B.TECH

CURRICULUM-2014

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

KALASALINGAM UNIVERSITY

(KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION)

(Under Section 3 of the UGC Act 1956)

Anand Nagar, Krishnankoil-626 126.

Srivilliputtur, Virudhunagar(Dist.),Tamil Nadu, India

(Website: www.kalasalingam.ac.in)

KALASALINGAM UNIVERSITY

(KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION)

VISION

To be a Center of Excellence of International Repute in Education and Research

MISSION

To Produce Technically Competent, Socially Committed Technocrats and Administrators through Quality Education and Research

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

To become a Centre of Excellence in Teaching and Research in the field of Computer Science and Engineering

MISSION

To prepare the students for a prospective career in IT industry and for higher learning.

To carry out research in cutting edge technologies in computer engineering to meet the requirement of the industry and society

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO1: The Graduates will be technically competent to excel in IT industry and to pursue higher studies.

PEO2: The Graduates will possess the skills to design and develop economically and technically feasible computing systems using modern tools and techniques.

PEO3: The Graduates will have effective communication skills, team spirit, ethical principles and the desire for lifelong learning to succeed in their professional career.

PROGRAM SPECIFIC OBJECTIVES (PSOs)

PSO1 : Problem-Solving Skills: The ability to apply mathematics, science and computer engineering knowledge to analyze, design and develop cost effective computing solutions for complex problems with environmental considerations.

PSO2: Professional Skills: The ability to apply modern tools and strategies in software project development using modern programming environments to deliver a quality product for business accomplishment.

PSO3 : Communication and Team Skill : The ability to exhibit proficiency in oral and written communication as individual or as part of a team to work effectively with professional behaviors and ethics.

PSO4 : Successful Career and Entrepreneurship : The ability to create a inventive career path by applying innovative project management techniques to become a successful software professional, an entrepreneur or zest for higher studies.

PROGRAMME OUTCOMES (POS)

PO1 : Ability to apply knowledge of mathematics, science and computer engineering to solve computational problems.

PO2 : Ability to identify, formulate, analyze and derive to solve complex computing problems.

PO3 : Capability to design and develop computing systems to meet the requirement of industry and society with due consideration for public health, safety and environment.

PO4 : Ability to apply knowledge of design of experiment and data analysis to derive solutions in complex computing problems.

PO5 : Ability to develop and apply modeling, simulation and prediction tools and techniques to engineering problems.

PO6 : Ability to assess and understand the professional, legal, security and societal responsibilities relevant to computer engineering practice.

PO7 : Ability to understand the impact of computing solutions in economic, environmental and societal context for sustainable development.

PO8 : Applying ethical principles and commitment to ethics of IT and software profession.

PO9 : Ability to work effectively as an individual as well as in teams.

PO10 : Ability to effectively communicating with technical community and with society.

PO11 : Demonstrating and applying the knowledge of computer engineering and management principles in software project development and in multidisciplinary areas.

PO12 : Understanding the need for technological changes and engage in life-long learning.

ABET STUDENT OUTCOMES

Computing Accreditation Commission (CAC)

CSO1 – Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

CSO2 – Design, implement, and evaluates a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

CSO3 – Communicate effectively in a variety of professional contexts.

CSO4 – Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

CSO5 – Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

CSO6 – Apply Computer Science theory and software development fundamentals to produce computing-based solutions.

Engineering Accreditation Commission (EAC)

ESO1 – Ability to identify, formulate and solve complex engineering problems by applying principles of Engineering, Science, and Mathematics.

ESO2 – Ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

ESO3 – An ability to communicate effectively with a range of audiences.

ESO4 – Ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

ESO5 – Ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

ESO6 – Ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

ESO7 – Ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech CSE - CURRICULUM STRUCTURE

S.No	Category		Credits
I.	**Basic Science and Mathematics**		
	Compulsory Courses	25	32
	Core (Mathematics)	4	
	Free Electives (Basic Science and Mathematics)	3	
II.	Humanities and Social Science		16
III.	Basic Engineering		16
IV.	**Program Core**		
	a)Core Courses	88	99
	b)Community Service Project	3	
	c)Project work	8	
V.	**Elective Courses**		
	a)Major Elective	12	21
	b)Minor Elective	9	
	Total Credits		**184**

Semester I

Code	Course Title	Objectives & Outcomes		L	T	P	C
		PEOs	Pos				
HSS101	English for Technical Communication I	1	10	2	0	0	2
MAT103	Mathematics I	1, 2	1,2,3,4,9,11	3	0	0	3
PHY131	Engineering Physics I	1	1,2	3	0	0	3
CHY106	Engineering Chemistry	1	1	3	0	0	3
CSE102	Programming Languages	1,2,3	1,2,4,5,11,12	2	0	0	2
EEE101	Basic Electrical and Electronics Engineering	1,2	1,9,11	4	0	0	4
PHY183	Physics Laboratory	1	1,2,3	0	0	3	1
CSE181	Programming Languages Laboratory	1,2,3	1,2,3,4,9,11	0	0	3	1
Total				**17**	**0**	**6**	**19**

Semester II

Code	Course Title	Objectives & Outcomes		L	T	P	C
		PEOs	Pos				
HSS102	English for Technical Communication II	1	10	2	0	0	2
MAT104	Mathematics II	1,2	1,2,3,4,9,11	3	0	0	3
PHY132	Engineering Physics II	1	1,2	3	0	0	3
CIV101	Basic Civil and Mechanical Engineering	1	1,2,3	4	0	0	4
CHY102	Environmental Sciences	1	6,7	2	0	0	2
MEC101	Engineering Drawing	1	1,2	1	0	3	2
CSE103	Data Structures	1,2	1,2,3,4,5,7,11	3	0	0	2
MEC181	Workshop	1,2	1,9,11	0	0	3	1
CHY182	Chemistry Laboratory	1	1,9	0	0	3	1
CSE182	Data Structures Lab	1,2,3	1,2,3,4,5,9,11,12	0	0	3	1
HSS036	Soft Skills-I	1,2	1,2,4,12	2	0	0	1
Total				**20**	**0**	**12**	**22**

Semester III

Code	Course Title	Objectives & Outcomes		L	T	P	C
		PEOs	POs				
MAT202	Mathematics III	1,2	1,2,3,4,9,11	3	0	0	3
HSS***	Humanities Elective I			3	0	0	3
CSE207	Operating Systems	1,2	1,2,3,4,11	3	0	0	3
CSE209	Algorithms and complexity	1,2	1,2,4,11	3	1	0	4
CSE206	Object Oriented Programming	1,2	1,2,3,4,5,7,11	3	1	0	4
ECE202	Digital Electronics	1	1,2,3	3	0	0	4
ECE291	Digital Logic and Design Laboratory	1,2	1,2,3,4,5,9,11	0	0	3	2
CSE284	Operating Systems Lab	1,2	1,2,3,4,5,9	0	0	3	2
CSE285	Object Oriented Programming Lab	1,2	1,2,3,4,5,9,12	0	0	3	2
HSS***	Soft Skills-II			2	0	0	1
Total				**20**	**2**	**9**	**28**

Semester IV

Code	Course Title	Objectives & Outcomes		L	T	P	C
		PEOs	POs				
MAT222	Mathematics IV	1,2	1,2,3,4,9,11	3	0	0	3
CSE210	Computer Architecture and Organization	1,2	1,2,3	3	0	0	3
CSE211	Microprocessors and micro controller	1,2	1,2,4	3	0	0	3
CSE203	System Software	1,2	1,2,5	3	0	0	3
CSE205	Java Programming	1,2	1,2,3,4,5,11, 12	3	0	0	3
CSE204	Theory of Computation	1,2	1,3,4	3	1	0	4
CSE286	Microprocessors and microcontroller Lab	1,2	1,2,3,4,5,9,12	0	0	3	2

CSE288	Java Lab	1,2	1,2,3,4,5,10,11, 12	0	0	3	2
CSE282	System Software Lab	1,2	1,2,9,12	0	0	3	2
HSS***	Soft Skills-III			2	0	0	1
Total				**20**	**1**	**9**	**26**

Semester V

Code	**Course Title**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**
		PEOs	**POs**				
CSE***	Major Elective I			3	0	0	3
	Minor Elective I			3	0	0	3
MAT302	Discrete Mathematics	1,2	1,2,3,4,9, 11	3	1	0	4
CSE305	Database Management Systems	1,2	1,2,3,5,6,7,8,11	3	1	0	3
CSE303	Software Engineering	1,2	1,2,3,4,5,7,11,12	3	1	0	4
CSE304	Compiler Design	1,2	1,2,3,4,7, 11,12	3	0	0	3
CSE381	Software Engineering Lab	1,2	1,2,3,4,5,7,8,9,11 ,12	0	0	3	2
CSE382	Compiler Design Lab	1,2	1,2,3,4,59,12	0	0	3	2
CSE385	DBMS Lab	1,2	1,2,3,4,5,9,11,12	0	0	3	2
CSE398	Community Service Project-Phase I			0	0	2	1
Total				**18**	**3**	**11**	**27**

Semester VI

Code	**Course Title**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**
		PEOs	**POs**				
HSS***	Humanities II			3	0	0	3
	Minor Elective II			3	0	0	3
	Free Elective I			3	0	0	3
CSE318	Computer Networks	1,2	1,3,4,5,7,9,10,11, 12	3	1	0	4

CSE320	Graphics and Visual Computing	1,2	1,2,3,11	3	1	0	4
CSE***	Major Elective II			3	0	0	3
CSE387	Networks Lab	1,2	1,2,3,4,5,8,9,12	0	0	3	2
CSE388	Visual Programming Lab	1, 2	1,2,3,4,5,11,12	0	0	3	2
CSE399	Community Service Project-Phase II	1,2,3	1,2,3,4,5,6,7,8, 10,11,12	0	0	3	2
Total				**18**	**2**	**9**	**26**

Semester VII

Code	**Course Title**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**
		PEOs	**POs**				
HSS***	Humanities III			3	0	0	3
	Minor Elective III			3	0	0	3
CSE401	Object Oriented Software Development	1,2	1,2,3,4,5,7,9,10, 11,12	3	1	0	4
CSE***	Major Elective III			3	0	0	3
CSE***	Major Elective IV			3	0	0	3
CSE402	Internet Programming	1,2	1,2,3,4,5,7,9,10, 11,12	3	1	0	4
CSE481	Internet Programming Lab	1,2	1,2,3,4,5,7,9,11, 12	0	0	3	2
CSE482	Object Oriented Software Development Lab	1,2	1,2,3,4,5,6,7,9, 11,12	0	0	3	2
CSE483	Mobile Application Development Lab			0	0	3	2
Total				**18**	**2**	**6**	**26**

Semester VIII

Code	**Course Title**	**Objectives & Outcomes**		**L**	**T**	**P**	**C**
		PEOs	**POs**				
CSE***	Self Study Elective			3	0	0	3
CSE499	Project work	1,2,3	1,2,3,4,5,6,7,8,9, 10,11,12	0	0	16	8
Total				**3**	**0**	**16**	**11**

MAJOR ELECTIVES

Code	Course Title	L	T	P	C
CSE307	Artificial Intelligence	3	0	0	3
CSE308	Multimedia Systems	3	0	0	3
CSE311	Embedded Systems	3	0	0	3
CSE312	Real Time Systems	3	0	0	3
CSE313	Natural Language processing	3	0	0	3
CSE314	Digital Image Processing	3	0	0	3
CSE315	Distributed Computing	3	0	0	3
CSE316	Digital Signal Processing	3	0	0	3
CSE321	Green Computing	3	0	0	3
CSE322	Free and Open Source Software	3	0	0	3
CSE323	Cryptography and Network Security	3	0	0	3
CSE324	Ethical hacking	3	0	0	3
CSE325	Mobile Application Development	3	0	0	3
CSE326	Cloud Computing	3	0	0	3
CSE327	Data mining and Data Ware housing	3	0	0	3
CSE328	C# and .NET Framework	3	0	0	3
CSE329	UNIX Internals	3	0	0	3
CSE403	Soft Computing	3	0	0	3
CSE407	Software Quality Management	3	0	0	3
CSE409	Bioinformatics	3	0	0	3
CSE410	Network Management	3	0	0	3
CSE411	Fault Tolerant Computer Systems	3	0	0	3
CSE412	Pervasive Computing	3	0	0	3
CSE413	Quantum Computing	3	0	0	3
CSE414	Nano Computing	3	0	0	3
CSE416	DNA computing	3	0	0	3
CSE417	VLSI design and fabrication	3	0	0	3
CSE418	Network System Design with Network Processors	3	0	0	3
CSE419	Distributed Architecture	3	0	0	3
CSE420	Digital Forensic	3	0	0	3
CSE421	Software Architecture	3	0	0	3
CSE423	Information Security	3	0	0	3
CSE424	Multicore Programming	3	0	0	3
CSE425	Software Testing	3	0	0	3
CSE426	Wireless Ad Hoc Networks	3	0	0	3
CSE427	Service Oriented Architecture	3	0	0	3
CSE428	Big Data Analytics	3	0	0	3
CSE429	Game Theory	3	0	0	3
CSE430	Script Programming	3	0	0	3

MINOR ELECTIVES

Code	Course Title	L	T	P	C
ECE318	Information Theory and Coding	3	0	0	3
ECE344	Multimedia Compression Techniques	3	0	0	3
ECE431	Wireless Communication	3	0	0	3
ECE443	Wireless Sensor Networks	3	0	0	3
ECE325	Robotics and Automation	3	1	0	4
ECE446	RFID and applications	3	0	0	3
EEE409	Industrial Automation	3	0	0	3
EEE410	Neural Network and Fuzzy Logic	3	0	0	3
INT404	Information System Design	3	0	0	3
INT408	Enterprise Resource Planning	3	0	0	3
INT315	Bluetooth Technology	3	0	0	3
INT423	Distributed Database Systems	3	0	0	3
INT326	IT Infrastructure Management	3	0	0	3
ICT320	Information Storage Management	3	0	0	3
ICT322	Internet Technology	3	0	0	3
ICT409	Web Services	3	0	0	3

HUMANITIES ELECTIVES

Code	Course Title	L	T	P	C
HSS001	Total Quality Management	3	0	0	3
HSS002	Engineering Management	3	0	0	3
HSS004	Industrial Psychology	3	0	0	3
HSS006	Professional Ethics	3	0	0	3
HSS014	Introduction to Marketing Management	3	0	0	3
HSS015	Management Concepts and Techniques	3	0	0	3
HSS016	Organizational Psychology	3	0	0	3
HSS017	International Economics	3	0	0	3
HSS018	Communication Skills	3	0	0	3
HSS020	Human Resource Management	3	0	0	3
HSS023	Entrepreneurship Development	3	0	0	3
HSS026	German I	3	0	0	3
HSS027	German II	3	0	0	3
HSS028	French I	3	0	0	3
HSS029	French II	3	0	0	3
HSS036	Technology & Development	3	0	0	3

FREE ELECTIVES (BASIC SCIENCE AND MATHEMATICS)

Code	Course Title	L	T	P	C
BPY502	Laser Physics	3	0	0	3
BPY503	Non-linear Optics	3	1	0	4
BPY504	Radiation Physics	3	0	0	3
BPY506	Nuclear Physics	3	0	0	3
BPY507	Space Physics	3	0	0	3
BCY501	Nano chemistry	3	0	0	3
BCY504	Applied Chemistry	3	0	0	3
BMA332	Mathematical Modelling	3	0	0	3
BCY506	Environmental Chemistry	3	0	0	3
BMA331	Combinatorics	3	0	0	3
BCY505	Instrumental Method of Analysis	3	0	0	3

SEMESTER I

		L	T	P	C
HSS101	**ENGLISH FOR TECHNICAL COMMUNICATION I** (Common to all branches)	**2**	**0**	**0**	**2**

PREREQUISITE

Basic knowledge in reading and writing skills.

COURSE OBJECTIVES

- To help the learners develop listening skills by providing them with inspiring material
- To help the learner acquire the ability to speak comfortably in real-life situations
- To inculcate in students a taste for English so that they take to reading books, journals and dailies
- To help learners passionately improve their vocabulary
- To enable students to write all kinds of letters, job applications, and reports
- To help learners sit for the BEC Preliminary Examination

COURSE OUTCOMES

CO1: Participate in Non-verbal communication
CO2: Enjoy Close reading—skimming and scanning
CO3: Frame simple sentences to express daily activities
CO4: Take notes when reading and listening lectures and media events
CO5: Frame Instructions, Recommendations and Short Speeches
CO6: Remember nuances of Note-making, the template of Notices, Advertisements, Graphs and Charts
CO7: Write Short stories, anecdotes, process description, etc..

UNIT I FOCUS ON LANGUAGE

Parts of speech - Nominal compounds, noun phrases - Relative pronoun - Adjective - numerical, comparison and contrast, collocation and word combinations - Verb - Preposition and relative - Conjunction- connectives, expressions of purpose and function, cause and effect - Articles - adjectives - Sentence pattern - Tenses - Voice - Rewriting the sentences in impersonal/abbreviated passive grammatical structures - Concord - sentence level verb noun agreement - Gerund - rewriting infinitive into gerund - Imperative - rewriting imperative into recommendation using should - Word formation - varied grammatical function of the same word - Affixes - prefix and suffix, number prefix, negative prefix - Reported speech - Editing strategies - Conditional structures - real, unreal, no possibility, zero condition - Writing formal definition - Abbreviation and acronym - Idioms and phrases - Varieties of English - British versus American.

UNIT II LISTENING SKILLS

Comprehension practice - Vocabulary development - Familiarity to varied types of spoken English and accents - Developing ability to understand audio and video media - Aiming at overcoming barriers to listening - Listening to documentaries, radio news broadcasts, TV news telecasts - Active listening in discussions and to lectures - Taking notes while listening - Extracting information from listening.

UNIT III SPEAKING SKILLS

Oral practice - Role play - Interplay - Seminar - Transcoding visual into oral - Participating in short and longer conversation - Voice record, replay, correction of intonation, pronunciation and flow of speech - Phonemes - vowels, consonants, stress, rhythm, intonation - Group discussion - Participative learning - Acquiring proficiency, fluency, accuracy in oral communication - Speaking practice - Developing confidence - Extempore speech - Learning professional/conversational etiquette.

UNIT IV READING SKILLS

Vocabulary Extension - Improving vocabulary - Intensive reading - Reading Strategies - identifying topic sentence - guessing meaning from content - picking out specific information - professional reading - Reading practice - Predicting the content, critical and analytical reading - Reading articles in English newspapers, sports magazines, encyclopedias - Reading aloud, use of stress and intonation - Reading and comprehending technical materials - Cloze reading.

UNIT V WRITING SKILLS

Discourse Cohesion - Improving writing skills, avoiding common grammatical errors in academic writing - Extending the hints - Writing shorter sentences - Punctuation - Dialogue writing - Paragraph writing, problems and solutions, achieving coherence, transition words, sequence words - Essays of descriptive and argumentative - Writing instructions, use of imperatives - Jumbled sentences into sequential paragraph using linguistic clues - Report writing - technical reports, industry visit reports, events reports - Writing recommendations - Letter writing - formal and informal letters - job application and resume, permission for in-plant training, business correspondence letters, calling for quotation, placing order, lodging complaint, persuasive letters - Assignment writing - Mini-project - Transcoding - transferring of information from text to pictorial/graphical representation and vice versa.

TEXT BOOK

1. Rizvi M Ashraf, Effective Technical Communication, Tata McGraw-Hill, 2005.

REFERENCE BOOKS

1. Daniel Jones, English Pronouncing Dictionary, Universal Book Stall, New Delhi, 17th Edition, 2000.
2. Geoffrey Leech, Fan Svartvik, A Communicative Grammar of English, Pearson Education Asia, 1994.
3. Hornby, AS, Oxford Advanced Learner's Dictionary of Current English, OUP, 7th Edition, 2005.
4. Manivannan G, English for Engineers - A Book on Scientific and Technical Writing, Govi Publications, 2005.
5. Martin Cutts, Plain English Guide - How to Write Clearly and Communicate Better, Oxford University Press, 1999.

WEB RESOURCES

- grammar.ccc.commnet.edu/grammar/ppt/parts.pps
- www.english-grammar-revolution.com
- www.englishgrammar.org
- https://www.gov.uk/.../English_Appendix_2_Vocabulary_grammar_a
- www.hss.iitb.ac.in/courses/malshe06.ppt
- ww.edb.gov.hk/attachment/.../english/Reading_process.ppt
- www.powershow.com/.../Effective_Writing_Skills_powerpoint_ppt_pres
- www.reading.ac.uk/ssc/n/UBOS.../Module_2_Session_10+11.ppt
- www.powershow.com/.../Effective_Writing_Skills_powerpoint_ppt_presentation
- www.hss.iitb.ac.in/courses/malshe06.ppt

MAT103	MATHEMATICS I (Common to all branches)	L	T	P	C
		3	0	0	3

PREREQUISITE

Basic concepts of matrix theory, differentiation, integration, two dimensional geometry and differential equations.

COURSE OBJECTIVES

- To familiarize the students with the concept and techniques of differentiation and integration and their applications to engineering problems**.**
- To study the Eigen value problems and Differential equations.
- To grasp the concepts in three dimensional geometry.

COURSE OUTCOMES

CO1: Find the Eigen values of a matrix and to use Cayley-Hamilton theorem for finding the inverse of a matrix.
CO2: Explain the concept of curvature and to find envelope of a curve.
CO3: Apply partial derivatives to find maxima and minima.
CO4: Solve second order linear differential equations with constant coefficients, Cauchy's equation and Legendre's equation .
CO5: Understand the geometry of sphere, plane and straight line in the three dimensional space.

UNIT I MATRICES

Characteristic equation – Eigen values and eigen vectors of a real matrix – Properties – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II APPLICATIONS OF DIFFERENTIAL CALCULUS

Curvature – cartesian and polar co-ordinates – radius of curvature – Circle of curvature – Evolutes – Envelopes - evolute as envelope of normals.

UNIT III FUNCTIONS OF SEVERAL VARIABLES

Partial derivatives – Total derivatives - higher order partial derivatives- Euler's theorem for homogenous functions - Taylor's expansion – Jacobians – Maxima and Minima – Constrained maxima and minima by Lagrangian multiplier method.

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS

Solutions of second and higher order linear ODE with constant coefficients - Cauchy's and Legendre's linear equations - Simultaneous first order linear equations with constant coefficients - Method of variation of parameters

UNIT V THREE DIMENSIONAL ANALYTICAL GEOMETRY

Direction cosines and ratios - Angle between two lines - Equations of a plane - Equations of straight line - Coplanar lines - Shortest distance between two skew lines - Sphere - Tangent plane - Plane section of a sphere - Orthogonal spheres

TEXT BOOKS

1. Kreyszig, E, Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore , 8th Edition, 2001
2. Arumugam, S., Thangapandi Isaac, A., Somasundaram, A., Mathematics for Engineers, Scitech Publications (India) Pvt. Ltd., Chennai –Edn-2008

REFERENCE BOOKS

1. Grewal , B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 43rd Edition., 2015
2. Venkataraman, M. K., Engineering Mathematics First Year, The National Publishing Company, Chennai, 2nd Edition., Reprint 2001, 2000

WEB RESOURCES

- http://www.sosmath.com/matrix/matrix1/matrix1.html
- http://www.coolmath.com/algebra/24-matrice en.wikipedia.org/wiki/Curvature
- https://www.khanacademy.org/math/differential-calculus/derivative_applications
- www.math.harvard.edu/archive/21a.../11-08-Lagrange-Multipliers.pdf
- www.haverford.edu/physics/MathAppendices/Taylor_Series.pdf
- www.applet-magic.com/euler.html
- www.math.psu.edu/tseng/class/Math251/Notes-HigherOrderLinEq.pdf
- http://dic.academic.ru/dic.nsf/eng_rus/650599/orthogonal

PHY131	ENGINEERING PHYSICS – I (Common to all Branches)	L	T	P	C
		3	0	0	3

PREREQUISITE

The privileged knowledge of physical principles at school level is important in understanding new discoveries, recent trends and latest developments in the field of engineering.

COURSE OBJECTIVES

- To make a bridge between the Physics in School and Engineering Courses
- To develop an ability to identify, formulate and solve Physics and Engineering problems.

COURSE OUTCOMES

CO1: Understanding the different types of sound waves and production & application of ultrasonics.

CO2: Understanding the basic concepts, production & applications of different types of laser sources.

CO3: To know the general ideas about optical fibres and their applications in various fields.

CO4: Learning the basic knowledge of crystallography and it's preparation techniques.

CO5: To gain the knowledge about the fundamentals, theory of quantum physics

CO6: To gain the knowledge about various mechanical properties & thermal properties of matters.

UNIT I ACOUSTICS AND STRUCTURE OF SOLIDS

Classification of sound – Reverberation - Sabine's formula - Common acoustical defects and remedies - Classification of solids- Crystal structures - X-ray diffraction - crystal growth - Crystal defects.

UNIT II LASER AND FIBRE OPTICS

Interaction of radiation with matter – quantum mechanical view - three and four Level laser system - Engineering and medical applications -Introduction of fibre optics- classification of fibre - Engineering and medical applications

UNIT III QUANTUM PHYSICS

Inadequacy of classical mechanics – Black body radiation - Plancks law - Photoelectric effect - Compton effect - Einstein's photoelectric equation - Schrödinger wave equation - Particle in one - three dimensional box.

UNIT IV NDT, NEW ENGG.MATERIALS

Ultrasonics - Ultrasonics flaw detectors - X-ray photography – Fluoroscopy – Thermography - Gamma ray spectroscopy -Characterization technique Nanophase materials – Biomaterials - Non linear materials - Polymer materials.

UNIT V DIGITAL ELECTRONICS

Introduction - Analog to Digital circuits - Conversion of numbers one's complement - 2's complement - Logic gates - Boolean algebra - DeMorgan's theorem - Karnaugh's maps.

TEXT BOOK

1. Gaur R. K. and Gupta S. L., Engineering Physics, Dhanpat Rai Publishers, New Delhi, 2001.

REFERENCE BOOKS

1. Murthy V.S.R., Jena AK., Gupta K.P. and Murthy G.S., Structures and Properties of Engineering Materials, Tata McGraw Hill Publishing company Limited, New Delhi, 2003.
2. Ali Omar. M., Elementary Solid State Physics, Pearson Education (Singapore), Indian Branch, New Delhi, First Edition, 2006.
3. William F. Smith., Foundations of materials science and Engineering, McGraw-Hill, New York, 3rd Edition , 2003.
4. Mathews P.M., Venkatesan. K., Text Book of Quantum Mechanics, Tata McGraw Hill company, Delhi, 2003.
5. Gupta S.L., Kumar.V., Hand book of Electronics, Pragati Prakashan, Meerut, 28th Edition, 2001.

WEB RESOURCES

- www.ce.berkeley.edu/~paulmont/CE60New/crystal_structure.pdf
- ww.slideshare.net/PRNsit/characteristic-classification-of-sound
- nptel.ac.in/courses/117101054/downloads/lect8.pdf
- www.qcc.cuny.edu/academicAffairs/.../Laser-FiberOptics.pdf
- voyager.egglescliffe.org.uk/physics/equations/maxwell/.../photoelec.html
- www.x-rayphotography.com
- courses.washington.edu/mengr553/Polymers.pdf
- http://www.ee.ic.ac.uk/pcheung/teaching/ee1_digital/Lecture5-Karnaugh%20Map.pdf
- en.wikipedia.org/wiki/Two's_complement
- http://www.learnabout-electronics.org/Digital/dig15.php

CHY106	ENGINEERING CHEMISTRY (Common to CSE & IT)	L	T	P	C
		3	0	0	3

PREREQUISITE

The students should have fundamental knowledge about chemistry at school level.

COURSE OBJECTIVES

The objective of an Engineering Chemistry course is introduced the fundamental concepts and applications of chemistry to the engineering students. It would be help them to identify the chemistry in each piece of finely engineered products used in households and industry and then builds an interface with their industrial applications.

