAMIC PROGRAMMING 10

Greedy Technique: Prim's algorithm, Kruskal's algorithm, Huffman trees - Dynamic Programming: Computing a binomial coefficient, Warshall's and Floyd's algorithms-OBST.

UNIT V BACKTRACKING & BRANCH AND BOUND 10

Backtracking: N-Queens Problem – Hamiltonian Circuit – Subset–sum problem. Branch-and-Bound: Assignment Problem- Knapsack problem – Travelling salesman problem. Limitations of Algorithm Power – P, NP and NP- complete problems.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. AnanyLevitin, "Introduction to the Design & Analysis of Algorithms", Pearson Education, 2nd edition, 2005.
2. Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", 2nd edition, Galgotia Publications, New Delhi, 2003.

REFERENCES:

1. Aho. A.V., Hopcroft. J. E. and Ullman. J. D., "The Design and Analysis of Computer Algorithms", Pearson Education Asia, 2003.
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2003.
3. Cormen.T.H.,Leiserson.C.E., Rivest. R.L. and Stein.C., "Introduction to Algorithms", PHI Pvt. Ltd., 2001.

WEB REFERENCES:

- NPTEL Design and Analysis of Algorithms Course Content:. URL: http://nptel.ac.in/courses/106101060/
- John McHugh and Dr.R.W.M.Lyttle, The Animation of Recursion. URL: http://www.animatedrecursion.com/
- Stephen Cook, The P versus NP problem, URL: http://www.claymath.org/millennium/P vs NP/pvsnp.pdf
- Algorithmic Puzzles. URL: http://www.cut-the-knot.org/

BoS Chairman

Course Code: 11CS404	**Course Title:** DATABASE SYSTEMS
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Outline the different data models and basic concepts of a database
CO2. Impart knowledge on database creation, manipulation and posing complex SQL queries of relational databases.
CO3. understand the data storage and query processing details with different data structures
CO4. Create an understanding of transaction processing and the manner in which database systems support ACID properties.
CO5. Provide familiarity in the concepts related to advanced and recent databases and applications

Course Content:

UNIT I INTRODUCTION AND CONCEPTUAL MODELING 8

Introduction to File and Database systems- Database system structure - Data Models - ER model - Relational Model - Relational Algebra and Calculus.

UNIT II RELATIONAL MODEL 9

SQL - Data definition- Queries in SQL- Updates- Views - Integrity and Security- Embedded SQL- Relational Database design - Functional dependences and Normalization for Relational Databases (up to BCNF).

UNIT III DATA STORAGE AND QUERY PROCESSING 9

Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques - Index Structure for files -Different types of Indexes- B-Tree – B^+ Tree- Query Processing.

UNIT IV TRANSACTION MANAGEMENT 10

Transaction Processing - Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serializability and Schedules - Concurrency Control - Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control - Recovery Techniques - Concepts- Immediate Update- Deferred Update - Shadow Paging.

UNIT V CURRENT TRENDS 9

Object Oriented Databases - Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogeneous- Distributed data Storage –Distributed Transactions- Data Mining and Data Warehousing.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- "Database System Concepts", 6th Edition, McGraw-Hill, 2010.

REFERENCES:

1. RamezElmasri and Shamkant B. Navathe, "Fundamental Database Systems", 3rd Edition, Pearson Education, 2003.
2. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003.
3. Hector Garcia-Molina, Jeffrey D.Ullman and Jennifer Widom- "Database System Implementation"- Pearson Education- 2000.
4. Peter Rob and Corlos Coronel- "Database System, Design, Implementation and Management", Thompson Learning Course Technology- 5th edition, 2003.

WEB REFERENCES:

- Database System Concepts EBook -www.db-book.com/ and codex.cs.yale.edu/avi/db-book
- www.w3schools.com/sql/
- http://www.eazynotes.com/pages/database-management-system/transaction management.html
- http://www.comptechdoc.org/independent/database/basicdb/dataobject.html

BoS Chairman

Course Code: 11CS405	**Course Title:** UNIX INTERNALS
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS306 – OPERATING SYSTEMS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Determine the components of Unix architecture and system structure.
CO2. Outline the buffer cache and demonstrate the working of i-node process.
CO3. Identify the various system calls for the specific task.
CO4. Illustrate the techniques for process control and process states.
CO5. Demonstrate the process scheduling, swapping and illustrate I/O subsystems.

Course Content:

UNIT I GENERAL OVERVIEW OF THE SYSTEM **9**

History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel: Architecture of the UNIX operating system – Introduction to system concepts – Kernel data structures – System administration – Summary and Preview.

UNIT II BUFFER CACHE **9**

Buffer headers – Structure of the buffer pool – Advantages and disadvantages of the buffer cache. Internal representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Other file types.

UNITIII SYSTEM CALLS FOR FILE SYSTEM **9**

Open – Read – Write – File and record locking – Adjusting the position of file I/O –LSEEK – Close – File creation – Creation of special files – Pipes – Dup – Mounting and unmounting file systems

UNIT IV THE STRUCTURE OF PROCESSES **9**

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process. Process Control: Process creation – Signals – Process termination– Awaiting process termination – Invoking other programs – The shell – System boot and the INIT process.

UNIT V PROCESS SCHEDULING AND MEMORY MANAGEMENT POLICIES **9**

Process Scheduling – Memory Management Policies: Swapping – A hybrid system with swapping and demand paging. The I/O Subsystem: Driver Interfaces– Disk Drivers-Terminal Drivers.

L: 45 T: 0 TOTAL: 45



TEXT BOOK:

1. Maurice J. Bach, "The Design of the Unix Operating System", Prentice Hall of India, 2004.

REFERENCES:

1. Uresh Vahalia, "Unix Internals: The New Frontiers", Pearson Education Inc, 2003.
2. John Lion, "Lion's Commentary on UNIX", 6th edition, Peer-to-Peer Communications, 2004.
3. Daniel P. Bovet & Marco Cesati, "Understanding the Linux Kernel", O'REILLY, Shroff Publishers &Distributors Pvt. Ltd, 2000.
4. Beck et al. M., "Linux Kernel Programming", Pearson Education Asia, 2002.

WEB REFERENCES:

- Maurice J. Bach, "The Design of the Unix Operating System", Prentice Hall of India, 2004. URL:https://robot.bolink.org/ebooks/Design%20of%20the%20Unix%20Operating%20System%20By%20Maurice%20Bach.pdf
- Unix System calls. URL:https://www.youtube.com/watch?v=xHu7qI1gDPA
- Using a named pipe. URL:https://www.youtube.com/watch?v=sP50GHDmfhY
- http://www.tutorialspoint.com/unix/unix-getting-started.htm

BoS Chairman

Course Code: 11CS406	**Course Title:** PRINCIPLES OF SOFTWARE ENGINEERING
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Compare and choose a life cycle model for software engineering projects.
CO2. Determine the software requirements for a system by applying appropriate requirements engineering processes.
CO3. Analyze and build efficient design and architecture for a variety of software systems.
CO4. Plan and prepare testing strategies and techniques for software systems.
CO5. Understand managing software projects and using CASE tools by applying various management concepts including cost estimation, project scheduling, and maintenance.

Course Content:

UNIT I SOFTWARE PROCESS **9**

Introduction -S/W Engineering Paradigm - life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) - system engineering - computer based system - verification - validation - life cycle process - development process -system engineering hierarchy.

UNIT II SOFTWARE REQUIREMENTS **9**

Functional and non-functional - user - system -requirement engineering process - feasibility studies - requirements - elicitation - validation and management - software prototyping - prototyping in the software process - rapid prototyping techniques - user interface prototyping -S/W document. Analysis and modeling - data, functional and behavioral models - structured analysis and data dictionary.

UNIT III DESIGN CONCEPTS AND PRINCIPLES **9**

Design process and concepts - modular design - design heuristic - design model and document. Architectural design - software architecture - data design - architectural design - transform and transaction mapping - user interface design - user interface design principles. Real time systems - Real time software design - system design - real time executives - data acquisition system - monitoring and control system. SCM - Need for SCM - Version control - Introduction to SCM process - Software configuration items.

UNIT IV TESTING **9**

Taxonomy of software testing - levels - test activities - types of s/w test - black box testing - testing boundary conditions - structural testing - test coverage criteria based on data flow mechanisms - regression testing - testing in the large. S/W testing strategies - strategic approach and issues - unit testing - integration testing - validation testing - system testing and debugging.

UNIT V SOFTWARE PROJECT MANAGEMENT **9**

Measures and measurements - S/W complexity and science measure - size measure - data and logic structure measure - information flow measure. Software cost estimation - function point models –

BoS Chairman

COCOMO model- Delphi method.- Defining a Task Network - Scheduling - Earned Value Analysis - Error Tracking - Software changes - program evolution dynamics - software maintenance - Architectural evolution. Taxonomy of CASE tools.

L: 45 T: 0 TOTAL: 45

TEXT BOOK:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.

REFERENCES:

1. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
2. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
3. James F Peters and Witold Pedryez, "Software Engineering - An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
4. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

WEB REFERENCES:

- Software Engineering: A Practitioner's Approach, 5th Edition. URL: http://www.mhhe.com/engcs/compsci/pressman/
- Software Engineering 10th Edition. URL: http://iansommerville.com/software-engineering-book/
- Software Engineering Institute. URL: http://www.sei.cmu.edu/
- The differences between life cycle models- Advantages and Disadvantages. URL: https://narbit.wordpress.com/2012/06/10/the-differences-between-life-cycle-models-advantages-and-disadvantages/
- NPTEL : Computer Science and Engineering - Software Engineering (Video Tutorials). URL: http://www.nptel.ac.in/courses/106101061/

BoS Chairman

Course Code: 11CS407	Course Title: MICROPROCESSOR SYSTEMS AND INTERFACING LAB
Core/Elective: Core	Credits (L : T : P : C : M) – 0 : 0 : 3 : 2 : 100
Type: Practical	Total Contact Hours: 45

Course Outcomes:

At the end of the course the student should be able to:
CO1. Understand and apply the fundamentals of assembly level programming of basic microcontrollers
CO2. Knowledge of the 8051 instruction set and ability to utilize it in programming
CO3. Understand basic knowledge in programming the ARM LPc2148
CO4. Acquire the solid foundation on interfacing external devices to processors

Course Content:

SIMPLE PROGRAMS (Using ARM processor and 8051 Microcontroller)

- 16 bit Addition, Subtraction, Multiplication and Division
- Largest and Smallest number
- Ascending and Descending numbers
- Sum of Series

INTERFACING

- Stepper motor interface using 8051
- Implementation of Interrupts.
- Implementation of Real Time Timer.
- Implementation of 4x4 Keyboard Control Systems.
- Implementation of 8 Segment LED Display.
- Implementation of Characters on LCD Display.
- Communication interface

TOTAL: 45

BoS Chairman

Course Code:11CS408	**Course Title:** DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1. Perform empirical analysis to identify the efficient searching and sorting techniques.
CO2. Choose the suitable algorithm design strategy for solving the given problem.
CO3. Develop efficient programs for solving various graph problems.
CO4. Employ Backtracking, Branch and Bound approaches for solving combinatorial problems.

List of Experiments:

1. Implementation of Sorting Algorithms
2. Implementation of Binary Search Algorithm
3. Implementation of Minimum Spanning Tree Algorithm
4. Implementation of Knapsack Algorithm
5. Implementation of Multistage Graphs
6. Implementation of All pair shortest Path Algorithm
7. Implementation of Eight Queens Problem
8. Implementation of Graph Coloring
9. Implementation of Dijkstra's algorithm
10. Implementation of Traveling Salesman Problem

TOTAL: 45

BoS Chairman

Course Code:11CS409	**Course Title**: DATABASE SYSTEMS LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1: Understand the need of SQL concepts
CO2: Understand the High-level language extension of cursors and triggers
CO3: construct simple applications using Front and Back end
CO4: impart knowledge on embedded SQL programs

List of Experiments:

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. PL/SQL Programs
4. Procedures and Functions
5. High-level language extension with Cursors.
6. High level language extension with Triggers
7. Embedded SQL.
8. Design and implementation of Payroll Processing System.
9. Design and implementation of Banking System
10. Design and implementation of Library Information System.

TOTAL: 45

BoS Chairman

SEMSTER V

Course Code: 11CS501-R	**Course Title:** COMPUTER NETWORKS
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS306 – OPERATING SYSTEMS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Comprehend the concepts of data communications and Computer Networks.
CO2. Demonstrate functionalities of different layers.
CO3. Describe IEEE standards employed in computer networking and implement routing protocols.
CO4. Design different protocols and network components.
CO5. Illustrate the security over the network and design different application.

Course Content:

UNIT I FOUNDATIONS OF NETWORKS **7**

Requirements – Network Architecture – Implementing Network Software – Bandwidth and Latency –Delay X Bandwidth product –Application Performance needs.

UNIT II LINK LAYER **9**

Perspectives on Connecting – Encoding (NRZ, NRZI, Manchester, 4B/5B) – Framing (Bit and Byte Oriented Protocols) – Error Detection (Parity, Internet Checksum, CRC) – Reliable transmission – Ethernet and Multiple Access Networks – Wireless

UNIT III INTERNETWORKING **10**

Internet Protocol (IP) – Service Model - Global Addresses - Datagram Forwarding in IP – Subnetting and Classless Addressing – ARP – DHCP – ICMP – Routing protocols: RIP and OSPF – IPv6 – Challenges for Mobile Networking – Mobile IP

UNIT IV END-TO-END PROTOCOLS **10**

UDP – TCP: Segment Format, Connection Establishment and Termination- Sliding Window Protocol – TCP Extensions – TCP Congestion Control – Congestion Avoidance Mechanisms.

UNIT V SECURITY & APPLICATIONS **9**

Cryptographic Building Blocks – Symmetric vs Public-Key Ciphers – Key Management - Transport layer Security – SSL – HTTPS – IPSec – Wireless Security – Firewalls – SMTP – World Wide Web (HTTP) – Web Services – DNS – SNMP

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. Larry L. Peterson and Bruce S. Davie, "Computer Networks – A Systems Approach", 5th Edition, The Morgan Kaufmann Publishers, 2011.

REFERENCES:

1. James F. Kurose, Keith W. Ross, "Computer Networking – A top down Approach Featuring the Internet", 4th Edition, Pearson Education, 2006
2. William Stallings, "Data and Computer Communication", 6th Edition, Pearson Education, 2000.
3. Jochen Schiller, "Mobile Communication", Addison Wesley, 2000

WEB REFERENCES:

- Larry L. Peterson and Bruce S. Davie, "Computer Networks – A Systems Approach", Fifth Edition, The Morgan Kaufmann Publishers, 2011 URL: http://booksite.elsevier.com/9780123850591/
- OPNET Tool :URL: http://www.opnet.com/university_program/itguru_academic_edition
- Lecture Notes. URL: http://nptel.ac.in/courses/IIT-MADRAS/Computer_Networks/
- http://nptel.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Computer%20networks/New_index1.html/

BoS Chairman

Course Code: 11CS502	**Course Title:** FORMAL LANGUAGES AND AUTOMATA THEORY
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS403 DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Design a machine for recognizing Regular Languages
CO2. Construct an automaton for recognizing context free languages
CO3. Understand the concepts of computability theory and design a Turing machine
CO4. Analyze the Time Complexity for Class NP Problems
CO5. Examine the Space Complexity of automaton

Course Content:

UNIT I REGULAR LANGUAGES **9**

Automata, Computability and Complexity – Regular Languages: Finite Automata – Nondeterminism – Regular Expressions – Non regular Languages

UNIT II CONTEXT-FREE LANGUAGES **7**

Context-Free Grammars – Pushdown Automata – Non Context-Free Languages

UNIT III COMPUTABILITY THEORY **11**

Turing Machines – Variants of Turing Machines – Decidability: Decidable Languages –Undecidability – Reducibility: Undecidable Problems from Language Theory – Post Correspondence Problem – Mapping Reducibility

UNIT IV TIME COMPLEXITY **9**

Measuring Complexity – The Class P – The Class NP – NP-completeness – Additional NP-complete Problems

UNIT V SPACE COMPLEXITY **9**

Savitch's Theorem – The Class PSPACE – PSPACE-completeness – The Classes L and NL –NL-completeness – NL equals coNL – Approximation Algorithms – Probabilistic Algorithms

L: 45 T: 0 TOTAL: 45

TEXT BOOK:

1. Michael Sipser, "Introduction to the Theory of Computation", Cengage Learning, Thomson Asia, 3rd Edition, 2013.

BoS Chairman

REFERENCES:

1. E.Hopcroft, J.D.Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson, Education Publishers, 3rd Edition, 2008.
2. Kamala Krithivasan and R. Rama, "Introduction to Formal Languages, Automata Theory and Computation", Pearson Education, Delhi, 1st Edition, 2009.

WEB REFERENCES:

- Formal languages and automata theory. URL: http://www.ics.uci.edu/~goodrich/teach/cs162/notes/
- http://nptel.ac.in/courses/106106049/
- JFLAP tool -Home. URL: www.jflap.org/

BoS Chairman

Course Code: 11CS503	**Course Title:** SYSTEM SOFTWARE DESIGN
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS402-MICROPROCESSOR SYSTEMS AND INTERFACING

Course Outcomes:

At the end of the course the student should be able to:
CO1. Identify the relationship between system software and machine architecture.
CO2. Design and implement the different type of assemblers
CO3. Design and implement the linkers and loaders
CO4. Construct a macro processors and illustrate software tools
CO5. Inspect and characterize the architecture of Virtual Machines.

Course Content:

UNIT I MACHINE ARCHITECTURE **8**

Evolution of the components of a Programming system - General Machine Architecture - Machine Language - Assembly language – Language Processors

UNIT II ASSEMBLERS **9**

Elements of an Assembly Language Programming- Simple Assembly Scheme- Pass structure of Assemblers- Design of a two pass assembler – A single pass Assembler-Case study: IBM PC

UNIT III LOADERS AND LINKERS **10**

Loader Schemes- Design of an absolute loader- Design of a direct linking loader – Relocation and linking concepts – Design of a linker – Self Relocating Programs- Linking for overlays.

UNIT IV MACROPROCESSORS & SOFTWARE TOOLS **9**

Macro Definition and Call- Macro Expansion- Nested Macro Calls- Advanced Macro facilities-Design of a Macro processor. Software tools for Program development- Editors- Debug monitors – Programming Environments- User Interfaces

UNIT V VIRTUAL MACHINES **9**

Introduction to Virtual Machines (VM) – Pascal P-Code VM – Object-Oriented VMs – Java VMArchitecture

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Dhamdhere D M, "Systems Programming and Operating Systems", Tata McGraw HillPublishing Company, New Delhi, 2nd revised edition 2009.
2. John J Donovan, "Systems Programming", Tata McGraw Hill Publishing CompanyLimited, New Delhi, 2009.
3. James E.Smith and Ravi Nair, "Virtual Machines", Elsevier, 2005

BoS Chairman

REFERENCES:

1. Leland L Beck, "System Software- An Introduction to System Programming", PearsonEducation, New Delhi, 3rd edition, (6th Impression) 2007.
2. J.Nithyashri, "System Software", Tata Mc-graw Hill Publishing Company Limited, New Delhi, 2nd Edition 2010.

WEB REFERENCES:

- System software and Design. URL: elearning.vtu.ac.in/CS51.html

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Course Code: 11CS504	**Course Title:** COMPUTER ARCHITECTURE
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS402 -MICROPROCESSOR SYSTEMS AND INTERFACING

Course Outcomes:

At the end of the course the student should be able to:
CO1. Describe the organization, addressing and architectural components of a computer
CO2. Compare the functionality and performance of various processor families
CO3. Infer the characteristics of multiprocessing and parallel processing systems
CO4. Illustrate the concept of pipelining and address the crosscutting issues
CO5. Demonstrate Instruction Level Parallelism with dynamic scheduling

Course Content:

UNIT I INTRODUCTION **9**

Basic structure of computers - machine instruction - memory allocation and address -instructions, sequencing. Accessing I/O devices - interrupts - DMA Buses - Interface Circuits -Standard I/O interfaces.

UNIT II BASIC PROCESSING UNIT AND PROCESSOR FAMILIES **9**

Fundamental concepts - multiple bus organization - superscalar operation - Ultra SPARC II.Embedded system - processor chips – microcontroller - programming considerations.Processor families - overview of ARM Family and Intel Family.

UNIT III LARGE COMPUTER SYSTEM **9**

Parallel processing - Array Processor - Structure of General Purpose Multiprocessors -Interconnection Networks - Parallelism & shared variable - Multi computers – Programmersview of shared memory & Message passing - Amdahl's Law.

UNIT IV PIPELINING **9**

Introduction - The Major Hurdle of pipelining - pipeline Hazards - Pipelining Implementation -Extending the MIPS pipeline to handle multicycle operations - Overview of MIPS R4000Pipeline - crosscutting issues.

UNIT V INSTRUCTION - LEVEL PARALLELISM **9**

Concepts and Challenges - Basic Compiler Techniques for Exposing ILP - Reducing BranchCosts with Prediction - Overcoming Data Hazards with Dynamic Scheduling - Examples andthe Algorithm - Hardware Based Speculation - Exploiting ILP Using Multiple Issue and StaticScheduling, Dynamic Scheduling and Speculation.

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Carl Hamacher, Zvonok Vranesic Safwat Zaky, "Computer Organization", 5th edition, McGraw Hill, 2002.
2. John L. Hennessey and David A. Patterson, "Computer Architecture: A Quantitative Approach", 5th Edition, Elsevier, 2011.

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REFERENCES:

1. William Stallings, "Computer Organization and Architecture -Designing for Performance", Pearson Education, 9th Editi on, (Hardcover Revised) 2012.
2. David A. Patterson and John L. Hennessey, "Computer Organization and design, The Hardware/Software Interface", 4th Edition, Morgan Kaufmann, 2009.
3. John P.Hayes, "Computer Architecture and Organization", 3rd edition, McGraw Hill, 2002.
4. B.Govindarajalu, "Computer Architecture and Organization", 2nd edition, McGraw Hill, 2010.

WEB REFERENCES:

- Carl Hamacher, Zvonok Vranesic Safwat Zaky, "Computer Organization", 5th edition, McGraw Hill, 2002. URL: http://www.technolamp.co.in/2011/04/computer-organization-carl-hamacher.html
- Carl Hamacher, Zvonok Vranesic Safwat Zaky, "Computer Organization", 5th edition, McGraw Hill,2002.URL:http://www.cse.iitk.ac.in/users/karkare/courses/2011/cs220/html/notes.html
- John L. Hennessey and David A. Patterson, "Computer Architecture: A Quantitative Approach", 5th Edition,Elsevier,2011.URL:https://books.google.co.in/books/about/Computer_Architecture.html?id=v3-hVwHnHwC&hl=en
- NPTEL: Computer Science and Engineering- "Computer Architecture". URL: http://www.nptel.ac.in/courses/106102062/

BoS Chairman

Course Code: 11CS505	**Course Title:** WEB TECHNOLOGIES
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS304 – JAVA PROGRAMMING

Course Outcomes:

At the end of the course the student will be able to:
CO1. Create web pages with various XHTML concepts and JavaScript features.
CO2. Construct web pages using dynamic scripting languages.
CO3. Outline the concepts of XML and apply its features in web.
CO4. Demonstrate the JSP and ASP scripting language.
CO5. Illustrate Servlets along with its features.

Course Content:

UNIT I XHTML - JAVA SCRIPT **8**

Internet and World Wide Web – XHTML –Lists- Forms- Cascading style sheets-JAVA Script –Memory Concepts- Control Statements – Functions – Arrays – Objects.

UNIT II DYNAMIC HTML **9**

Object Referencing- Collections- Dynamic Style- Dynamic Position- Event Model– Form Processing – Event Bubbling – Filters and Transitions – Flip Filters –Shadows –Gradients – Data Binding – Record Set

UNIT III XML **9**

XML Markup- Namespaces-Document Type Definitions-Schema-Document Object Model-XML Path Language –Extensible Style Sheet Language – XLink- XPointer - Xinclude – Xbase.

UNIT IV JSP-ASP **10**

JSP - Objects – Scripting – Standard Actions – Directives - ASP – Page Objects – File System Objects – Session Tracking and Cookies – ADO –Active-X Components – Form Navigation –Posting Messages.

UNIT V SERVLETS **9**

HTTP Servlet – Servlet Life Cycle –Caching- Retrieving Information- HTML Information –Session Tracking- URL Rewriting- Cookies-Security-Applet Servlet Communication - Collaboration.

L: 45 T: 0 TOTAL: 45

TEXT BOOK:

1. Deitel & Deitel, Goldberg, "Internet and World Wide Web – How to Program", Pearson Education Asia, 3rd Edition (Reprint) 2005.
2. Deitel & Deitel ,Nieto , Lin ,Sadhu, "XML: How To Program", Pearson Education Asia, 2nd Edition 2009.
3. Jason Hunter, William Crawford,"Java Servlet Programming",O'Reilly Publication, 2nd Edition 2010

BoS Chairman

REFERENCES:

1. Eric Ladd, Jim O' Donnel, "Using HTML 4, XML and JAVA", Prentice Hall of India – QUE, Platinum Edition, 2001.
2. Ramesh Bangia, Web Technology (including HTML, CSS, XML, ASP, JAVA), Firewall Media, 1st Edition (Reprint) 2008.

WEB REFERENCES:

- http://xwiki.usc.edu/groups/instructionalmaterials/weblog/e5657/XHTML_and_CSS_tutorial.html
- http://www.w3schools.com/html/html_xhtml.asp
- https://www.ischool.utexas.edu/technology/tutorials/webdev/xml_dtds/xml.pdf
- http://www.ceng.metu.edu.tr/~e1195288/JSP_tutorial.pdf
- http://www.java-programming.info/tutorial/pdf/csajsp2/02-Servlet-Basics.pdf
- http://www.nptel.ac.in/courses/106105084/

BoS Chairman

Course Code: 11CS506	**Course Title:** DATA WAREHOUSING AND DATA MINING
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS404 - DATABASE SYSTEMS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Determine the components of data warehouse and OLAP techniques.
CO2. Apply the Data Pre-processing techniques and demonstrate the association rule mining process.
CO3. Analyze the different methods and issues in Classification Techniques.
CO4. Illustrate the techniques for clustering the data and detection of outliers
CO5. Identify the techniques for mining heterogeneous data sources such as Text, Multimedia and Spatial data.

Course Content:

UNIT I DATA WAREHOUSING **8**

Basic Concepts, Modeling: Data cube and OLAP, Design and Usage, Implementation, Data Generalization by Attribute-Oriented Induction.

UNIT II DATA PREPROCESSING AND ARCHITECTURE **8**

Overview of data mining, Patterns, Technologies, Issues in data mining, Data Objects and Attribute Types, Preprocessing: Cleaning, Integration, Reduction, Transformation, Discretization

UNIT III ASSOCIATION RULE MINING **9**

Association Rule Mining: Basics, Frequent Itemset Mining Methods, Pattern Evaluation Methods.Pattern Mining in Multilevel, Multi Dimensional Space, Constraint–based Frequent Pattern Mining

UNIT IV CLASSIFICATION **10**

Basics, Decision Tree Induction, Bayesian Classification, Rule Based Classification, Model Evaluation and Selection, Classification by back propagation, Other Classification Methods

UNIT V CLUSTERING **10**

Cluster Analysis, Partitioning methods, Hierarchical methods, Outlier Analysis and Detection Methods
RECENT TRENDS- Spatial Data Mining, Multimedia Data Mining, Text Mining, Data Mining Applications.

L: 45 T: 0 TOTAL: 45

TEXT BOOK:

1. Jiawei Han, MichelineKamber and Jian Pei, "Data Mining Concepts and Techniques", 3rd Edition, Elsevier, 2012.

BoS Chairman

REFERENCES:

1. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education 2004.
2. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, 10th Reprint 2007.
3. David Hand, HeikkiMannila, Padhraic Smyth, "Principles of Data Mining", PHI 2004.
4. W.H.Inmon, "Building the Data Warehouse", 3rd Edition, Wiley, 2003.

WEB REFERENCES:

- Han and Kamber: Data Mining — Concepts and Techniques, 2nd ed., Morgan Kaufmann, 2006. URL: http://web.engr.illinois.edu/~hanj/bk3/bk3_slidesindex.htm
- DATA MINING CLASSIFICATION. URL: http://courses.cs.washington.edu/courses/csep521/07wi/prj/leonardo_fabricio.pdf

BoS Chairman

Course Code: 11CS507	**Course Title:** COMPUTER NETWORKS LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1: Design various LAN topologies and evaluate the performance
CO2: Implement socket programming
CO3: Develop various routing protocols
CO4: Design and Monitor a computer Network.

List of experiments:

The following experiments are to be implemented/ simulated using any of the following tools

- Network Simulator (latest version) and OPNET

1. Simulation of IEEE LAN topologies
2. Building a network topology with proper connectivity
3. TCP and UDP Socket programming
4. Remote Method Invocation and Remote Procedure Call.
5. Implementation of Routing Protocols
6. Study of router configuration
7. Dynamic Host Configuration Protocol.
8. Sliding Window Protocol
9. TCP Congestion Control algorithms
10. Implementation of SNMP protocol.

TOTAL: 45

BoS Chairman

Course Code: 11CS508	**Course Title:** SYSTEM SOFTWARE DESIGNLABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1: Design a single pass and two pass assembler
CO2: Implement a Macro processor
CO3: Design absolute and re-locatable loader
CO4: Implement a text editor.