COURSE OUTCOMES

CO1: Know the water quality parameters to assess the quality of water
CO2: Learning the techniques of purification of water
CO3: Gathering the knowledge in basic concepts of thermodynamics
CO4: Explain the principles of chemical & electrochemical reactions and prevention of corrosion of materials
CO5: Principles and generation of energy in batteries, solar cells and fuel cells
CO6: Explain the preparation, properties and applications of polymers and nano-materials
CO7: Discuss the principles, instrumentations and applications of analytical techniques

UNIT I WATER

Water Quality Parameter (Industry and Drinking Water) – Hardness, Definition, Classifications, Expressions, Units of Hardness of Water with respect to CaCO3, Problems -Estimation of Hardness by EDTA Method (Theory Only) - Definition of Alkalinity (Theory Only) – Boiler feed water - Requirements, Disadvantages of using hard water in boilers, Removal of boiler scales and sludges - Water Softening - Zeolite Process, Demineralization (Ion – Exchange Process), Desalination.

UNIT II CORROSION SCIENCE AND CONTROL ENGINEERING

Corrosion, definitions – Electrode potential - Principles of Dry and Wet Corrosion, Factors Influencing rate of corrosion, Types of Corrosion - Corrosion Control – Impressed Current Cathodic Protection and Sacrificial Anodic Protection Method - Corrosion Inhibitors – Protective Coatings, Surface conversion coatings, organic coatings (paints).

UNIT III POLYMERS

Introduction, Classification, Difference Between Thermoplastic and Thermosetting Plastics – Properties of Plastic -Degree of Polymerization – Types of Polymerization (Mechanism) - Phenol Formaldehyde Resin, Epoxy Resin, polyurethanes, Teflon -Amino Resins (Urea Formaldehyde, Nylon.11, Nylon.66 & Nylon 6), PET, PVC – Composites - Definition, characteristics, Constituent. Types-Fibre reinforced plastics (FRP), Metal Matrix Composites (MMC), Ceramic Matrix Composites (CMMC),Properties and Applications.

UNIT IV INSTRUMENTAL METHODS OF ANALYSIS

Electro Magnetic Radiation - Absorption of Radiation , Beer -Lambert's Law – UV-VIS. Spectroscopy – IR Spectroscopy Principle and Instrumentation (Black Diagram Only) Estimation of Iron by Colorimeter – Flame Photometry, Principle and Instrumentation (Black Diagram Only), Estimation of Na by Flame Photometry - Atomic Absorption Spectroscopy, Principle and Instrumentation (Block Diagram Only), Quantitative Estimation of Nickel by Atomic Absorption Spectroscopy.

UNIT V ENERGY AND MEMORY STORAGE DEVICES AND NANOTECHNOLOGY

Batteries - Introduction, Primary and Secondary Batteries - Dry Cell - Alkaline Batteries, Lead Acid Storage Cell, NICAD Battery, Lithium Batteries – Fuel Cell (Hydrogen - Oxygen Fuel Cell) – Photo Galvanic Cell - Ferrites – Definition, Properties, Manufactures and uses – Ferrite Core – Magnetic Core – Transformer – Ferrite Toroids – Semiconductor storage - Optical disc Storage – Magneto-optical disc storage – Chemical sensors - Nanotechnology – Introduction, Preparation, Characterization and Application.

TEXT BOOKS

1. Jain,P.C and Monika Jain, Engineering Chemistry, Dhanpat Rai Publishing company (P) Ltd., New Delhi, 14th Edition 2002.
2. Sharma, B.K., Industrial Chemistry, Goel Publishing House, Meerut, 12th edition 2001.

REFERENCE BOOKS

1. Puri B.R.and Sharma L.R. Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co., Jalandhar, 40th edition 2003.
2. Vogel A.I., A text book of Quantitative Inorganic Analysis, ELBS, London, 3rd edition 2000.
3. Mick Wilson and Kamali Kannangara, Nanotechnology: Basic science and emerging technology, Overseas India Pvt. Ltd. Press, New Delhi, Ist edition 2005.
4. Bandyopadhyay, A.K., Nano Materials, New Age International Publishers, New Delhi, 1st edition 2007.

WEB RESOURCES

- https://www.epa.ie/pubs/advice/water/quality/Water_Quality.pdf
- http://cd1.edb.hkedcity.net/cd/science/chemistry/s67chem/pdf/sOL_6_Water_hardness.pdf
- www.npl.co.uk/upload/pdf/corrosion_control_in_engineering_design.pdf corrosion.ksc.nasa.gov/corr_fundamentals.htm
- http://chemwiki.ucdavis.edu/Organic_Chemistry/Polymers/Polymer_Fundamentals
- http://www.innovateus.net/innopedia/what-process-polymerization
- http://courses.engr.uky.edu/CME/mse404g/text%20pdfs/4%20%5Bpolymerization%5D.pdf
- ww.authorstream.com/Presentation/aSGuest94391-955831-infrared-spectroscopy/
- http://web.nmsu.edu/~esevosti/report.htm
- http://www.engineersedge.com/battery/primary_secondary_cells_batteries.htm
- http://www.nanotechproject.org/topics/nano101/introduction_to_nanotechnology/

CSE102	PROGRAMMING LANGUAGES (Common to all Branches)	L	T	P	C
		2	0	0	2

PREREQUISITE

Basic mathematical, analytical and logical capability

COURSE OBJECTIVES

This course is basis for learning other programming languages like C++, Java and enable learners to design, develop and apply logic to solve mathematical and scientific problem.

COURSE OUTCOMES

CO1: To learn the basics of computer programming concepts using C programming language.

CO2: To design programs involving decision structures, and loops

CO3: To understand how to include functions and structure as part of the solution

CO4: To utilize pointers & arrays to efficiently solve problems and understand the dynamics of memory

CO5: To understand the file system and operations on files

CO6: To develop algorithms to solve basic programming problems & able to learn hands-on experience in designing and implementing some selected types of team oriented projects

CO7 : To understand the UNIX basics and also the concept of Shell Programming

UNIT I BASIC ELEMENTS OF C & CONTROL STATEMENTS

Introduction to C programming – C character set – Identifiers, keywords, data types, constants, variable, declarations, expressions, statements, symbolic constants, Operators and Expressions-Operator precedence and associativity of operators -Input and Output Functions-Library Functions - Header Files - Simple Computational problems. Decision Making: if statement - if-else statement - else-if ladder –Looping statements –While –do-while- Still more looping-For statement, Nested control statements- switch statement – the break statement - ? : operator - Continue statement - goto statement – Problems using Control Structures.

UNIT II USER DEFINED FUNCTION FUNCTIONS & STORAGE CLASSES

Need for User defined functions, a multifunction program- Elements of user defined functions-Definition of Functions- Return values and their Types- Function Calls-Function declaration-Category of functions- Nesting of functions –Recursion- Problems on functions & recursion functions. Storage Classes -Automatic Variables -External Variables – Static and Register Variables.

UNIT III ARRAYS AND POINTERS

Defining and Processing an Array - Passing Arrays to Functions - Multidimensional Arrays - Arrays and Strings - Enumerated data types-Programs using sorting, searching and merging of arrays. Pointer Fundaments - Pointer Declarations - Passing Pointers to Functions - Arrays and Pointers - Pointers and One-Dimensional Arrays - Pointers and Multidimensional Arrays - Operations on Pointers-Programs using Pointers with Functions.

UNIT IV DYNAMIC MEMORY MANAGEMENT, STRUCTURES & UNIONS

Dynamic Memory Allocation –Allocating a Block of memory, multiple blocks, releaseing used space, altering the size of block. – Defining a Structure - Processing a Structure – User defined Data Types – Nested structure - Structures and Pointers - Passing Structures to Functions - Self Referential Structures- Arrays and & Structures Union.

UNIT V DATA FILES AND UNIX OS

Opening and Closing a Data File - Creating a Data File – Reading & writing a data file. Processing and Updating of Data Files - Unformatted Data Files - Programs using merging, searching of data file contents. Introduction to Operating System. Shell fundamentals- shell commands – File commands- Directory commands-Miscellaneous commands

TEXT BOOK

1. Byron S. Gottfried, Programming with C, Second Edition, Tata McGraw Hill, 2010

REFERENCE BOOKS

1. Brian W. Kerninghan and Dennis M.Richie,"The C Programming language", Pearson Education,2005.
2. Johnsonbaugh R.and Kalin M, "Applications Programming in ANSI C", Third Edition, Pearson Education, 2003.
3. E. Balagurusamy " Programming in ANSI C" fourth edition TMH 2008
4. V.Rajaraman "Computer Basics and C Programming" PHI 2008
5. Stephen Kochan and Patrick Wood, UNIX Shell Programming, Third Edition, Pearson education 2003.

WEB RESOURCES

- http://computer.howstuffworks.com/c.htm
- http://www.le.ac.uk/cc/tutorials/c/
- http://www.eskimo.com/~scs/cclass/notes/top.html (for notes)
- http://www.cprogramming.com/tutorial.html
- http://www2.its.strath.ac.uk/courses/c/

- http://www.iu.hio.no/~mark/CTutorial/CTutorial.html
- http://www.cs.cf.ac.uk/Dave/C/
- http://www.cs.utah.edu/~hamlet/release/classes/C/contents.shtml
- http://www.di-mgt.com.au/cprog.html (c complex code examples)
- http://c-faq.com/index.html (frequently asked questions)
- www.nist.gov/dads/ - Introduction to Data Structures.
- http://www.ics.uci.edu/~eppstein/161/syl.html - Basic Algorithm analysis concepts
- http://www.informatics.susx.ac.uk/courses/dats/notes/html/index.html - Introduction
- cgm.cs.mcgill.ca/~godfried/teaching/algorithms-web.html – Data Structures web notes
- http://www.tutorialmaniacs.com/scripts/c-/articles/data-structures - Tutorials
- http://hemsidor.torget.se/users/d/Devlin/shell/
- http://www.esscc.uq.edu.au/~ksteube/Bshell/

EEE101	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common to all Branches)	L	T	P	C
		4	0	0	4

PREREQUISITE

The students should have basic knowledge about the fundamentals of physics, chemistry and mathematics of plus two subjects

COURSE OBJECTIVES

This course provides comprehensive insight into electrical and electronics, and creates awareness in every engineering graduate about the importance of electrical and electronics and the effect of technology on the engineering field and make them sensitive and educate.

COURSE OUTCOMES

CO1: Do the basic estimation of electrical quantities
CO2: Interpret the basic electrical and electronics circuits.
CO3: Understand the DC and AC single phase and three phase fundamentals.
CO4: Understand the working principle of various Electrical AC and DC machines.
CO5: Get the knowledge about various Analog type measuring instruments and house wiring.
CO6: Get the knowledge about basic semiconductor devices.
CO7: Get the knowledge about the application of basic Electronics devices for Domestic and Industries.

UNIT I ELECTRICAL CIRCUITS

Introduction to electric circuits – laws of electric circuits– Ohm's Law, Kirchoff's Laws– analysis of DC circuits–mesh, nodal – introduction to AC circuits– average Value, RMS value, power and power factor–analysis of 3 phase AC circuits – balanced and unbalanced circuits

UNIT II ELECTRICAL MACHINES

DC Machines –principle of operation–DC generators–emf equation, characteristics, types– DC motors–shunt, series, compound– single phase transformer – principle of operation, emf equation, phasor diagram –induction motors–single phase, three phase–alternators– principle of operation, emf equation , characteristics

UNIT III ELECTRICAL MEASUREMENTS

Moving coil –ammeter, voltmeter – moving iron instruments – ammeter, voltmeter – dynamometer – wattmeter, energy meter

UNIT IV BASIC ELECTRONICS

Semiconductor devices – introduction, construction, types – pn junction diode –working principle, characteristics– zener diode– working principle, characteristics uni–junction transistor– operation, characteristics –field effect transistor– operation, characteristics– bipolar junction transistor– operation, characteristics–applications– half wave and full wave rectifiers

UNIT V DIGITAL ELECTRONICS

Introduction to binary number system–logic gates –AND, OR, NOT, NAND, NOR, exclusive OR– boolean algebra– combinational circuits – half adder, full adder, half subtractor, full subtractor

UNIT VI INTEGRATED CIRCUITS

Operational amplifier–introduction, DC characteristics, AC characteristics–types of operational amplifier–inverting, non– inverting– applications– scalar, adder, Subtractor, differentiator, and integrator

TEXT BOOKS

1. Edward Hughes., Electrical &Electronics Technology, Pearson Education ltd, 9th edition, 2005.
2. Kothari.D.P.,and.Nagrath.I.J.,Basic Electrical Engineering, Tata McGraw Hill,2nd Edition.

REFERENCE BOOKS

1. Malvino,A P., Electronic Principles, TataMcGraw Hill International, 1998.
2. Vincent Del tora.,Electrical Engineering fundamentals, Prentice hall of India , 2nd edition 2003.
3. Muraleedharan.K.A., Muthusubramanian .R., and Salivahanan .S., Basic Electrical and Electronics and Computer Engineering, Tata McGraw Hill, 1997.

WEB RESOURCES

- https://www.asee.org/conferences-and.../Introduction_to_Circuits.pdf
- http://www.pssurvival.com/ps/electronic/circuits/All_About_Circuits_Lessons_2003.pdf
- www.ncert.nic.in/html/learning_basket/.../machine/dc_generator.htm
  electrical4u.com/working-principle-of-three-phase-induction-motor
- www.ebay.com/bhp/voltmeter-ammeter
- www.themcclungs.net/physics/download/H/.../AmmetersVoltmeters.pdf
- http://www.completepowerelectronics.com/zener-diode-basics-operation-characteristics/
- https://filebox.ece.vt.edu/~LiaB/ECE2204/.../Half-Wave_Rectifiers.pdf
- http://www.b-u.ac.in/sde_book/bca_fund.pdf
- http://www.thelearningpoint.net/home/electrical-science-and-engineering/boolean-algebra--part-2
- http://www.circuitstoday.com/half-adder-and-full-adder

PHY 183	PHYSICS LABORATORY (Common to all Branches)	L	T	P	C
		0	0	3	1

PREREQUISITE

Engineering Physics I(PHY131)

COURSE OBJECTIVES

- To introduce fundamental ideas of science through different practical
- To enhance the theoretical and modern technological aspects in Physics
- To enable the students to correlate the theoretical principles with Experiments

COURSE OUTCOMES

CO1: Understand the practical understanding of the mechanical properties such as modulus, moment of inertia, gravitational force, stress, strain, etc
CO2: Understanding and applying the optical phenomena like diffraction, interference,etc.
CO3: Understanding the thermal conductivity and also thermal behavior of the specimen
CO4: Can acquire practical skill to analyze the fluid state mechanism
CO5: Ability to find thickness of very very thin objects
CO6: Learn the knowledge of generating ultrasonic waves and finding the velocity of it in Liquid.
CO7: Can determine the bandgap of semiconductor.

LIST OF EXPERIMENTS

1. To determine the acceleration due to gravity using Compound Pendulum
2. To determine the Rigidity Modulus of wire using Torsional Pendulum
3. To find thickness of the given two glass plates using single optic lever.
4. To determine the thermal conductivity of a bad conductor
5. To determine the refractive index of the material of the prism.
6. To find the number of rulings per cm length of the given transmission grating.
7. To determine the particle Size Using Laser
8. To determine the coefficient of viscosity of the liquid by Poiseuille's method
9. To determine the young's modulus of given material using Uniform Bending
10. To Determine the thickness of a given material using Air wedge method
11. To determine the focal length of a biconvex lens using Newton's Rings method
12. To determine the velocity of ultrasonic waves in the given medium using ultrasonic Interferometer.

WEBRESOURCES

- http://www.ld-didactic.de/documents/en-US/EXP/P/P1/P1515cle.pdf
- http://www.cmi.ac.in/~debangshu/lab1/torpen.pdf
- http://www.bmsce.in/determine-thermal-conductivity-bad-conductor
- http://www.escubed.co.uk/sites/default/files/particle_size_analysis_(an003)_laser_diffraction.pdf
- http://nvlpubs.nist.gov/nistpubs/jres/8/jresv8n1p79_A2b.pdf
- file:///C:/Documents%20and%20Settings/mtech/My%20Documents/Downloads/Air%20wedge.pdf
- http://www.physics.usyd.edu.au/teach_res/jp/fluids/viscosity.pdf

CSE181	PROGRAMMING LANGUAGES LABORATORY (Common to all Branches)	L	T	P	C
		0	0	3	1

PREREQUISITE

Programming Language(CSE102)

COURSE OBJECTIVES

This course is designed to provide a comprehensive study and implementation of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code. The nature of C language is emphasized in the wide variety of examples and applications. It is used to learn and acquire art of computer programming. It will serve as a basis to know about some popular programming languages and how to choose Programming language for solving a problem.

COURSE OUTCOMES

CO1: Understand problem analysis, algorithm design, and program implementation
CO2: Write modular, efficient and readable C programs
CO3: Design modular programs with structured programming constructs
CO4: Ability to formulate problems and implement algorithms in C and work in a team to develop projects

LIST OF EXPERIMENTS

APPLICATION PACKAGES

- Word Processing
- Spreadsheet
- Powerpoint
- Database Management

C PROGRAMMING

- Basics
- Operators and Expressions
- I/O formatting
- Control Statements

ARRAYS AND FUNCTIONS

- Arrays
- String Manipulation
- Functions

POINTERS, STRUCTURES AND FILES

- Pointers
- Structures and Unions
- File Handling

UNIX PROGRAMMING

- Basic Unix Commands
- Basic Shell Programming

WEB RESOURCES

- http://computer.howstuffworks.com/c.htm
- http://www.le.ac.uk/cc/tutorials/c/
- http://www.eskimo.com/~scs/cclass/notes/top.html (for notes)
- http://www.cprogramming.com/tutorial.html
- www.programiz.com/c-programming/c-recursion
- https://onlinecourses.nptel.ac.in/iitk_cs_101
- freevideolectures.com / Programming / IIT Kharagpur
- https://www.coursera.org/course/cprogramming
- programming-in-c-january-iap-2010/
- http://www.iu.hio.no/~mark/ctutorial/ctutorial.html
- http://www.cs.cf.ac.uk/dave/c/
- http://www.di-mgt.com.au/cprog.html (c complex code examples)
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/
- http://www.esscc.uq.edu.au/~ksteube/bshell/

SEMESTER II

HSS102	**ENGLISH FOR TECHNICAL COMMUNICATION II** (Common to all branches)	**L**	**T**	**P**	**C**
		2	**0**	**0**	**2**

PREREQUISITE

English for Technical Communication I(HSS101)

COURSE OBJECTIVES

- To help the learner construct simple sentences to express Engineering concepts.
- To help the learner express orally in understandable English.
- To help the learner familiarize in official communications like Notices, Circulars and Minutes.
- To help the learner prepare project proposals, and reports of industrial events like expansion, annexation, lockouts and fire accidents

COURSE OUTCOMES

CO1: Identify the errors in sentence structures.
CO2: The need to construct grammatically correct sentences
CO3: Framing conversations
CO4: Effectively construct utterances for a Dialogue
CO5: Prepare various components of official communication like Memos, Circulars, Notices and Agendas
CO6: Recall Mechanics of Manuscript Preparation
CO7: Write reviews of a text, that the students read or a movie that they watch

UNIT I GRAMMAR AND VOCABULARY

Grammar and Vocabulary - Introduction to grammatical models - Proper use of tenses, concord, voice, articles, punctuation, and modal auxiliaries.

UNIT II RECEPTION SKILLS

Listening and Language Development - Improving listening skills - comprehension practice - Comprehend classroom lectures, simple technically oriented passages - Listening to news bulletins, prerecorded talks, different speech styles, comprehending the essential meaning - Physical and psychological barriers to listening - Steps to overcome the barriers - Practice in note-taking while listening.

UNIT III SPEAKING TECHNIQUES

Speaking practice - Improving conversing skills - Improving self-expression -Developing confidence and fluency in oral communication - Physical and psychological barriers to speaking - Steps to overcome the barriers - Formal and public speaking practice - Extemporary talk practice - Speech process - fluency and accuracy in speech - Developing persuasive speaking skills - Conversation in a given milieu, social and cultural surroundings - Practice in giving small talks on local topics for a minute or two - Goal oriented group discussion - Participating in seminars - Independent and effective communication.

UNIT IV READING STRATEGIES

Reading comprehension - Vocabulary extension methods - Speed reading practice - technical and non-technical materials - Practice in various reading techniques - skimming, scanning, eye reading -Looking for specific information - Comprehending the given passages, technical information.

UNIT V WRITTEN COMMUNICATION

Basic grammatical structures - Alphabet of other languages -Paragraph writing - Expressing the idea in writing - Avoiding and correcting common errors - Effective writing techniques - brevity, clarity, objectivity and simplicity - Discourse writing - definition, description, instruction - Note-making - Proof reading - Mechanics of writing - Writing formal, informal letters, Technical reports - Reference skills - using dictionary better.

TEXT BOOKS

1. Rizvi M Ashraf, Effective Technical Communication, Tata McGraw Hill , 2005
2. Rutherfoord Andrea J, Basic Communication Skills for Technology, Pearson Education, 2002.

REFERENCE BOOKS

1. Deborah C Andrews, Margaret D Bickle, Technical Writing - Principles and Forms, Macmillan, 1978.
2. Manivannan G, English for Engineers - A Book on Scientific and Technical Writing, Govi Publications, 2005.
3. Sarah Freeman, Written Communication in English, Orient Longman, 2000.
4. Thomson A J & AV Martinet, A Practical English Grammar, OUP, 4th Edition, 1986.
5. Tom Hutchinson, Alan Waters, English for Specific Purpose, Cambridge University Press, 1987.

WEB RESOURCES

- portal.unedmotril.org/files/english%20grammar_1.pdf
- www.language-worksheets.com/.../grammar-worksheets-secondary.pdf
- www.e-grammar.org
- ccc.ca/wp-content/.../es.../EFFECTIVESPEAKINGTECHNIQUES.pdf
- www.snow.edu/communication/public_speaking_handbook.pdf
- https://www.hand2mind.com/pdf/miriam/grades_1_2.pdf
- https://www.princeton.edu/mcgraw/library/...reading/active-reading.pdf
- ww.unicef.org/cbsc/.../Writing_a_Comm_Strategy_for_Dev_Progs.pdf
- hplengr.engr.wisc.edu/Prof_Comm.pdf

MAT104	MATHEMATICS II (Common to all branches)	L	T	P	C
		3	0	0	3

PREREQUISITE

Mathematics I(MAT103)

COURSE OBJECTIVES

- To familiarize the students with the concept and techniques of the calculus of several variables and vector calculus and their applications to engineering problems**.**
- To study the multiple integrals, vector calculus.
- To grasp the basics of complex integration and the concepts of contour integration which is an important tool for evaluation of certain integrals encountered in practice.
- To apply the ordinary differential equations in various engineering concepts.

COURSE OUTCOMES

CO1: Explain the concept of double integral and triple integral.
CO2: Explain the concept of Gradient, divergence and curl.
CO3: Explain the concept of line, volume and surface integrals.
CO4: Construct conformal mappings between regions.
CO5: Evaluate certain real integrals using residue theorem.
CO6: Apply differential equations for Physical problems.

UNIT I MULTIPLE INTEGRALS

Review of Riemann integrals - Double integration – Cartesian and polar coordinates – change of order of integration – change of variable between Cartesian and polar – Area as double integral – Triple integration in Cartesian, cylindrical and spherical polar coordinates – volume as triple integral

UNIT II VECTOR CALCULUS

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proof) – Simple applications

UNIT III ANALYTIC FUNCTION AND CONFORMAL MAPPING

Function of a complex variable – Analytic function – Necessary conditions – Cauchy – Riemann equations – Sufficient conditions (excluding proof) – Properties of analytic function – Harmonic conjugate – Construction of Analytic functions - Conformal mapping - w = z+a, az, 1/z, e^z , sin z, cos z and bilinear transformation.

UNIT IV COMPLEX INTEGRATION

Statement and application of Cauchy's integral theorem and integral formula – Taylor and Laurent expansions – Isolated singularities – Residues - Cauchy's residue theorem - Contour integration over unit circle and semicircular contours (excluding poles on boundaries)- evaluation of real integrals using contour integration

UNIT V APPLICATION OF ODE

Solutions of ODE related to electric circuit, bending of beams, motion of a particle in a resisting medium and simple harmonic motion

TEXT BOOKS

1. Kreyszig, E, Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore, 8th Edition, 2001
2. Arumugam, S., Thangapandi Isaac, A., Somasundaram, A., Mathematics for Engineers, Scitech Publications (India) Pvt. Ltd., Chennai – Edn-2008.

REFERENCE BOOKS

1. Grewal , B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 37th Edition., 5th Reprint 2004, 2003
2. Venkataraman, M. K., Engineering Mathematics First Year, The National Publishing Company, Chennai, 2nd Edition., Reprint 2001, 2000
3. Venkataraman, M. K., Engineering Mathematics –III A, The National Publishing Company, Chennai, 11th Edition., Reprint 2002, 1998

WEB RESOURCES

- http://www.math.klte.hu/~muzsnay/Pdf/0607EN/5_mult_int.pdf
- http://www.robots.ox.ac.uk/~sjrob/Teaching/Vectors/slides1.pdf
- http://www.math.umn.edu/~olver/ln_/cml.pdf
- https://www.math.ust.hk/~maykwok/courses/ma304/06_07/Complex_4.pdf
- http://math.msu.edu/~gnagy/teaching/ode.pdf

PHY 132	ENGINEERING PHYSICS – II (Common to CSE & IT)	L	T	P	C
		3	0	0	3

PREREQUISITE

Engineering Physics I(PHY131)

COURSE OBJECTIVES

- To gain knowledge on and understand about the solid state materials, conducting, semi-conducting, superconducting, magnetic, dielectric, optical materials.
- To learn the latest development on new engineering materials.
- To gain some knowledge about the different materials characterization techniques

COURSE OUTCOMES

CO1: Understanding the free electron theories, formation of energy bands, energy distribution and also the electron behavior in solids

CO2: Ability to know and understand the cooper pair electron behavior, applications of superconducting materials in developing technologies.

CO3: To learn the importance of semiconducting materials in engineering fields by projecting the view of energy bands.

CO4: To gain the knowledge about various kinds of magnetic materials, their properties and applications in advanced technologies.

CO5: To gain the knowledge about dielectric materials, their properties and significant applications in advanced technologies.

CO6: To learn how to prepare some new materials like metallic glasses, nano-materials, shape memory alloys, nonlinear materials to improve the technology.

CO7: Adaptability to new developments of materials in science and technology by characterizing with sophisticated instruments.

UNIT I VOLTAGE AND CURRENT LAWS

Kirchoff's current law, Kirchoff's Voltage law, Single loop circuit, single node-pair circuit, Series and parallel connected independent sources, Resistors in series and parallel, Voltage and current division

UNIT II CIRCUIT ANALYSIS TECHNIQUES

Linearity and superposition, Sources transformation, Thevenin and Norton equivalentcircuits, Maximum power transfer, Dela-Wye conversion, Single Phase and 3 Phase Circuits, Power factor, Power, Concept of Phasor Diagrams.

UNIT III SEMICONDUCTOR DEVICES

Conductors, Semiconductors, Silicon crystals, ideal diode, diode approximation, zener diode, zener regulator- Bipolar transistors- Basic ideas of junction FET, Depletion mode MOSFET, Enhancement mode MOSFET and Silicon control rectifier

UNIT IV RECTIFIER, AMPLIFIER AND OSCILLATOR

Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Filter, Choke input filter, Capacitors input filter, Zener Regulator. Un-biased transistor, biased transistor, transistor currents, JFET Amplifier. Theory of Sinusoidal Oscillation, RC Oscillators, LC Oscillators, 555 Timer, 555 Circuits.

UNITV OPERATIONALAMPLIFIER

Introduction of an Inverting Amplifier, Non Inverting Amplifier, Basic Application of perational amplifier: Subtractor, Summing Amplifier, Digital to Analog Converter, Low Pass Filter, First Order Low Pass Filter, First Order High Pass Filter, Integrator, Differentiator, Relaxation Oscillator.

TEXT BOOK

1. Albert Paul Malvino, Electronic Principles, Tata McGraw-Hill Publishing Company Limited, Sixth Edition, 1999.

REFERENCE BOOKS

1. William H. Hayt, Jack E.Kemmerly, Steven M.Durbin, Engineering Circuit Analysis, Tata McGraw-Hill Publishing Company, Sixth Edition, 2002.
2. Robert L. Boylestad, Louis Nashelsky, Electronic devices and Circuit Theory, Pearson Education Asia, Eigth Edition, 2002.
3. Floyd, Electronic Devices, , Pearson Education, Sixth-Edition, 2002.
4. David A. Bell, “Electronics Devices and Circuits”, Fourth Edition-Prentice Hall of India, 1999.

WEB RESOURCES

- http://physics.mercer.edu/labs/manuals/manualEMlab/Kirchhoff.pdf
- http://www.animations.physics.unsw.edu.au//jw/power.html
- http://phylab.fudan.edu.cn/lib/exe/fetch.php?media=course:j.p._colinge.physics_of_semiconductor_devices.springer.2005.pdf
- http://homepages.rpi.edu/~sawyes/Models_review.pdf
- http://www.talkingelectronics.com/Download%20eBooks/Principles%20of%20electronics/CH-14.pdf
- http://www.physics.udel.edu/~nowak/phys645/555%20timer%20lab_files/555%20timer%20lab.pdf
- http://www.phys.hawaii.edu/~morse/P272fall10-20_pdf.pdf
- http://opencourseware.kfupm.edu.sa/colleges/ces/ee/ee203/files%5C3-Handouts_Handout_2f.pdf
- http://www.jamia-physics.net/lecnotes/lab/opamp.pdf
- https://www.physics.wisc.edu/undergrads/courses/fall2014/623/exp/adc.pdf

CIV101	BASIC CIVIL AND MECHANICAL ENGINEERING	L	T	P	C
		4	0	0	4

PREREQUISITE

Basic Knowledge in Science and Engineering.

COURSE OBJECTIVES

The aim of undergoing this course is to develop basic understanding the topics in Civil Engineering like surveying, building materials, components of building, different modes and importance of transportation and in Mechanical Engineering like power plants, boilers and various manufacturing technologies etc.

COURSE OUTCOMES

CO1: Describe the scientific terminologies related to construction and mechanical sciences.
CO2: Familiarize with different components, equipments and technical standards
CO3: Know the purpose, procedures, and the materials
CO4: Aware of the uses and standards adopted in industries.
CO5: Understand the basic laws pertaining towards the subject.
CO6: Understand the procedures for construction of several structures.
CO7: Create working models or prototypes of the components.
CO8: Knowledge in surveying, their types and the equipments used.
CO9: Explain the principle, working and application of Engines and Power plants.
CO10: Understand and apply the concepts of manufacturing and the technology related.
CO11: Mention some of the applications of the manufacturing processes.

UNIT I CIVIL ENGINEERING BUILDINGS

Characteristics of good building materials such as stones, bricks, plywood and ceramic tiles, timber, cement, aggregates and concrete - Basic functions of buildings – Major components of buildings – Foundations - Purpose of a foundation – Bearing capacity of soils – types of foundations. Proper methods of construction of Brick masonry – Stone masonry – Hollow Block masonry. Beams – Lintels – Columns – Flooring – Damp proof course – surface finishes – Doors and windows – Roofing.

UNIT II TRANSPORTATION ENGINEERING

Principles and Classification of surveying, Chain surveying, Compass surveying and leveling - Importance of roads – Classification of Highways –water bound macadam, bituminous and cement concrete roads –. Railways - Importance of railways – Gauges – Components of a permanent way. Bridges - Components of Culverts – Causeways, Slab Bridge, T-beam and slab bridge, Suspension bridge

UNIT III MECHANICAL ENGINEERING BOILERS AND TURBINES

Boilers - boiler mountings and accessories – Cochran boiler, Locomotive boiler, Babcock and Wilcox boiler, fire and water tube boilers - Steam turbine - single stage impulse turbine, Parson's reaction turbine, difference between impulse and reaction turbines.

UNIT IV POWER PLANTS AND INTERNAL COMBUSTION (IC) ENGINE

Classification of power plants – steam, nuclear, diesel and hydro power plants - Alternate sources of energy - solar, wind, tidal, geothermal, ocean thermal energy conversion. – IC engine - components, working of four and two stroke petrol and diesel engines.

UNIT V PRODUCTION TECHNOLOGY

Metal casting and forming process –patterns, moulding, melting of cast iron, casting – forging – rolling – extrusion – drawing - Metal joining process - welding – arc welding, gas welding, brazing and soldering - Metal machining – lathe, drilling machine, milling machine, shaping machine, planing machine, introduction to Computer Numerical Control machining.

TEXT BOOK

1. Shanmugam, G,, and Palanichamy, M.S., Basic Civil and Mechanical Engineering, Tata McGraw Hill Publishing Co., New Delhi, 1996.

REFERENCE BOOKS

1. Khanna, K., Justo C E G, Highway Engineering, Khanna Publishers, Roorkee, 2001
2. Arora S.P. and Bindra S.P., Building Construction, Planning Techniques and Method of Construction, Dhanpat Rai and Sons, New Delhi, 1997.
3. Venugopal K., Basic Mechanical Engineering, Anuradha Publications, Kumbakonam, 2000.
4. Shanmugam G., Basic Mechanical Engineering, Tata McGraw Hill Publishing Co.,New Delhi, 2001.

WEB RESOURCES

- http://www.tudelft.nl/fileadmin/Files/tudelft/studeren/master/Brochures/CivilEngineering-BE-MSc.pdf
- http://wiki.iricen.gov.in/doku/lib/exe/fetch.php?media=613:1pre_engineered_building_system.pdf
- http://www.betterbricks.com/sites/default/files/operations/om_of_boilers_final.pdf
- http://www.ignou.ac.in/upload/Unit-2-61.pdf
- http://www.npti.in/Download/Hydro/Difference%20Between%20Impulse%20Vs%20ReactionTurbine.pdf
- http://hillagric.ac.in/edu/coa/agengg/lecture/243/Lecture%203%20Engine.pdf
- http://agridr.in/tnauEAgri/eagri50/FMP211/pdf/lec02.pdf
- http://www.irena.org/DocumentDownloads/Publications/Ocean_Thermal_Energy_V4_web.pdf

CHY102	ENVIRONMENTAL SCIENCES	L	T	P	C
		2	0	0	2

PREREQUISITE

Engineering Chemistry (CHY106)

COURSE OBJECTIVES

- Should be conversant with the language of Environment
- The Knowledge gained will be prerequisite for the application oriented topics to be pursued in the later semesters.
- Fundamental aspects of Environmental Pollution.
- Various types of Environmental studies used for student's life.

COURSE OUTCOMES

CO1: Know the importance of environmental studies and methods of conservation of natural resources.
CO2: Describe the structure and function of an ecosystem.
CO3: Identity the values and conservation of bio-diversity.
CO4: Explain the causes, effects and control measures of various types of pollutions.
CO5: Select the appropriate methods for waste management.
CO6: Get knowledge about various disaster management methods
CO7: Recall social issues and legal provision.

UNIT I NATURAL RESOURCES

Definitions – Scope of Environmental Sciences - Forest Resource – Food Resource – Land Resource – Water – Mineral resources - Utilization of Natural Resource, Impact on Environment – Conservation of Natural Resources.

UNIT II ECOSYSTEM AND BIODIVERSITY

Concept – Structure and Function – Energy Flow in Ecosystem – Ecological Succession – Food Chain – Food Web, Ecological Pyramids – Biodiversity, Definition, Values, Threats to Biodiversity, Conservation of Biodiversity.

UNIT III ENVIRONMENTAL POLLUTION

Definition, Causes, Effects and Control Measures of Air, Water and Soil Pollution – Thermal and nuclear Pollution.

UNIT IV MANAGEMENT OF ENVIRONMENTAL POLLUTION

Solid Waste Management – Treatment Methods adopted for Municipal Sewage and Industrial Effluent – Hazardous and Biomedical Waste Management.

UNIT V TOOLS FOR ENVIRONMENTAL MANAGEMENT

Environment Impact Assessment – Precautionary and Polluter Pay Principle - Constitutional Provision – (Air, Water and Forest) - Waste Minimization Techniques, Cleaner Technology Options, Bioremediation.

TEXT BOOK

1. Dhameja, S.K., Environmental engineering and Management, S. K. Kataria and sons, New Delhi, 1st edition 2004.

REFERENCE BOOKS

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad, 1st edition, 2001.
2. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. USA, 2nd edition, 2004.
3. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media., New Delhi, 2nd edition, 2004.
4. Masters, G. M., Introduction to Environmental Engineering & Science, Prentice Hall, New Delhi, 2nd edition, 1997
5. Henry, J. G. and Heike, G. W. Environmental Science & Engineering, Prentice Hall International Inc., New Jersey, 1st edition, 2005.

WEB RESOURCES

- http://www.yourarticlelibrary.com/environment/environmental-studies-meaning-objectives-scope-and-importance-of-environmental-studies/12295/
- http://www.infoplease.com/encyclopedia/science/conservation-natural-resources.html
- www.thebigger.com/biology/resources/what-are-mineral-resources
- https://www.csun.edu/science/scale/4th_grade/.../energy_ecosystem.ppt
- www.cbd.int/2010/biodiversity
- people.umass.edu/envsc101/e101/outH2OPoll.pdf
- http://www.allsubjects4you.com/thermal-pollution.htm
- www.cyen.org/innovaeditor/assets/Solid%20waste%20management.pdf
- www.slideshare.net/.../hazards-of-biomedical-waste-its-management
- www.eolss.net/sample-chapters/c07/e2-14-02-00.pdf

MEC101	ENGINEERING DRAWING (Common to all branches)	L	T	P	C
		1	0	3	2

PREREQUISITE

Basics of Geometrical drawing

COURSE OBJECTIVES

This course aims to introduce the concept of graphic communication, develop the drawing skills for communicating concepts, ideas and designs of engineering products, Demonstrate skills in interpreting, and producing engineering drawings accurately and to give exposure to national standards relating to engineering drawing.

COURSE OUTCOMES

CO1: Familiarize with different drawing equipments and technical standards and Know the purpose, procedures, materials and conventional symbols used. Create and read an engineering drawing using standard views and have ability to Convert pictorial (3-D) drawings to orthographic (2-D) drawings and vice versa
CO2: Understand the projection of points, straight lines and planes and have the ability to convert the practical problems in to projections
CO3: To understand and apply concepts of the projection and section of simple solids.
CO4: Understand and apply the concepts of development of surfaces
CO5: Convert simple 2D orthographic projections into 3D isometric projections

UNIT I INTRODUCTION

Importance of graphics – use of drafting instruments – BIS conventions and specifications – size, layout and folding of drawing sheets – lettering dimensioning and scales - Orthographic principles - free hand sketching in first angle projection from pictorial views.

UNIT II PROJECTION OF POINTS, STRAIGHT LINES AND PLANES

Projection of points, located in all quadrants - projection of straight lines located in the first quadrant, determination of true lengths and true inclinations, location of traces - projection of polygonal surface and circular lamina located in first quadrant inclined to one or both reference planes.

UNIT III PROJECTION AND SECTION OF SOLIDS

Projection of solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method. Section of above solids in simple vertical position by cutting planes inclined to any one of the reference planes, obtaining true shape of section.

UNIT IV DEVELOPMENT OF SURFACES

Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones - development of lateral surfaces of combined solids – prism and cylinder, cylinder and cylinder with axes at right angles with no offset.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTION

Principles of isometric projection – isometric view and projections of simple solids, truncated prisms, pyramids, cylinders and cones. Perspective projection of prisms, pyramids and cylinders by visual ray and vanishing point methods.

TEXT BOOK

1. Bhatt, N.D., Engineering Drawing, Charotar publishing House, New Delhi, 46th Edition,2003.

REFERENCE BOOKS

1. Nataraajan, K.V., A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2006.
2. Shah, M.B., and Rana, B.C., Engineering Drawing, Pearson Education, New Delhi, 2005.
3. Gopalakrishnana, K.R., Engineering Drawing (Vol. I and II), Subhas Publications, 1998.
4. Luzadder and Duff, Fundamentals of Engineering Drawing, Prentice Hall of India Pvt Ltd, New Delhi, XI Edition, 2001.
5. Venugopal, K., Engineering Graphics, New Age International (P) Limited, 2002.

WEB RESOURCES

- http://www.ucvts.tec.nj.us/cms/lib5/NJ03001805/Centricity/Domain/611/Lesson%201%20Intro%20to%20Drawing.pdf
- http://www.sdcpublications.com/pdfsample/978-1-58503-610-3-1.pdf
- http://cifo.in/uploads/9-projection%20f%20st.ln%20MKS.pdf
- http://www.eglive.in/wp-content/uploads/2013/09/Chap_01.pdf
- http://web.iitd.ac.in/~hirani/mel110-part3.pdf
- http://www.uap-bd.edu/ce/Handouts/Shaika/Doc/4.%20Projection%20(Solid%20Geometry).pdf
- https://www.cs.iastate.edu/~cs577/handouts/projection.pdf

CSE103	DATA STRUCTURES	L	T	P	C
		3	0	0	3

PREREQUISITE

Programming Language(CSE102)

COURSE OBJECTIVES

- To learn the systematic way of solving problems.
- To understand the different methods of organizing large amounts of data.
- To introduce the practical and formal aspects of data structures
- To teach methodologies useful for the implementation and empirical evaluation of sorting and searching algorithms.
- To efficiently implement the solutions for specific problems using data structures.

COURSE OUTCOMES

CO1: Understand different data structures and its applications.
CO2: Develop ability to analyze algorithms, to determine algorithm correctness and time efficiency.
CO3: Design data structures for complex computing problems.
CO4: Identify, model, solve and develop code for real life problems like shortest path, network flow, and minimum spanning using graphs
CO5: Evaluate the performance of computing solutions in terms of time and space.

UNIT1 INTRODUCTION

The Role of Algorithms in Computing - Algorithms, Algorithms as a technology - Structures in C – Implementation of structures - Unions in C - Implementation of unions - Structure parameters - Recursive definition and processes: Factorial function - Fibonacci sequence - Recursion in C - Efficiency of recursion.

UNIT II STACKS, QUEUES AND HASHING

Abstract Data Types- Stacks-Stack applications- Balancing symbols, Infix to postfix expression conversion, Postfix Expression evaluation, Function calls- Queues- Linked lists- Hash Tables - Direct-address tables, Hash tables, Hash functions - Open addressing.

UNIT III TREES

Tree Terminologies - Binary tree - Binary tree traversal - Expression tree construction- Binary Search Trees- Querying a binary search tree, Insertion and deletion–AVL trees-rotations, insertion. B-Trees-Definition of-trees- Basic operations on B-trees- insertion and deletion.

UNIT IV SORTING AND SEARCHING

Priority Queues (Heaps) – Model – Simple implementations – Binary Heap-Properties. Sorting- Bubble sort, insertion sort, selection sort, shell sort, Heap sort, quick sort, Radix sort, Merge sort. Searching- Linear search, Binary search.

UNIT V GRAPHS

Graph Terminologies - Representations of Graphs, Breadth-first search, Depth-first search, Topological sort, strongly connected components. Minimum Spanning Trees- Growing a minimum spanning tree - The algorithms of Kruskal and Prim-Shortest paths in directed acyclic graphs, Dijkstra's algorithm ,All Pairs Shortest Paths - The Floyd - Warshall algorithm.

TEXT BOOKS

1. Weiss M. A., Data Structure and Algorithm Analysis in C, Addison Wesley, 3rd Edition, 2006.
2. Cormen T. H., Leiserson C. E., Rivest R. L. and Stein C., Introduction to Algorithms, Prentice Hall India, 3rd Edition, 2009.

REFERENCE BOOKS

1. Aaron Tenenbaum M, Yeedidyah Langsam, Moshe Augenstein J., Data structures using C, Pearson Education, 2rd Edition, 2008
2. Horowitz E., Shan S, Fundamentals of Data Structures, Pittman, 2rd Edition , 2008

WEB RESOURCES

- http://www.cs.cf.ac.uk/Dave/C/
- http://www.lysator.liu.se/c/bwk-tutor.html
- http://www.imada.sdu.dk/~svalle/courses/dm14-2005/mirror/c/
- http://www.eskimo.com/~scs/cclass/notes/top.html
- http://www.le.ac.uk/cc/tutorials/c/
- http://www.desy.de/gna/html/cc/Tutorial/node4.html
- http://www.sqa.org.uk/e-learning/LinkedDS02CD/page_45.htm
- http://www.cs.ucr.edu/cs14/cs14_03win/lecture_slides/lec6/lec6.pdf
- http://en.wikibooks.org/wiki/Data_Structures/Stacks_and_Queues
- http://www.sqa.org.uk/e-learning/LinkedDS02CD/page_23.htm
- http://www.cs.ucr.edu/cs14/cs14_05win/slides/Stacks.pdf
- http://cpp.datastructures.net/textbook/index.html
- http://lcm.csa.iisc.ernet.in/dsa/node21.html
- http://kumarharmuscat.tripod.com/ds/schedule.html
- http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/binarySearchTree.htm

MEC181	WORK SHOP (Common to all branches)	L	T	P	C
		0	0	3	1

PREREQUISITE

Safe handling of tools.

COURSE OBJECTIVES

To develop basic skills in Mechanical Manufacturing Processes like Material Joining, Metal Removal, Metal Forming, etc.

COURSE OUTCOMES

CO1: Making of Joints and understanding their uses in Wooden Products like Table, Frame, etc.
CO2: Metal Joining with simple saw process
CO3: Making of Hollow Channels, Containers using Sheet metal development
CO4: Joining of Metal using Welding process (Knowledge only)
CO5: Knowledge in Casting and Molding of Metals
CO6: Various Machining Techniques like Drilling, Tapping, etc…

UNIT I CARPENTRY

Carpentry tools - practice in marking, sawing, planing and chiseling – making simple joints: lap joint, T-joint, dovetail joint, mortise and tenon joint.

UNIT II FITTING

Fitting tools - practice in marking, filing, punching, hacksawing - fitting to size and drilling - making of simple mating profiles: V, square, dovetail, half round joints.

UNIT III SHEET METAL

Study of press, die and tools - sheet metal layout - development of lateral surfaces -simple exercises: blanking, forming, bending and flanging.

UNIT IV DRILLING

Drilling and tapping in drilling machines

DEMONSTRATION ON:

- Welding operations like butt joint and lap joints in Arc welding
- Foundry operations like mould preparation for split pattern

- Smithy operations like the production of hexagonal bolt
- Preparation of plumbing line sketches – basic pipe connections involving the fittings like valves, taps, couplings, unions, reducers, elbows and other components used in household fittings.

WEB RESOURCES

- http://gyan.fragnel.ac.in/carpentry/car.pdf
- http://www.longwood.edu/assets/chemphys/ch4.pdf
- http://www.egr.msu.edu/~pkwon/me478/sheetforming.pdf
- http://www.sut.ac.th/engineering/Metal/pdf/MetForm/06_Sheet-metal%20forming.pdf
- https://www.metu.edu.tr/~kok/pete110/PETE110_CHAPTER7.pdf

CHY 182	CHEMISTRY LABORATORY (Common to all branches)	L	T	P	C
		0	0	3	1

PREREQUISITE

Engineering Chemistry (CHY106)

COURSE OBJECTIVES

- Develop skills in estimation of a given sample by Chemical and Instrumental analyses.
- Enrich knowledge in determination of various parameters of specific samples

COURSE OUTCOMES

CO1: Analyze the various water quality parameters.
CO2: Investigate the kinetics of a chemical reaction.
CO3: Determine the amount of fluoride and iron by spectrophotometric methods.
CO4: Estimate the amount of acid and base by electrochemical methods.

LIST OF EXPERIMENTS

1. Estimation of hardness of water sample by EDTA method
2. Determination of alkalinity of given water sample
3. Determination of dissolved oxygen in a water sample
4. Determination of rate constant of a reaction (Ester hydrolysis)
5. Estimation of hydrochloric acid by pH titration
6. Estimation of chloride ion in a given water sample
7. Determination of sodium and potassium by flame photometry
8. Estimation of ferrous ion by potentiometric method
9. Estimation of iron by spectrophotometry using 1,10-phenanthroline
10. Determination of strength of mixture of acids using strong base by conductometric titration
11. Estimation of fluoride ion by spectrophotometry
12. Conductometric titration of strong acid with strong base

WEB RESOURCES

- http://www.uobabylon.edu.iq/eprints/publication_2_2630_250.pdf
- http://ggnindia.dronacharya.info/APSDept/Downloads/Labmanuals/Chemistry/Experiment2-18052012.pdf
- http://nitttrc.ac.in/Four%20quadrant/eel/Quadrant%20-%201/exp10_pdf.pdf

- http://www.satyensaha.com/pdf%20files/B.Sc.%201st%20year-Ester-hydrolysis-Practical-SSaha.pdf
- https://www.apsu.edu/sites/apsu.edu/files/chemistry/SP12_1011_Titration_of_Hydrochloric_Acid_with_Sodium_Hydroxide_0.pdf
- http://nitttrc.ac.in/Four%20quadrant/eel/Quadrant%20-%201/exp4_pdf.pdf
- http://www.jbc.org/content/168/2/641.full.pdf
- http://www2.vernier.com/sample_labs/CHEM-A-08-COMP-potentiometric_titration.pdf
- http://www.elmhurst.edu/~ksagarin/honors/lab-iron-S11.pdf
- http://nptel.ac.in/courses/122101001/downloads/lec-38.pdf
- http://chemistry.niser.ac.in/labhandouts/C141%20(6).pdf

CSE182	DATA STRUCTURES LABORATORY (Common to all branches)	L	T	P	C
		0	0	3	1

PREREQUISITE

- Programming Languages(CSE102)
- Data Structures(CSE103)

COURSE OBJECTIVES

- To learn the systematic way of solving problems.
- To understand the different methods of organizing large amounts of data.
- To introduce the practical and formal aspects of data structures
- To teach methodologies useful for the implementation and empirical evaluation of sorting and searching algorithms.
- To efficiently implement the solutions for specific problems using data structures.

COURSE OUTCOMES

CO1: Implement stack, queue and list ADT to manage the memory using static and dynamic allocations
CO2: Apply binary search tree to construct expression trees used in indexing.
CO3: Identify and create code for real life applications of shortest path and Minimum Spanning Tree.
CO4: Develop and compare the graph search algorithms and sorting algorithms.
CO5: Predict appropriate data structure and algorithm for a given contextual problem and Develop the same using C language.

LIST OF EXPERIMENTS

1. Simple programs using structure and recursive method
2. Write a program to implement a list using an array.
3. Write a program to create a singly linked list
4. Write a program to implement a stack using an array.
5. Write a program to implement a stack using a linked list.
6. Write a program to check for balanced parentheses of an expression using array implementation of stack.
7. Write a program to check for balanced parentheses of an expression using linked list implementation of stack.
8. Write a program to evaluate a postfix expression using array implementation of stack.
9. Write a program to evaluate a postfix expression using linked list implementation of stack.
10. Write a program to implement a Queue using an array.

11. Write a program to implement a Queue using linked list.
12. Write a program to implement a binary search tree.
13. Write a program to sort a set of elements using bubble sort ,insertion sort, selection sort, Shell sort, heap sort, and quick sort
14. Write a C program to search a set of elements using linear search and binary search.
15. Write a C program to implement the Dijkstra's Algorithm
16. Write C program for the implementation of minimum panning using Kruskal and Primsalgorithm.

WEB RESOURCES

- www.cs.cf.ac.uk/Dave/C/
- http://www.lysator.liu.se/c/bwk-tutor.html
- http://en.wikibooks.org/wiki/Data_Structures/Introduction
- http://www.eskimo.com/~scs/cclass/notes/top.html
- http://www.desy.de/gna/html/cc/Tutorial/node4.html
- http://www.sqa.org.uk/elearning/LinkedDS02CD/page_45.htm
- http://www.cs.ucr.edu/cs14/cs14_03win/lecture_slides/lec6/lec4.
- http://kumarharmuscat.tripod.com/ds/schedule.html
- http://www.personal.kent.edu/rmuhamma/Algorithms/MyAlgorithms/binarySearchTree.html
- http://interactivepython.org/runestone/static/pythonds/Trees/trees.html
- http://www.geeksforgeeks.org/applications-of-tree-data-structure/
- http://www.cosc.canterbury.ac.nz/mukundan/dsal/ISort.html
- http://maven.smith.edu/~thiebaut/java/sort/
- http://www.cs.pitt.edu/~kirk/cs1501/animations/Sort2.html
- http://www.brpreiss.com/books/opus4/html/page557.html
- http://www.algolist.net/Algorithms/Graph_algorithms/Undirected/Depth_first_search
- http://www.brpreiss.com/books/opus4/html/page535.html

SEMESTER III

MAT202	MATHEMATICS III	L	T	P	C
		3	0	0	3

PREREQUISITES

- Mathematics I(MAT103)
- Mathematics II(MAT104)

COURSE OBJECTIVES

To demonstrate how differential equations can be useful in solving many types of problems - in particular, to show how to translate problems into the language of differential equations, to find or numerically approximate the solution of the resulting differential equation subject to given conditions, and to interpret the solutions obtained.

- To study Fourier series and solve boundary values problems. .
- To understand Fourier Transform, the convergence issues, relation to Fourier Series
- To understand the properties of Fourier Transform, use these to derive Fourier Transforms for related signals
- To know the various definitions of the Fourier Transforms, sufficient conditions for its existence how to compute inverse Fourier Transform.
- To know the various rules (convolution Theorem etc) for the Fourier and z-transform and how to use them.

COURSE OUTCOMES

CO1: Evaluate integrals and solve boundary value problems using Laplace transfoms.
CO2: Solve standard type of first order partial differential equations and higher order partial differential equations with constant coefficients.
CO3: Apply the concept of Fourier series to find the sum of certain series.
CO4: Solve difference equations using Z-transform.
CO5: Find Fourier, Sine and Cosine transforms of given functions.

UNIT I PARTIAL DIFFERENTIAL EQUATIONS

Formation of PDE - Solution of standard types of first order PDE - Lagrange's linear equation - Linear PDE of second and higher order with constant coefficients

UNIT II LAPLACE TRANSFORM

Definition of Laplace transform - Linearity property - condition for existence of Laplace transform - First and second shifting properties - Laplace transform of derivatives and integrals - Unit step functions - Diarc delta-function - Differentiation and integration of transforms - Convolution theorem - Inversion - Periodic functions - Evaluation of integrals by Laplace transform - Solution of boundary value problems

UNIT III FOURIER SERIES

Dirichlet's conditions - General Fourier series - odd and even functions - Half range sine and cosine series - complex form of Fourier series - Parseval's identity - Harmonic analysis

UNIT IV Z – TRANSFORM

Z-transform - elementary properties - Inverse Z-transform –Initial and Final value Theorems - Convolution theorem - formation of difference equation - Solution of difference equation using Z-transform.

UNIT V FOURIER TRANSFORM

Fourier Integral formula - Fourier Transform - Fourier sine and cosine transforms - Linearity, Scaling, frequency shifting and time shifting properties - Self reciprocity of Fourier Transform - Convolution theorem – Parseval's Identity.

TEXT BOOKS

1. Grewal, B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 43th Edition, 2015
2. Arumugam, S., Thangapandi Isaac, A., Somasundaram, A., Engineering Mathematics Volume II, Scitech Publications (India) Pvt. Ltd., Chennai, 1st Edn., Reprint 2000, 1999

REFERENCE BOOKS

1. Kreyszig, E., Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore, 8th Edition., 2001
2. Venkataraman, M. K., Engineering Mathematics –III A, The National Publishing Company, Chennai, 11th Edition., Reprint 2002, 1998
3. Venkataraman, M. K., Engineering Mathematics - III B, The National Publishing Company, Chennai, 13th Edition., Reprint 1999, 1998

WEB RESOURCES

- http://tutorial.math.lamar.edu/Classes/DE/IntroPDE.aspx
- http://www.chennaituition.com/pde.php
- https://www.classle.net/book/lagranges-linear-equation
- http://mathworld.wolfram.com/LaplaceTransform.html
- https://www.khanacademy.org/math/differential-equations/laplace-transform
- http://www.sosmath.com/fourier/fourier1/fourier1.html
- http://www.fourier-series.com/
- http://lpsa.swarthmore.edu/LaplaceZTable/LaplaceZFuncTable.html
- http://www.facstaff.bucknell.edu/mastascu/econtrolhtml/sampled/Sampled1.html
- http://www.thefouriertransform.com/

CSE207	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITES

- Programming language(CSE102)
- Data Structures(CSE103)

COURSE OBJECTIVES

This course aims to introduce the students with the Operating System concepts, Process Concept. Students can apply the concepts of Virtual Memory Management and File systems. Students can evaluate different Protection and Security mechanisms for operating systems. Students can design and implement CPU Scheduling algorithms, Page replacement algorithms, Memory Allocation algorithms and Disk Scheduling algorithms.