List of Experiments:

1. Implementation of a symbol table.
2. Design of a two pass assembler.
3. Design of a one pass assembler.
4. Design of a macro processor.
5. Implementation of an absolute and relocating loader.
6. Implement pass one and pass two of a direct-linking loader.
7. Implementation of a simple text editor.

TOTAL: 45

BoS Chairman

Course Code: 11CS509	**Course Title:** WEB TECHNOLOGIESLABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student should be able to:
CO1. Construct the dynamic websites with all kinds of tags.
CO2. Illustrate the various concepts of XML.
CO3. Demonstrate with example the concepts of objects using JSP &ASP, components of the Active X objects and HTTP Servlets.
CO4. Develop a project by applying web application technologies and services

List of Experiments

1. Create a website using HTML tags and Cascading style sheets.
2. Implement the java script functions and objects.
3. Implement the Client Side Scripting for Validating the Web Form Controls using DHTML
4. Implement the concepts of XML Schema and DTD
5. Implement the concepts of XML Style Sheet and XLink
6. Implement the concepts of JSP Objects
7. Implement the concepts of ASP objects
8. Implement the Active X components
9. Implement the HTTP Servlets

TOTAL: 45

BoS Chairman

SEMESTER VI

Course Code: 11CS601	**Course Title:** ARTIFICIAL INTELLIGENCE
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS403 DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS

Course Outcomes:

At the end of the course the student will be able to:
CO1. Understand the fundamental concepts of Artificial Intelligence.
CO2. Apply efficient search techniques for Problem Solving
CO3. Devise Knowledge Representation scheme and apply Inference rules
CO4. Interpret the working of various Learning methods
CO5. Apply Artificial Intelligence techniques in Real world systems

Course Content:

UNIT I INTELLIGENT AGENTS **9**

Artificial Intelligence: Definition – History – Intelligent Agents – Problem Solving Agents – Toy Problems and Real-world Problems – Searching for Solutions - Uninformed Search Strategies

UNIT II PROBLEM SOLVING **9**

Informed Search Strategies: Greedy best-first search – A* search – Heuristic functions – Local search Algorithms and Optimization problems – Online Search Agent – Constraint Satisfaction Problems – Adversarial Search

UNIT III KNOWLEDGE REPRESENTATION **9**

Propositional Logic – Reasoning Patterns in Propositional Logic – First Order Logic – Inference in First Order Logic

UNIT IV LEARNING **9**

Learning from Observations – Forms of Learning – Learning Decision – Ensemble Learning – A Logical Formulation of Learning – Knowledge in Learning – Explanation Based Learning – Learning using Relevance Information – Inductive Logic Programming

UNIT V PLANNING AND APPLICATIONS **9**

The Planning Problem – Planning with State-Space Search – Partial-Order Planning – Conditional Planning. Applications: Communication as action – Formal grammar for English – Information Retrieval – Information Extraction – Speech Recognition

L: 45 T: 0 Total: 45

TEXT BOOK:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Prentice Hall, 3rd Edition, 2010.

BoS Chairman

REFERENCES:

1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw-Hill, 2nd Edition 2003.
2. Patrick Henry Winston, "Artificial Intelligence", Pearson Education / PHI, 2004.

WEB REFERENCES:

- Tool:SWI-Prologhttp://www.swi-prolog.org/downloadhttp://www.swi-prolog.org/pldoc/man?section=quickstart
- AIMA (Artificial Intelligence: A Modern Approach) http://aima.cs.berkeley.edu/ - TEXT BOOK: followedhttp://aima.cs.berkeley.edu/code.html - online code repository C++, Java, Python, LISP
- E Learning courses from IITs and IISChttp://nptel.ac.in/video.php?subjectId=106105079 – Video Lecture by Prof P. Dasgupta
- MITOPENCOURSEWARE http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/ - Video Lecture by Prof. Patrick Henry Winston
- Learn and explore the concepts in AI –AIspace tool developed at Laboratory of computational Intelligence at University of British Columbia.http://www.aispace.org/index.shtml

BoS Chairman

Course Code: 11CS602	**Course Title:** COMPILER DESIGN
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS502- FORMAL LANGUAGES AND AUTOMATA THEORY

Course Outcomes:

At the end of the course the student should be able to:
CO1. Describe the phases of compilers, tools and working of a compiler.
CO2. Design and implement a lexical analyzer
CO3. Analyze and develop different types of parsers
CO4. Choose schemes to develop intermediate code and memory space allocation.
CO5. Validate various techniques of code optimization and generation.

Course Content:

UNIT I INTRODUCTION **9**

Structure of a Compiler - Applications of Compiler Technology. A Simple Syntax – Directed Translator - syntax definition, syntax-directed translation, Parsing, A translator for simple expressions, Symbol Tables.

UNIT II LEXICAL ANALYSIS **9**

The role of the lexical analyzer, Input buffering, Specification of tokens, Recognition of Tokens, Finite Automata, Regular expression to an Automata, Optimization of DFA- Based Pattern Matchers.

UNIT III SYNTAX ANALYSIS **9**

Context-free grammars, Top-Down Parsing, Bottom-up parsing, Introduction to LR parsing, Powerful LR Parsers.

UNIT IV INTERMEDIATE CODE GENERATION **9**

Variants of Syntax Trees, Three – Address Code, Types and Declarations, Translation of Expressions, control flow, Back patching, Switch Statement. **Run-time environments:** Storage organization, stack-allocation of space.

UNIT V OPTIMIZATION &CODE GENERATION **9**

Machine-Independent Optimization: The principal sources of optimization, Loops in flow graph
Code Generation: Issues in the design of a code generator, Target Language, Address in the Target code, Basic Block and flow graph. DAG representation of Basic Blocks, A simple code generator, Peephole Optimization. Register allocation and Assignment.

L: 45 T: 0 Total: 45

TEXT BOOK:

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D Ullman – Compiler Principles, Techniques and Tools, 2nd Edition, Pearson Education – 2012.

BoS Chairman

REFERENCES:

1. Keith Cooper, Linda Torczon – "Engineering a Compiler" - Elsevier ,2nd Edition , 2012
2. Steven S. Muchnick – Advanced Compiler Design & Implementation – Harcourt Asia, Morgan Kaufmann – 2010.
3. J. P. Bennet - Introduction to Compiling Techniques- Tata McGraw-Hill Publishing- 2002.

WEB REFERENCES:

- Introduction to Machine Independent Optimization URL: http://nptel.ac.in/courses/106108052/17
- The Static Single Assignment Form URL: http://nptel.ac.in/courses/106108052/31

BoS Chairman

Course Code:11CS603	Course Title: SOFTWARE QUALITY ASSURANCE AND TESTING
Core/Elective: Core	Credits (L:T:P:C:M) – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites: The student should have undergone the course(s):
11CS406 PRINCIPLES OF SOFTWARE ENGINEERING

Course Outcomes:

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

CO1. Identify and explain various models, tools, and approaches for software quality control
CO2. Describe quality related activities such as quality tasks, planning, documentation, reviews and audits for software processes
CO3. Design and execute various Software testing techniques
CO4. Compare and evaluate various levels and types of software testing
CO5. Illustrate and explain various types of object oriented software testing activities

Course Content:

UNIT I SOFTWARE QUALITY AND CONTROL 10

Software Quality – Hierarchical models of Boehm and McCall – Quality measurement –Metrics measurement and analysis – Gilb's approach – GQM Model. Tools for Quality – Ishikawa's basic tools – CASE tools.

UNIT II SOFTWARE QUALITY ASSURANCE 10

SQA versus software quality control - Various Components of SQA system-overview -Quality tasks – SQA plan – Teams – Documentation control— Reviews and Audits.

UNIT III TESTING STRATEGIES AND METHODS FOR TEST CASE DESIGN 9

Introduction to test case design strategies, Black box approach - Random testing, equivalence class partitioning, boundary value analysis, cause effect graphing, state transition testing, White box approach - white box approach to test design, test adequacy criteria, coverage and control flow graphs, covering code logic, data flow and white box test design, loop testing, mutation testing.

UNIT IV LEVELS OF TESTING 8

Levels of testing: Need for testing levels, Unit test, Integration testing, System Testing- Functional testing, Performance testing, Stress testing, Configuration testing, Security testing Recovery testing, Regression testing, Alpha, Beta and Acceptance tests

UNIT V OBJECT ORIENTED TESTING 8

Issues in object oriented testing, Class testing, object oriented integration testing, GUI Testing and Object oriented system testing.

L: 45 T: 0 Total: 45

BoS Chairman

TEXT BOOKS:

1. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Computer press, 2nd Edition, 2003.
2. Stephen H.Kan, "Metrics and models in software quality Engineering", Addison –Wesley, 2nd Edition, 2003.
3. Daniel Galin, "Software Quality Assurance: From Theory to Implementation", Addison-wesley, 2009.
4. Ilene Burstein "Practical Software testing- A process oriented approach", 8th Indian reprint 2010.

REFERENCES:

1. Paul C. Jorgensen "Software Testing, A Craftsman's Approach", 3rd Edition, 4th Indian reprint 2012.
2. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Computer press, 3rd Edition, 2011.

WEB REFERENCES:

- Software Testing Concepts: http://www.tutorialspoint.com/software_testing/
- Testing Levels: http://www.cs.uky.edu/~paulp/CS499/CS499testingnotes.html

BoS Chairman

Course Code: 11CS604	**Course Title:** OBJECT ORIENTED SYSTEM DESIGN
Core/Elective: Core	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS406 - PRINCIPLES OF SOFTWARE ENGINEERING

Course Outcomes:

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

CO1. Describe the essence of object-oriented software processes and outline the usage of general purpose modeling language in the field of software Engineering
CO2. Illustrate Object Oriented Analysis and to analyze the functional requirements for a system
CO3. Construct UML diagrams to model various aspects of the systems
CO4. Relate object oriented concepts to all stages of the software development life cycle
CO5. Develop software using object oriented approach (modeling objects from the real world and then using the model to build a language independent design.)

Course Content:

UNIT I INTRODUCTION TO OBJECT ORIENTATION 9

Software related problems, software Engineering concepts, development activities, Introduction to Object Orientation - Development – Themes - Evidence for Usefulness of OO Development-OO modeling history.

UNIT II MODELING CONCEPTS 9

Modeling -Abstraction-The ThreeModels-ClassModeling-State Modeling, Interaction Modeling

UNIT III ADVANCED MODELING CONCEPTS 9

Advanced Class Modeling, Advanced State Modeling, Advanced Interaction Modeling

UNIT IV ANALYSIS AND DESIGN 10

Process overview, System conception, Domain Analysis, Application Analysis, System Design, Class Design

UNIT V IMPLEMENTATION 8

Implementation Modeling – OO languages, Databases, Programming Style

Case Study: ARENA System

L: 45 T: 0 Total: 45

TEXT BOOKS:

1. Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: Using UML, Patterns and Java", 3rd Edition, Pearson Education Asia, 2010.
2. Michael Blaha, James Rumbaugh "Object-Oriented Modeling and Design with UML", 2nd Edition, Pearson Education, 5th impression 2009

BoS Chairman

REFERENCES:

1. Ali Bahrami, "Object Oriented System Development" , Tata McGraw-Hill , 2nd Reprint 2008.
2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The unified Modeling language user guide", 2nd Edition, Pearson Education, 4th Reprint 2008.
3. James Rumbaugh,Ivar Jacobson, Grady Booch, "The Unified Modeling Language Reference Manual", Second Edition Pearson Education , 4th Reprint 2009.

WEB REFERENCES:

- Michael Blaha, James Rumbaugh "Object-Oriented Modeling and Design with UML", Second Edition, Pearson Education, Fifth impression 2009 https://books.google.co.in/books?id=wirmoiviloYC&pg=PA67&lpg=PA67#v=onepage&q&f=false
- Material: http://people.aub.edu.lb/~ws06/OOCourse.pdf

BoS Chairman

Course Code: 11CS607	**Course Title:** COMPILER DESIGN LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course, the students should able to:
CO1. Design and implementation of the Front end phase of the compiler.
CO2. Construction of Front end phase using LEX and YAAC tool
CO3. Generation of Intermediate code from the Front end phase
CO4. Implementation of Back end phase of the compiler

LIST OF EXPERIMENTS:

1. Construction of NFA from a given regular expression.
2. Construction of minimized DFA from a given regular expression.
3. Lexical Analysis using LEX.
4. Implementation of Shift Reduce Parsing Algorithm.
5. Construction of LR Parsing Table.
6. Syntax Analysis using YACC.
7. Intermediate code generation.
8. Implementation of Code Optimization techniques.
9. Implementation of Code Generation Phase.

Total: 45

BoS Chairman

Course Code: 11CS608	**Course Title:** OBJECT ORIENTED SYSTEM DESIGN LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

At the end of the course the student will be able to:
CO1: Design SRS.
CO2: Construct UML Diagrams and Implement it
CO3: Generate Test cases for the developed system.
CO4: Prepare Requirement, analysis, design and testing documents

For any 2 Applications

I Preparation of SRS and construction of the following diagrams

1. Activity diagram.
2. Use Case diagram.
3. State diagram.
4. Sequence diagram.
5. Collaboration diagram.
6. Class diagram.
7. Deployment diagram.
8. Package diagram.
9. Code generation.
10. Forward and reverse engineering.

II Test Plan, Test case Generation and documentation

Suggested Applications:
Automatic Teller Machine – Library Management System – Inventory Control System – e-shopping system – ARENA System, Ticket Reservation System, Quiz system ,Examination Management system, Course Management system.

Total : 45

BoS Chairman

SEMESTER VII

Course Code: 11CS701 / 11EC801	**Course Title:** ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING (Common to CSE, ECE, EEE, E&I and ICE)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Course Outcomes:

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

CO1. Define and describe the basic terminologies and concepts related to economics.
CO2. Outline the various functions of production and analyze using pricing methods.
CO3. Perform cost estimation for material, labor, and different type of jobs.
CO4. Understand and use the various costing methods for operations, processes and other factors.
CO5. Employ techniques such as balance sheet, average rate of return, payback period and net present value for accounting.