COURSE OUTCOMES

CO1: Understand Operating System Structure, Operations and Services
CO2: Understand the Process Concept, Multithreaded Programming, Process Scheduling and Synchronization
CO3: Apply the Concepts of Virtual Memory Management and File Systems
CO4: Analyze the Secondary Storage and I/O Systems
CO5: Evaluate the different Protection and Security Mechanisms for Operating System
CO6: Design and implement CPU Scheduling algorithms, Page Replacement Algorithms, Memory Allocation Algorithms, Disk Scheduling Algorithms

UNIT I

Introduction-OS Concepts – Evolution of OS, OS Structures- Kernel, Shell, General Structure of MSDOS, Windows 2000, Linux. Introduction- UNIX and ANSI Standards: The ANSI C Standard, The ANSI/ISO C++ Standards, Difference between ANSI C and C++, The POSIX Standards.

UNIT II

Process Management-Process & Threads – Process States - Process Control Block – Process Scheduling – Operations on Processes, Threads, CPU Scheduler – Preemptive and Non-Preemptive; Dispatcher, Scheduling Criteria, Scheduling Algorithms – Process Management in UNIX.

UNIT III

UNIX Processes: The Environment of a UNIX Process: Introduction, main function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions, UNIX Kernel Support for Processes. Process Control

UNIT IV

Process Synchronization & Inter process Communication-Concurrent Processes, Co-operating Processes, Precedence Graph, Hierarchy of Processes, Critical Section Problem – Two process solution, Synchronization Hardware, Semaphores – Deadlock- detection, handling, prevention, avoidance, recovery, Starvation, Critical Regions, Monitors, Inter process communication.

UNIT V

Memory Management-Objectives and functions, Simple Resident Monitor Program (No design), Overlays – Swapping; Schemes – Paging – Simple, Multi-level Paging; Internal and External Fragmentation; Virtual Memory Concept, Demand Paging - Page Interrupt Fault, Page Replacement Algorithms; Segmentation – Simple, Multi-level, Segmentation with Paging, Memory Management in UNIX.

TEXT BOOKS

1. Operating Systems Concepts – Silberschatz, Galvin, Wiley Publications 9th Edition 2014
2. Modern Operating Systems - Andrew S. Tenenbaum, Pearson Education Asia / PHI 3rd Edition 2009
3. UNIX System Programming Using C++,by Terrence Chan: Prentice Hall India, 1999.
4. Advanced Programming in UNIX Environment, by W. Richard Stevens: 2nd Ed, Pearson Education, 2005.

REFERENCE BOOKS

Operating Systems- William Stallings, Internals and Design Principles", 7th Edition, Prentice Hall, 2011

WEB RESOURCES

- http://informatics.indiana.edu/rocha/i101/pdfs/os_intro.pdf
- http://www.ics.uci.edu/~ics143/lectures/oslecture1.pdf
- http://codex.cs.yale.edu/avi/os-book/OS8/os8c/slide-dir/PDF-dir/ch2.pdf
- http://www.iicsn.org/Staff/TeacherSites/GayMark/MartinezADocuments/OSandUI.pdf
- http://www.cs.princeton.edu/courses/archive/spr03/cs217/lectures/OS.pdf
- http://www.cs.kent.edu/~farrell/osf03/lectures/ch4-2.pdf
- http://www.dauniv.ac.in/downloads/EmbsysRevEd_PPTs/Chap_7Lesson12EmsysNewIPCpdf

- http://www.cs.gmu.edu/~setia/cs571-F02/slides/lec6a.pdf
- http://www.cs.rutgers.edu/~pxk/416/notes/content/15-net-intro-slides.pdf
- http://web.cs.wpi.edu/~cs3013/c07/lectures/Section04-Threads.pdf
- http://horstmann.com/corejava/cj7v2ch1.pdf
- http://cs.gmu.edu/~menasce/cs471/slides/ch6.pdf
- http://troydhanson.github.io/virtual_memory.pdf
- http://cseweb.ucsd.edu/classes/fa05/cse120/lectures/120-l12.pdf
- https://www.usenix.org/legacy/event/usenix06/tech/full_papers/shrira/shrira.pdf
- http://pages.cs.wisc.edu/~mattmcc/cs537/notes/Replacement.pdf
- http://www.cs.virginia.edu/~son/cs414.f05/lec11.slides.pdf
- http://web.cs.wpi.edu/~cs3013/c07/lectures/Section12-IO_Systems.pdf
- http://www.cs.columbia.edu/~junfeng/13fa-w4118/lectures/l21-raid.pdf
- http://www.wiley.com/college/silberschatz6e/0471417432/slides/pdf2/mod13.2.pdf

CSE209	ALGORITHMS AND COMPLEXITY	L	T	P	C
		3	1	0	4

PREREQUISITES

- Data Structures (CSE103)
- Mathematics I (MAT103)
- Mathematics II (MAT104)

COURSE OBJECTIVES

The goal of this course is to develop the appropriate background, foundation and experience for logical study in Computer Science. Students will develop the necessary skills from both a theoretical perspective as well as applying their knowledge on various problem sets. Particularly, the course objectives: Develop mathematical skills for algorithm design, analysis, evaluation and computational cost; Develop the skills to design and implement efficient programming solutions to various problems; Develop data structure techniques for various aspects of programming; Develop application specific knowledge of dynamic programming, graphs, hash tables, sorting, searching and tree structures. The approach of the course is mathematical such as deriving formulae for the expected running time of algorithms. Upon the successful completion of this class, students will be able to:

- Analyze the running time and space complexity of algorithms.
- Use the big Oh notation. (e.g., $O(n \lg n)$.)
- Describe how to prove the correctness of an algorithm.
- Use the mathematical techniques required to prove the time complexity of a program/algorithm (e.g., limits and sums of series.)
- Apply algorithmic complexity principles in the design of programs.
- Design divide and conquer and dynamic programming algorithms.

COURSE OUTCOMES

CO1 : Understand asymptotic notations to Analyze the performance of algorithms

CO2 : Identify the differences in design techniques and apply to solve optimization problems.

CO3: Apply algorithms for performing operations on graphs and trees.

CO4: Formulate novel problems, by choosing the appropriate algorithm design technique for their solution and justify their selection

CO5: Evaluate deterministic and nondeterministic algorithms to solve complex Problems

UNIT I INTRODUCTION TO ALGORITHMS AND ANALYSIS

Introduction – Fundamentals of Algorithmic Solving – Important Problem types – fundamentals of the Analysis Framework –Asymptotic Notations and Basic Efficiency Classes-. Mathematical Analysis of Non-recursive Algorithm -Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Algorithm Visualization.

UNIT II ANALYSIS OF SORTING AND SEARCHING ALGORITHMS

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort - Heaps and Heap sort

UNIT III TRESS AND GRAPH ALGORITHMS

Binary Search – Binary tree- Traversal and Related Properties- Decrease and Conquer – Insertion Sort Depth first Search and Breadth First Search-.Transform and conquer – Presorting – Balanced Search trees –AVL Trees – 2-3 Trees

UNIT IV DYNAMIC PROGAMMING AND GREEDY TECHNIQUES

Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman tree

UNIT V BACK TRACKING

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

TEXT BOOK

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 3rd Edition 2012.

REFERENCE BOOKS

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 3rd Edition ,2012
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 3rd Edition, 1999
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 3rd Edition 2011

WEB RESOURCES

- http://www.cs.brynmawr.edu/Courses/cs206/spring2009/
- http://www.artsandscience.utoronto.ca/ofr/calendar/crs_csc.htm
- http://www.cs.uakron.edu/~margush/210Labs/C_Labs/index.html
- http://www.cs.auckland.ac.nz/compsci220s2c/Algorithms and Data Structures
- http://www.ece.uwaterloo.ca/Undergrad/yellowbook/ece250.html
- http://www.cosmolearning.com/computer-science/courses/cs-61b-data-structures/
- http://www.cs.umn.edu/academics/undergraduate/class_desc/csci4041.php

CSE206	OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	1	0	4

PREREQUISITE

Programming Languages(CSE102)

COURSE OBJECTIVES

- To get a clear understanding of object-oriented concepts.
- To understand object oriented programming through C++.
- To demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.
- To develop the problem solving skills by applying object-oriented concepts of the language C++.
- To arrange the concrete and abstract classes in an appropriate hierarchy

COURSE OUTCOMES

CO1: Understand the concepts of Object Oriented Programming.
CO2: Select and use objects from standard template libraries
CO3: Examine and design reusable components.
CO4: Assemble an efficient code for engineering problems.
CO5: Assess applications with fault tolerant capability.

UNIT I INTRODUCTION

Introduction to OOP – Basic Concepts of OOP – Applications of OOP- Introduction to C++ - Introduction to C++ - C++ Input and Output – declarations in C++ - Creating New data types in C++ -Namespaces- function Prototypes – Inline functions – Reference Parameters – Const Qualifier – Dynamic memory allocation – default arguments – Unary Scope resolution operator

UNIT II CLASSES, CONSTRUCTORS AND FRIEND CLASS

Introduction – Comparing class with Structure – Class Scope – Accessing Members of a class – Constructor – Destructor – pasting and returning objects from functions-Const objects – Const member functions – Friend class – Friend function – This pointer – Static members

UNIT III OVERLOADING & INHERITANCE

Operator Overloading – Fundamentals – Restrictions – Overloading stream – Insertion and stream extraction operators – Overloading unary & binary operators – Converting between types – Overloading ++ and --. Inheritance – Introduction – Protected members – Casting base _class pointers to derived _class pointers – Overloading Base class members in a Derived class – Public, Protocols and Private inheritance – Direct base classes and Indirect Base Classes – Using Constructors and Destructors in Derived classes – Implicit Derived class object to base class object conversion.

UNIT IV VIRTUAL FUNCTIONS, STREAMS AND FILES

Introduction – Type fields and switch statements – Virtual functions – Abstract base classes and concrete classes – Polymorphism – Dynamic binding – Virtual destructors. C++ Stream I/O: Streams – Stream Input – Stream Output – Unformatted I/O – Stream manipulators – Stream format states – Stream error – States. Files: File Operations, File pointers, Error Handling during file Operations.

UNIT V TEMPLATES & EXCEPTION HANDLING

Templates – Function templates – Class templates – Overloading template functions – Class template and non type parameters –Templates with Multiple parameters. container classes and Iterators. Exception Handling - When exception handling, Basic of C++ exception, Catching an exception, re throwing an exception, exception specifications.

TEXT BOOK

1. Goran Svenk , Object-Oriented Programming Using C++ for Engineering and Technology, Thomson Delmer Learning, 2003

REFERENCE BOOKS

1. D.S.Malik, C++ Programming Language, CENGAGE Learning, 2009.
2. Bjarne Struoustrup, The C++ Programming Language, Addison Wesley, 2000.
3. John R.Hubbard, Programming with C++, Schaums outline series, TMH 2003.
4. Deitel H.M., and Deitel P.J., How to program C++, PHI 2003.

WEB RESOURCES

- http://www.cplusplus.com/doc/tutorial/variables/
- http://www.cplusplus.com/doc/tutorial/other_data_types/
- http://en.wikipedia.org/wiki/Function_prototype
- http://www.parashift.com/c++-faq-lite/inline-functions.html
- http://www.learncpp.com/cpp-tutorial/77-default-parameters/
- http://knol.google.com/k/thiyagaraaj-m-p/scope-resolution-operator-in-c/1lfp8o9xxpx13/148
- http://www.yolinux.com/TUTORIALS/Cpp-DynamicMemory.html
- http://www.fredosaurus.com/notes-cpp/functions/refparams.html
- http://fog.ccsf.cc.ca.us/~arule/110b/classes2.pdf
- http://www.exforsys.com/tutorials/c-plus-plus/how-to-access-class-members.html
- http://www.fredosaurus.com/notes-cpp/oop-condestructors/constructors.html
- http://www.cprogramming.com/tutorial/constructor_destructor_ordering.html

ECE202	DIGITAL ELECTRONICS	L	T	P	C
		3	1	0	4

PREREQUISITE

Knowledge in the basic concepts of electronics, number systems & logic gates.

COURSE OBJECTIVES

- Digital Electronics is the study of electronic circuits that are used to process and control digital signals. In contrast to analog electronics, where information is represented by a continuously varying voltage, digital signals are represented by two discreet voltages or logic levels.
- This distinction allows for greater signal speed and storage capabilities and has revolutionized the world electronics. Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, etc.
- The major focus of this course is to expose students to the design process of combinational and sequential logic design, teamwork, communication methods, engineering standards, and technical documentation.

COURSE OUTCOMES

CO1: Understand numerical and character representations in digital logic including ASCII, sign magnitude, 2's complement, and floating point arithmetic.
CO2: Design combinational and sequential digital circuits to meet a given specification and to represent logic functions in multiple forms.
CO3: Apply and interpret function tables and truth tables for simple sequential devices including flip-flops, counters and registers.
CO4: Explain the concept of memories and programmable logic devices.
CO5: Demonstrate the working of flip-flops, the basics of Programmable Logic Devices and memory types

UNIT I NUMBER SYSTEMS AND BOOLEAN ALGEBRA

Review of binary, octal, hexadecimal number systems - Representation of signed numbers, floating point numbers - BCD – ASCII – EBCDIC – Excess 3 codes – gray code - Code Converters - Error detecting and correcting codes - Boolean algebra – Postulates and theorems of Boolean algebra - Canonical forms - Simplification of logic functions using K–map - Quine McClusky method

UNIT II COMBINATINAL LOGIC DESIGN

Logic gates - Half adder, half subtractor - Full adder, full subtractor - Parallel binary adder/subtractor - Parity generator/checker – Comparator-Implementation of combinational logic Functions - Encoders and decoders - Multiplexers and Demultiplexers - Implementation of logical functions using multiplexers

UNIT III COUNTERS AND REGISTERS

RS, JK, JK Master-Slave - D, T flip – flops - Level triggering and edge triggering - Excitation tables – synchronous counters - Modulus counters –Johnson counter – ring counter – timing waveforms - Counter applications – registers – shift register – universal shift register - Sequential Logic Design – Basic models of sequential machines - State table – State diagram -State reduction through partitioning - Implementation of sequential Circuits

UNIT IV ASYNCHRONOUS SEUENTIAL LOGIC AND MEMORY DEVICES

Asynchronous Sequential Logic Design - Classification of memories - RAM organization – Write operation –Read operation - memory cycle – Timing wave forms - memory decoding – memory expansion - Static RAM Cell – Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell - ROM organization - PROM –EPROM – EEPROM – EAPROM

UNIT V PROGRAMMABLE LOGIC DEVICES

Semi custom design – Introduction to PLDs – PAL – PLA -FPGA – Architecture of PLDs – PAL22V10, PLS100/101 - Implementation of digital functions - Logic families-RTL,DTL -TTL families, Schottky, clamped TTL - Emitter Coupled Logic (ECL), Integrated Injection Logic (IIL) - MOS inverters – CMOS inverters - comparison of performance of various logic families

TEXT BOOK

1. A.Anand Kumar, Fundamentals of Digital Circuits, PHI learning, Second edition.

REFERENCE BOOKS

1. M.Morris Mano, Digital Design, Pearson Education, New Delhi, 3rd Edition, 2003.
2. John.M.Yarbrough, Digital Logic Applications and Design, Cengage Learning, 6th reprint 2009.
3. Donald P.Leach, Albert Paul Malvino, Digital Principles and Applications, Tata Mc-Graw-Hill, 5th Edition, 2003.
4. John F.Wakerly, Digital Design-Principles and Practices, Pearson Education, 3rd Edition, 2003.

WEB RESOURCES

- memo.cgu.edu.tw/chingyuan/index.files/logic/Chapter10.ppt
- courses.cs.washington.edu/courses/cse370/.../04-LogicGatesCanonical.ppt
- www.iitg.ernet.in/asahu/cs221/Lects/Lec03.pdf
- wps.pearsoned.co.uk/wps/media/objects/1244/1273900/Chap09.pp
- www.comp.nus.edu.sg/~cs1104/oldlect/cs1104-13.ppt

- psut.edu.jo/sites/kahhaleh/Logic.../Chapter_6_Registers_&_Counters.ppt
- driyad.ucoz.net/Courses/CPE231/Slides/07_Registers_and_Counters.ppt
- www.cs.siu.edu/~hexmoor/classes/CS315-S09/Chapter7-Counters.ppt
  fyi.uwex.edu/agrability/files/2010/02/YorkPPT.ppt
- schools.tdsb.on.ca/rhking/.../LessonStorageDevices_short%20ver.ppt
- www1.mans.edu.eg/facscim/english/courses/Math/Hamdy/lect4,5.ppt
- www.cs.uwec.edu/~ernstdj/courses/cs278/.../cs278_implementation.ppt
- www.eeng.dcu.ie/~ee201/programmable_logic_Devices.ppt
- www.comp.nus.edu.sg/~cs1104/oldlect/cs1104-10.ppt
- www2.ece.ohio-state.edu/.../Lect%2012%20-%20Combinational%20Logic.ppt
- www.csie.nuk.edu.tw/~stpan/.../101_2_digitalSystem_Chap_3_part_2.ppt

ECE291	DIGITAL LOGIC AND DESIGN LABORATORY	L	T	P	C
		0	0	3	2

PREREQUISITES

- Basic Electrical and Electronics Engineering(EEE101)
- Switching Theory and digital design(EEE254)

COURSE OBJECTIVES

- To impart the concepts of digital electronics practically and train students with all the equipment's which will help in improving the basic knowledge.
- To analyze and design combinational logic and sequential logic circuits.

COURSE OUTCOMES

CO1: An ability to operate laboratory equipment.
CO2: An ability to construct, analyzes, and troubleshoots simple combinational and sequential circuits.
CO3: An ability to design and troubleshoot a simple state machine.
CO4: An ability to measure and record the experimental data, analyze the results, and prepare a formal laboratory report.

LIST OF EXPERIMENTS

1. Combinational Logic Design.
2. Real World Circuit Behavior.
3. Implementing Combinational Circuits.
4. Segment Decoder, Redux.
5. Structural VHDL and Iterative Circuits.
6. Basic logic building blocks, muxes, encoders, decoders,
7. Registers, counters, latches.
8. Synchronous finite state machine design.
9. Memory devices and microprocessor busses
10. Mixed signal design, analog to digital converters.

WEB RESOURCES

- http://www.electronics-tutorials.ws/combination/comb_1.html
- http://www.ni.com/white-paper/5676/en/
- http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/multiplexer/index.html

- http://www.mrc.uidaho.edu/mrc/people/jff/240/241/labs/vhdl_7seg.htm
- http://www.mrc.uidaho.edu/mrc/people/jff/240/241/labs/iterative.htm
- http://www.tutorialspoint.com/computer_logical_organization/combinational_circuits.htm
- http://www.electronics-tutorials.ws/sequential/seq_3.html
- http://www.allaboutcircuits.com/vol_4/chpt_11/5.html
- http://www.slideshare.net/RajatMore/types-of-memories-and-storage-device-and-computer
- http://www.maximintegrated.com/en/products/analog/data-converters/analog-to-digital-converters/MAX11300.html

CSE284	OPEARATING SYSTEMS LABORATORY	L	T	P	C
		0	0	3	2

PREREQUISITE

Programming Languages Laboratory(CSE181)

COURSE OBJECTIVES

- To gain a complete knowledge about UNIX commands and shell programming.
- To obtain an overview of distributed operating systems and the related topics of inter process communication models (message passing, remote procedure call, distributed object computing, and shared memory)
- To know the concepts of process management and synchronization
- To know the concept of memory management such as best fit, worst fit and so on

COURSE OUTCOMES

CO1: The student will be familiar with the language and terms of the UNIX/LINUX operating system

CO2: The student will be able to delineate the commands and procedures needed to carry out basic operations on the UNIX/LINUX operating system

CO3: Students can design, develop and implement a software solution to a given problem which employs operating systems tools

LIST OF EXPERIMENTS

1. Study of basic Commands in Linux Operating System
2. Shell programming using control statements
3. Shell programming using loops, patterns, expansions and substitutions
4. Write programs using the following system calls (fork, exec, getpid, exit, wait, close, stat, opendir, readdir).
5. Write programs using the I/O system calls (open, read, write, etc).
6. Simulation of Linux commands.
7. Implementation of CPU Scheduling Algorithms(FCFS, SJF, RR, Priorty).
8. Implementation of Page Replacement Algorithms (LRU, OPT, FIFO).
9. Implementation of memory allocation algorithms (First Fit, Best Fit, Worst Fit)
10. Implement the Producer – Consumer problem using semaphores.
11. Simulation of Shared Memory Concept.
12. Implementation of bankers Algorithm.
13. Implementation Disk Scheduling Algorithms

WEB RESOURCES

- http://www.ee.surrey.ac.uk/Teaching/Unix/unixintro.html
- https://kb.iu.edu/d/afsk
- http://www.ch.embnet.org/CoursEMBnet/Pages05/slides/Unix05.pdf
- http://www.ee.surrey.ac.uk/Teaching/Unix/
- http://www.comptechdoc.org/os/linux/usersguide/linux_ugshellpro.html
- http://www.freeos.com/guides/lsst/
- http://searchenterpriselinux.techtarget.com/definition/shell-script
- http://www.cs.jhu.edu/~yairamir/cs418/os4/sld025.htm
- http://labe.felk.cvut.cz/~stepan/AE3B33OSD/OSD-Lecture-5.pdf
- http://scanftree.com/programs/c/c-program-for-bankers-algorithm/
- http://2k8618.blogspot.in/2011/02/producer-consumer-problem-os-lab.html
- http://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/5_CPU_Scheduling.html
- http://www.tutorialspoint.com/operating_system/os_process_sheduling.htm
- http://web.cs.wpi.edu/~cs3013/c07/lectures/Section05-Scheduling.pdf
- http://www.cs.utexas.edu/users/witchel/372/lectures/16.PageReplacementAlgos.pdf
- http://www.informit.com/articles/article.aspx?p=25260&seqNum=7
- http://www.liralab.it/teaching/OS/files_current/class_6_10.pdf

CSE285	OBJECT ORIENTED PROGRAMMING LABORATORY	L	T	P	C
		0	0	3	2

PREREQUISITE

Programming Languages Lab(CSE181)

COURSE OBJECTIVES

- To familiarize the students with various data types, control structures, storage classes & various I/O statements of C & C++.
- To introduce the students with the features of Object Oriented Programming such as classes, objects, data abstraction.
- To introduce students the syntax to create inline and friend functions.
- To explain the various concepts of overloading such as function overloading, operator overloading
- To introduce the levels of inheritance & ambiguity problems in them.
- To familiarize the students with polymorphism & their implementation in C++.

COURSE OUTCOMES

CO1: Capable of explaining procedure as well as object oriented programming concepts &their differences.
CO2: Able to implement inline and friend function very well.
CO3: Familiar with how to make programs using function overloading & operator overloading.
CO4: Get the capability to implement the different types of inheritance & done problems related to them.
CO5: Implement various types of polymorphism & the use of pointers for virtual functions.

LIST OF EXPERIMENTS

1. Simple C++ programs.
2. Programs using Functions and classes.
3. Friend Functions
4. Function Overloading
5. Operator Overloading
6. Simple & Multiple Inheritance
7. Multilevel & Hybrid Inheritance
8. Virtual Functions
9. Polymorphism
10. File Handling
11. Templates
12. Exception Handling

WEB RESOURCES

- http://fahad-cprogramming.blogspot.in/p/c-simple-examples.html
- http://www.cpp.thiyagaraaj.com/c-programs/c-c-class-example-programs/simple-class-example-program-in-c
- http://www.cplusplus.com/doc/tutorial/program_structure/
- http://www.programiz.com/cpp-programming/friend-function-class
- http://www.codingunit.com/cplusplus-tutorial-friend-function-and-friend-class
- http://www.tutorialspoint.com/cplusplus/cpp_overloading.htm
- http://www.studytonight.com/cpp/function-overloading.php
- http://www.programmingsimplified.com/cpp/source-code/cpp-function-overloading-example-program
- http://www.cprogramming.com/tutorial/operator_overloading.html
- http://courses.cms.caltech.edu/cs11/material/cpp/donnie/cpp-ops.html
- http://www.cprogramming.com/tutorial/multiple_inheritance.html
- http://www.learncpp.com/cpp-tutorial/117-multiple-inheritance/
- http://electrofriends.com/source-codes/software-programs/cpp-programs/cpp-advanced programs/c-program-to-illustrate-multilevel-inheritance/
- https://www.hscripts.com/tutorials/cpp/hybrid-inheritance.php
- http://programmingcandcpp.blogspot.in/2013/08/c-program-to-implement-hybrid.html
- http://forgetcode.com/Cpp/358-Hybrid-Inheritance
- http://programmingvilla.com/c-3/920-2/c-hybrid-inheritance/
- http://www.programiz.com/cpp-programming/virtual-functions
- http://www.cpp.thiyagaraaj.com/c-programs/simple-program-for-virtual-functions-using-c-programming
- http://www.tutorialspoint.com/cplusplus/cpp_polymorphism.htm
- http://www.cplusplus.com/doc/tutorial/polymorphism/
- http://www.codingunit.com/cplusplus-tutorial-polymorphism-and-abstract-base-class
- https://www.cs.bu.edu/teaching/cpp/polymorphism/intro/
- http://www.programsformca.com/2012/03/c-program-file-handling-readwrite.html
- http://www.dailyfreecode.com/code/file-operation-180.aspx
- http://www.tutorialspoint.com/cplusplus/cpp_files_streams.htm

SEMESTER IV

MAT222	**MATHEMATICS IV**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

PREREQUISITE

Mathematics III(MAT202)

COURSE OBJECTIVES

- To provide the students with a fundamental understanding of probabilistic methods in engineering.
- To acquire skills in handling situations involving one or more random variables.
- To introduce the notion of sampling distributions and make students to acquire knowledge of statistical techniques useful in various engineering applications.
- To familiarize the students with statistical methods designed to contribute to the process of making scientific judgments in the face of uncertainty and variation.

COURSE OUTCOMES

CO1: Understand addition theorem, the multiplication theorem and other important theorems on probability and their use in solving problems in various diversified situations.
CO2: Explain and illustrate the concept of a random variable and its probability distributions.
CO3: Demonstrate the concept of joint, marginal and conditional probability distribution involving two random variables.
CO4: Apply probability distributions to a variety of problems in various diversified fields.
CO5: Understand the concept of testing of hypothesis and Analysis of Variance.

UNIT I PROBABILITY AND RANDOM VARIABLES

Axioms of probability - Conditional probability - Total probability - Bayes theorem - Random variable - Probability mass function - Probability density functions - Properties- Mathematical expectation - Moments - Moment generating functions and their properties

UNIT II STANDARD DISTRIBUTIONS

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

UNIT III TWO DIMENSIONAL RANDOM VARIABLES

Joint distributions - Marginal and conditional distributions –Independent random variables -

Covariance - Correlation and Regression - Transformation of random variables - Central limit theorem.

UNIT IV ESTIMATION AND TESTING OF HYPOTHESIS

Theory of estimation-Properties of a good estimator-Methods of estimation(MLE)-Confidence interval-Testing of hypothesis for mean, variance, proportions and differences using Normal, t, Chi-square and F distributions-Goodness of fit.

UNIT V DESIGN OF EXPERIMENTS

Analysis of variance – One way classification – CRD - Two – way classification – RBD - Latin square.

TEXT BOOKS

1. Gupta, S.C, and Kapur, J.N., Fundamentals of Mathematical Statistics, Sultan Chand, New Delhi, 11th Edn., 2006.
2. Ross, S., A first Course in Probability, Pearson Education, Delhi, 5th Edn., 2002.

REFERENCE BOOKS

1. Johnson. R. A., Miller & Freund's Probability and Statistics for Engineers, Prentice Hall of India, New Delhi, 7th Edition., 2005.
2. Kapur,J.N., Saxena,H.C., Mathematical statistics,S.CHAND,New Delhi,2009.

WEB RESOURCES

- http://www.mathsisfun.com/data/random-variables.html
- http://ocw.mit.edu/courses/mathematics/18-440-probability-and-random-variables-spring-2011/
- http://stattrek.com/probability-distributions/standard-normal.aspx
- http://www.mathsisfun.com/data/standard-normal-distribution-table.html
- http://onlinestatbook.com/2/normal_distribution/standard_normal.html
- http://pages.stern.nyu.edu/~adamodar/New_Home_Page/StatFile/statdistns.htm
- https://onlinecourses.science.psu.edu/stat414/node/107
- http://www.thelearningpoint.net/home/mathematics/probability---part-3---joint-probability-bivariate-normal-distributions-functions-of-random-variable-transformation-of-random-vectors
- http://data.princeton.edu/wws509/notes/c3s2.html
- http://rimarcik.com/en/navigator/hypotezy.html

CSE210	COMPUTER ARCHITECTURE AND ORGANIZATION	L	T	P	C
		3	0	0	3

PREREQUISITES

- Digital Electronics (ECE202)
- Operating system (CSE207)

COURSE OBJECTIVES

- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic UNIT Including the algorithms & implementation of fixed- point and floating-point addition, subtraction, multiplication &division.
- To learn about single bus, multiple bus organization and pipe lining concepts
- To study the different ways of communicating with I/O devices and standard I/O interfaces.
- To study the hierarchical memory system including cache memories and virtual memory

COURSE OUTCOMES

CO1: Understand the functional units of a computers, bus structures and addressing modes

CO2: Apply the knowledge of algorithms to solve arithmetic problems.

CO3: Learn about single bus, multiple bus organization and pipelining concepts

CO4: Analyze RAM, ROM, Cache memory and virtual memory concepts

CO5: Evaluate the various I/O interfaces

UNIT I BASIC STRUCTURE OF COMPUTERS

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

UNIT II ARITHMETIC UNIT

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

UNIT III BASIC PROCESSING UNIT

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control - Pipelining – Basic concepts – Data hazards –

Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

UNIT IV MEMORY SYSTEM

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory - Memory Management requirements – Secondary storage.

UNIT V I/O ORGANIZATION

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

TEXT BOOK

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw-Hill, 2008, 5th Edition.

REFERENCE BOOKS

1. William Stallings, Computer Organization and Architecture – Designing for Performance, Pearson Education, 8th Edition, 2009.
2. David A.Patterson and John L.Hennessy, Computer Organization and Design: The hardware software interface, Morgan Kaufmann, 3rd Edition, , 2007.
3. John P.Hayes, Computer Architecture and Organization, McGraw Hill, 3rd Edition, 1998.

WEB RESOURCES

- http://www.cs.mcgill.ca/~mhawke1/cs208/02a-ComputerStructureNotes.pdf
- http://www.stat.auckland.ac.nz/~dscott/782/Computers.pdf
- www-csag.ucsd.edu/teaching/cse141-w00/lectures/Introduction.pdf –
- www.cise.ufl.edu/~prabhat/Teaching/cda5155-su09/lecture.html
- www.ecl.incheon.ac.kr/courses/ca6/ca00.syllabus.pdf
- www.site.uottawa.ca/~mbolic/ceg4131/Ch_14_superscalar.ppt
- www.ece.eng.wayne.edu/~gchen/ece4680/lecture-notes/lecture-notes.html
- www.cs.berkeley.edu/~pattrsn/252S01/index.html/140.113.88.21/course/Computer/handout/Ch0.pdf
- www.cs.utwente.nl/~co/co213030/sheets/col10.pdf
- www.ece.eng.wayne.edu/~gchen/ece4680/lecture-notes/lecture-notes.html -
- www.cs.utwente.nl/~co/co213030/sheets/col10.pdf
- www.cs.utexas.edu/~dburger/teaching/cs352- s07/lectures_07/Lecture_1.pdf

CSE211	MICROPROCESSOR AND MICROCONTROLLER	L	T	P	C
		3	0	0	3

PREREQUISITES

- **Digital Electronics (ECE202)**
- **Programming Language (CSE102)**

COURSE OBJECTIVES

To study the architecture and Instruction set of 8086
To study the architecture and its interfacing technique
To study Embedded C Programming practices using LPC2148

COURSE OUTCOMES

CO1: Identify the basic element and functions of microprocessor
CO2: Describe the architecture of microprocessor and its peripheral devices
CO3: Demonstrate fundamental understanding on the operation between the Microcontroller and its interfacing devices
CO4: Apply the programming techniques in developing the Embedded C program for Microcontroller applications
CO5: Specify, design, implement, and debug simple Microcontroller-based applications using the LPC2148

UNIT I 8086 Architecture

Intel 8086 Microprocessor - Architecture - Signals- Instruction Set-Addressing Modes, assembler Directives, Assembly Language Programming, Procedures, Macros, Interrupts and Interrupt Service Routines, BIOS function calls.

UNIT II LPC2148 Introduction

LPC2148 Introduction - Architecture Overview, Instruction set Types and summary, Memory Mapping Diagram

UNIT III Embedded ARM Compiler and Programming

Different vendors - Embedded ARM Compilers Keil/IAR/CrossWorks, Introduction, Project Creation, Executable files generation, downloading the executable files to ARM7 LPC2148 Microcontroller using Philips Flash Magic Utility, Embedded C Programming technique for LPC2148, Working with Controller Registers, Pin Block selection

UNIT IV LPC2148 System Control Block Functions

PLL , Power Control, Reset, VPB Divider, Wakeup Timer, Memory Acceleration Module, Timer0 and Timer1, PWM, RTC, On Chip ADC, On Chip DAC, Interrupts, Vectored Interrupt Controller

UNIT V LPC2148 – Peripheral Interfacing and Programming Techniques

General Purpose Input/Output ports (GPIO) , Universal Asynchronous Receiver and Transmitter (UART) , Inter Integrated Circuit (I^2C), Timer Programming, SPI Interface, LCD Interfacing, Switch Interfacing

TEXT BOOKS

1. A.K.Ray, K.M.Bhurchandi, ―Advanced Microprocessors and Peripherals‖, Tata McGraw Hill, 2006
2. Kenneth J. Ayala, ―The 8086 Microprocessor: Programming & Interfacing The PC‖, Delmar Cengage Learning, 2008.
3. The Insider's Guide to the Philips ARM 7 Based Microcontroller by Trevor Martin, Hitex (UK) Ltd., 2005

REFERENCE BOOKS

1. Mohamed Rafiquzzaman, ―Microprocessors and Microcomputer-Based System Design‖, Second Edition, CRC Press, 1995
2. Yu-cheng Liu and Glenn A. Gibson, Microcomputer Systems: The 8086/8088 Family Architecture, Programming & Design, Prentice Hall of India Pvt. Ltd, 2 nd Edition, 1986.
3. http://www.nxp.com/documents/user_manual/UM10139.pdf
4. http://supp.iar.com/FilesPublic/UPDINFO/004916/arm/doc/EWARM_UserGuide.ENU.pdf
5. http://www.rowleydownload.co.uk/arm/documentation/arm_crossworks_reference_manual.pdf
6. https://www.keil.com/product/brochures/uv4.pdf

WEB RESOURCES

1. http://www.eastaughs.fsnet.co.uk/cpu/index.htm
2. http://www.eie.polyu.edu.hk/~enzheru/eie311/lecture-notes/new/csf-protected-0809-v6.ppt
3. http://wiki.answers.com/Q/What_is_difference_between_minimum_mode_and_maximum_mode_operations_in_8086
4. http://www.cse.iitd.ernet.in/~sak/courses/cdp/cards/8086.txt
5. https://www.pantechsolutions.net/microcontroller-boards/user-manual-arm7-lpc2148-development-kit

CSE203	SYSTEM SOFTWARE	L	T	P	C
		3	1	0	4

PREREQUISITES

- Programming languages (CSE102)
- Operating System(CSE207)

COURSE OBJECTIVES

To introduce the techniques adopted in the design and implementation of System Software

COURSE OUTCOMES

CO1: Fundamental knowledge about working of language processors and architectures of hypothetical machines
CO2: Understand the design of an assembler.
CO3: Design a loader for loading an object program for execution
CO4: Develop skills to design macro processors using C language
CO5: Impart basic knowledge to develop other system softwares like text editors and debuggers.

UNIT I SYSTEM SOFTWARE AND MACHINE ARCHITECTURE

System Software Introduction - Overview of System Software - Program Development Flow- SIC Architecture - SIC/XE Architecture - RISC Verses CISC Architecture - VAX Architecture - Pentium Pro Architecture - Ultra SPARC Architecture

UNIT II ASSEMBLERS

Basic Assembler Functions - Machine Dependent Assembler Features - Machine Independent Assembler Features – Literals - Symbol Defining Statements - Expressions-Program Blocks - Control Section - Assembler Design Options – Load and Go Assembler - Multipass Assembler - MASM Assembler

UNIT III LOADERS AND LINKERS

Basic Loader Functions - Absolute Loader - Relocatable Loader – Bootstrap Loader - Machine Dependent Loader Features - Machine Independent Loader Features - Linkage Editor - Dynamic Linkers - MS DOS Linker.

UNIT IV MACROPROCESSORS

Basic Macro processor Functions – Macro Invocation – Macro Definition – Macro Expansion – Machine Independent Macro Processor Features – Recursive Macro Expansion – General purpose Macro processor – ANSI C Macro processor.

UNIT V OTHER SYSTEM SOFTWARE

Basic Compiler Functions – Operating System Functions - DBMS -Text Editors - Interactive Debugging Systems

TEXT BOOK

1. Leland L. Beck, System Software: An Introduction to Systems Programming, Addison-Wesley, 3rd Edition, 2008.

REFERENCE BOOKS

1. Dhamdhere D.M, Systems Programming and Operating Systems, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2nd revised edition, 2009.
2. Godbole, A, Operating Systems & Systems Programming, The McGraw-Hill Education, India, 2003.

WEB RESOURCES

- http://www.heyrick.co.uk/assembler/intro.html
- http://www.apl.jhu.edu/Classes/Notes/Schappelle/204/ASSEM1.PDF
- http://www.apl.jhu.edu/Classes/Notes/Schappelle/204/ASSEM2.PDF
- http://www.apl.jhu.edu/Classes/Notes/Schappelle/204/ASSEM3.PDF
- http://www.gnu.org/manual/gas-2.9.1/html_node/as_136.html#SEC138
- http://www.apl.jhu.edu/Classes/Notes/Schappelle/204/ASSEM4.PDF
- http://dbserver.kaist.ac.kr/~yjlee/Courses/CS230/assem/design.html
- http://dbserver.kaist.ac.kr/~yjlee/Courses/CS230/mp/examples.html
- http://www.apl.jhu.edu/Classes/Notes/Schappelle/204/LOADER1.PDF
- http://dbserver.kaist.ac.kr/~yjlee/Courses/CS230/load/design.html
- http://www.ecmwf.int/publications/manuals/metview/manual/Macro_Parameters.html

CSE205	JAVA PROGRAMMING	L	T	P	C
		3	0	0	3

PREREQUISITES

- CSE101 – Programming Languages
- CSE206 – Object Oriented Programming

COURSE OBJECTIVES

This course introduces computer programming using the JAVA programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using Java for network level programming and middleware development

COURSE OUTCOMES

CO1: Understand Java programming concepts and utilize Java Graphical User Interface in program writing.
CO2: Write, compile, execute and troubleshoot Java programming for networking concepts.
CO3: Build Java Application for distributed environment.
CO4: Design and Develop multi-tier applications.
CO5: Identify and Analyze Enterprise applications.

UNIT I JAV A FUNDAMENTALS

Objects and classes in Java – defining classes – methods - access specifiers – static members – constructors – finalize method - Arrays – Strings – Packages - Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword – abstract classes – Interfaces.

UNIT II I/O, EXCEPTIONS AND THREADING

Java I/O streaming – exception handling – exception hierarchy – throwing and catching exceptions. Multi-threaded programming – interrupting threads – thread states – thread properties – thread synchronization - Suspending, Resuming, and Stopping Threads.

UNIT III GRAPHICS PROGRAMMING

Applets: Fundamentals, Type of applet, Applet architeture, passing parameters to Applet – Frames: Working with frame windows, creating frame windows in an applet – AWT Components: Lable, Buttons, Checkbox, Checkbox group, list, text field, – Layout management: Menubars & Menu - working with Graphics: Drawing Lines, Rectangles, Ellipse, Circles, Arcs and Polygons

UNIV IV EVENT HANDLING

Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy.

UNIT V NETWORK PROGRAMMING IN JAVA

Internet Addresses - URLs and URIs – Sockets - TCP/IP client and Server Sockets – UDP datagrams – multicast sockets – URL classes - Reading Data from the server – writing data – JDBC: Drivers, Connection to databse

TEXT BOOKS

1. Herbert Schildt, Java - The Complete Reference, Tata McGraw- Hill, Seventh Edition, 2008.
2. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Eighth Edition, Sun Microsystems Press, 2008.
3. Elliotte Rusty Harold, — Java Network Programming, O'Reilly publishers, 2000

REFERENCES:

Kathy Sierra, Bert Bates, Head First Java, Second Edition, O'Reilly Media, 2005.
Harvey M. Dietel, Java How to Program, Seventh Edition, Prentice Hall, 2007.
Bruce Eckel, Thinking in Java, Fourth Edition, Prentice Hall, 2006.
Ivor Horton, Beginning Java 2 JDK, Fifth Edition, Wiley, 2004.
Ken Arnold, James Gosling, David Holmes, The Java Programming Language, Fourth Edition, Prentice Hall Professional Technical Reference.
E. Balagurusamy, Programming with Java: A primer, Third Edition, Tata McGraw-Hill, 2007.

WEB RESOURCES

- www.tutorialspoint.com/javaexamples/
- www.programmingsimplified.com/java-source-codes
- www.vogella.com/tutorials/JavaIntroduction/article.html
- www.oracle.com › Topics › New to Java
- www.java.com/en/download/faq/develop.xml

CSE204	THEORY OF COMPUTATION	L	T	P	C
		3	1	0	4

PREREQUISITES

- Programming language(CSE102)
- Mathematics-III (MAT202)

COURSE OBJECTIVES

The goal of this course is to provide students with an understanding of basic concepts in the theory of computation. At the end of this course students will:

- Be able to construct finite state machines and the equivalent regular expressions.
- Be able to prove the equivalence of languages described by finite state machines and regular expressions.
- Be able to construct pushdown automata ,Turing Machine and the equivalent context free grammars.
- Be able to prove the equivalence of languages described by pushdown automata and context free grammars.

COURSE OUTCOMES

CO1: Fundamental knowledge about Finite Automata, Deterministic Finite Automata and Non Deterministic Finite Automata
CO2: Understand the Regular languages and expressions
CO3: Apply the context free grammar (CFG) to describe programming languages and evaluate the equivalence of push down automata and CFG.
CO4: Design the Turing machine for different languages and simple computations
CO5: Analyze the undecidable problem in regular expression and turing machine

UNIT I AUTOMATA

Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II REGULAR EXPRESSIONS AND LANGUAGES

Regular Expression –Finite Automata and Regular Expressions – Properties of Regular languages: Pumping Lemma for regular languages and applications – Closure Properties of regular languages- Equivalence and Minimization of Automata

UNIT III CONTEXT-FREE GRAMMAR AND PUSH DOWN AUTOMATA

Context-Free Grammar (CFG) – Application- Parse Trees – Ambiguity in grammars and languages – Pushdown automata – Languages of a Pushdown Automata – Equivalence of

Pushdown automata and CFG - Deterministic Pushdown Automata.

UNIT IV PROPERTIES OF CFL AND TURING MACHINE

Normal forms for CFG – Pumping Lemma for CFL –Applications properties of CFL –Turing Machines – Programming Techniques for TM: Multiple Stacks, Subroutines-Extensions to the Basic Turing Machine

UNIT V UNDECIDABILITY

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem - The classes P and NP - NP complete-complements of languages in NP

TEXT BOOK

1. Hopcroft J.E,Motwani R and Ullman J.D, "Introduction to Automata Theory, Languages and Computations", 3 Edition, 2006.

REFERENCE BOOKS

1. Martin J, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2003
2. Lewis H. R and Papadimitriou C.H , "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2003

WEB RESOURCES

- http://www.keithschwarz.com/cs103/WWW/fall2011/lectures/020_Proof_Techniques.pdf
- http://www.eecs.wsu.edu/~ananth/CptS317/Lectures/FiniteAutomata.pdf
- http://www.cse.chalmers.se/~coquand/AUTOMATA/o2.pdf
- http://www.cs.miami.edu/~ogihara/csc527/new01-2.pdf
- http://www.nvc.cs.vt.edu/~jzhang/cs5104/Note-3.pdf
- http://www.cse.sc.edu/~maxal/csce551/lec05.pdf
- http://www.eecs.wsu.edu/~ananth/CptS317/Lectures/RegularLanguageProperties.pdf
- http://www.cs.sunysb.edu/~cse350/slides/pumping.pdf
- http://infolab.stanford.edu/~ullman/ialc/spr10/slides/rs2.pdf
- http://www.cs.rit.edu/~jmg/courses/cs380/20031/slides/minfa.pdf
- http://people.cs.umass.edu/~mccallum/courses/inlp2007/lect5-cfg.pdf
- http://www.cs.columbia.edu/~kathy/NLP/ClassSlides/Class7-Parsing09/cfg-parsing.pdf
- http://www.univ-orleans.fr/lifo/Members/Mirian.Halfeld/Cours/TLComp/res2-CG.pdf
- http://www.eecs.wsu.edu/~ananth/CptS317/Lectures/PDA.pdf
- http://www.cs.sunysb.edu/~cse350/slides/pda2.pdf
- http://www.cs.uiuc.edu/class/fa05/cs475/Lectures/new/bwlec14.pdf
- http://infolab.stanford.edu/~ullman/ialc/spr10/slides/cfl3.pdf

- http://user.it.uu.se/~pierref/courses/FLAT/pumping-cfl.pdf
- http://infolab.stanford.edu/~ullman/ialc/spr10/slides/cfl5.pdf
- http://www.cs.princeton.edu/courses/archive/spr01/cs126/lectures/T2-4up.pdf
- http://homepage.cs.uri.edu/faculty/hamel/courses/2013/spring2013/csc544/lecture-notes/06-turing-machines.pdf
- http://www.stanford.edu/class/archive/cs/cs103/cs103.1132/lectures/19/Small19.pdf
- http://www.cs.ucc.ie/~dgb/courses/toc/handout39.pdf
- http://www.cs.utexas.edu/~cline/ear/automata/CS341-Fall-2004-Packet/1-LectureNotes/23-24-TuringMachinesHandout.pdf
- http://www.eecs.wsu.edu/~ananth/CptS317/Lectures/Undecidability.pdf

CSE286	MICROPROCESSOR AND MICROCONTROLLER LAB	L	T	P	C
		0	0	3	2

PREREQUISITES

- **Digital Logic Design Lab (ECE291)**
- **Programming Language Lab (CSE181)**

COURSE OBJECTIVES

To introduce the basics of 8086 microprocessor and C Program
To introduce and ARM7 LPC2148 Microcontroller and its interfacing techniques
To introduce the Embedded C based Programming techniques

COURSE OUTCOMES

CO1: Identify the basic element and functions of microprocessor
CO2: Describe the architecture of microprocessor and its peripheral devices
CO3: Demonstrate fundamental understanding on the operation between the Microcontroller and its interfacing devices
CO4: Apply the programming techniques in developing the Embedded C program for Microcontroller applications
CO5: To design, implement and debug simple Microcontroller-based applications using the LPC2148

LIST OF EXPERIMENTS

1. Develop a File utility in C Language Using DOS Interrupts for 8086 Processor
2. Study of Embedded-ARM Compilers KEIL/IAR/CrossWorks
3. Write an Embedded-C Program for LPC2148 to control LED On/Off condition
4. Write and Embedded-C Program for LPC2148 to control the SWITCH operation
5. Write an Embedded-C Program for LPC2148 to control the BUZZER operation
6. Write an Embedded-C Program for LPC2148 to control the RELAY operation
7. Write an Embedded-C Program for LPC2148 to control the Multi-7 Segment operation using I^2C interface
8. Write an Embedded-C Program for LPC2148 to interface Analog to Digital Conversion technique

9. Write an Embedded-C Program for LPC2148 to interface Temperature Sensor
10. Write an Embedded-C Program for LPC2148 to interface Serial interface (LPC2148 Kit to Desktop Computer)
11. Write an Embedded-C Program for LPC2148 to interface Stepper Motor
12. Write an Embedded-C Program for LPC2148 to interface LCD Display
13. Write an Embedded-C Program for LPC2148 to interface SPI – Serial to Parallel Interface for controlling the LEDs

WEB RESOURCES

1. http://fleder44.net/312/notes/16Files/Index.html
2. http://www.keil.com/support/man/docs/uv4/
3. http://supp.iar.com/FilesPublic/UPDINFO/004916/arm/doc/EWARM_DevelopmentGuide.ENU.pdf
4. https://www.pantechsolutions.net/microcontroller-boards/led-interfacing-with-lpc2148-arm7-primer
5. https://www.pantechsolutions.net/microcontroller-boards/switch-interfacing-with-lpc2148-arm7-primer
6. https://www.pantechsolutions.net/arm7-primer-article/how-to-interface-buzzer-with-lpc2148.html?virtuemart_category_id=1
7. https://www.pantechsolutions.net/microcontroller-boards/relay-interfacing-with-lpc2148-arm7-primer
8. https://www.pantechsolutions.net/media/k2/attachments/I2C_Seven_Segment_Display_Interfacing_With_ARM7_Primer.pdf
9. http://www.ocfreaks.com/lpc2148-adc-programming-tutorial/
10. https://www.pantechsolutions.net/project-kits/digital-temperature-controller-using-arm7
11. https://www.pantechsolutions.net/microcontroller-boards/uart-interfacing-with-lpc2148-arm7-primer
12. https://www.pantechsolutions.net/microcontroller-boards/stepper-motor-interfacing-with-lpc2148-arm7-primer
13. https://www.pantechsolutions.net/microcontroller-boards/lcd-Interfacing-with-lpc2148-arm7-primer

CSE288	JAVA LABARATORY	L	T	P	C
		0	0	3	2

PREREQUISITES

- CSE181 – Programming Languages Lab
- CSE206 – Object Oriented Programming

COURSE OBJECTIVES

- Understand programming language concepts, particularly Java and object-oriented concepts.
- Write, debug, and document well-structured Java applications.
- Implement Java classes from specifications.
- Effectively create and use objects from predefined class libraries.
- Able to formulate problems and implement algorithms in C.

COURSE OUTCOMES

CO1: Write, debug, and document well-structured Java applications
CO2: Apply decision and iteration control structures to implement algorithms
CO3: Effectively create and use objects from predefined class libraries
CO4: Implement interfaces, inheritance, and polymorphism as programming techniques
CO5: Apply exceptions handling
CO6: Design and Develop distributed and enterprise applications.
CO7: Apply graphical user interface for application development.

LIST OF EXPERIMENTS

1. Develop Rational number class in Java. Use JavaDoc comments for documentation. Your implementation should use efficient representation for a rational number, i.e. (500 / 1000) should be represented as (½).
2. Develop Date class in Java similar to the one available in java.util package. Use JavaDoc comments.
3. Implement Lisp-like List in Java. Write basic operations such as 'car', 'cdr', and 'cons'. If L is a list [3, 0, 2, 5], L.car() returns 3, while L.cdr() returns [0,2,5].
4. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.

5. Design a Vehicle class hierarchy in Java. Write a test program to demonstrate polymorphism.
6. Design classes for Currency, Rupee, and Dollar. Write a program that randomly generates Rupee and Dollar objects and write them into a file using object serialization. Write another program to read that file, convert to Rupee if it reads a Dollar, while leave the value as it is if it reads a Rupee.
7. Design a scientific calculator using event-driven programming paradigm of Java.
8. rite a multi-threaded Java program to print all numbers below 100,000 that are both prime and fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe. Design another thread that generates fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify numbers common to both.
9. Develop a simple OPAC system for library using even-driven and concurrent programming paradigms of Java. Use JDBC to connect to a back-end database.
10. Develop multi-threaded echo server and a corresponding GUI client in Java.
11. [Mini-Project] Develop a programmer's editor in Java that supports syntax- highlighting, compilation support, debugging support, etc.

WEB RESOURCES

- http://stackoverflow.com/questions/26855854/rational-number-java-project
- http://www.javatpoint.com/package
- http://forgetcode.com/Java/643-Lisp-List
- http://stackoverflow.com/questions/19239471/abstract-data-type-and-interface
- http://veccse2.blogspot.in/2010/08/vehicle-class-hierarchy-in-java.html
- http://engineerportal.blogspot.in/2012/02/implementation-of-object-serialisation.html
- http://engineerportal.blogspot.in/2012/02/implementation-of-scientific-calculator.html
- http://forgetcode.com/Java/216-scientific-calculator

CSE282	SYSTEM SOFTWARE LAB	L	T	P	C
		0	0	3	2

PREREQUISITE

Programming Language Lab (CSE181)

COURSE OBJECTIVES

To develop their own system software programs and tools.

COURSE OUTCOMES

CO1: Develop function for symbol table management
CO2: Write programs to implement assembler functions.
CO3: Design a macro-processors using ANSI C.
CO4: Develop skills to design absolute and reloadable loaders.
CO5: Develop skills to do a project in designing a simple system software.

USING C OR C++

1. Implement a symbol table with functions to create, insert, modify, search, an display.
2. Implement pass one of a two pass assembler.
3. Implement pass two of a two pass assembler.
4. Implement a single pass assembler
5. Implement a macro processor.
6. Implement an absolute loader.
7. Implement a relocating loader.
8. Implement a direct-linking loader.
9. Implement a simple text editor with features like insertion / deletion of a character, word, sentence.
10. Debugging the program.

WEB RESOURCES

- http://www.apl.jhu.edu/Classes/Notes/Schappelle/204/ASSEM3.PDF
- http://www.gnu.org/manual/gas-2.9.1/html_node/as_136.html#SEC138
- http://www.apl.jhu.edu/Classes/Notes/Schappelle/204/ASSEM4.PDF
- http://dbserver.kaist.ac.kr/~yjlee/Courses/CS230/assem/design.html
- http://dbserver.kaist.ac.kr/~yjlee/Courses/CS230/mp/examples.html

SEMESTER-V

MAT302	DISCRETE MATHEMATICS	L	T	P	C
		3	0	0	3

PREREQUISITE

Basic concepts of logical conditions and binary operations.

OBJECTIVES

- To familiarize the students with the concepts of propositional calculus and predicate calculus.
- To familiarize the students with Set theory and Lattices.
- To familiarize the students with the concepts of Groups.
- To familiarize the students with the basic concepts of Graph theory.

COURSE OUTCOMES

CO1: Understand the concepts of Truth tables, Tautology and Contradiction.
CO2: Explain the concept of theory of inferences and validity of arguments.
CO3: Apply the concept of Lattice theory in distributed computing
CO4: Analyze the concept of Group theory.
CO5: Apply the concept of Graph theory in Data Mining and Network analysis.

UNIT I LOGIC AND PROOFS

Propositional Logic – Propositional equivalences-Predicates and quantifiers-Nested Quantifiers-Rules of inference-introduction to Proofs-Proof Methods and strategy

UNIT II COMBINATORICS

Mathematical inductions-Strong induction and well ordering-.The basics of counting-The pigeonhole principle –Permutations and combinations-Recurrence relations-Solving Linear recurrence relations-generating functions-inclusion and exclusion and applications.