Course Content:

UNIT I INTRODUCTION **9**

Objectives of Managerial Economics, Firm, Cost Estimation, Costing, Cost Accounting, Factors Influencing Managerial Decisions & Theoretical Concepts, Classification and Elements of cost

UNIT II PRODUCTION ANALYSIS AND PRICING **9**

Production Function-Least Cost Combination of Inputs-Factor Productivities & Return to Scale-Determinants of Price-Pricing under different objectives and Market Structures-Price Discrimination & Pricing methods in practice

UNIT III ESTIMATION **9**

Estimation of Material, Labor and Overhead Cost, Allocation of Overheads. Estimation for different types of jobs

UNIT IV COSTING **9**

Job Costing - Operating Costing - Process Costing - Standard Costing (Variance Analysis) GDP

UNIT V ACCOUNTING **9**

Balance Sheet - Profit & Loss Statement - Evaluation of Investment decisions – Average Rate of Return-Payback Period-Net Present Value & IRR

TEXT BOOKS:

1. Jawaharlal, Cost Accounting, Tata McGraw-Hill Company, 1996.
2. T.P.Banga&S.C.Sharma, Mechancial Estimating and Costing, Khanna Publishers, 1984

BoS Chairman

REFERENCES:

1. James.C.Van Home, "Fundamentals of fincancial Management", PHI, NewDelhi, 2004.
2. V.L.Mote, Samuel Paul &G.S.Gupta, Managerial Economics-Concepts & Cases, TMH, Co, NewDelhi, 1989.
3. Ramachandran Aryasry&VV.Ramana Murthy, Engg Economics & Financial Accounting, Tata McGraw-Hill company, NewDelhi, 2004

WEB REFERENCES:

- URL: http://web.stevens.edu/ecosys/eng_eco/index.html
- URL: http://www.nptel.ac.in/syllabus/syllabus.php?subjectId=110101003
- URL: http://www.nptel.ac.in/syllabus/syllabus.php?subjectId=110101005

BoS Chairman

Course Code: 11CS702-R	Course Title: OPEN SOURCE SOFTWARE DEVELOPMENT
Core/Elective: Core	Credits (L : T : P : C : M) – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Outline the open source licenses and contractual issues and also design open source Databases.
CO2. Develop an object oriented program using groovy language
CO3. Combine groovy and grails framework for developing a Mini project.
CO4. Propose an idea for developing a concept using ruby
CO5. Combine ruby and rails framework for developing a Mini project.

Course Content:

UNIT I OPEN SOURCE SOFTWARE & DATABASE DESIGN 9

OPEN SOURCE SOFTWARE: Open Source Initiatives – definition-Open Source Licenses- Legal Issues-Contractual Protections SQL Database : MYSQL- Data types –stored programs NoSQL database :MongoDB – Schema-less, Database, collections, documents, fields, Establish relationships - Create, retrieve, update and delete documents.

UNIT II OPEN SOURCE PROGRAMMING LANGUAGE: GROOVY 9

Groovy as extension of Java - Data types, control structures, special loops & operators- List, Map, String, Date – Closure- Object Oriented groovy-Builders-working with databases

UNIT III OPEN SOURCE PROGRAMMING FRAMEWORK: GRAILS 9

Grails Introduction – commands-Web system evolution – Data Layer- scaffolding – InjectionAttacks-Plugin-Unit and integration testing-Service layer

UNIT IV RUBY 9

Ruby Introduction –variables –objects-numbers and expression-Text and strings-Arrays and List-Ruby application development-Object orientation basics-Databases

UNIT V RAILS 9

Rails on the web-web style-controlling data flow: Controllers and models – scaffolding andREST-Models with forms-model relationships

L: 45 T: 0 TOTAL: 45

TEXTBOOKS:

1. Michael R.Overly," The Open Source Handbook", 1st Edition, A BNA Company, 2003
2. Paul Dubios, "MYSQL – Developers Library", 4th Edition,2008
3. Kristina Chodorow, Michael Dirolf, "MongoDB: The Definitive Guide Powerful and Scalable Data Storage", 2nd Edition, O'Reilly Publication, 2010

BoS Chairman

4. Bashar Jawad, "Groovy and Grails Recipes", 1st Edition, A Press Publication, 2008
5. Peter Cooper," Beginning Ruby: From Novice to Professional", A press Publication, 2009
6. Simon St. Laurent, Edd Dumbill, "Learning Rails", 1st Edition, O'Reilly Publication, 2008

REFERENCES:

1. Jim Shingler, Joseph Faisal Nusairat, Christopher M. Jud, Beginning Groovy and Grails: From Novice to Professional, First Edition, APress Publication, 2008.

WEB REFERENCES:

- Open Source Initiative : http://opensource.org/
- MySQL: https://www.safaribooksonline.com/library/view/mysql-fifth-edition/9780133038552/pref01.html
- Groovy: http://www.groovy-lang.org/
- Grails Framework: https://grails.org/
- Ruby Programming Language: https://www.ruby-lang.org/en/
- Ruby on Rails : http://rubyonrails.org/

BoS Chairman

Course Code: 11CS703	**Course Title:** GRAPHICS AND VISUALIZATION
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CO102 ENGINEERING MATHEMATICS – I
11CO109 ENGINEERING GRAPHICS

Course Outcomes:

At the end of the course the student will be able to:
CO1. Outline the core concepts of Graphics and apply OpenGL API to create Interactive Computer Graphics.
CO2. Illustrate Graphics primitives & attributes and implement it using OpenGL API.
CO3. Distinguish the relationship between 2D and 3D versions of geometrical transformation & clipping algorithms and apply OpenGL API for performing operations.
CO4. Interpret 3D viewing concepts and representation.
CO5. Discriminate visible surface detection methods and select the models for lightning &surface rendering.

Course Content:

UNIT I GRAPHICS SYSTEMS **8**

Survey of Computer Graphics – Overview of Graphics Systems–Basic OpenGL Syntax-Related Libraries-Header Files- Complete OpenGL Program- Coordinate Reference Frames-Specifying a Two-Dimensional World Coordinate Reference Frame in OpenGL-OpenGL Point functions- Line functions-Line Drawing Algorithms-Parallel Line Algorithms.

UNIT II GRAPHICS OUTPUT PRIMITIVES AND ATTRIBUTES **9**

OpenGL Curve Functions-Circle And Ellipse Generating Algorithm- Fill Area Primitives- Polygon Fill Areas, OpenGL Functions, Attributes Of Output Primitives

UNIT III 2D and 3D GRAPHICS **9**

2D Basic Geometric Transformations, Matrix Representation, Composite Transformation, Reflection, Shearing, 2D Viewing and Clipping algorithms, 3D Basic Geometric Transformations.

UNIT IV 3D VIEWING AND REPRESENTATION **10**

3D viewing: Concepts, Projection Transformations, Orthogonal Projections, Parallel Projections and Perspective Projections, OpenGL 3D Viewing functions, 3D Object Representation: Polyhedra, OpenGL functions, Curved surfaces, Quadric surfaces, Spline representation, Bezier Curve and surfaces, Octrees, BSP Trees, Fractal Geometry methods

UNIT V VISUALIZATION OF 3D OBJECTS **9**

Visible surface detection methods: Classification of algorithms, Back Face Detection, Depth Buffer, A Buffer, Scan Line method, Depth sorting, BSP Tree method, Area subdivision, Octree method-Ray casting, OpenGL functions-**Illumination Models**: Light sources, Surface Lighting methods , Basic Illumination models, Polygon Rendering methods, OpenGL Illumination functions

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXTBOOK:

1. D. Hearn and M. Pauline Baker, Computer Graphics with OpenGL, Pearson Education, 3rd Edition, 2009

REFERENCES:

1. D. F. Rogers and J. A. Adams, Mathematical Elements for Computer Graphics,2nd Edition 24th reprint, McGraw-Hill International Edition, 2013.
2. F. S. Hill Jr., Computer Graphics using OpenGL, PH, 2007
3. Edward Angel, Interactive Computer GraphicsA Top-Down Approach with OpenGL, 5th Edition, Addison-Wesley, 2008.
4. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics - Principles and Practice, Second Edition in C, Pearson Education, 2003.
5. Mason Woo, Jackie Neider, Tom Davis, Dave Shreiner ,OpenGL Programming Guide: The Official Guide to Learning OpenGL, Version 1.2, Open GL Architecture Review Board, Pearson Education, First Indian Reprint 2000.

WEB REFERENCES:

- OpenGL API
  - https://www.opengl.org/
  - https://www.opengl.org/resources/libraries/glut/ - GLUT downloads
- Tutorials – Game Development
  - http://nehe.gamedev.net/
  - https://www.opengl.org/archives/resources/code/samples/s2001/ - Nate Robins tutorial
- OpenGL Programming Guide
  - http://www.glprogramming.com/red/
- OpenGL Reference Manual
  - http://www.glprogramming.com/blue/
- E Learning Course from IIT and IISC
  - http://nptel.ac.in/courses/106102065/ - Video Lecture notes by Prof Prem K Kalra
- MITOPENCOURSEWARE
  - http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-837-computer-graphics-fall-2012/ - Video Lecture Prof. Wojciech Matusik, Prof. Frédo Durand

BoS Chairman

Course Code: 11CS706-R	**Course Title:** OPEN SOURCE SOFTWARE DEVELOPMENT LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes:

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

CO1. Develop web applications with PHP as front end and MongoDB as backend.
CO2. Implement the OOP principles using Groovy
CO3. Write programs in GROOVY and develop applications in GRAILS framework.
CO4. Implement web-based applications in RAILS framework using RUBY.

Areas of Experiments:

- Develop a webpage using PHP and open source databases by validating the certain fields
- Implementation of Database using MONGO
- Groovy text parsing, regular expressions, and SQL
- Framework using Grails
- Ruby OOPs concepts and Databases
- Framework using rails

TOTAL: 45

BoS Chairman

Course Code: 11CS707	**Course Title:** GRAPHICS AND VISUALIZATION LABORATORY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 0 : 0 : 3 : 2 : 100
Type: Practical	**Total Contact Hours:** 45

Course Outcomes

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

CO1. Outline and apply graphics built-in functions in designing and creating simple animation.
CO2. Analyze the algorithms for displaying output primitives and construct complex objects.
CO3. Develop menu driven graphics by combining output primitive algorithms, transformation operations & viewing principles.
CO4. Create projects by conceiving and applying graphics fundamentals.

Areas of Experiments:

1. Implementation of graphics built-in functions
2. Implementation of Line Drawing Algorithms.
3. Implementation of Circle and Ellipse drawing Algorithms
4. Implementation of 2D and 3D Transformation
5. Implementation of 2D clipping
6. Visualizing 3D objects.

TOTAL: 45

BoS Chairman

SEMESTER VIII

Course Code:11CS801	**Course Title:** PRINCIPLES OF MANAGEMENT (Common to CSE and Mechanical)
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Define the concept of management and discuss why organizations are needed, why managers are necessary, and why management is a challenge.

CO2. Explain why planning is needed in organizations and why long-term objectives are necessary for successful planning and Identify the essential characteristics of decision making.

CO3. Differentiate between the various types of organizational structures and patterns. Explain the importance of delegation in organizations and describe the relationship between authority, responsibility and accountability.

CO4. Analyze the leadership function, recognizing leadership as the relationship between a supervisor and subordinates in an organizational environment.

CO5. Recognize the link between planning and controlling, and the various means by which managers measure and compare performance to objectives. Explain why financial controls are used by organizations as the predominant means of control

UNIT I INTRODUCTION **9**

Historical developments –approaches to management– Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organization

UNIT II MANAGERS & ENVIRONMENT **9**

Social responsibility–Planning – Objectives – Setting Objectives – Process of Managing through Objectives – Strategies- Policies & Planning Premises- Forecasting Techniques – Decision-making

UNIT III FUNCTIONAL AREA ORGANIZATION **9**

Formal and informal organization – Organization Chart – Structure and Process – Departmentation by difference strategies – Line and Staff authority – Benefits and Limitations – De-Centralization and Delegation of Authority – Staffing – Selection Process – Techniques

UNIT IV MOTIVATION & DIRECTIONS **9**

Objectives– Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication-Types

BoS Chairman

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UNIT V CONTROLLING STRATEGIES 9

System and process of Controlling – Requirements for effective control – The Budget as Control Technique – Information Technology– Computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and Preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management.

TEXTBOOKS:

1. Harold Koontz & Heinz Weihrich "Essentials of Management"- Tata McGraw- Hill-7th Edition-2007.
2. Tripathy PC and Reddy PN, "Principles of Management"- Tata McGraw-Hill 1999.

REFERENCES:

1. Maheswari S N," Principles of management accounting" Sultan hand&sons 2003
2. Vilas Bagad," Principles of Management", technical publishers,2006.

WEB REFERENCES:

- http://catalog.flatworldknowledge.com/bookhub/reader/5?cid=41991&e=carpenter-ch01
- http://www.nios.ac.in/media/documents/VocInsServices/m1-4f.pdf
- http://discovery.bits-pilani.ac.in/dlpd/courses/coursecontent/courseMaterial/mgtszc211/principles_of_management_notes.pdf
- http://faculty.mercer.edu/jackson_r/Ownership/chap02.pdf

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ELECTIVES

Course Code: 11CS961	**Course Title:** TCP/IP
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS501–COMPUTER NETWORKS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Characterize and interpret the significance of using Internet Protocol and Transmission Control Protocol.
CO2. Demonstrate the functionality of client and server systems using socket programming
CO3. Identify and illustrate various TCP/IP functionalities used in wireless and ATM systems
CO4. Formulate the required TCP functionalities in higher level application layer protocols
C05. Develop security solutions in various levels of network communication

Course Content:

UNIT I ADDRESSING AND RELIABILITY **11**

IP – Addressing – Sub-netting and Super-netting; The TCP/IP Protocol Suite – Versions – Port address – Communication – Services – Flow control – Silly window syndrome – Error control – Timers Congestion control – Connection – Operation and Package

UNIT II SOCKET INTERFACE **7**

Client Server Model – Concurrency – Processes – Sockets – Byte Ordering – Address Transformation and Manipulation – System calls – Iterative Server – Concurrent Server – Client and Server programmes

UNIT III TCP/IP OVER WIRELESS & ATM **9**

BOOTP and DHCP – Mobile IP – Addressing – Agent Discovery – Registration – Data Transfer – ATM WANS – Cells – Routing Cells – ARP – LIS – Real Time Traffic over Internet

UNIT IV APPLICATION LAYER PROTOCOLS **10**

Domain Name System – Telnet – Rlogin – FTP – TFTP – Simple Mail Transfer Protocol - Hyper Text Transfer Protocol

UNIT V INTERNET SECURITY **8**

Privacy – Digital Signature – Security in the Internet – Transport Layer security – Security at the IP layer – Firewalls – Private Networks – NAT – IPv6

L: 45 T: 0 TOTAL: 45

TEXT BOOK:

1. Behrouz A. Forouzan, "TCP/IP Protocol suite", Tata McGraw Hill, 2010, 4th Edition.

BoS Chairman

REFERENCES:

1. Douglas E. Comer, "Internetworking with TCP/IP", 4th Edition, Pearson Education Asia, Volume 1,2 2000.
2. Richard Stevens, "TCP/IP Illustrated", Vol. 1,2,3, Pearson Education India, 1996.
3. John Ray, "Using TCP/IP", Prentice Hall of India, 1999

WEB REFERENCES:

- IIT Madras, National Programming on Technology Enabled Learning (NPTEL) – Data Communications – TCP/IP. URL: http://nptel.ac.in/courses/106105082/35
- Virtual and Software Training- TCP/IP for windows course URL: http://www.vtc.com/products/TCP/IP-for-Windows-tutorials.htm
- EPA University - TCP/IP Networking. URL: http://moodle.epfl.ch/course/view.php?id=523

BoS Chairman

Course Code:11CS962	Course Title: MULTIMEDIA SYSTEMS AND APPLICATIONS
Core/Elective: Elective	Credits (L:T:P:C:M) – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Demonstrate a step-by-step approach to multimedia systems design

CO2. Explain in detail multimedia Image compression standards, Lossless and lossy compression algorithms.