UNIT III GRAPHS

Graphs and graph models-Graph terminology and special types of graphs-Representing graphs and graph isomorphism -connectivity-Euler and Hamilton paths

UNIT IV ALGEBRAIC STRUCTURES

Algebraic systems-Semi groups and monoids-Groups-Subgroups and homomorphisms-Cosets and Lagrange's theorem- Ring & Fields (Definitions and examples)

UNIT V LATTICES AND BOOLEAN ALGEBRA

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

TEXT BOOKS

1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", Special Indian edition, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, (2007). (For the units 1 to 3,Sections 1.1 to 1.7 , 4.1 & 4.2, 5.1 to 5.3, 6.1, 6.2, 6.4 to 6.6, 8.1 to 8.5)

2. Trembly J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30th Re-print (2007).(For units 4 & 5 , Sections 2-3.8 & 2-3.9,3-1,3-2 & 3-5, 4-1 & 4-2)

REFERENCES

1. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia, Delhi, (2002).
2. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier Publications, (2006).
3. Seymour Lipschutz and Mark Lipson, "Discrete Mathematics", Schaum's Outlines, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, Second edition, (2007).

WEB RESOURCES

- http://mathworld.wolfram.com/DiscreteMathematics.html
- http://www.dmtcs.org/dmtcs-ojs/index.php/dmtcs
- http://mathworld.wolfram.com/Combinatorics.html
- http://www.uidaho.edu/sci/math/research/combinatorics
- http://nptel.ac.in/courses/106106094/
- http://mathworld.wolfram.com/BooleanAlgebra.html

CSE305	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	1	0	3

PREREQUISITES

- Programming Languages(CSE102)
- Data Structures(CSE103)
- Operating Systems(CSE207)

COURSE OBJECTIVES

To learn the principles of systematically designing and using large scale database Management systems for various applications.

COURSE OUTCOMES

CO1: Describe a relational database and object-oriented database.
CO2: Create, maintain and manipulate a relational database using SQL
CO3: Describe ER model and normalization for database design.
CO4: Examine issues in data storage and query processing and can formulate appropriate solutions.
CO5: Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage.
CO6: Design and build database system for a given real world problem.

UNIT I INTRODUCTION TO RELATIONAL MODEL

Database-System Applications - Purpose of Database Systems - View of Data – Database Languages- Relational Databases - Database Design – Database overall Structure - Structure of Relational Databases - Fundamental Relational-Algebra - operations – Additional & Extended Relational-Algebra operations - Null Values - Modification of the Database

UNIT II STRUCTURED QUERY LANGUAGE

SQL - Data Definition - Structure of SQL Queries - Set Operations - Aggregate Functions - Nested Sub queries - Complex Queries - Views – Data base Modification - Joined Relations - SQL Data Types and Schemas - Integrity Constraints - Authorization – ODBC and JDBC - Functions and Procedural Constructs

UNIT III DATABASE DESIGN

Overview of the Design Process - ER Model - Constraints - ER-Diagrams - Design Issues - Weak Entity Sets - Extended E-R Features: Specialization and Generalization - UML - Relational Database Design - Features of Good Relational Designs - Normalization and its Types - Functional-Dependency Theory –Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies.

UNIT IV DATA STORAGE AND QUERY PROCESSING

Physical Storage Media – RAID, RAID levels – File Organization: Fixed and Variable length records – Various organizations of records - Indexing - Basic Concepts - types - Comparison - B+ Trees - B-Tree Index Files - Static Hashing - Dynamic Hashing - Query Processing - Overview - Measures of Query Cost - selection Operation -sorting -join Operation -Evaluation of Expressions

UNIT V TRANSACTION MANAGEMENT

Transaction Concept - Transaction State - Implementation - Concurrent Executions Serializability - Concurrency Control - Lock-Based Protocols - Timestamp-Based Protocols - Deadlock Handling - Weak Levels of Consistency - Recovery System - Failure Classification - Storage Structure - Recovery and Atomicity - Log-Based Recovery - Recovery with Concurrent Transactions - Buffer Management - Failure with Loss of Nonvolatile Storage - Remote Backup Systems .

TEXT BOOK

1. Abraham Silberschatz, Henry F. Korth and Sudarshan S., Database System Concepts, McGraw-Hill , 6th Edition, 2011.

REFERENCE BOOKS

1. Ramez Elmasri and Shamkant B. Navathe, Fundamental Database Systems, Addison-Wesley, 5th Edition, 2008.
2. Raghu Ramakrishnan, Database Management System, Tata McGraw-Hill, 4th Edition, 2010
3. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, Database Systems: The Complete Book, Prentice Hall, 2003.

WEB RESOURCES

- http://codex.cs.yale.edu/avi/db-book/
- http://www.networkdictionary.com/Software/Basic-Structure.php
- http://pages.cs.wisc.edu/~dbbook/openAccess/thirdEdition/slides/slides3ed-english/Ch4_Domain_Calculus.pdf
- http://faculty.ksu.edu.sa/zitouni/203%20Haseb%20%20Lecture%20Notes/Relional%20Algebra.pdf
- http://sqlcourse.com,

- http://www.w3schools.com/sql/default.asp
- http://pages.cs.wisc.edu/~dbbook/openAccess/thirdEdition/slides/slides3ed-english/Ch5_SQL.pdf
- http://www.cs.toronto.edu/db/courses/db2/embedsql.html
- http://publib.boulder.ibm.com/infocenter/db2luw/v9/index.jsp?topic=/com.ibm.db2.udb.apdv.embed.doc/doc/c0005784.htm
- http://www.slideshare.net/koolkampus/ch02
- http://www-db.in.tum.de/~grust/teaching/ss06/DBfA/db1-04.pdf
- http://databases.about.com/od/specificproducts/a/normalization.htm
- http://cs.gmu.edu/~aobaidi/spring-02/Normalization.ppt
- http://docs.kde.org/stable/en/kdesdk/umbrello/uml-basics.html
- www.slideshare.net/koolkampus/ch11
- http://homepages.cwi.nl/~manegold/teaching/DBtech/slides/ch11-8.pdf
- http://www.micc.unifi.it/delbimbo/documents/database_multimediali/a03_dbms_indexing.pdf
- http://www.cs.wayne.edu/~jamil/DBMS/SLIDES/PDF/ch12-2.pdf
- http://www.scribd.com/doc/10880683/13-DBMS-Query-Processing
- http://cs.gmu.edu/~ami/teaching/infs760/slides/ch15-edited.pdf
- http://www.slideshare.net/koolkampus/ch15
- http://dbserver.kaist.ac.kr/~mhkim/cs662-05spring.dir/ozsu-chap11.pdf
- www.cs.ust.hk/~dimitris/CS530/L24.ppt

CSE303	SOFTWARE ENGINEERING	L	T	P	C
		3	1	0	4

PREREQUISITE

Computer System Engineering(CSE205)

COURSE OBJECTIVES

- To assist the students in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.
- To help students to develop skills that will enable them to construct software of high quality, software that is reliable, and that is reasonably easy to understand, modify and maintain.
- To foster an understanding of why these skills are important.

COURSE OUTCOMES

CO1: Identify and build an appropriate process model for a given project
CO2: Analyze the principles at various phases of software development
CO3: Translate specifications into design, and identify the components to build the architecture for a given problem, all using an appropriate software engineering methodology
CO4: Define a Project Management Plan and tabulate appropriate Testing Plans at different levels during the development of the software
CO5: Understand the software project estimation models and estimate the work to be done, resources required and the schedule for a software project

UNIT I SOFTWARE ENGINEERING CONCEPTS

Software and Software Engineering - Project management concepts - Software engineering paradigms – Generic process models, Assessment and Improvement - water fall life cycle model - prototype model - RAD model - spiral model - incremental model – Understanding requirements

UNIT II MANAGING SOFTWARE PROJECTS

Metrics : Metrics in process and project domains - Software measurement - Metrics for software Quality - Integrating metrics in a software engineering process - Estimation , Scheduling – Risk Management – Review Techniques - Software quality assurance

UNIT III DESIGN CONCEPTS

Design Process - Design Principles - Design Concepts - Software architecture – Architectural style, design and Mapping - user interface design

UNIT IV SOFTWARE TESTING AND DEBUGGING

Testing Fundamentals and strategies - White-box and Black box testing - Basis path testing - data flow testing - testing for special environments - Unit testing, - Integration testing - validation testing - system testing – debugging - software maintenance – software configuration management

UNIT V ADVANCED TOPICS

Computer Aided Software Engineering - Clean room software engineering – Reengineering - Reverse Engineering

TEXTBOOK

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Mc-Graw Hill, 8th Edition, 2014.

REFERENCE BOOKS

1. Steve McConnell, Code Complete, Second Edition, Microsoft Press.2004
2. Ian Somerville, Software Engineering,, Addison-Wesley, 9th edition, 2011.
3. Richard E. Fairley, Software Engineering Concepts, McGraw- Hill, 1985.

WEB RESOURCES

- http://www.designingprojectmanagement.com/SoftwareProcessModels.html
- http://en.wikipedia.org/wiki/Software_development_process
- http://www.mindtools.com/pages/article/newTMC_07.htm
- http://www.ecfc.u-net.com/cost/index.htm
- http://www.functionpoints.com/
- http://zing.ncsl.nist.gov/nist-icv/documents/node8.html
- http://scitec.uwichill.edu.bb/cmp/online/cs22l/design_-_concepts_and_ principles.htm
- http://www.testingbrain.com/
- http://www.qa-software-testing.com/Testing/index.htm
- http://www.sei.cmu.edu/legacy/case/case_whatis.html
- http://www.unl.csi.cuny.edu/faqs/software-enginering/tools.html
- http://www.buzzle.com/articles/software-reverse-engineering-for-debugging.html

CSE304	COMPILER DESIGN	L	T	P	C
		3	0	0	3

PREREQUISITE

Theory of computation(CSE204)

COURSE OBJECTIVES

- To understand the theory and practice of compiler implementation.
- To learn finite state machines and lexical scanning.
- To learn context free grammars, compiler parsing techniques, construction of abstract syntax trees, symbol tables, intermediate machine representations and actual code generation

COURSE OUTCOMES

CO1: Understand the different phases of compilation
CO2: Implement small compiler using modern compiler writing tools.
CO3: Develop skills on lexical analysis and parsing which are helpful to a broad range of computer science application areas.
CO4: Apply context free grammars to syntax analysis
CO5: Analyze optimization techniques to reduce the code size

UNIT I INTRODUCTION

Introduction to Compiler – The structure of a compiler- Compiler- Lexical Analysis – Role of the lexical analysis – Input Buffering – Specification of tokens- Recognition of tokens – Lexical analyzer generator

UNIT II LEXICAL ANALYSIS

Finite Automata – Regular Expression to an NFA - Optimization of DFA based pattern matchers- The Role of the Parser - Context-Free Grammars - Writing a Grammar -Top-Down Parsing - Recursive Descent Parsing – Predictive Parsing - Bottom-Up Parsing - Shift Reduce Parsing - Operator-Precedence Parsing

UNIT III SYNTAX ANALYSIS

Introduction to LR parsing - SLR Parser – Canonical LR Parser – LALR Parser Generators - Intermediate Languages – Declarations – Control Flow -Boolean Expressions –Switch Statements - Back patching .

UNIT IV INTERMEDIATE CODE GENERATION

Issues in the Design of a Code Generator - The Target Language - Addresses in the target code - Basic Blocks and Flow Graphs - A Simple Code Generator - DAG Representation of Basic Blocks

UNIT V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS

The Principal Sources of Optimization - Optimization of Basic Blocks - Peephole optimization- Loops in Flow Graphs –Runtime environments –Storage organizations-stack allocation of space – Access to nonlocal data on the stack

TEXT BOOK

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Monica S. Lam, Compilers: Principles, Techniques, and Tools, Second Edition , 2014

REFERENCE BOOKS

1. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2003
2. Bennet J.P., Introduction to Compiler Techniques, Tata McGraw-Hill, 2nd Edition, 2003
3. Henk Alblas and Albert Nymeyer,, Practice and Principles of Compiler Building with C, PHI, 2001.

WEB RESOURCES

- http://www.cs.pitt.edu/undergrad/courses/cs1622.php
- http://www.personal.kent.edu/%7Ermuhamma/Compilers/compiler.html
- http://www.cs.cornell.edu/courses/cs412/2002sp/schedule.html
- http://www.cs.wright.edu/people/faculty/tkprasad/courses/cs780/cs780.html
- http://www.owlnet.rice.edu/%7Ecomp412/
- http://www.stanford.edu/class/cs143/
- http://www.cs.utexas.edu/users/novak/cs375contents.html
- http://www.linuxgazette.com/issue39/sevenich.html
- http://www.softpanorama.org/Algorithms/compilers.shtml
- www.flint.cs.yale.edu
- http://www.cs.nmsu.edu/~jeffery/courses/unlv/478/lecture.html
- www.pdclab.cs.ucdavis.edu
- http://www.cs.umd.edu/class/spr98/c msc430/slides
- http://www.cs.gmu.edu
- http://www.csee.umbc.edu
- http://www.ambda.uta.edu
- http://www.userpages.umbc.edu
- http://www.cs.waikato.ac.nz
- http://www.cwi.nl/~jurgenv/publications/slides/cc2002.ppt

CSE381	SOFTWARE ENGINEERING LABORATORY	L	T	P	C
		0	0	3	2

PREREQUISITES

- Software Engineering(CSE 303)
- Proficiency in MS-Project

COURSE OBJECTIVES

- To assist the students in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.
- To help students to develop skills that will enable them to construct software of high quality, software that is reliable, and that is reasonably easy to understand, modify and maintain.
- To foster an understanding of why these skills are important.

COURSE OUTCOMES

CO1: Analyze system requirements to determine the needs of the end users to be computerized
CO2: Identification of suitable process model for the given project
CO3: Conduct project management activities like estimation and planning
CO4: Generate software requirements specification
CO5: Develop UML diagrams
CO6: Write test cases

LIST OF EXPERIMENTS

1. Selection of a project for each organized team.
2. Preparation of System Requirement Specification (SRS) and related analysis documents as per the guidelines in ANSI/IEEE Std 830-1984.
3. Estimation using COCOMO and Functions point model for the project chosen.
4. Developing Schedules and Tracking the progress
5. Decomposing systems into modules.
6. Design documents representing the complete design of the software system as well as the design diagrams for each module.
7. Analysis and design for the same problem in O-O approach.
8. Test documents as per ANSI/IEEE Std. 829/1983 and prepare Software Test Documentation Implementation
9. Testing the developed software– preparation of test cases, Execution of test cases Debugging Maintenance using SCM tools

WEB RESOURCES

- www.virtual-labs.ac.in/cse08
- virtual-labs.ac.in/cse08/isad/3
- www.vlssit.iitkgp.ernet.in
- www.iitkgp.vlab.co.in/?sub=38
- http://www.uml.edu/IT/Services/vLabs/Client-Configurations/windows.aspx

CSE382	COMPILER DESIGN LABORATORY	L	T	P	C
		0	0	3	2

PREREQUISITE

Programming language lab(CSE181)

COURSE OBJECTIVES

This course covers the design and implementation of compiler and runtime systems for high-level languages, and examines the interaction between language design, compiler design and runtime organization. This course also emphasis on problem solving and implementation of code and to optimize the code using a universal subset of the C programming language

COURSE OUTCOMES

CO1: Develop different Phases of Compiler
CO2: Develop Front end and back end of compiler.
CO3: Demonstrate simple code generation techniques.
CO4: Implement the parsing techniques
CO5: Develop the techniques to optimize the code

LIST OF EXPERIMENTS

- Write a Program to design Token Separator for the given Expression
- Implement a lexical analyzer part of a 'C' Compiler
- Constructing NFA from a regular Expression
- Constructing DFA from a regular Expression
- Find leading and Trailing of the given Grammar
- Constructing Top down parsing table
- Implementation of Shift reduce parsing Algorithm
- Implementation of Operator precedence Parsing Algorithm
- Constructing LR Parsing table
- Generation of DAG for the given expression
- Simulation of Symbol Table Management
- Generation of a code for a given intermediate code
- Use LEX tool to implement a lexical analyzer
- Use LEX and YACC to implement a parser

WEB RESOURCES

- http://www.linuxgazette.com/issue39/sevenich.html
- http://www.softpanorama.org/Algorithms/compilers.shtml
- www.flint.cs.yale.edu
- http://www.cs.nmsu.edu/~jeffery/courses/unlv/478/lecture.html
- http://ag-kastens.uni-paderborn.de /lehre /material /compi /aufgaben/blatt3/Blatt3.html
- www.pdclab.cs.ucdavis.edu
- http://www.cs.umd.edu/class/spr98/c msc430/slides
- www.cs.gmu.edu
- www.csee.umbc.edu
- www.ambda.uta.edu
- www.cs.waikato.ac.nz
- www.userpages.umbc.edu
- www.cwi.nl/~jurgenv/publications/slides/cc2002.ppt
- www.met.ed.ac.uk/~hcp/wrk/idlcourse/notes/node16.html

CSE385	DBMS LAB	L	T	P	C
		0	0	3	2

PREREQUISITE

Programming Languages (CSE102)

COURSE OBJECTIVES

The major objective of this lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers. Rather than imparting isolated knowledge/experience fragments in each of concepts, technology and practice, the course will aim at achieving a good blend of the three. The overriding concern, therefore, is to include just enough concepts and theory to motivate and enrich the practical component, and to include technology component to maximize the relevance of the course to the industry without sacrificing the long-term objectives of rigour and foundational strength that can withstand the vagaries of technological advances. The sub-objectives are:

- To give a good formal foundation on the relational model of data
- To present SQL and procedural interfaces to SQL comprehensively
- To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design
- To motivate the participants to relate all these to one or more commercial product environments as they relate to the developer tasks
- To present the concepts and techniques relating to query processing by SQL engines
- To present the concepts and techniques relating to ODBC and its implementations.
- To introduce the concepts of transactions and transaction processing
- To present the issues and techniques relating to concurrency and recovery in multi-user database environments

COURSE OUTCOMES

CO1: Demonstrate the basic fundamentals of Structured Query Language (SQL).

CO2: Employ the conceptual and relational models to design large database systems.

CO3: Design and build database system for a given real world problem.

LIST OF EXPERIMENTS

MS-ACCESS

1. Creating Tables and Queries using Access
2. Creating Forms and Reports using Access

SQL

1. Implementation of DDL commands in RDBMS.
2. Implementation of DML and DCL commands in RDBMS.
3. Implementation of Date and Built in Functions of SQL.

PL/SQL

1. Implementation of Simple Programs.
2. Implementation of High-level language extension with Cursors.
3. Implementation of High level language extension with Triggers
4. Implementation of stored Procedures and Functions.
5. Embedded SQL.
6. Database design using E-R model and Normalization.
7. Database Connectivity using ADO
8. Database Connectivity using ODBC
9. Database Connectivity using JDBC

WEB RESOURCES

- http://www.tutorialspoint.com/listtutorials/ms-access/1
- http://www.techonthenet.com/access/tutorials/
- http://www.profsr.com/access/accless0.htm
- https://support.office.com/en-ca/article/Training-courses-for-Access-2013-a4bd10ea-d5f4-40c5-8b37-d254561f8bce
- http://www.w3schools.com/sql/
- http://www.tutorialspoint.com/sql/
- http://www.sqlcourse.com/
- http://beginner-sql-tutorial.com/sql.htm
- http://www.sql-tutorial.net/
- http://www.sql-zone.com
- http://www.computer.org
- http://www.dbpd.com
- http://www.dmreview.com
- http://www.oracle.com/oramag/
- http://www.way2tutorial.com/plsql/plsql_triggers.php
- http://docs.oracle.com/cd/E11882_01/appdev.112/e25519/triggers.htm#LNPLS020
- http://www.java2s.com/Tutorial/Oracle/0560__Trigger/DMLTriggerExample.htm
- http://www.java2s.com/Tutorial/Oracle/0560__Trigger/Catalog0560__Trigger.htm

SEMESTER VI

		L	T	P	C
CSE318	**COMPUTER NETWORKS**	**3**	**1**	**0**	**4**

PREREQUISITE

Knowledge in the basic concepts of operating systems, C, Linux & Undergraduate Level Mathematical preparation.

COURSE OBJECTIVES

- To understand the fundamental concepts of computer networking.
- To familiarize the student with the basic taxonomy and terminology of the computer networking area.
- To introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- To allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

COURSE OUTCOMES

CO1: Understand the concepts of networks, types and architectures.

CO2: Apply addressing entities of network with implementation of TCP and UDP protocols.

CO3: Identify the networks technologies for error free transmission of data

CO4: Apply various routing protocols in data communication to select optimal path.

CO5: Develop real time applications of networks

UNIT I PHYSICAL LAYER

Introduction: Networks- Protocol and Standards-Topology- Transmission Modes- Categories of Networks. Modulation techniques: Data and Signals-Digital Transmission- Analog Transmission-Multiplexing and Spreading-Transmission Media. Reference Model:: OSI and TCP/IP

UNIT II DATA LINK LAYER

Error Detection and Correction- Data Link Control-Multiple Access- Wired:Ethernet- Connecting Devices in Data Link Layers- Backbone Network- VLAN.

UNIT III NETWORK LAYER

Logical Addressing- Internet Protocols: IPv4 and IPv6- Address Mapping- Error Reporting and Multicasting- Delivery, Forwarding and Routing

UNIT IV TRANSPORT LAYER

Process to Process Delivery: UDP, TCP, SCTP – Congestion Control and Quality of Service: Data Traffic, Congestion and Congestion Control, QoS, Technique to improve QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT V APPLICATION LAYER

DNS- Remote Logging - E-mail and File Transfer- WWW and HTTP – Multimedia.

TEXT BOOK

1. Forouzan B. A, "Data Communications and Networking", 4th edition, Tata McGraw-Hill Publications, 2007

REFERENCE BOOKS

1. Tanenbaum A. S., "Computer Networks", 4th Edition, Pearson Education, 2003
2. James F. Kurose, "Computer Networking- a top-down approach featuring the internet" , Person Education, 6th Edition 2012
3. Leon-Garcia-Wadjaja, "Communication Networks- Fundamental Concepts and Key Architectures", Tata McGraw-Hill Publications,3rd Edition ,2004
4. Comer D., "Computer Networks and Internet", 5th Edition, Pearson Education, 2012

WEB RESOURCES

- www.acm.org/sigcomm/sos.html
- www.ietf.org
- www.cne.gmu.edu/modules/osi.html
- www.osi.org
- www.ietf.org/rfc
- http://www.ietf.org/rfc/rfc2131.txt
- https://www.isc.org/software/dhcp
- http://computer.howstuffworks.com/nat.htm
- http://www.faqs.org/rfcs/rfc1631.html
- https://learningnetwork.cisco.com/thread/14911
- http://www.cisco.com/public/technotes/tech_protocol.shtml
- http://www.iana.org/
- http://blog.ioshints.info/2008/03/wan-ip-addresses-and-subnet-masks.html
- http://www.fcc.gov/voip/
- http://www.indiabroadband.net/voice-over-ip/

- http://www.voip-info.org/wiki/view/SIP

CSE320	GRAPHICS AND VISUAL COMPUTING	L	T	P	C
		3	1	0	4

PREREQUISITES

- Programming Languages (CSE102)
- Object Oriented Programming (CSE206)
- Algorithms and complexity (CSE209)

COURSE OBJECTIVES

- To understand the need of developing graphics applications.
- To learn the hardware involved in building graphics applications.
- To learn algorithmic development of graphics primitives like: line, circle, ellipse, polygon etc.
- To learn the representation and transformation of graphical images and pictures.
- To learn the concept of Color Generation.

COURSE OUTCOES

CO1: Understand the concepts of display devices and Line drawing algorithms
CO2: Learn the different types of clipping algorithms and two dimensional transformations.
CO3: Apply the concepts of 3D display methods, transformation and viewing in computer graphics
CO4: Analyzee the surface detection methods, dither techniques, rendering and illumination Models
CO5: Design and implement computer animation with morphing

UNIT I INTRODUCTION

Overview of graphics systems-display devices-Raster Scan and Random Scan Systems- Graphics hardware and software. Line Drawing algorithms- DDA- Bresenham.- Circle- Ellipse Drawing algorithm- Area fills algorithms- Attributes of output primitives.

UNIT II TWO-DIMENSITIONAL CONCEPTS

Two-dimensional geometric transformation: Translation- rotation- scaling- shearing- reflection. - Two-dimensional Viewing- window to viewport mapping- Clipping- point clipping- line clipping- Cohen-Sutherland- Liang Barsky- Nicholl-Lee-Nicholl Line clipping algorithms- Polygon Clipping-Sutherland- Hodgeman polygon clipping- Curve clipping- Text clipping- Exterior Clipping.

UNIT III THREE-DIMENSIONAL CONCEPTS

Three-dimensional display methods- Three-dimensional object representations – polygon surfaces- Cure surfaces- spine representations- Bezier curves and surfaces- B-spline curves and surfaces- Beta splines- Rational spline – Octree - BSP Trees-Fractal Geometry methods: Procedures,Classification,Geometric Construction of deterministic and statistically self-similar fractals - Three-dimensional geometric and modeling transformations - Three dimensional viewing and clipping.

UNIT IV SURFACE METHODS AND ILLUMINATION MODELS

Visible surface detection methods-Back face Detection- Depth buffer method- scan line method- area subdivision method- ray-casting method- curved surfaces- wireframe methods. Basic illumination models- displaying light intensities- Halftone patterns and Dithering- polygon-rendering methods- Ray-tracing methods- Adding surface detail.

UNIT V ANIMATION AND OPEN GL

Color models and color applications- Computer Animation- Real time application of computer graphics- Morphing – Overview of Open GL: Basic graphics Primitives – Line Drawings – Simple interaction with mouse and Keyboard – Design and use of menus in an application.

TEXT BOOK

1. Donald Hearn- M. Pauline Baker- "Computer Graphics with OpenGL: 3rd edition" Prentice hall- 2003.
2. F.S Hill,JR.Stephen M.Kelley,"Computer graphics using Open GL",3rd edition ,PHI Learning Private Limited,New Delhi,2009.

REFERENCE BOOKS

1. Angel Edward "Interactive Computer Graphics- 4th Edition"- Addison-Wesley Longman- 2006.
2. Peter Shirley- "Fundamentals of Computer Graphics"-
3. AK Peters Woo- Jackie Neider- Tom Davis- and Dave Shreiner- "OpenGL Programming Guide"- Addison Wesley- 2003.
4. Francis S. Hill- "Computer Graphics using OpenGL "- Prentice Hall- 2nd edition- 2000.
5. Foley Van Dam- Feiner Hughes "Computer Graphics: Principles and Practice"- Addison Wesley- 2rd Edition, 2003

WEB RESOURCES

- http://www.cosc.canterbury.ac.nz/people/mukundan/cogr/DDA.html
- www.doc.ic.ac.uk/~dfg/graphics/GraphicsSlides01.pdf
- www.cs.duke.edu/~pankaj/fall97/summary.html
- http://www.doc.ic.ac.uk/~pb/graphics2001/Week3.html
- http://www.cc.gatech.edu/gvu/multimedia/nsfmmedia/cware/graphics
- notes/ragra/sccir/sccir02.html
- http://www.cs.wisc.edu/~schenney/courses/cs559-s2001/cs559.html
- http://www.cs.buffalo.edu/~walters/cs480/NewLect9.pdf
- http://www.cs.rit.edu/~icss571/filling/index.html
- http://www.geocities.com/kirentanna/index.html

CSE387	NETWORKS LABORATORY	L	T	P	C
		0	0	3	2

PREREQUISITE

Programming language lab(CSE181)

COURSE OBJECTIVES

- Understanding basic Unix Commands.
- To help students understand the fundamental services provided by TCP and UDP and how information is sent between TCP and UDP ports
- To help students appreciate the basic techniques of design and analyzing networked system.
- Ability to design basic network services with sockets

COURSE OUTCOMES

CO1: Demonstrate the client-server communication.
CO2: Implement data link layer operations.
CO3: Develop applications with RMI.
CO4: Aware of UNIX commands for Networking.
CO5: Implement Application layer functions

LIST OF EXPERIMENTS

1. Basic Unix Commands
2. Introduction to socket programming
3. Write an application for client-server environment (TCP, UDP)
4. Multicast Server/Client application
5. Data Link Layer Operations
6. Domain name service
7. Getting the MAC Address
8. HTTP Download
9. Cryptography
10. Remote Command Execution
11. Remote Method Invocation

WEB RESOURCES

- http://java.sun.com/j2se/1.5.0/docs/api/java/net/Socket.html
- http://java.sun.com/j2se/1.5.0/docs/api/java/net/ServerSocket.html
- http://java.sun.com/j2se/1.5.0/docs/api/java/net/DatagramSocket.html
- http://java.sun.com/j2se/1.5.0/docs/api/java/net/DatagramPacket.html
- http://java.sun.com/j2se/1.5.0/docs/api/java/net/MulticastSocket.html

CSE388	VISUAL PROGRAMMING LAB	L	T	P	C
		0	0	3	2

PREREQUISITE

Students should have basic knowledge in Object Oriented Concepts, data base management concepts and Internet Technologies concepts

COURSE OBJECTIVES

- To Understand and design the forms in interactive manner
- To implement and apply active X controls in real time applications .
- To learn the basic concepts in Windows programming using MFC
- To study the different controls and forms for designing a web page

COURSE OUTCOMES

CO1: Design Webpage using Visual Basic Controls with Data base Connectivity ODBC and DAO.
CO2: Identify the recourses for drawing, painting and sorting without using MFC
CO3: Analyze and Evaluate the concepts of windows programming using MFC (VC++)and Active X
CO4: Apply the general idea about the different Active X Controls and Dialog boxes.
CO5: Evaluate ODBC and DAO database connectivity's for webpage design using VC++

VISUAL BASIC

1. Form Designing – To Access the Credit Card Information
2. Using the structure of the three top-level menu items, File, Edit, and Help, combine them all together tomake one large menu item. Make sure File,Edit and the Help menu all branch out to their own originalmenu items, and include the separator bars.Use of ODBC, DAO- Using the BIBLIO database, write the SQL Statement required returning the following columns
    - Table Column
    - Titles Title
    - Titles ISBN
    - Authors Author
    - Titles Year Published
    - Publisher Company Name
3. Use of Active X Controls for a Font Demo Program
4. Use of Report Generation - To create a form that displays the list of publishers from the Data Environment by dragging and dropping columns unto the form. Add a button to export the report to HTML.
5. Design of Paint Brush, Notepad , Calculator Using VB

VISUAL C++

6. Creation of Resources- To Access the Credit Card Information
7. Drawing in a Window- To Access the Credit Card Information
8. Document – Creation , Storing, Printing Without using MFC
9. Creation of Dialog Resources Using MFC
10. Writing DLLs Using MFC
11. Implementation of Stock Market Simulation without using MFC.
12. Connecting and Updating Data Sources Using ODBC, DAO for BIBLIO Database

WEB RESOURCES

- www.cs.sjsu.edu/faculty/pearce/mfc/
- www.drnnce.ac.in/files/VP_lm.pdf
- https://www.scribd.com/doc/.../Visual-Programming-Lab-Manual
- www.winprog.org/tutorial/simple_window.html
- www.win32developer.com/tutorial/windows/windows_tutorial_1.shtm
  www.tenouk.com/clabworksheet/clabworksheet.html
- www.cpp.edu/~hlin/CplusManual/CCplusmanual.pdf

CSE390	COMMUNITY SERVICE PROJECT	L	T	P	C
		0	0	3	2

PREREQUISITES

- Data Structures and Algorithms – CSE103
- Programming languages – CSE102
- Software Engineering - CSE303
- Database Management Systems - CSE212
- Computer Networks – CSE318

COURSE OBJECTIVES

- To estimate the ability of the student in transforming the theoretical knowledge studied so far into application software.
- For enabling the students to gain experience in organization and implementation of a small project and thus acquire the necessary confidence to carry out main project in the final year
- To understand and gain the knowledge of software engineering practices, so as to participate and manage large software engineering projects in future.
- To create a novel research and education program for graduate students from computer science and engineering focused on the development of diagnostics methodologies and analytical models and tools.

COURSE OUTCOMES

CO1 : Identify real world problems and analyse the need for computing solutions.
CO2 : Formulate the Mathematical Model for computing problems.
CO3 : Choose and apply modern design methodologies and advanced programming techniques. Test and debug the developed project.
CO4 : Produce the project in product based form.
CO5 : Present the project orally and in written report.

WEB RESOURCES

- http://www.w3school.com/xml/default.asp
- http://www.w3schools.com/html/html_xhtml.asp
- http://www.w3.org/XML/
- http://www.xmlfiles.com/xml/
- http://nptel.ac.in/courses/106105084/16

- http://www.cs.tufts.edu/comp/20/oldnotes
- http://www.w3schools.com/vbscript/default.asp
- http://www.w3schools.com/asp/ado_intro.asp
- http://www.w3schools.com/php/php_forms.asp
- http://www.cwru.edu/help/introHTML
- http://www.w3schools.com/html/html_intro.asp
- http://www.w3schools.com/html/html_elements.asp
- http://nptel.ac.in/courses/106105084/13
- http://nptel.ac.in/courses/106105084/14
- http://projectabstracts.com/4975/a-simulation-environment-for-automatic-night-driving-and-visual-control.html
- http://projectabstracts.com/8290/web-based-management-solution-for-iptv-network.html#utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+ComputerProjects+%28Computer+Projects+from+ProjectAbstracts.com%29
- http://feedproxy.google.com/~r/ComputerProjects/~3/L0ZcudZhWO4/enhanching-the-human-team-awareness-of-a-robot.html?utm_source=feedburner&utm_medium=email
- http://projectabstracts.com/4975/a-simulation-environment-for-automatic-night-driving-and-visual-control.html

SEMESTER- VII

CSE401	OBJECT ORIENTED SOFTWARE DEVELOPMENT	L	T	P	C
		3	1	0	4

PREREQUISITES

- Object Oriented Programming (CSE203)
- Software Engineering (CSE303)
- Object Oriented Programming Lab (CSE282)
- Software Engineering Lab (CSE381)

COURSE OBJECTIVES

- The object-oriented software development industry has gone through the process of standardizing visual modeling notations. The Unified Modeling Language (UML), a modeling language for specifying, visualizing, constructing, and documenting, is the product of this effort. It unifies the notations that currently exist in the industry. Therefore, every computer scientist, and especially every software engineer should have contact with UML during his or her studies.

- It offers a common language uniting different object-oriented software development methodologies in terms of notation and vocabulary. It provides a rich set of notations that can be used to describe many different aspects of the software under development, including complex concurrency and distribution.

COURSE OUTCOMES

CO1: Understand the importance of system analysis with object oriented concepts and design in solving complex problems.
CO2: Explain the importance of modeling and how the UML represents an object oriented system using number of modeling views.
CO3: Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state diagrams, and implementation diagrams) using appropriate notations.
CO4: Recognize the difference between various object relationships like inheritance, association, whole-part and dependency relationships.
CO5 : Apply rational software suite for the construction of UML models and expressing the appropriate notations associated with each model.

UNIT I INTRODUCTION AND USE CASE MODEL

Object oriented concepts-Object Oriented systems analysis and design-Concept of a software development lifecycle-Unified Process-Iterative process - Definition of the Inception phase -

FURPS+ model. Use Case Model: Goals and scope of a Use Case-Actors - Finding Primary Actors, Goals, and Use Cases-Identifying and writing Use Cases-Use Case types and formats

UNIT II ELABORATION PHASE AND INERACTION DIAGRAM

Definition of the Elaboration phase -Estimate the overall schedule and resources- System behavior: Identify system events and system operations - Creating a System Sequence Diagram. Interaction diagrams: Importance of interaction diagrams-Sequence diagrams and collaboration diagrams-Creating a collaboration diagram-Collaboration diagram notation

UNIT III DOMAIN AND DESIGN MODELS

Visualizing and identifying concepts-Using noun phrase identification-Domain or Conceptual Models - Creating a domain model - Associations. Responsibilities-Pre-conditions-Post-conditions-Exceptions Design Model: Visibility; identifying four kinds -Visibility in UML notation-Fundamental object design-Design patterns-UML notation for interaction diagrams

UNIT IV DESIGNING CLASS DIAGRAMS

Identify classes, methods and associations -DCDs and the UP-Domain Model and Design Model Classes-Steps for creating DCDs - DCDs and CASE tools-Generalization- specialization-aggregation. State diagrams : Events, states and transitions-Use Case State diagram-State independent and State dependent Classes or Types-External and internal events

UNITV IMPLEMENTATION MODEL

Define patterns-Applying patterns and assigning responsibilities-Coupling and Cohesion Applying patterns to assign responsibilities to classes-Define frameworks-Persistence Mapping design artifacts to code in an OO language-Mapping designs to code-Creating class definitions from DCDs - Creating methods from interaction diagrams UML and CASE tools : Fitting UML into Unified Process- CASE tools

TEXT BOOK

1. Larman, C., Applying UML and Patterns. An introduction to Object-Oriented Analysis and Design, Prentice-Hall , 3rd Edition, 2005

REFERENCE BOOKS

1. Bjarne Stroustrup , The C++ Programming Language, 3rd edition, 2000
2. Grady Booch, James Rumbaugh, Ivar Jacobson, UML User Guide, Addison Wesley, 2000.
3. Tom Pender , UML 2.0 Bible, Wiley Publishing, Inc, 2003

WEB RESOURCES

- http://g.oswego.edu/dl/oosd/ch3.html
- http://www.sts.tu-harburg.de/teaching/ws-98.99/OOA+D/entry.html
- http://www.visualbuilder.com/uml/tutorial/
- http://www.iai.uni-bonn.de/III/lehre/vorlesungen/SWT/RE05/slides/09_Non-functional%20Requirements.pdf
- http://www.scribd.com/doc/79644611/17/FURPS-Supportability
- http://publib.boulder.ibm.com/infocenter/rtnlhelp/v6r0m0
- http/index.jsp?topic=/com.ibm.rsm.nav.doc/topics/cusecasemodel.html
- http://www.peterindia.net/OODBMSLinks.html
- http://www.vldb.org/conf/1992/P077.PDF
- http://sqa.fyicenter.com/FAQ/Glossary-Software-Testing/Quality_Assurance.html
- http://www.asknumbers.com/QualityAssuranceandTesting.aspx
- http://www.unl.csi.cuny.edu/faqs/software-enginering/tools.html

CSE402	INTERNET PROGRAMMING	L	T	P	C
		3	1	0	4

PREREQUISITE

Object oriented programming(CSE206)

COURSE OBJECTIVES

- To make the student to become aware of the Internet Principles, Basic WebConcepts, Mark up & Scripting Languages.
- To equip the student with the techniques of CGI, Socket and Server side programming for online communication and computing.
- To train the student to become familiar with the online databases-commerce and its application.

COURSE OUTCOMES

CO1: Understand the programming concepts of HTML, DHTML, CSS, JavaScript, XML and other Web technologies.
CO2: Implement client side applications using JavaScript Language
CO3: Develop dynamic User Interface applications.
CO4: Analyze the need of "WEBSERVERS" for the management and Development delivery of electronic information.
CO5: Utilize professional level platforms (ASP, JSP, Servlets) to produce software systems/websites that meet specified user needs and constraints.
CO6: Evaluate the software system/websites produced for usability, efficiency and accuracy.

UNIT I INTRODUCTION

History of the Internet, History of the World Wide Web, World Wide Web Consortium (W3C) - Introduction to Hyper Text Markup Language - Editing HTML - Common Elements – Headers - Linking - Images - Unordered Lists - Nested and Ordered Lists - HTML Tables - Basic HTML Forms, Image Maps, Meta Elements, Frames and Framesets.

UNIT II CSS and JAVASCRIPT

Cascading Style sheets, Embedded Style sheets, Inline Style sheets, Linking External Style sheets, Positioning elements, Backgrounds. JavaScript - Introduction to Scripting- Control Statements- Functions- Arrays- Objects, Client side Form Validations.

UNIT III DYNAMIC HTML

Dynamic HTML - Object Model and Collections- Event Model- Filters and Transitions- Data Binding with Tabular Data Control, Structured Graphics Active X Controls.

UNIT IV EXTENSIBLE MARK UP LANGUAGE

XML - Introduction-Structuring Data-XML Namespaces - Parsers, Well-formed XML Document – Valid XML Document - Document Type Definition (DTD) - Document Type Declaration - Element Type Declarations - Attributes –Schemas - Document Object Model (DOM) –DOM Methods, XSL: Extensible Style Sheet Language Transformations (XSLT).

UNIT V SERVER SIDE PROGRAMMING

ASP – Introduction and Basics - ASP Objects-Simple Examples-File System Objects, Session Tracking and Cookies –Active X Data Objects, Accessing a Database from an ASP. Servlets – Introduction – Overview and Architecture – Handling HTTP Get and POST Methods. JSP - Overview – Example – Implicit Objects – Scripting Components – Examples – Standard Actions.

TEXTBOOKS

1. Deitel & Deitel, Internet & World Wide Web How to Program, Pearson Education India Third Edition -2008.
2. N.P. Gopalan, J. Akilandeswari, Web Technology, PHI, July 2009.

REFERNCE BOOKS

1. Robert W. Sebesta, Programming with World wide Web, 4th Edition, Pearson Education, 2009.
2. Negrino and Smith, Javascript for the World Wide Web, 5th Edition, , Peachpit Press-2008.
3. Deitel & Deitel, XML How to Program, Pearson Education, 2009
4. Benoit Marchal, XML by Example, 2nd Edition, Que/Sams 2008.
5. Rob Francis, Rescued by ASP and ASP .Net, Thomson Dellman Learning, 2005.

WEB RESOURCES

- http://www.cwru.edu/help/introHTML/
- http://javascriptkit.com/javaindex.shtml
- http://www.pageresource.com/jscript/index6.htm
- http://www.w3schools.com/dhtml/
- http://www.w3schools.com/vbscript/default.asp
- http://www.cs.tufts.edu/comp/20/oldnotes/
- http://www.htmlhelp.com/reference/css/
- http://java.sun.com/docs/books/tutorial/servlets
- http://www.w3school.com/xml/default.asp

CSE481	INTERNET PROGRAMMING LABORATORY	L	T	P	C
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PREREQUISITE

Object oriented programming Lab(CSE285)

COURSE OBJECTIVES

- This course provides the student with a basic understanding of the more common programming languages/scripts used on the internet. Emphasizes the development of dynamic/interactive WebPages. Some of the internet languages that are covered include HTML, DHTML, JavaScript, Vbscript, Java Applets, JavaServlets, Form processing, and database Connectivity.

- The client/server paradigm will be explored in detail featuring website design and construction using HTML and java script. Students will learn how to construct their own web clients and servers and become proficient in HTML programming. Students will learn the tools needed to successfully review, analyze and modify both client/server and Web environments programming systems

COURSE OUTCOMES

CO1: Develop interactive web pages using scripting languages and style sheets.

CO2: Extend three tier applications using servlets.

CO3: Demonstrate simple chat applications using datagram.

CO4: Utilize the protocols namely FTP, SMTP, POP3.

CO5: Design interactive and dynamic WebPages using HTML / DHTML, Cascading Style Sheets , JavaScript & VBScript and Java & JavaServlets

LIST OF EXPERIMENTS

1. Write programs in Java to demonstrate the use of following components Text fields, buttons, Scrollbar, Choice, List and Check box
2. Write Java programs to demonstrate the use of various Layouts like Flow Layout, Border
3. Layout, Grid layout, Grid bag layout and card layout
4. Write programs in Java to create applets incorporating the following features:
    a. Create a color palette with matrix of buttons
    b. Set background and foreground of the control text area by selecting a color from color palette.
    c. In order to select Foreground or background use check box control as radio buttons
    d. To set background images
5. Write programs in Java to do the following.

a. Set the URL of another server.
b. Download the homepage of the server.\
c. Display the contents of home page with date, content type, and Expiration date.

6. Last modified and length of the home page.
7. Write programs in Java using sockets to implement the following:
   1. HTTP request 2. FTP 3. SMTP. 4. POP3
8. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
9. Write programs in Java using Servlets:
   a. To invoke servlets from HTML forms b. To invoke servlets from Applets
10. Write programs in Java to create three-tier applications using servlets
    a. Or conducting on-line examination.
    b. For displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
11. Create a web page with the following using HTML
    a. To embed a map in a Web page
    b. To fix the hot spots in the map
    c. Show all the related information when the hot spots are clicked.
12. Create a web page with the following
    a. Cascading style sheets.
    b. Embedded style sheets.
    c. Inline style sheets.
    d. Use our college information for the web pages

WEB RESOURCES

- http://www.cwru.edu/help/introHTML/
- http://www.w3schools.com/html/html_intro.asp
- http://www.w3schools.com/html/html_elements.asp
- http://nptel.ac.in/courses/106105084/13
- http://java.sun.com/docs/books/tutorial/servlets
- http://en.wikipedia.org/wiki/Java_servlet
- http://www.tutorialspoint.com/servlets/
- http://www.javatpoint.com/servlet-tutorial
- http://tutorials.jenkov.com/java-servlets/index.html
- http://www.youtube.com/watch?v=XlryaovT_3k
- http://www.w3school.com/xml/default.asp
- http://www.w3schools.com/html/html_xhtml.asp
- http://www.w3.org/XML/
- http://www.xmlfiles.com/xml/
- http://www.xml.com/
- http://nptel.ac.in/courses/106105084/16

CSE482	OBJECT ORIENTED SOFTWARE DEVELOPMENT LABORATORY	L	T	P	C
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PREREQUISITE

Software Engineering Lab (CSE381)

COURSE OBJECTIVES

The course provides knowledge in introducing the concepts and terms used in the object-oriented approach to systems analysis and design. This course highlights the importance of object-oriented analysis and design and its limitations. The course shows how to apply the process of object-oriented analysis and design to software development. It points out the importance and function of each UML model throughout the process of object-oriented analysis and design and explains the notation of various elements in these models. It provides students with the necessary knowledge and skills in using object-oriented CASE tools.

After completing this course the student must demonstrate the knowledge and ability to:

- Show the importance of systems analysis and design in solving complex problems.
- Show how the object-oriented approach differs from the traditional approach to systems =analysis and design.
- Explain the importance of modeling and how the Unified Modeling Language (UML) represents an object-oriented system using a number of modeling views.
- Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation. Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships.
- Show the role and function of each UML model in developing object-oriented software.
- Apply the Rational Software Suit for the construction of UML models and expressing the appropriate notation associated with each model.

COURSE OUTCOMES

CO1: Create a list of use cases, classes, objects out of the given problem summary.

CO2: Develop the steps in each phase of the software development model.

CO3: Apply the given UML tool on identified models.

CO4: Verify the deliverables of the model with sample inputs.

CO5: Document the refined designs and coding

FOR AN ASSIGNED PROBLEM APPLY THE FOLLOWING SOFTWARE ENGINEERING TECHNIQUES:

1. Read and refine an Analysis Document for design.
2. Create and document a logical design.

3. Create and document a physical design.
4. Create and document an application database.
5. Use a CASE tool for systems design. (Be familiar with modern object-oriented systems including CASE tools and libraries)
6. Use an Application Framework in the design of an information system.
7. Create commonly expected deliverables of systems design: Design Documentation, UML System Design (including UML database design) & System prototypes
8. Perform Software Testing using a suitable testing technique with testing data
9. Perform Software Debugging
10. Document the refined designs and coding

WEB RESOURCES

- http://norsamsiah.files.wordpress.com/2010/01/lab-001-introduction-to-uml.pdf
- http://web.uettaxila.edu.pk/CMS/coeOODbsSp09/labs%5Codd_lab1.pdf
- http://ocw.mit.edu/courses/architecture/4-297-special-problems-in-architecture-studies-fall-2000/labs/UML3.pdf
- http://jnec.org/Lab-manuals/IT/BE/BE-ooad%20lab%20manual.pdf

CSE483	MOBILE APPLICATION DEVELOPMENT LAB	L	T	P	C
		0	0	3	2

PREREQUISITE

· Sound Knowledge in Java and javascript - CSE 205/ Java programming

COURSE OBJECTIVES

To make the students to develop mobile applications using existing programming languages such as JavaScript, Java, and third party mobile application development tools. Includes developing simple applications that could run on mobile devices. Sharpens programming skills in application development

COURSE OUTCOMES

CO1: Understand and learn how to develop applications for Android mobile devices
CO2: Develop mobile applications with underlying database supports
CO3: Design and develop mobile applications that can smartly communicate with a server applications
CO4: Develop multimedia and location based applications for Android devices
CO5: Understand the IOS SDK framework

LIST OF EXPERIMENTS

1. General Form Design
2. Mobile browser based interactive applications
3. Applications using controls
4. Mobile networking applications (SMS/Email)
5. Applications involving data retrieval
6. Launching services in a mobile phone
7. Web portal development
8. Applications using Android SDK framework (like interactive applications, applications that make use of accelerometer sensor, video applications)
9. Applications that use the iPhone SDK framework
10. Testing the applications using emulators

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

1. JDK environment
2. J2ME
3. Sun Java Wireless Toolkit
4. Android SDK
5. iPhone SDK

WEB RESOURCES

- http://www.vbtutor.in/getting-started-with-visual-basic-net/introducing-to-visual-studio
- http://centurion2.com/VBHomework/VB2/vb2.php
- http://visualbasic.about.com/od/learnvbnet/a/eventhandler.htm
- http://msdn.microsoft.com/en-us/library/ms172749.aspx
- http://www.vbtutor.net/vb2008/vb2008_lesson1.html
- http://www.vbtutor.net/vb2008/vb2008_lesson5.html
- http://msdn.microsoft.com/en-us/library/hcwywcse%28v=vs.80%29.aspx
- http://www.aivosto.com/vbtips/datatypes.html
- http://msdn.microsoft.com/en-us/library/47zceaw7%28v=vs.80%29.aspx
- http://msdn.microsoft.com/en-us/library/ae55hdtk.aspx
- http://visualbasic.about.com/od/usingvbnet/a/datatypes.htm
- http://msdn.microsoft.com/en-us/library/47zceaw7%28v=vs.71%29.aspx
- http://www.homeandlearn.co.uk/net/nets1p15.html
- http://visualbasic.about.com/od/quicktips/qt/vardeclare.htm
- http://www.vbdotnetheaven.com/tags/Connecting-to-a-MySQL-Database-in-ADO.NET
- http://www.vbdotnetheaven.com/tags/Creating-Your-First-ADO.NET-Web-Application
- http://www.vbdotnetheaven.com/tags/Database-Layer

MAJOR ELECTIVES

CSE307	ARTIFICIAL INTELLIGENCE	L	T	P	C
		3	0	0	3

PREREQUISITES

- Data structure(CSE103)
- Algorithm and complexity(CSE209)

COURSE OBJECTIVES

- To Understand different planning problems
- To have the basic knowledge how to design and implement AI planning systems
- To know how to use AI planning technology for projects in different application domains
- Ability to make use of AI planning literature

COURSE OUTCOMES

CO1: Learn the basics of the theory and practice of Artificial Intelligence as a discipline about intelligent agents capable of deciding what to do, and do it.
CO2: Understand the strengths and limitations of various state-space search algorithms and choose the appropriate algorithms for a problem.
CO3: Apply knowledge representation techniques and problem solving strategies to common AI applications.
CO4: Design simple software to experiment with various AI concepts and analyze results.
CO5: Build self-learning and research skills to be able to tackle a topic of interest on his/her own or as part of a team.

UNIT I INTRODUCTION

Intelligent Agents – Agents and environments - Good behavior – The nature of environments – structure of agents - Problem Solving - problem solving agents – example problems – searching for solutions – uniformed search strategies - avoiding repeated states – searching with partial information.

UNIT II SEARCHING TECHNIQUES

Informed search and exploration – Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Constraint satisfaction problems (CSP) – Backtracking search and Local search for CSP – Structure of problems - Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning.

UNIT III KNOWLEDGE REPRESENTATION

First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution

UNIT IV LEARNING

Learning from observations - forms of learning - Inductive learning - Learning decision trees - Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods - Learning with complete data - Learning with hidden variable - EM algorithm - Instance based learning - Neural networks

UNIT V APPLICATIONS

Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction - Probabilistic language processing - Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

TEXT BOOK

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", 3rd Edition, Pearson Education / Prentice Hall of India, 2014.

REFERENCE BOOKS

1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw-Hill, 2003.
3. George F. Luger, "Artificial Intelligence-Structures And Strategies For Complex Problem Solving", Pearson Education / PHI, 2002.

WEB RESOURCES

- http://51lica.com/wp-content/uploads/2012/05/Artificial-Intelligence-A-Modern-Approach-3rd-Edition.pdf
- http://www.facweb.iitkgp.ernet.in/~pallab/ai.slides/lec1.pdf
- http://www.cs.ubbcluj.ro/~csatol/log_funk/prolog/slides/7-search.pdf
- http://spider.sci.brooklyn.cuny.edu/~kopec/Publications/Publications/O_5_AI.pdf
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-825-techniques-in-artificial-intelligence-sma-5504-fall-2002/lecture-notes/Lecture2Final.pdf
- http://people.cs.pitt.edu/~milos/courses/cs2740/Lectures/class1.pdf
- http://stpk.cs.rtu.lv/sites/all/files/stpk/lecture_7.pdf
- http://www.time.mk/trajkovski/teaching/aim/chapter18.pdf
- https://www8.cs.umu.se/kurser/5DV063/HT07/utdelat/Learning_Chapter18.pdf
- http://www.bionet.nsc.ru/chair/grfb/presentations/hofestaedt.pdf
- https://cis.k.hosei.ac.jp/~rhuang/Miccl/AI-2/AI-2-L1.pdf
- http://www.micai.org/rcs/Vol-17-Applications.pdf
- http://www.hutter1.net/ai/sintro2ai.pdf

CSE308	MULTIMEDIA SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITE

Graphics and visual computing(CSE320**)**

COURSE OBJECTIVES

- To have knowledge about multimedia-enabled protocols in multimedia communication and multimedia-enabled concepts in the protocol stack in multimedia group communication.
- To enable the students to develop synchronization concepts and mechanisms across the whole multimedia system architecture.
- To study the basic concepts for multimedia transmission at the physical, Medium access control layers presenting the past and existing network technologies

COURSE OUTCOMES

CO1: Understand the concepts of Multimedia architecture, elements, applications and interface standards.
CO2: Learn the different types of compression techniques and different types of data file Format used in multimedia systems.
CO3: Know the Multimedia Authoring Systems and Hypermedia message components & standards.
CO4: Be able to analyze the QOs requirements and real time system model in multimedia systems.
CO5: Prepared to use the presented idea in a multimedia group communications and specification methods for synchronization.

UNIT I INTRODUCTION

Multimedia Elements – Multimedia applications – Architecture- Evolving Technologies for Multimedia systems – Objects for Multimedia Systems – Multimedia Data Interface standards – Multimedia Databases

UNIT II COMPRESSION AND DATA, FILE FORMAT

Types of Compression – Binary Image Compression schemes – Color , Gray scale and still video image compression – Video Compression – Audio Compression – Fractal Compression - Rich Text Format – TIFF File Format – RIFF – MIDI File Format – JPEG DIB File Format – AVI indeo File Format –MPEG Standards.

UNIT III MULTIMEDIA AUTHORING AND USER INTERFACE

Multimedia Authoring Systems – Hypermedia applications and Design considerations – User Interface Design – Mobile Messaging – Hyper Media Message Components – Hyperlinking and Embedding – Creating Hypermedia Messages – Integrated Multimedia Message Standards – Integrated Document Management .

UNIT IV MULTIMEDIA QOS AND OS

Introduction - QoS Requirements and Constraints – Concepts Resources – Establishment Phase – Management Architecture – Real Time Processing - Scheduling – Interprocess Communication – Server Architectrure.

UNIT V MULTIMEDIA COMMUNICATION AND SYNCHRONIZATION

Transport Subsystem – Protocol Support for QoS – Transport of Multimedia – Computer Supported Cooperative Work Architecture – Session Management – MBone Applications – Synchronization Types – Multimedia Synchronization Methods – Case studies: MHEG –MODE – ACME.

TEXT BOOKS

1. Prabhat K.Andliegh , Kiran Thakrar,":Multimedia System Design", PHI Learning Private Ltd, 2009.
2. Ralf Steinmetz , Klara Nahrstedt," Multimedia Systems", Springer ,1st edition 2004.