CO3. Devise Video Compression Techniques

CO4. Illustrate the issues related to generic multimedia databases, to describe programmingissues at different levels and cover object based and object oriented approaches

CO5. Depict application related issues: media design, general user-interface topics & multimedia learning, discuss on various possible applications and experiment with a case study

Course Content:

UNIT I MULTIMEDIA AUTHORING AND DATA REPRESENTATION **8**

Introduction – components of Multimedia- Multimedia and Hypermedia-WWW- Multimedia software tools- Multimedia authoring and Tools- Graphics and Data Representations – Image data types – Popular File formats

UNIT II MULTIMEDIA DATA COMPRESSION **10**

Basics of Information theory-Lossless Compression Algorithms – Run Length Encoding- Variable Length Encoding- Dictionary Based Coding- Arithmetic coding – Lossy Compression Algorithms – Distortion Measures – Rate Distortion theory – Quantization – Transform coding- Image Compression standards

UNIT III VIDEO COMPRESSION TECHNIQUE **9**

Basic Video compression Techniques- Video compression based on motion compensation- search for motion vectors –H.261 – MPEG Video Coding – MPEG-I and 2

UNIT IV MULTIMEDIA DBMS AND PROGRAMMING **9**

Multimedia specific properties of MMDBMS-Data modeling in MMDBMS- Implementation-Abstraction levels – requirement for Programming Languages – Object Oriented Application development – Object Oriented Frameworks and Class Libraries

UNIT V MULTIMEDIA APPLICATION DESIGN **9**

Design specific properties of Images – Visualization –symbols- Illustrations-Image production techniques – User Interfaces – Multimedia Learning-Applications: Media preparation- Editing – Integration – Transmission- Usage – Electronic Books and Magazines-Kiosks- Tele-shopping- Entertainment

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOKS:

1. Ze-Nian Li Mark S. Drew," Fundamentals of Multimedia", Pearson Education,2007
2. Ralf Steinmetz KlaraNahrstedt," Multimedia Applications", Springer 2007

REFERENCES:

1. John.F. Koegel Buford, "Multimedia Systems ", Pearson Education, 6th Impression 2009.
2. Tay Vaughon, "Multimedia making it works, "McGraw-Hill Education 2010
3. Ralf Steinmetz and Klara Nahrstedt, "Multimedia: Computing, Communications and Applications", Pearson Education, 6th Impression 2009.

WEB REFERENCES:

- Multimedia Systems:http://link.springer.com/book/10.1007%2F978-3-662-08878-4

BoS Chairman

Course Code: 11CS963	**Course Title:** ADVANCED DATA STRUCTURES
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course:
11CS303–DATA STRUCTURES

Course Outcomes:

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

CO1. Develop algorithms for efficient search using Tree data structures
CO2. Analyze the working of Priority Queue and its variations
CO3. Identify the need for Disjoint Sets and deploy them in real world problems
CO4. Develop Range Search applications using suitable data structures
CO5. Design applications using Geometric Data structures

Course Content:

UNIT I SEARCH DATA STRUCTURES **10**

Top-Down Splay Trees – Red Black Trees - Treaps – Skip Lists – Tries – Suffix Arrays and Trees

UNIT II PRIORITY QUEUE DATA STRUCTURES **8**

Binary Heap – *d*-Heaps – Leftist Heaps – Skew Heaps – Binomial Queues – Fibonacci Heaps

UNIT III DISJOINT SET ADT **9**

Basic Data Structure – Smart Union Algorithms – Path Compression – Analysis – Application

UNIT IV RANGE SEARCH **9**

1-Dimensional Range Searching – kd-Trees – Range Trees – Higher-Dimensional Range Trees

UNIT V GEOMETRIC DATA STRUCTURES **9**

Interval Trees – Priority Search Trees – Segment Trees – Quad Trees

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Mark Allen Weiss, "Data Structures & Algorithms in Java", Pearson Education, 3rd Edition, 2012.
2. Mark de Berg, Otfried Cheong, Marc van Kreveld, Mark Overmars, "Computational Geometry Algorithms and Applications", Springer, 3rd Edition, 2008.

REFERENCES:

1. Peter Brass "Advanced Data Structures", Cambridge University Press, 1st Edition, 2008.
2. Dinesh P.Mehta, Sartaj Sahni, "Handbook of Data Structures and Applications", Chapman & Hall/CRC, 2005.

WEB REFERENCES:

- Adrian Vladu and CosminNegruşeri, Suffix arrays – a programming contest approach, 2005. URL: http://web.stanford.edu/class/cs97si/suffix-array.pdf
- Applications of Computational Geometry – Geometry in Action. URL: https://www.ics.uci.edu/~eppstein/geom.html
- Data Structure Visualizations URLs:https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
- http://visualgo.net/

BoS Chairman

Course Code: 11CS964	**Course Title:** NETWORK SECURITY
Core/Elective: Core	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS401- DISCRETE MATHEMATICS, and
11CS501-COMPUTER NETWORKS

Course Outcomes:

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

CO1. Comprehend and describe the OSI Security Architecture X.800 and use classical encryption/decryption techniques.
CO2. Explain the various modes of operation for block ciphers as well as the various types of symmetric key ciphers.
CO3. Apply number theory and explain a variety of public key cryptographic systems.
CO4. Explain the different types of message authentication and cryptographic hash functions.
CO5. Choose and evaluate techniques for enhancing security on the cloud, web, email, and computer network.

Course Content:

UNIT I INTRODUCTION **9**

Introduction – Computer Security Concepts – Security Services, Mechanisms and Attacks – OSI Security Architecture - Basic cryptography - Classical Encryption Techniques: Transposition and Substitution, Caesar Cipher.

UNIT II SYMMETRIC CIPHERS **9**

Stream Ciphers vs Block ciphers – Block cipher design principles - Modes of operation: Electronic Code Book, Block Chaining, Counter Mode – Data Encryption Standard (DES) and DES Example – AES: Structure and Key Expansion. Contemporary Ciphers: Multiple DES, RC4 and RC5, Blowfish.

UNIT III PUBLIC KEY ENCRYPTION **9**

Introduction to number Theory – Fermat's and Euler's Theorem - Primality testing-factorization –Chinese remainder theorem - Discrete logarithms - RSA Cryptosystem - Diffie-Hellman Key Exchange - Rabin Cryptosystem - Elgamal Cryptosystem.

UNIT IV MESSAGE AUTHENTICATION AND HASH FUNCTIONS **9**

Message authentication: Requirements and Functions, Security of MACs – Cryptographic Hash Functions – –MD5, SHA, HMAC. Digital Signatures: Elgamal, Schnorr – Kerberos - X.509.

UNIT V NETWORK SECURITY AND SYSTEM SECURITY **9**

Network Access Control and Cloud Security: Cloud Security Risks and Countermeasures, Data Protection in Cloud, Cloud Security as Service – Web Security: SSL, TLS, HTTPS – e-mail security: PGP, S/MIME – IP Security: Overview, Policy, and ESP.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. William Stallings, "Cryptography and Network Security: Principles and Practices", Pearson Education, New Delhi, 6th edition 2013.

REFERENCES:

1. Behrouz A Forouzan, "Cryptography and Network Security", The McGraw-Hill Companies, Special Indian Edition 2007.
2. Roberta Bragg, Mark Phodes - Ousley, Keith Strassberg, "Network Security: The Complete Reference", Tata McGraw-Hill edition 2004.
3. AtulKahate "Cryptography and Network security", Tata McGraw-Hill Publications Company Ltd. New Delhi, 2nd edition, 2009.

WEB REFERENCES:

- Cryptography. URL: http://williamstallings.com/Cryptography/
- Network Security Protocols: A Tutorial - IETF. URL: https://www.ietf.org/proceedings/61/slides/sectut-0/editorstrain.ppt
- X.800 : Security architecture for Open Systems Interconnection for CCITT applications. URL: http://www.itu.int/rec/T-REC-X.800-199103-I/e
- US-CERT Security Trends Report: 2012 in Retrospect. URL: https://www.us-cert.gov/sites/default/files/US-CERT_2012_Trends-In_Retrospect.pdf
- A simple introduction to NS concepts. URL: http://ptgmedia.pearsoncmg.com/images/1587131625/samplechapter/1587131625content.pdf
- NPTEL: Computer Science and Engineering - Cryptography and Network Security (Video Tutorials). URL: http://www.nptel.ac.in/courses/106105031/

BoS Chairman

Course Code: 11CS965	**Course Title:** BIG DATA
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS306- OPERATING SYSTEMS
11CS404- DATABASE SYSTEMS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Define Big Data and identify applications for Big Data
CO2. Describe and explain the HADOOP framework with HDFS architecture.
CO3. Comprehend the anatomy of MapReduce and explain how a MapReduce job runs.
CO4. Run MapReduce jobs on a Hadoop framework.
CO5. Use Hadoop related tools including Pig, Hive, and HBASE for data analytics.

Course Content

UNIT I BIG DATA and ANALYTICS **8**

Big Data - Volume, Velocity, Variety, Veracity – Big Data Analytics Applications – Architecture Components: Massively Parallel Processing (MPP) Platforms, Unstructured Data Analytics and Reporting, Data Privacy Protection, Real-time Adaptive Analytics – Google BigTable and BigQuery – Amazon S3.

UNIT II HADOOP AND HDFS **10**

Hadoop - Data Storage and Analysis, Comparison with Other Systems, Apache Hadoop, Hadoop Ecosystem, Hadoop Releases. Design of Hadoop Distributed File System (HDFS), HDFS Concepts, CLI, Filesystems and Interfaces, The Java Interface, Data Flow, Parallel Copying with distcp, Hadoop Archives. Hadoop I/O - Data Integrity, Compression, Serialization, File-Based Data Structures.

UNIT III MapReduce **10**

MapReduce – Weather Dataset: Analysis with Unix Tools and Hadoop, Scaling Out, Hadoop Streaming, Hadoop Pipes. Classic vs YARN MapReduce: Anatomy of Job Run, Failures, Scheduling, Shuffle and Sort.

UNIT IV ADVANCED MapReduce **9**

MapReduce Types and Formats – Types, Input Formats, Output Formats. MapReduce Features – Counters, Sorting, Joins, Side Data Distribution, MapReduce Library Classes.

UNIT V TOOLS **8**

Pig: Comparison with Databases, Pig Latin – Hive: Comparison with Traditional Databases, HiveQL, Tables, Querying Data, User-Defined Functions – Hbase: Hbasics, Concepts, HBase Versus RDBMS.

L: 45 T: 0 TOTAL: 45



TEXT BOOK:

1. ArvindSathi, "Big Data Analytics: Disruptive Technologies for Changing the Game (Paperback)", Mc Press, 2013.
2. Tom White, "Hadoop: The Definitive Guide, O'Reilly Publication and Yahoo!Press", 2009.

REFERENCES:

1. Viktor Mayer-Schönberger and Kenneth Cukier, "Big Data: A Revolution That Will Transform How We Live, Work, and Think, Eamon Dolan/Houghton Mifflin Harcourt", 2013.

WEB REFERENCES:

- Google BigQuery, URL: https://developers.google.com/bigquery/sign-up?csw=1#queries
- Amazon S3, URL:http://aws.amazon.com/s3/
- Welcome to Apache™ Hadoop®! URL: https://hadoop.apache.org/

BoS Chairman

Course Code:11CS966	**Course Title:** PROBABILITY AND QUEUEING THEORY
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS401- Discrete Mathematics

Course Outcomes:

At the end of the course the student should be able to:
CO1: Apply the basics concepts of probability in real life problems.
CO2: Apply the concepts standard probability distributions in real time problems.
CO3: Develop the knowledge in handing random variables.
CO4: Solve and formulate the random process by probabilistic model.
CO5: Solve the real time problems using the knowledge queuing theory.

Course Content:

UNIT I PROBABILITY AND RANDOM VARIABLE **9**

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

UNIT II STANDARD DISTRIBUTIONS **10**

Discrete distributions: Geometric-Negative Binomial - Continuous distributions: Uniform – Exponential – Normal distributions and their properties (Proofs excluded).

UNIT III TWO DIMENSIONAL RANDOM VARIABLES **9**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and regression – Transformation of random variables – Central limit theorem.

UNIT IV RANDOM PROCESSES AND MARKOV CHAINS **9**

Classification – Stationary process – Markov process – Poisson process – Birth and death process –Markov chains – Transition probabilities.

UNIT V QUEUEING THEORY **8**

Markovian models – M/M/1 – M/M/C – finite and infinite capacity (steady state solutions only) – M/G/1 queues – Pollaczek – Khintchine formula.

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Ross S, "A first course in probability", 9th Edition, Pearson Education, 2012.
2. Veerarajan. T, "Probability, Statistics and Random Processes", 2nd Edition, Tata McGraw Hill, 11th reprint 2007.
3. Taha. H. A., "Operations Research-An Introduction", 9th Edition, Pearson Education Edition, 2010.

BoS Chairman

REFERENCES:

1. S.Karlin and H.M. Taylor., "An Introduction to Stochastic Modeling" Academic Press, 2007.
2. Richard A Johnson, "Probability and Statistics for Engineers", 7th Edition, Pearson Education, 2005.
3. Gross D. and Harris, C.M., "Fundamentals of Queuing Theory", 4th Edition, John Wiley and Sons, 2008.

WEB REFERENCES:

- http://nptel.ac.in/video.php?subjectId=106106094
- http://nptel.ac.in/syllabus/syllabus.php?subjectId=111104028
- http://nptel.ac.in/syllabus/syllabus.php?subjectId=111106052
- http://www.nptelvideos.in/2012/11/discrete-mathematical-structures.html
- http://nptel.ac.in/courses/111103020/

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Course Code: 11CS970	**Course Title:** PROFESSIONAL ETHICS
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS201–COMMUNICATION SKILLS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Characterize the fundamental principles and theories in Engineering Ethics
CO2. Define the code of ethics that shape the ethical behavior of the engineer
CO3. Identify the various methods for assessment of Risk Benefit Policies
CO4. Illustrate the significance of societal responsibilities, Loyalty and Professional Rights
CO5. Exhibit professional ethics in society and devise ethical norms for societal and Technological development

Course Content:

UNIT I ENGINEERING ETHICS **9**

Senses of Engineering Ethics –The Negative and the Positive face of Engineering Ethics-Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy–The Problems of many Hands–Kohlberg's theory–Gilligan's theory of impediments to Responsible Action–Consensus and Controversy–Professions and Professionalism–Professional Ideals and Virtues –Theories about Right Action-Uses of Ethical Theories

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION **9**

Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics –Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – Columbia Space Shuttle Explosion

UNIT III ENGINEER'S RESPONSIBILITY FOR SAFETY **9**

Safety and Risk –Assessment of safety and risk- Social and Value dimensions of Technology- Technology Pessimism –The Perils of Technological Optimism–The Promise of Technology –Computer Technology Privacy and Social Policy–Risk Benefit Analysis– the Three Mile Island and Chernobyl case studies

UNIT IV RESPONSIBILITIES AND RIGHTS **9**

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Whistle Blowing-Employee Rights –Intellectual Property Rights (IPR) – Discrimination

UNIT V GLOBAL ISSUES **9**

Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics –Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors– Moral Leadership –Honesty – Integrity and Ingenuity Sample Code of Conduct like ABET, AAES, ASME, ASCE, IEEE, NSPE, Institution of Engineers (India), etc.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOKS:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", 3rd Edition, McGraw Hill, New York, 2005.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics–Concepts and Cases", Thompson Learning, 2000.

REFERENCES:

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999.
2. Gail D.Baura, "Engineering Ethics: An Industrial Perspective", Elsevier Inc, 2006
3. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi, 2004.
4. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

WEB REFERENCES:

- Mike Martin and Roland Schinzinger, "Ethics in Engineering", Third Edition, McGraw Hill, New York, 2005. URL : http://course.sdu.edu.cn/G2S/eWebEditor/uploadfile/20131018102149728.pdf
- Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Thompson Learning, 2000
  URL:http://www.course.sdu.edu.cn/G2S/eWebEditor/uploadfile/20131017113053223.pdf

BoS Chairman

Course Code: 11CS971	**Course Title:** HIGH SPEED NETWORKING
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS501 – COMPUTER NETWORKS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Differentiate the principal services and applications of high speed networking technologies.
CO2. Distinguish the functionalities of various access and traffic control algorithms used in High Speed networks.
CO3. Analyze the properties of packet scheduling and queuing mechanisms
CO4. Characterize the flow and congestion control mechanisms for the applications' desired QoS
CO5. Illustrate the properties of various differentiated services and their applications

Course Content:

UNIT I NETWORK TECHNOLOGIES **8**

Network Technologies - QoS Parameters – Control Methods – Deterministic Bound – Call Admission Control for ATM VBR services and Integrated Services Internet

UNIT II TRAFFIC ACCESS CONTROL **9**

ATM Traffic Contract and Control Algorithms – Cell delay variation tolerance – Generic Cell Rate Algorithm – Shaping Multiplexer – Integrated Packet Shaper

UNIT III PACKET SCHEDULING AND QUEUING **12**

Packet Scheduling Techniques – Packet fair Queuing – RAM –Based Search Engine – General Shaper and Scheduler – Buffer Management

UNIT IV FLOW AND CONGESTION CONTROL **9**

Window based Flow Control – Rate-based Flow Control – Predictive Control Mechanism – Flow Control in ATM and TCP/IP Networks – QoS Routing in ATM and Integrated Services

UNIT V DIFFERENTIATED SERVICES **8**

SLA and TCA – Architecture – PHB – Conceptual Model – Multiprotocol Labeled Switching – Architecture – Label Distribution and Forwarding Model – Support - Applications

L: 45 T: 0 TOTAL: 45

TEXT BOOK:

1. H. Jonathan Chao, XiaoleiGuo, "Quality of Service Control in High-Speed Networks", John Wiley & Sons, Inc, 2002

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REFERENCES:

1. James P. G. Sterbenz, Joseph D. Touch, "High Speed Networking – A Systematic Approach to High-Bandwidth Low-Latency Communication", John Wiley Publications, 2002
2. William Stallings, "High Speed Networks and Internets – Performance and Quality of Service", Pearson Education, 2nd Edition.
3. Benny Bing, "High Speed Wireless ATM and LANs", Artech House Publications, 2000

WEB REFERENCES:

- William Stallings, Technical Resources and Course Web Site for High-Speed Networks and Internet. URL: http://www.williamstallings.com/HsNet2e.html
- Classle Learning – High speed Networks-problems and solutions. URL: https://www.classle.net/content-page/high-speed-networks-problems-n-solutions
- Johns Hopkins University, High-Speed Networking Technologies. URL: https://ep.jhu.edu/programs-and-courses/605.473-high-speed-networking-technologies
- A Course on High Speed Networks. URL: https://3cs1101vu.wordpress.com/about/

BoS Chairman

Course Code: 11CS972	**Course Title:** USER INTERFACE DESIGN
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS406– PRINCIPLES OF SOFTWARE ENGINEERING

Course Outcomes:

At the end of the course the student should be able to:
CO1. Distinguish various interaction styles
CO2. Comprehend the effect of interfaces on emotions
CO3. Design effective interfaces and evaluate their performance
CO4. Understand various aspects related to mobile interface design
CO5. Design well organized Web interfaces

Course Content:

UNIT I CONCEPTUAL INTERACTION **9**

Problem space and Conceptualizing Design – Conceptual Models – Interface Metaphors – Interaction types – Cognitive Aspects – Social Interaction – Conversations – Social Phenomena

UNIT II EMOTIONS AND INTERFACES **9**

Emotions and the User Experience – Expressive Interfaces – Frustrating Interfaces – Persuasive Technologies and Behavioral Change – Anthropomorphism and Zoomorphism – Models of Emotion – Interfaces – Natural User Interface

UNIT III INTERACTION DESIGN & EVALUATION **9**

The Process of Interaction Design – Issues – Requirements Gathering – Analysis – Interpretation and Presentation -Evaluation Types – The Evaluation Framework – Usability Testing – Experiments – Field Studies

UNIT IV MOBILE HCI **9**

Mobile Ecosystem: Platforms–Application frameworks– Types of Mobile Applications– Mobile Information Architecture– Mobile Design–Elements of Mobile Design–Tools.

UNIT V WEB HCI **9**

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow, In Page Editing, Static Invitations, Dynamic Invitations.

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Yvonne Rogers, Helen Sharp, Jenny Preece, "Interaction Design: Beyond Human - Computer Interaction", John Wiley & Sons Ltd, 3rd Edition, 2011
2. Brian Fling, "Mobile Design and Development", O'Reilly Media Inc., 1st Edition , 2009
3. Bill Scott and Theresa Neil, "Designing Web Interfaces", O'Reilly, 1st Edition, 2009.

BoS Chairman

REFERENCES:

1. Jenifer Tidwell, "Designing Interfaces", O'Reilly Publications, 2nd Edition, 2011
2. Wilbert O. Galitz, "An Essential Guide to User Interface Design", John Wiley & Sons Ltd, 3rd Edition, 2007.

WEB REFERENCES:

- User Interface Design and Implementation— http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-831-user-interface-design-and-implementation-spring-2011/lecture-notes
- Interaction Design. URL: http://www.idc.iitb.ac.in/academics/Interaction-design-course-content.htm

BoS Chairman

Course Code: 11CS973	**Course Title:** NEURAL NETWORKS AND FUZZY LOGIC
Core/Elective: Elective	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS601 – ARTIFICIAL INTELLIGENCE

Course Outcomes:

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

CO1. Comprehend the concepts related to neural networks and their functioning
CO2. Distinguish between various Supervised and Unsupervised learning neural network architectures and use them in real world problems
CO3. Understand the functioning of Associative Memory Networks
CO4. Distinguish classical and fuzzy set concepts
CO5. Design Fuzzy Reasoning Systems

Course Content:

UNIT I NEURAL NETWORKS **9**

Soft Computing Techniques – Neural Networks: Concept & Evolution – Models – Terminologies– McCulloch-Pitts Neuron – Linear Separability – Hebb Network – Supervised Learning Networks: Perceptron – Adaline – Madaline – Back-propagation network – Radial Basis Function network

UNIT II UNSUPERVISED LEARNING NETWORKS **9**

Fixed Weight Competitive Nets – Kohonen Self–Organizing Feature Maps – Learning Vector Quantization – Counter propagation Networks – Adaptive Resonance Theory Network

UNIT III ASSOCIATIVE MEMORY NETWORKS **9**

Auto-associative and Hetero-associative Memory Networks – Bidirectional Associative Memory– Hopfield Networks – Special Networks: Simulated Annealing Network – Boltzmann Machine

UNIT IV FUZZY LOGIC **9**

Classical Sets and Fuzzy Sets – Classical Relations and Fuzzy Relations – Tolerance and Equivalence Relations – Membership Functions: Features –Fuzzification – Membership Value Assignment – Defuzzification: Lambda Cuts and Defuzzification Methods

UNIT V FUZZY REASONING **9**

Fuzzy Arithmetic – Fuzzy Measures – Measures of Fuzziness – Fuzzy Rule Base and Approximate Reasoning: Fuzzy Propositions – Fuzzy Rules – Fuzzy Reasoning – Fuzzy Inference Systems

L: 45 T: 0 TOTAL: 45

TEXTBOOK:

1. S.N. Sivanandam and S.N. Deepa, "Principles of Soft Computing", Wiley India Ltd., 1st Edition, 2007.

BoS Chairman

REFERENCES:

1. Laurene Fausette, "Fundamentals of Neural Networks", Pearson Education, New Delhi, 2004.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", Wiley, 3rd Edition, 2010.
3. S.Rajasekaran, G.A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications", PHI Learning Pvt. Ltd., 2004.

WEB REFERENCES:

- Kohonen Self Organizing Maps. URL: http://www.ai-junkie.com/ann/som/som1.html
- Boltzmann Machines. URL: http://www.scholarpedia.org/article/Boltzmann_machine
- Classical Sets and Fuzzy Sets. URL: http://www.atp.ruhr-uniochum.de/rt1/syscontrol/node116.html
- Fuzzy arithmetic. URL: http://reference.wolfram.com/applications/fuzzylogic/Manual/9.html

BoS Chairman

Course Code:11CS974	**Course Title:** DIGITAL IMAGE PROCESSING
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS962-Multimedia systems and applications

Course Outcomes

At the end of the course the student should be able to:
CO1. Describe the concepts in acquiring, storing and Processing of images
CO2. Illustrate the image quality enhancement techniques.
CO3. Extract the images features and Analyze it.
CO4. Illustrate the techniques for the image compression.
CO5. Demonstrate the case studies of Image Processing

Course Content

UNIT I FOUNDATIONS OF IMAGE PROCESSING 9

Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization –Pixel Relationships – Color Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

UNIT II IMAGE ENHANCEMENT 9

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain – DFT, FFT, DCT –Smoothing and Sharpening filters – Homomorphic Filtering.

UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS 9

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection –Thresholding – Region Based Segmentation – Morphological Watersheds – MotionSegmentation, Feature Extraction and Analysis.

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSION 9

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Wavelet Transforms. Image Compression: Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

UNIT V APPLICATIONS OF IMAGE PROCESSING 9

Image Classification – Image Recognition – Image Understanding – Video Motion Analysis –Image Fusion – Steganography – Digital Compositing – Mosaics – Color Image Processing.

L: 45 T: 0 TOTAL: 45

TEXT BOOK:

1. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", 3rd Edition, Pearson Education, 2009.

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REFERENCES:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", 2nd Edition, Thomson Learning, 2001
2. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2006.
3. Sanjit K. Mitra, & Giovanni L. Sicuranza, "Non Linear Image Processing", Elsevier, 2007
4. Richard O. Duda, Peter E. HOF, David G. Stork, "Pattern Classification" Wiley Student , 2006.
5. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing Using MATLAB", 2nd Edition, Pearson Education, 2010.

WEB REFERENCES:

- Introduction to Digital Image processing URL: http://nptel.ac.in/courses/106105032/
- http://nptel.ac.in/courses/117105079/,http://nptel.ac.in/courses/117104069/,http://nptel.ac.in/courses/117102060/
- Multimedia processing URL: http://nptel.ac.in/courses/117105083/

BoS Chairman

Course Code: 11CS975	**Course Title:** OPTIMIZATION TECHNIQUES
Core/Elective: Elective	**Credits (L : T : P : C : M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11AU301 ENGINEERING MATHEMATICS III and 11CS601 ARTIFICIAL INTELLIGENCE

Course Outcomes:

At the end of the course the student should be able to:
CO1. Formulate and solve Optimization problems using Linear Programming
CO2. Apply PERT/CPM on Activity Network models
CO3. Comprehend about Evolutionary Computation principles
CO4. Apply Evolutionary Optimization techniques to Real world problems
CO5. Understand the working of Swarm Intelligence approaches for Optimization

Course Content:

UNIT I LINEAR PROGRAMMING **9**
General linear programming problem - Formulation-Simplex method - General Transportation Problem – Vogel's Approximation method-Transportation algorithm by MODI method

UNIT II NETWORK SCHEDULING BY PERT/CPM **9**
Network and basic components - Network construction - Critical path Analysis - PERT computations – Crashing and resource leveling

UNIT III EVOLUTIONARY COMPUTATION **9**
Conventional Optimization and Search Techniques - Genetic Algorithms: Biological Background – Simple Genetic Algorithm – Terminology – Encoding – Genetic Operators – Convergence – Working of GA – Fitness Scaling

UNIT IV EVOLUTIONARY OPTIMIZATION **9**
Multi-objective Reliability Design – Combinatorial Optimization - Scheduling Problems - Transportation Problems – Network Design and Routing

UNIT V SWARM INTELLIGENCE **9**
Particle Swarm Optimization: Background – Operations – Applications. Ant Colony Optimization: Real Ants and Artificial Ants – Characteristics – Algorithms – Applications

L: 45 T: 0 TOTAL: 45

TEXTBOOKS:
1. Taha, H. A., "Operations Research-An Introduction", 9th Edition, Pearson Education, 2010.
2. Sivanandam S.N., Deepa S.N., "Introduction to Genetic Algorithms", Springer, 2008.

REFERENCES:
1. KantiSwarup, P.K.Gupta, Man Mohan, "Operations Research", 10th Edition, Sultan Chand & Sons, 2002.
2. Sumathi, S., Surekha, P., "Computational Intelligence Paradigms Theory and Applications using MATLAB", CRC Press, 2010.

WEB REFERENCES:
- Particle swarm optimization. URL:http://ci.cs.up.ac.za/chapter16.pdf
- Genetic Algorithms. URL: http://ocw.mit.edu/courses/engineering-systems-division/esd-77-multidisciplinary-system-design-optimization-spring-2010/lecture-notes/MITESD_77S10_lec11.pdf

BoS Chairman

Course Code: 11CS976	**Course Title:** VIRTUALIZATION
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS503–SYSTEM SOFTWARE DESIGN ;
11CS501-R - COMPUTER NETWORKS ;
11CS504 -COMPUTER ARCHITECTURE

Course Outcomes:

At the end of the course the student should be able to:
CO1. Determine the fundamental concepts of virtualization
CO2. Outline the various methods of server virtualization
CO3. Demonstrate the concepts and issues in various Desktop virtualization
CO4. Illustrate the techniques and design of WAN virtualization and enterprise networks
CO5. Compare and analyze various components of Storage virtualization

Course Content:

UNIT I OVERVIEW OF VIRTUALIZATION **9**

Basics of Virtualization - Virtualization Types – Desktop Virtualization – Network Virtualization –Server and Machine Virtualization – Storage Virtualization – System-level of Operating Virtualization – Application Virtualization-Virtualization Advantages – Virtual Machine. Basics – Taxonomy of Virtual Machines - Process Virtual Machines - System Virtual Machines –Hypervisor - Key Concepts.

UNIT II SERVER VIRTUALIZATION **9**

Hardware Virtualization – Virtual Hardware Overview - Server Virtualization – Physical and Logical Partitioning - Types of Server Virtualization – Business cases for Server Virtualization –Uses of Virtual server Consolidation – Planning for Development –Selecting server Virtualization Platform – Case Study

UNITIII DESKTOP VIRTUALIZATION **9**

Concepts - Desktop Management Issues - Potential Desktop Virtualization Scenarios – DesktopVirtualization Infrastructures - Terminal services – Hosted Desktop - Case Study

UNIT IV NETWORK VIRTUALIZATION **9**

Design of Scalable Enterprise Networks - Virtualizing the Campus WAN Design – WAN Architecture - WAN Virtualization - Virtual Enterprise Transport Virtualization–VLANs and Scalability - Theory Network Device Virtualization Layer 2 - VLANs Layer 3 VRF Instances Layer 2 - VFIs Virtual Firewall Contexts Network Device Virtualization.

UNIT V STORAGE VIRTUALIZATION **9**

SCSI- Speaking SCSI- Using SCSI buses – Fiber Channel – Fiber Channel Cables –Fiber Channel Hardware Devices – iSCSI Architecture – Securing iSCSI – SAN backup and recovery techniques – RAID – SNIA Shared Storage Model – Classical Storage Model – SNIA Shared Storage Model – Host based Architecture – Storage based architecture – Network based Architecture.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. Chris Wolf, Erick M. Halter, "Virtualization: From the Desktop to the Enterprise", A Press 2005.
2. Kumar Reddy, Victor Moreno, "Network Virtualization", Cisco Press, July, 2006.
3. David Marshall, Wade A. Reynolds, "Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center", Auerbach Publications, 2006.

REFERENCES:

1. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
2. Danielle Ruest, Nelson Ruest -"Virtualization: A Beginner's Guide", TMH, 2009.
3. Kenneth Hess , Amy Newman: "Practical Virtualization Solutions: Virtualization from the Trenches", Prentice Hall 2010.

WEB REFERENCES:

- TEXT BOOK: Chris Wolf, Erick M. Halter, "Virtualization: From the Desktop to the Enterprise", A Press 2005
  URL:https://books.google.co.in/books?id=qXw9p1nzb9QC&printsec=frontcover&dq=Virtualization:+From+the+Desktop+to+the+Enterprise+A+Press+2005+pdf&hl=en&sa=X&ved=0CCsQ6AEwAGoVChMIh5qg9a6WxgIVAUC8Ch24SgAK#v=onepage&q&f=false
- Intro to Virtualization URL:http://vmwarevideos.com/free-vmware-training/free-intro-virtualization-video-training-course
- Virtualization Essentials URL: http://www.lynda.com/Fusion-tutorials/Virtualization-Essential-Training/163066-2.html

BoS Chairman

Course Code:11CS977	Course Title: SOCIAL NETWORK ANALYSIS
Core/Elective: Elective	Credits (L:T:P:C:M) – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites: The student should have undergone the course(s):
11CS506 DATA WAREHOUSING AND DATA MINING

Course Outcomes:

At the end of the course the student should be able to:
CO1. Formulate and examine the fundamentals of social networks and working with datasets
CO2. Explore various classification methods and know about evolution of social networks
CO3. Be expertise in various modeling techniques and privacy preservation methods.
CO4. Visualize the data, text and tag features of social networks.
CO5. Mine various real time social and web applications.

Course Content:

UNIT I FOUNDATIONS OF SOCIAL NETWORKS 9

Introduction – Static and Dynamic properties – Random walks in Social networks – Algorithms – Applications – Evaluation and datasets. Community discovery – Applications and Methods

UNIT II CLASSIFICATION APPROACHES AND EVOLUTION 9

Local classifiers – Random walk based methods – other approaches and variations – Evolution in social networks – Framework – Challenges – Community tracing. Survey models and algorithms – Social Influence Analysis.

UNIT III MODELING AND PRIVACY PRESERVATION 9

Expert Location in social networks – approaches – location systems. Link prediction – Bayesian probabilistic models – probabilistic relational models – Linear algebraic methods. Privacy in social networks – privacy breaches and preservation mechanisms

UNIT IV MINING AND VISUALIZATION 9

Visualizing social networks – data mining and text mining in social networks – Social tagging – Tag generation models – System design and analysis – tag visualization, recommendations and applications – Tagging problems

UNIT V MINING SOCIAL WEB 9

Mining Twitter – Exploring Twitter API – Analyzing and examining tweets. Mining Facebook – Exploring social graph API – Analyzing graph connections. Mining Google+ - Computing Document similarity – Querying Human Language data with TF-IDF.

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Charu. C.Aggarwal, "Social Network Data Analytics", Springer, 2011
2. Matthew A. Russell, "Mining the Social Web", 2nd Edition, O'Reilly Media Inc., 2013

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REFERENCES:

1. Peter Mika, "Social Networks and the Semantic Web", Springer, 1st Edition, 2007
2. BorkoFurht, " Handbook of Social Network Technologies and Applications Springer", 1st Edition, 2010
3. Giles, Mark Smith, John Yen, "Advances in Social Network Mining and Analysis", Springer, 2010.

WEB REFERENCES:

- Social network analysis URL http://ocw.mit.edu/courses/sloan-school-of-management/15-599 workshop-in-it-collaborative-innovation-networks-fall-2011/lecture-notes/
- Introduction to social network methods URL: http://faculty.ucr.edu/~hanneman/nettext/

BoS Chairman

Course Code: 11CS979	**Course Title:** AGILE SOFTWARE DEVELOPMENT
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS406 – PRINCIPLES OF SOFTWARE ENGINEERING.

Course Outcomes:

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

CO1. Describe the various concepts and activities involved in the Agile Software Development process
CO2. Define SCRUM and illustrate the benefits of using SCRUM.
CO3. Identify various individual roles and explain their responsibilities/activities in SCRUM.
CO4. Explain and analyze the SCRUM Team Structures along with their responsibilities and performances for effective project management.
CO5. Present the SCRUM requirements and specifications effectively.

Course Content:

UNIT I INTRODUCTION **9**

Agile Development – Agility – Cost of Change – Agile Process – Principles and Human Factors – Extreme Programming (XP): Values, XP Process, and Industrial XP – Agile Process Models: Adaptive Software Development (ASD) – Scrum – DSDM – Crystal – Feature Driven Development – LSD – Agile Modeling – Agile Unified Process.

UNIT II SCRUM **9**

Advantages of Agile Development: Higher Productivity, Lower Costs, Faster Time to Market, Higher Quality – Introduction to SCRUM – Adapting to SCRUM – Awareness – Desire – Ability – Promotion – Transfer – Integrating all Together.

UNIT III SCRUM PRACTICES AND INDIVIDUALS **10**

Individual Roles – Scrum Master – Product Owner – Changed Roles: Analysts, Project Managers, Architects, Functional Managers, Programmers, DB Administrators, Testers, User Experience Designers - Technical Practices – Strive for Excellence - Test-driven development – Refactoring – Collective Ownership – Continuous Integration – Pair Programming –Design: Intentional yet Emergent – Guiding the Design.

UNIT IV SCRUM TEAMWORK **8**

Team Structures – Small Team Productivity – Feature Teams – Component Teams – Guidelines for Good Team Structure – Team Responsibility – Foster Team Learning – Self-Organizing Team – Influencing Evolution: Selecting Environment, Defining Performance, Manage Meaning, Energizing the System.

UNIT V SCRUM SPECIFICATION **9**

Product Backlog – Documents to Discussions – Written Documentation Disadvantages – User Stories - Progressively Refine Requirements – Emergent Requirements – Backlog Iceberg – Refining User Stories – Specify by Example.

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXTBOOKS:

1. Roger S.Pressman, "Software engineering- A practitioner's Approach", McGraw-Hill International Edition, 7th edition, 2010.
2. Mike Cohn, "Succeeding with Agile: Software Development Using Scrum", Addison-Wesley.

REFERENCE:

1. Ken Schwaber, "Agile Project Management with Scrum (Microsoft Professional)", Microsoft Press, 2004.

WEB REFERENCES:

- Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition.URL: http://highered.mcgraw-hill.com/sites/0073375977/information_center_view0/. Mike Cohn, Succeeding with Agile: Software Development Using Scrum. URL: http://www.succeedingwithagile.com/

BoS Chairman

Course Code: 11CS981	**Course Title:** DISTRIBUTED SYSTEMS DESIGN
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS306–OPERATING SYSTEMS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Demonstrate the architecture and identify the desirable features of Distributed systems.
CO2. Design the communication mechanisms between processes and objects in a distributed environment.
CO3. Analyze the issues related to distribute shared memory and Synchronization mechanisms.
CO4. Identify the different approaches and issues in Distributed Resource and Process management.
CO5. Apply the file accessing and replication mechanism in Distributed File systems and outline the Naming services.

Course Content:

UNIT I INTRODUCTION **9**

Evolution- system models- Issues in the design of distributed systems- Distributed computing environment. Message Passing: Features- Issues in IPC- Synchronization – Buffering- Multi datagram messages – Process addressing- Failure handling

UNIT II REMOTE PROCEDURE CALLS **9**

RPC Model – Implementation - Stub generation - RPC messages – Marshaling - server Management - Call semantics - communication protocols for RPC-Client server binding –Exception handling – security- special types – RPC in heterogeneous environments – Lightweight RPC - Optimizations

UNIT III DISTRIBUTED SHARED MEMORY & SYNCHRONIZATION **9**

Architecture – Design and Implementation Issues – Consistency models – Clock Synchronization - Event Ordering - Mutual Exclusion – Deadlock - Election algorithms.

UNIT IV RESOURCE AND PROCESS MANAGEMENT **9**

Features - Task assignment approach - Load balancing approach - Load sharing approach - Process migration Features – Mechanism -Threads: models, issues, implementation.

UNIT V DISTRIBUTED FILE SYSTEMS **9**

Introduction – Features - File Models – File accessing, sharing and caching - File Replication – Fault Tolerance - Atomic transactions **NAME SERVICES**: Features – Name services and DNS

L: 45 T: 0 TOTAL: 45

TEXT BOOK:

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, New Delhi, 2005(reprint).

BoS Chairman

REFERENCES:

1. George Colouris, Jean Dollimore and Tim Kindberg, "Distributed Systems – Concepts and Design", Pearson Education Private Limited, New Delhi, 4th Edition 2009.
2. MukeshSinghal, NiranjanG.Shivaratri, "Advanced Concepts in Operating Systems: Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2000.
3. Gerard Tel, "Introduction to Distributed algorithms", Cambridge University Press, USA, 2000.

WEB REFERENCES:

- Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design",2005 URL:https://books.google.co.in/books?id=SewHKWac2I4C&pg=PA167&source=gbs_toc_r&cad=3#v=onepage&q&f=false
- NPTEL : Computer Science and Engineering -Distributed Computing Systems URL:http://www.nptel.ac.in/courses/106106107/http://www.nptel.ac.in/downloads/106106107/

BoS Chairman

Course Code:11CS982	Course Title: MOBILE AND PERVASIVE COMPUTING
Core/Elective: Elective	Credits (L:T:P:C:M) – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites: The student should have undergone the course(s):
11CS501-R COMPUTER NETWORKS

Course Outcomes:

At the end of the course the student should be able to:
CO1. Confer the Architecture in wireless and mobile networks
CO2. Comprehend and setup a wireless local area network
CO3. Expound and implement the protocols in network and transport layer of wireless network
CO4. Discuss about the computational requirements, security and performance of pervasive computing
CO5. Design a mobile device by following the appropriate technologies and explain how data communication is done

Course Content:

UNIT I WIRELESS AND CELLULAR NETWORKS **9**

Cellular Wireless Networks – GSM – Architecture – Protocols – Localization and calling – Handover – Security –GPRS – DECT and UMTS.

UNIT II WIRELESS LAN **9**

Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – MAC Management –HiperLAN – Blue Tooth- Wi-Fi – WiMAX

UNIT III HIGHER LAYERS **9**

Mobile IP – DHCP – AdHoc Networks. Mobile TCP– WAP – Architecture – WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WMLScripts.

UNIT IV PERVASIVE ARCHITECTURE **9**

Context- Aware Computing – Mobile Middleware – Mobile Agents – Middleware for application development – Service Discovery

UNIT V ADHOC AND SENSOR NETWORKS **9**

Adhoc networks – Features of Sensor Networks – Applications. Challenges – Resources – Security – Mobility – Protocols.

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", PHI, 2nd Edition, 2009
2. F. Adelstein, S.K.S. Gupta, "Fundamentals of Mobile and Pervasive Computing". The McGraw-Hill, 2005.

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REFERENCES:

1. Burkhardt, Henn, Hepper, Rintdorff, Schaeck. "Pervasive Computing", Addison Wesley, 2002.
2. Jochen Burkhardt, Horst Henn, Stefan Hepper, Klaus Rindtorff, Thomas Schack, "Pervasive Computing: Technology and Architecture of Mobile Internet Applications", Addison-Wesley, ISBN: 0201722151, 2002
3. Uwe Hansmann, L. Merk, M. Nicklous, T. Stober, U. Hansmann, "Pervasive Computing (Springer Professional Computing) ", Springer Verlag, ISBN:3540002189, 2003

WEB REFERENCES:

- http://www.cse.wustl.edu/~jain/cse574-10/
- http://www.wikihow.com/Create-a-Wireless-Network
- http://web.cse.ohio-state.edu/~prasun/publications/theses/phdthesis.pdf
- https://books.google.co.in/books?isbn=3540398813

BoS Chairman

Course Code:11CS983	**Course Title:** INFORMATION RETRIEVAL TECHNIQUES
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS303 DATA STRUCTURES
11CS505 WEB TECHNOLOGIES

Course Outcomes:

At the end of the course the student should be able to:
CO1. Design User Interfaces for Search
CO2. Comprehend about Information Retrieval Modeling and evaluation methods
CO3. Develop procedures for web indexing and searching
CO4. Understand the working of search engines and develop web crawlers
CO5. Deduce the working of Structured text retrieval systems

Course Content:

UNIT I INTRODUCTION **9**

Information Retrieval System – User Interfaces for search: Search Interfaces –Visualization – Design and Evaluation – Trends

UNIT II MODELING AND EVALUATION **9**

Modeling: Classic Information Retrieval – Other Models. Retrieval Evaluation: Retrieval Metrics – Reference Collections – User based Evaluation

UNIT III INDEXING AND SEARCHING **9**

Query Languages – Query Properties – Indexing and Searching: Inverted Indexes – Signature Files – Suffix Trees and Suffix Arrays –Multi-dimensional Indexing

UNIT IV WEB RETRIEVAL **9**

Web Retrieval: Search Engine Architectures – Search Engine Ranking – Managing Web Data – Browsing – Web Crawling: Applications – Taxonomy – Architecture and Implementation

UNIT V STRUCTURED TEXT RETRIEVAL **9**

Structured Text Retrieval: Early Text Retrieval Models – XML Retrieval and Evaluation – Query Languages. Case Study: Open Source IR

L: 45 T: 0 TOTAL:45

TEXT BOOK:

1. Ricardo Baeza-Yates, BerthierRibeiro-Neto, "Modern Information Retrieval", Pearson Education, 2nd Edition 2011.

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REFERENCES:

1. William B.Frakes, Ricardo Baeza-Yates, BerthierRibeiro-Neto, "Information Retrieval Data Structures and Algorithms", Pearson Education, 2009.
2. Christopher D. Manning and PrabhakarRaghavan, "Introduction to Information Retrieval", Cambridge University Press, 2008.

WEB REFERENCES:

- Modern Information Retrieval URL: http://www.mir2ed.org/
- Suffix Trees and Suffix Arrays URL:http://www.inf.fu-erlin.de/lehre/WS05/aldabi/downloads/stringMatching_part2.pdf
- XML Retrieval and Evaluation URL:http://nlp.stanford.edu/IRbook/html/htmledition/xml-retrieval-1.html
- Retrieval Evaluation URL: http://www.ccs.neu.edu/home/jaa/CSG339.06F/Lectures/evaluation.pdf.

BoS Chairman

Course Code: 11CS984	Course Title: GRAPH THEORY
Core/Elective: Elective	Credits (L : T : P : C : M) – 3 : 0 : 0 : 3 : 100
Type: Lecture	Total Contact Hours: 45

Prerequisites: The student should have undergone the course(s):
11CS303 DATA STRUCTURES and
11CS403 DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS

Course Outcomes:

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

CO1. Explain the basic concepts of Graph Theory.
CO2. Identify Fundamental Theorems on Euler graphs.
CO3. Analyze the algorithms on connectedness.
CO4. Comprehend the concepts of tree.
CO5. Study of matrix application in Graph Theory

Course Content:

UNIT I GRAPHS AND SUBGRAPHS **9**

Graph – finite & infinite graphs – incidence, degree isolated and pendent Vertices –Isomorphism –sub graphs – walks- Paths and circuits.

UNIT II CONNECTEDNESS AND EULER GRAPHS **10**

Connected, disconnected graphs – components – Euler graphs -Operations on Graphs –More on Euler graphs – Hamiltonian paths and circuits- Planar Graphs- chromatic Number

UNIT III ALGORITHMS IN GRAPH THEORY **8**

Directed graphs - Undirected graphs- Paths –Reachability- Connectedness- Matrix representation.

UNIT IV TREES AND TYPES **9**

Trees – Properties– Pendent vertices in a tree – Distances , centers in a tree –Rooted , Binary trees – Spanning trees –Spanning trees in a weighted graph.

UNIT V MATRICES AND GRAPHS **9**

Cut set matrix –adjacency matrix – Chromatic partitioning – Chromatic Polynomial. Graph Theories: theorems, and applications.

L: 45 T: 0 TOTAL: 45

TEXTBOOK:

1. Narsingh Deo, "Graph Theory with applications to Engineering & Computer Science", Prentice Hall of India, New Delhi, 2006.

REFERENCES:

1. Dr. S. Arumugam& Dr. S. Ramachandran, "Invitation to Graph Theory", Scitech Publications India Pvt Limited, Chennai, 2001.
2. K.R. Parthasarathy, "Basic Graph Theory", Tata McGraw Hill Publishing Company, New Delhi, 1994.
3. G.T. John Clark, Derek Allan Holten," A First Look at Graph Theory", World Scientific.

WEB REFERENCES:

- Graph Theory. URL: http://nptel.ac.in/courses/106108054/
- Cut set matrix. URL:http://www.academia.edu/4418417/EE-304_Electrical_Network_Theory_Class_Notes4_-_2013

BoS Chairman

Course Code:11CS985	**Course Title:** CYBER SECURITY AND CYBER LAWS
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS964 NETWORK SECURITY

Course Outcomes

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

CO1. Infer the basics of Information Security
CO2. Identify the legal, ethical and professional issues in Information Security and the aspects of risk management
CO3. Outline technological aspects of Information Security
CO4. Comprehend various cyber offences and security challenges
CO5. Discuss various cyber laws and observe various cyber-crime investigation methods.

Course Content

UNIT I INTRODUCTION **9**

Information Security, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Information Security and Access, the SDLC, the Security SDLC. Need for Security: Business Needs, Threats, Attacks, Secure Software development.

UNIT II SECURITY INVESTIGATION AND SECURITY ANALYSIS **9**

Risk Management: Identifying and Assessing Risk, Controlling Risk, Selecting a Risk Control Strategy. Planning for Security: Information security Policy, Standards and Practices, Information Security Blueprint

UNIT III PHYSICAL DESIGN **9**

Security Technology: VPNs, Scanning and Analysis Tools, Access Control Devices, Physical Security, Security and Personnel: Positioning and Staffing the Security Function, Credentials of Information Security Professionals, Privacy and the Security of Personnel Data.

UNITIV CYBER CRIME ISSUES **9**

Cyber Crime and Information Security: Classification, Legal, Cyber offences: Social Engineering, Cyber talking, Cyber cafe, Botnets, Attack Vector, Cloud Computing, Tools & methods: Attacks on Wireless Networks, Mobile &wireless Devices: Mobility, Credit card frauds, Security challenges, Attacks on Mobile Cell phones.

UNIT V CYBER LAW **9**

Cyber Crime and Cyber Security Legal perspectives: Need for law, Indian IT Act, Challenges, Digital Signatures, Amendments, Punishments, Cyber Law, Technology and Students

L: 45 T: 0 TOTAL: 45

BoS Chairman

TEXT BOOK:

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 4th Edition ,Reprint 2011.
2. SunitBelapure Nina Godbole,"Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives" ,Wiley India Pvt Ltd,2011.

REFERENCES:

1. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004.
2. Matt Bishop, "Computer Security Art and Science", Pearson/PHI, 2002.
3. Nelson Phillips and Enfinger Steuart, "Computer Forensics and Investigations", Cengage Learning, New Delhi,2009.

WEB REFERENCE

- http://www.cyberlawsindia.net/

BoS Chairman

Course Code: 11CS986	**Course Title:** BUSINESS INTELLIGENCE
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS506 - DATA WAREHOUSING AND MINING

Course Outcomes:

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

CO1. Understand the components of BI framework.
CO2. Describe the components of Decision Support System and its characteristics.
CO3. Describe the architecture of BPM technologies and its applications.
CO4. Analyze the characteristics, technologies, roles and approaches of Knowledge management activities
CO5. Practice the new technologies and tools in Business Intelligence.

Course Content:

UNIT I INTRODUCTION **9**

Business view of information technology applications –Getting started with BI-Introduction to business analytics - BI component framework-BI users

UNIT II DECISION SUPPORT SYSTEM (DSS) DEVELOPMENT **9**

DSS configuration, description, characteristics, capabilities, Components, user, Hardware and classifications – Data management subsystems – Model management subsystems – The user interface (DIALOG) subsystem

UNIT III BUSINESS PERFORMANCE MANAGEMENT (BPM) **9**

BPM Overview, Closed Loop Processes - Performance Measurement- BPM Methodologies, architecture and applications-Performance dashboards- Business Activity Monitoring (BAM)

UNIT IV KNOWLEDGE MANAGEMENT (KM) **9**

Introduction – Organizational learning & transformation–KM activities, approaches– Information technology and Roles of people in KM– Knowledge management systems implementation – Ensuring the success of knowledge management Efforts

UNIT V NEW TECHNLOGY IN BI **9**

BI Applications - Best practices in BI/DW-The complete BI professional, tools –Data Profiling – Balanced scorecard- Dashboards- BI road ahead

L: 45 T: 0 TOTAL:45

TEXTBOOKS:

1. R N Prasad, Seema Acharya, "Fundamentals of Business Analytics", 1st edition, Wiley India, 2011 (Unit 1 & 5)
2. Efraim Turban, Jay E.Aronson, Teng-Peng Liang, Ramesh sharda, "Decision Support and Business Intelligence Systems", 8/E, Pearson education, 2009 (Unit2,3 & 4)

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REFERENCES:

1. Daniel J.Power,"Decision Support Systems – Concepts and Resources for Managers", 2002.
2. MarkWhitehorn& Mary Whitehorn "Business Intelligence: The IBM Solution –Data warehousing and OLAP", Springer – verlag London limited, 1999.
3. ViekiL.Sauter, "Decision Support Systems for Business Intelligence", 2nd Edition, Wiley India.

WEB REFERENCES:

- Business Intelligence: http://www-03.ibm.com/software/products/en/category/business-intelligence
- Pentaho:Data Integration | Pentaho Business Analytics Platform.
  URL: http://www.pentaho.com/product/data-integration

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Course Code: 11CS987	**Course Title:** INFORMATION VISUALIZATION
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: The student should have undergone the course(s):
11CS703–Graphics and Visualization

Course Outcomes:
At the end of the course the student should be able to:
CO1: Investigate on the basic elements necessary for graphics and data visualization
CO2: Explore the various stages in visualizing the data
CO3: Analyze various methodologies and standards used for color management
CO4: Characterize various techniques for identifying static and moving patterns
CO5: Illustrate object recognition phenomenon through diagrams, gestures and animated languages.

Course Content:

UNIT I DATA VISUALIZATION **9**
Data Visualization- Info graphics Vs Data Visualization – Informative Vs Visual Art – Ingredients of successful Visualization- Visual Encoding – Layout and Axes- Color- Size-Shape –Lines

UNIT II VISUALIZATION STAGES **9**
Stages of visualizing the Data –sketching and scripting –mapping –time series-Axis labels connections and correlations-sophisticated sorting-deployment issues in scatter plot maps

UNIT III COLOR **9**
Trichromacy Theory-Color Blindness-Color Measurement-CIE System of Color Standards Opponent Process Theory-Color Appearance-Applications of Color in Visualization

UNIT IV STATIC AND MOVING PATTERNS **9**
Gestalt Laws-Contours-Perception of Transparency: Overlapping Data-Perceptual Syntax of Diagrams-Patterns in Motion-Data Selection and Manipulation Loop-Exploration and Navigation

UNIT V VISUAL& DATA OBJECTS AND GESTURES **9**
Image and structure based object recognition – Object based diagrams – Surface shapes of objects – Coding Words and Images – visual and spoken Languages – Animated Visual languages

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Noah Iliinsky, Julie Steele, "Designing Data Visualizations: Representing Informational Relationships", O'Reilly Media, Inc.", 2011.
2. Ben Fry, "Visualizing Data: Exploring and Explaining Data with the Processing Environment",Kindle Edition ,2007.
3. Colin Ware, "Information Visualization: Perception For Design" , 2nd Edition, 2004.

REFERENCE:

1. Andy Kirk, "Data Visualization: A Successful Design Process", 1st Edition, 2012.

WEB REFERENCES:
- http://www.infovis-wiki.net/index.php?title=Visualization_Design_Patterns
- http://documents.software.dell.com/Statistics/Textbook/Graphical-Analytic-Techniques

BoS Chairman

Course Code: 11CS988-R	**Course Title:** CLOUD TECHNOLOGY
Core/Elective: Elective	**Credits (L:T:P:C:M)** – 3 : 0 : 0 : 3 : 100
Type: Lecture	**Total Contact Hours:** 45

Prerequisites: NIL

Course Outcomes:

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

CO1. Identify and explain the components in cloud architecture and its services.
CO2. Discuss cloud deployment models and their characteristics from different providers.
CO3. Communicate and collaborate using cloud services.
CO4. Illustrate and describe cloud based techniques for implementation.
CO5. Use various methods and tools to collaborate online through cloud services.

Course Content:

UNIT I FOUNDATIONS OF CLOUD COMPUTING **8**

Introduction - Cloud Computing – Cloud Architecture – Cloud Storage –Computing in Cloud: Pros and Cons, Cloud and Virtualization, Dynamic Infrastructure, Services Requirements, Computing Characteristics.

UNIT II CLOUD DEPLOYMENT AND OFFERINGS **9**

Cloud Characteristics – Measured Service – Cloud Deployment Models – Security in a Public Cloud – Cloud Analytics – Testing under Cloud – Information Security – Virtual Desktop Architecture – Storage Cloud – Amazon Ec2 – Google App Engine – MS Azure.

UNIT III CLOUD SERVICES AND MANAGEMENT **9**

Cloud Services: SaaS, IaaS, PaaS – Cloud Ecosystem and Business Process Management – Cloud Service Management – Computing on Demand (CoD) – Service-based Model – Resiliency – Provisioning – Asset Management – HA and Disaster Recovery.

UNIT IV CLOUD IMPLEMENTATION TECHNOLOGIES **10**

Cloud Virtualization Technology – Benefits – Server Virtualization – Virtualization for x86 – Infrastructure Requirements – Storage Virtualization and Storage Area Networks – Network-Attached Storage – Virtualization in Datacenter – Cloud and SOA – Cloud Mobility.

UNIT V ONLINE COLLABORATION TOOLS **9**

Collaboration using online Scheduling Applications, Planning, and Task Management – Contact Management, CRM, and SFA – Collaborating on Project Management – Web-based Word Processors and Databases - Evaluating Web Conferencing Tools - Collaborating via Social Networks and Groupware

L: 45 T: 0 TOTAL: 45

TEXT BOOKS:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Kumar Saurabh, "Cloud Computing – Insights into New Era Infrastructure", Wiley Indian Edition, 2011.

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REFERENCES:

1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On demand Computing, Applications and Data Centers in the Cloud with SLAs", Emereo Pty Limited, July 2008.
2. John Ritting house& James Ransome, "Cloud Computing, Implementation, Management and Strategy", CRC Press, 2010.

WEB REFERENCES:

- Peter Mell and Timothy Grance, The NIST Definition of Cloud Computing. URL: http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf
- Alexa Huth and James Cebula, The Basics of Cloud Computing. URL: https://www.us-cert.gov/sites/default/files/publications/CloudComputingHuthCebula.pdf, © 2011 Carnegie Mellon University. Produced for US-CERT, a government organization.
- An Overview of Cloud Computing. URL: https://www.nsa.gov/research/_files/publications/cloud_computing_overview.pdf

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