REFERENCE BOOKS

1. Vaughan T, Multimedia , Tata McGraw Hill ,1999.
2. Rao K, Zoran S.Bojkovic, Dragoard A.Milovacovic,D.A. Milovacovic,"Multimedia Communication Systems: Techniques,Standards and Networks,Prentice Hall, 1st Edition,2002.
3. Ze-NianLi, Mark S.Drew," Fumdamentals of Multimedia", PHI Learning Private ltd, 2009.

WEB RESOURCES

- http://pet.ece.iisc.ernet.in/course/E0262/ch7.ppt
- http://students.cs.byu.edu/~cs460ta/cs460/slides/lecture40.ppt
- http://www.csie.ntu.edu.tw/~rfchang/lab/pdf/Make/Ch11.pdf
- http://www.item.ntnu.no/_media/academics/courses/ttm4142/ttm4142_090821_qos.pdf
- http://www.cs.uiuc.edu/class/fa05/cs423ug/L29_real.pdf
- http://www.csd.uoc.gr/~hy345/notes/7.ppt
- http://www.dcs.ed.ac.uk/teaching/cs3/os/slides/ipc.ppt
- http://www.nets.rwth-achen.de/content/teaching/lectures/sub/mms/mmsSS02/slides/08.pdf
- http://www.tkn.tu-berlin.de/curricula/ss01/bbn/Folien/FDDI_6.pdf
- http://web.cs.wpi.edu/~rek/Undergrad_Nets/B04/ATM.ppt
- http://pet.ece.iisc.ernet.in/course/E0262/ch4.ppt
- http://artstream.ucsc.edu/film20c/Spring2003/Lectures/08.05.2003/lecture.ppt
- http://social.cs.uiuc.edu/class/cs414/lectures/mm-synchronization.ppt

CSE311	EMBEDDED SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITES

- Digital Electronics (ECE202)
- Microprocessors (CSE286)
- Microprocessors Lab(CSE211)

COURSE OBJECTIVES

To teach students all aspects of the design and development of an embedded system, including hardware and embedded software development. A wide competence from different areas of technology, especially from computer engineering, robotics, electronics, intelligent systems and mechatronics. Deep state of the art theoretical knowledge in the areas of real time systems, artificial intelligence, learning systems, and their interdisciplinary nature needed for integrated hardware/software development of embedded systems. Ability to analyze a system both as whole and in the included parts, to understand how these parts interact in the functionality and properties of the system. Understanding and experience of state of – the - practice industrial embedded systems and intelligent embedded system development.

- To understand about the basic architecture and functions of embedded system.
- To appreciate the impact of Embedded System on our daily lives
- To realize the role played by various companies in embedded product development
- To appreciate the globalization of the product development ecosystem
- To understand the career paths for an entry level professional and implement a new
- feature on an embedded product platform
- To have the ability to design a system, component or process to meet desired needs
- within realistic constraints such as economic, environmental, social, ethical and
- sustainability.

COURSE OUTCOMES

CO1: Study about the hardware fundamentals and the microprocessor architecture

CO2: Understand the operating system and the programming guidelines

CO3: Realize the operation and memory management of Real-time operating system

CO4: Understand the embedded software development tools and design the real time operating system

CO5: Program execution environment, Testing and debugging on host machine

UNIT I INTRODUCTION TO EMBEDDED SYSTEM AND HARDWARE FUNDAMENTALS

Examples of Embedded Systems-Typical Hardware- Terminology-Gates-A Few Other Basic Considerations-Timing Diagrams-Memory- Interrupts: Microprocessor Architecture-Interrupt Basics-The Shared-Data Problem-Interrupt Latency.

UNIT II SOFTWARE ARCHITECTURES FOR EMBEDDED SYSTEMS

Round-Robin-Round-Robin with Interrupts-Function-Queue-Scheduling Architecture-Real-Time Operating System Architecture-Selecting an Architecture Forth/Open Firmware: Introducing Forth. String Words-Stack Manipulation- Creating New Words Comments- if ... else- Loops-. Data Structures-Interacting with Hardware and Memory- Forth Programming Guidelines

UNIT III INTRODUCTION TO REAL-TIME OPERATING SYSTEMS.

Tasks and Task States-Tasks and Data-Semaphores and Shared Data -Operating System Services - Message Queues, Mailboxes, and Pipes-Timer Functions-Events - Memory Management - Interrupt Routines in an RTOS Environment.

UNIT IV BASIC DESIGN USING A REAL-TIME OPERATING SYSTEM.

Overview – Principles - An Example - Encapsulating Semaphores and Queues - Hard Real-Time Scheduling Considerations - Saving Memory Space - Saving Power - Embedded Software Development Tools - Host and Target Machines - Linker/Locators for Embedded Software - Getting Embedded Software into the Target System

UNIT V DEBUGGING TECHNIQUES AND AN EXAMPLE SYSTEM:

Testing on Your Host Machine-Instruction Set Simulators - The assert Macro - Using Laboratory Tools -An Example System - What the Program Does - Environment in Which the Program Operates - A Guide to the Source Code - Source Code.

TEXT BOOKS

1. David Simon , An Embedded Software Primer, Addison Wesliey.
2. John Catsoulis, Designing Embedded Hardware, O'Reilly Publication, 2005

REFERENCE BOOK

1. Raj Kamal, Embedded Systems: Architecture and Programming, Mc Graw Hill publications, 1st Edition, 2003.

WEB RESOURCES

- http://www.futureelectronics.com/en/microprocessors/embedded-processors.aspx
- http://what-when-how.com/8051-microcontroller/microcontrollers-and-embedded-processors/
- http://ubiquity.acm.org/article.cfm?id=1086450
- http://esd.cs.ucr.edu/
- http://www.springer.com/gp/book/9789400702561
- http://users.ece.utexas.edu/~bevans/courses/ee382c/resources/
- http://www.peterindia.net/EmbeddedSoftwareSystem.html
- http://www.embeddedrelated.com/

CSE312	REAL TIME SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITE

Operating system (CSE207)

COURSE OBJECTIVES

- Explain and apply the fundamental concepts and terminology of real-time systems.
- Explain and address the fundamental problems of real-time systems.
- Analyze real-time systems designs.
- Design a real-time system.
- Identify and assess the relevant literature and research trends of real-time systems.

COURSE OUTCOMES

CO1: Understand the basics and importance of real-time systems
CO2: Implement a high-level analysis document based on requirements specifications
CO3: Implement a high-level design document based on analysis documentation
CO4: Implement a test plan based on requirements specification
CO5: Implement a validation plan based on all documentation
CO6: Understand basic multi-task scheduling algorithms for periodic, a periodic, and sporadic task as well as understand the impact of the latter two on scheduling
CO7: Understand capabilities of at least one commercial off-the-shelf R-T kernel

UNIT I INTRODUCTION TO REAL TIME SYSTEMS

Architecture of Real time Systems / Embedded Systems – Operating Systems issues – Performance Measures – Estimating Program runtimes.

UNIT II TASK ASSIGNMENT AND SCHEDULING

Uniprocessor Scheduling – IRIS Tasks – Tasks Assignment - Mode changes – Fault tolerant scheduling.

UNIT III PROGRAMMING LANGUAGES AND TOOLS

Desired characteristics based on ADA – Data typing – Control Structures – Packages – Exception Handling – Overloading – Multitasking – Timing specification – Task Scheduling – Just-in-time Compilation – Runtime support.

UNIT IV REAL TIME COMMUNICATION AND DATABASES

Basic networking principles – Real time databases – Transaction processing – Concurrency control – Disk scheduling algorithms – Serialization and Consistency.

UNIT V FAULT TOLERANCE, RELIABILITY AND SYNCHRONIZATION

Fault types – Fault detection and Fault containment – Redundancy – Data diversity – Reversal checks – Obtaining parameter values – Reliability models for hardware redundancy – Software error models – Clocks – Fault tolerant synchronization – Synchronization in software.

TEXT BOOK

1. Krishna C.M., Kang G.Shin, Real Time Systems, McGraw-Hill, 1997.

REFERENCE BOOKS

1. Raymond J.A. Buhr, Donald L. Bailey, An Introduction To Real Time Systems, Prentice Hall International, 1999.
2. Raymond J.A. Buhr, An Introduction to Real Time System from Design to Networking C and C++, Prentice Hall, 1999.
3. Stuart Bennett, Real Time Computer Control -An Introduction, 2nd Edition PHI, 1994.
4. Peter D Lawrence, Real Time Micro Computer System Design - An Introduction, McGrawHill, 1988.
5. 5.Jane .W. S. Liu "Real Time Systems" Pearson Education, 2000.

WEB RESOURCES

- http://users.ece.cmu.edu/~koopman/des_s99/real_time/
- http://www.ni.com/white-paper/52225/en/
- http://goo.gl/50rUOz
- http://goo.gl/iYY2jY
- http://goo.gl/IxTWD0
- www.cse.unsw.edu.au/~cs9242/08/lectures/09-realtimex2.pdf
- http://class.ece.iastate.edu/cpre458/lecture_notes.htm.
- http://class.ece.iastate.edu/cpre458/cpre558.F00/notes/new-rts-lect03.ppt
- http://class.ece.iastate.edu/cpre458/cpre558.F00/notes/new-rts-lect02.ppt
- www.cse.chalmers.se/edu/course/...Real_Time_Systems/lectures.html

CSE313	NATURAL LANGUAGE PROCESSING	L	T	P	C
		3	0	0	3

PREREQUISITES

- Theory of Computation(CSE204)
- Compiler Design(CSE304)

COURSE OBJECTIVES

- Understand approaches to syntax and semantics in NLP.
- Acquire basic understanding of , generation, dialogue and summarization within NLP.
- To learn the efficiency of current methods for statistical approaches to machine translation.

COURSE OUTCOMES

CO1: Understand Knowledge in speech and language processing
CO2: Determine the language syntax Grammars equivalence and normal forms.
CO3: Recognize Syntax-Driven semantic analysis
CO4: Identify natural language generation.
CO5: Build Language similarities and differences for Usability and system development.

UNIT I INTRODUCTION

Introduction: Knowledge in speech and language processing – Ambiguity – Models and Algorithms – Language, Thought and Understanding. Regular Expressions and automata: Regular expressions – Finite-State automata. Morphology and Finite-State Transducers: Survey of English morphology – Finite-State Morphological parsing – Combining FST lexicon and rules – Lexicon-Free FSTs: The porter stammer – Human morphological processing

UNIT II SYNTAX

Constituency – Context-Free rules and trees – Sentence-level constructions – The noun phrase – Coordination – Agreement – The verb phase and sub categorization – Auxiliaries – Spoken language syntax – Grammars equivalence and normal form – Finite-State and Context-Free grammars – Grammars and human processing. Parsing with Context-Free Grammars - Parsing as search – A basic Top-Down parser – Problems with the basic Top-Down parser – The early algorithm – Finite-State parsing methods

UNIT III SEMANTIC

Syntax-Driven semantic analysis – Attachments for a fragment of English – Integrating semantic analysis into the early parser – Idioms and compositionality – Robust semantic analysis. Lexical semantics: relational among lexemes and their senses – WordNet: A database of lexical relations –

The Internal structure of words – Creativity and the lexicon.

UNIT IV NATURAL LANGUAGE GENERATION

Introduction to language generation – Architecture for generation – Surface realization – Discourse planning – Other issues

UNIT V MACHINE TRANSLATION

Language similarities and differences – The transfer metaphor – The interlingua idea: Using meaning – Direct translation – Using statistical techniques – Usability and system development.

TEXT BOOK

1. Daniel Jurafsky and James Martin H., Speech and Language Processing, Pearson Education,Singapore Pvt. Ltd., 2003.

REFERENCE BOOK

1. James Allen, Natural Language Understanding, Pearson Education, 2003.

WEB RESOURCES

- www.cambridge.org/.../languages.../introducing-speech-and-language-prcourses.uohyd.ac.in/Humanities/AL_424.htm
- www.lite.etsii.urjc.es/fran/pdf/VAST-JUCS-SIIE08.pdf
- effbot.org/zone/simple-top-down-parsing.htm
- ling.umd.edu/~ellenlau/courses/ling646/sprouse.lau.syntax.brain.pdf
- ocw.mit.edu/courses/...natural-language-processing.../lecture-notes/lec01...
- www.cl.cam.ac.uk/teaching/0708/CST/node66.html
- https://www.coursera.org/course/nlangp

CSE314	DIGITAL IMAGE PROCESSING	L	T	P	C
		3	0	0	3

PREREQUISITES

- Mathematics III (MAT202)
- Mathematics IV (MAT222)

COURSE OBJECTIVES

To understand the theoretical knowledge of digital image processing techniques and applications

COURSE OUTCOMES

CO1: Acquire the fundamental concepts of a digital image processing system.
CO2: Learn different image transforms techniques
CO3: Apply image enhancement techniques.
CO4: Understand the concept of restoration techniques.
CO5: Analyze and compress given images using segmentation techniques.

UNIT I INTRODUCTION

Background and Applications – Elements of Digital Image Processing System – Elements of Visual Perception – Brightness Adoption and Discrimination – Color Representation - Statistical Background – Image Representation – The Need – Format.

UNIT II DIFFERENT IMAGE TRANSFORMS

The Discrete Fourier Transform(DFT) – Properties of 2-D DFT – Hadamard Transform – Walsh Transform – Discrete Cosine Transform (DCT) – Karhunen-Loeve(KL) Transform – Wavelet Transform (WT) – Discrete Sine Transform (DST)- Wavelet Compression.

UNIT III IMAGE ENHANCEMENT

Introduction – Point Operations – Histogram Modeling – Image Smoothing – Magnification and Interpolation – Transform Operations – Multispectral Image Enhancement – False Color, True Color & Pseudo Color – Color Image Enhancement.

UNIT IV RESTORATION

Introduction – Convolution Techniques – Formulation of Discrete Linear Operators – Inverse and Weiner Filtering – Maximum Entropy Restoration – Coordinate Transformation and Geometric Correction – Splines and their Role in Image Restoration – Fourier Descriptors.

UNIT V IMAGE ANALYSIS & COMPRESSION

Edge Detection – Segmentation – Texture – Texture Segmentation – Introduction to Image Compression – Error Criterion – Lossy Compression – Loss-less Compression – Other Methods.

TEXT BOOKS

1. Madhuri A.Joshi, "Digital Image Processing – An Algorithmic Approach", PHI Learning, 2009.
2. Handa B, Dutta Majumder D, "Digital Image Processing and Analysis", PHI Learning, 2009.

WEB RESOURCES

- http://www.imageprocessingplace.com
- http://www.eie.polyu.edu.hk/~enyhchan/imagef.pdf
- http://pippin.gimp.org/image_processing/chap_dir.html
- http://www.scantips.com/basics09.html
- http://www.uiowa.edu/geog/health/index8.html
- http://ee.sharif.edu/~dip/Files/DIPTransformForPrint.pdf
- http://www.commsp.ee.ic.ac.uk/~tania/teaching/DIP%202014/Image%20Transforms.pdf
- http://www.commsp.ee.ic.ac.uk/~tania/teaching/DIP%202014/Image%20Enhancement.pdf
- http://inst.eecs.berkeley.edu/~ee225b/sp06/handouts/Image_Restoration_99.pdf
- http://www.commsp.ee.ic.ac.uk/~tania/teaching/DIP%202014/Image%20Restoration.pdf
- http://homepages.inf.ed.ac.uk/rbf/CVonline/LOCAL_COPIES/MORSE/region.pdf
- http://www.commsp.ee.ic.ac.uk/~tania/teaching/DIP%202014/Part-0.pdf
- http://www.commsp.ee.ic.ac.uk/~tania/teaching/DIP%202014/Part-1.pdf
- http://www.cs.dartmouth.edu/farid/tutorials/fip.pdf

CSE315	DISTRIBUTED COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITE

Operating system(CSE207)

COURSE OBJECTIVES

- Present the principles underlying the function of distributed systems and their extension to grid and cloud computing and virtualization techniques.
- Create an awareness of the fundamental technical challenges in advanced distributed systems design and implementation;
- Expose students to current technology used to build architectures to enhance distributed computing infrastructures with various computing principles and paradigms, including grid and cloud computing;
- Enhance students' understanding of key issues related to multi-level interoperability across a distributed infrastructure and across multiple heterogeneous and distributed resources in a dynamically changing computing environment;
- Expose students to past and current research issues in the field of distributed Computing and new challenges in cloud computing; and Provide experience in analyzing a distributed computing model and implementing typical algorithms used in distributed systems and distributed applications in cloud infrastructure.

COURSE OUTCOMES

CO1: Understand distributed system and Computing.

CO2: Analysis why you would design a distributed system , what the desired properties of such systems are and list the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;

CO3: Remember what are the issues in operating systems for distributed systems while designing the distributed systems

CO4: Apply distributed Transaction process such as locking and deadlock in distributed systems

CO5: Create distributed system software using various methods, strategies, and fault tolerance techniques presented in the course.

UNIT I INTRODUCTION

Characterization of Distributed Systems: Resource sharing and the Web-System models:-Architectural models-Fundamental Models, Interprocess Communication:-The API for the Internet protocols, External data representation and marshalling, Client Server communication, Group communication.

UNIT II DISTRIBUTED OBJECT AND REMOTE INVOCATION

Distributed objects and Remote Invocation - Communication between distributed objects - Remote Procedure call - Events -and notifications - Operating System Support - The operating system layer- Protection- Processes and threads-Communication and invocation-Operating system architecture**.**

UNIT III OPERATING SYSTEM ISSUES

Distributed File Systems:- File service architecture-Sun Network File System-The Andrew File System. Time and Global States:-clocks, events and process states Synchronizing physical clocks-Logical time and logical clocks-Global states. Coordination and Agreement - Distributed mutual exclusion- Elections- Multicast communication.

UNIT IV DISTRIBUTED TRANSACTION PROCESS

Transactions and Concurrency Control:- Transactions, Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering. Distributed Transactions:- Flat and nested distributed transactions - Atomic commit protocols - concurrency control in distributed transactions - Distributed deadlocks - Transaction recovery.

UNIT V FAULT TOLERANCE

Process Resilience, Reliable client server communication, Reliable group communication, Distributed Commit and Recovery.

TEXT BOOKS

1. George Coulouris, Jean Dollimore & Tim Kindberg, "Distributed Systems – Concepts and Design", Pearson (LPE), 4th Edition, 2008.
2. Andrew S. Tanenbaum & Maarten van Steen, "Distributed Systems Principles and Paradigms", PHI, 2nd Edition, 2007

REFERENCE BOOKS

1. Joel M Crichlow, "Distributed System – Computing over Networks", Prentice Hall, 2008.
2. Mugesh Singhal, Niranjan G Shivaratri, "Advanced Concepts in Operating systems", Tata McGraw Hill, 3rd Edition, 2001
3. Andrew S. Tanenbaum, "Distributed Operating Systems", Prentice Hall, 1st Edition, 1994
4. Pradeep K. Sinha, "Distributed Operating Systems Concepts and Design", PHI, 1st Edition, 1997.

WEB RESOURCES

- http://en.wikipedia.org/wiki/List_of_distributed_computing_projects
- http://www.e-reading.link/book.php?book=143358
- http://www.indiastudychannel.com/resources/107761-Design-Issues-Distributed-Operating-System.aspx
- http://www.inf.uni-konstanz.de/dbis/teaching/ss06/os/ch14-wrongNumber.pdf
- https://www.cs.rutgers.edu/~pxk/rutgers/notes/content/ft.html

CSE316	DIGITAL SIGNAL PROCESSING	L	T	P	C
		3	0	0	3

PREREQUISITE

Mathematics III- MAT 201

COURSE OBJECTIVES

To develop skills for analyzing and synthesizing algorithms and systems that process discrete time signals, with emphasis on realization and implementation.

COURSE OUTCOMES

CO1: Represent discrete-time signals analytically and visualize them in the time domain

CO2: Understand the Transform domain and its significance and problems related to computational complexity

CO3: Design linear digital filter IIR using different techniques and their associated structures

CO4: Design linear digital filter FIR using different techniques and their associated structures

CO5: Understand the concept of Finite Word Length Effects

UNIT I SIGNALS AND SYSTEMS

Basic elements of digital signal Processing – Concept of frequency in continuous time and discrete time signals Sampling theorem -Discrete time signals. Discrete time systems – Analysis of Linear time invariant systems –Z transform –Convolution and correlation

UNIT II FAST FOURIER TRANSFORMS

Introduction to DFT – Efficient computation of DFT Properties of DFT – FFT algorithms – Radix-2 and Radix-4 FFT algorithms – Decimation in Time – Decimation in Frequency algorithms – Use of FFT algorithms in Linear Filtering and correlation.

UNIT III IIR FILTER DESIGN

Structure of IIR – System Design of Discrete time IIR filter from continuous time filter – IIR filter design by Impulse Invariance - Bilinear transformation – Approximation derivatives – Design of IR filter in the Frequency domain

UNIT IV FIR FILTER DESIGN

Symmetric - Antisymteric FIR filters – Linear phase filter – Windowing technique – Rectangular, Kaiser windows – Frequency sampling techniques – Structure for FIR systems.

UNIT V FINITE WORD LENGTH EFFECTS

Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representation – comparison – over flow error – truncation error – co-efficient quantization error - limit cycle oscillation – signal scaling – analytical model of sample and hold operations – Application of DSP – Model of Speech Wave Form – Vocoder.

TEXT BOOK

1. John G Proakis and Dimtris G Manolakis, Digital Signal Processing Principles, Algorithms and Application, PHI/Pearson Education, 3rd Edition, 2000.

REFERENCE BOOKS

1. Alan V Oppenheim, Ronald W Schafer and John R Buck, Discrete Time Signal Processing, PHI/Pearson Education, 2nd Edition , 2000.
2. Johny R.Johnson, Introduction to Digital Signal Processing, Prentice Hall of India/Pearson Education, 2002.
3. Sanjit K.Mitra, Digital Signal Processing: A Computer – Based Approach, Tata McGraw-Hill, Second Edition , 2001.

WEB RESOURCES

- http://www.eng.ucy.ac.cy/cpitris/courses/ece623/notes/SignalsAndSystems.pdf
- http://www.analog.com/media/en/technical-documentation/dsp-book/dsp_book_Ch12.pdf
- https://www.ece.cmu.edu/~ee791/lectures/L22/IIRDesign.pdf
- http://www.ee.ic.ac.uk/naylor/notes/DSP4.pdf
- http://www.cs.tut.fi/~ts/Mitra_Kaiser.pdf
- http://www.sps.ele.tue.nl/members/j.h.f.ritzerfeld/pdfs/aeu89.pdf
- http://www.dsp-book.narod.ru/DSPMW/03.PDF

CSE321	GREEN COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITE

Student must know about basic energy management option in individual components such as CPUs, network interfaces, hard drives, memory. And operating systems.

COURSE OBJECTIVES

This course covers fundamental principles of energy management faced by designers of hardware, operating systems, and data centers. We will explore basic energy management option in individual components such as CPUs, network interfaces, hard drives, memory. We will further present the energy management policies at the operating system level that consider performance vs. energy saving tradeoffs. Finally we will consider large scale data centers where energy management is done at multiple layers from individual components in the system to shutting down entries subset of machines. We will also discuss energy generation and delivery and well as cooling issues in large data centers.

COURSE OUTCOMES

CO1: Understand the concepts of technologies that conform to low-power computation

CO2: Understand green (power-efficient) technologies for components of one single computer, such as CPU, memory and disk, and appreciate cutting edge designs for these components including memristors

CO3: Have a basic understanding of a variety of technologies applied in building a green system (especially green datacentres), including networks, Virtual Machine (VM) management and storage systems

CO4: Be able to use a range of tools to help monitor and design green systems

UNIT I FUNDAMENTALS

Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics.

UNIT II GREEN ASSETS AND MODELING

Green Assets: Buildings, Data Centers, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Environmental Intelligence – Green Supply Chains – Green Information Systems: Design and development Models.

UNIT III GRID FRAMEWORK

Virtualizing of IT systems – Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data center – Green Grid framework.

UNIT IV GREEN COMPLIANCE

Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future.

UNIT V CASE STUDIES

The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

TEXT BOOKS

1. Bhuvan Unhelkar, "Green IT Strategies and Applications-Using Environmental Intelligence", CRC Press, June 2011
2. Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", August 2009.

REFERENCES

1. Alin Gales, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shoff/IBM rebook, 2011.
2. 2.John Lamb, "The Greening of IT", Pearson Education, 2009.
3. 3 Jason Harris, "Green Computing and Green IT- Best Practices on regulations & industry", Lulu.com, 2008.
4. Carl speshocky, "Empowering Green Initiatives with IT", John Wiley & Sons, 2010.
5. Wu Chun Feng (editor), "Green computing: Large Scale energy efficiency", CRC Press, 2012.

WEB RESOURCES

- http://www.ncomputing.com/company/green-computing
- http://www.sustainableit.com/top-10-reasons-to-adopt-a-green-it-strategy/
- http://www.greenstreetadvisors.com/about/page/REIT_valuation_toc/
- http://www.infoworld.com/article/2621446/server-virtualization/server-virtualization-top-10-benefits-of-server-virtualization.html
- http://www.vmware.com/in/virtualization
- http://www.greencompliance.com/
- http://onlinelibrary.wiley.com/doi/10.1002/2013JG002591/abstract

CSE322	FREE AND OPEN SOURCE SOFTWARE	L	T	P	C
		3	0	0	3

PREREQUISITES

- System software**(CSE 203)**
- Programming languages (**CSE102**)
- Java programming (**CSE205)**
- Opersting systems (**CSE207**)

COURSE OBJECTIVES

- Understand the Philosophy and System Administration of Free and Open Source Software
- To learn the efficiency of open source software in the orientation of information literacy.
- Work with local, national and international institutions and networks working in the FOSS domain in order to share experiences and to learn from one other.

COURSE OUTCOME

CO1: Understand GNU/ Linux and Licensing free software.
CO2: Determine GNU/ Linux system administration.
CO3: Recognize licensing norms of FOSS which enables software to be freely modified and distributed.
CO4: Identify different programming techniques.
CO5: Build a software system in a team with other developers.

UNIT I PHILOSOPHY

Linux, GNU and Freedom, Brief history of GNU, Licensing free software – GPL and copy Left, trends and potential – global and Indian, overview and usage of various Linux Distributions – user friendliness perspective – scientific perspective

UNIT II SYSTEM ADMINISTRATION

GNU and linux installation – Boot process, Commands Using bash features, The man pages, files and file systems, File security, Partitions, Processes, Managing processes, I/O redirection, Graphical environment, Installing software, Backup techniques

UNIT III FOSS PROGRAMMING PRACTICES

GNU debugging tools, Using source code versioning and managing tools, Review of common programming practices and guidelines for GNU/Linux and FOSS, Documentation

UNIT IV PROGRAMMING TECHNIQUES

Application programming – Basics of X Windows server architecture – QT programming – GTK + Programming- Python programming – Open source equivalent of existing Commercial software

UNIT V PROJECTS AND CASE STUDIES

Linux for portable Devices, Creation of Bootable CD and USB from command line, Case Studies – Samba, Libreoffice, Assistive technology

TEXT BOOK

1. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, Linux in a nutshell, Sixth Edition, OReilly media, September 2009.

REFERENCE BOOKS

1. Philosophy of GNU URL: http://www.gnu.org/philosophy/
2. Overview of Linux Distributions URL: http://distrowatch.com/dwres.php?resource=major
3. Introduction to Linux – A Hands on Guide, URL: http://tldp.org/guides.html
4. Linux: Rute's User tutorial and exposition , URL: http://rute.2038bug.com/index.html.gz
5. Version control system , URL: http://git-scm.com/
6. SVN version control , URL: http://svnbook.red-bean.com/
7. GTK+/GNOME Application Development, HavocPennington.
    a. URL: http://developer.gnome.org/doc/GGAD
8. Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor. URL:
9. http://www.python.org/doc/current/tut/tut.html
10. Doug Abbot, Linux for Embedded and Embedded and Real time applications , Newnes
11. Case study SAMBA: URL : http://www.samba.org/
12. Case study., Libre office: http://www.libreoffice.or

WEB RESOURCES

- http://visualgdb.com/tutorials/gnudebug/
- https://help.ubuntu.com/community/PortableDevices/iPhone
- http://www.fujifilmusa.com/shared/resource_center/resources/FUJIFILM_SAMBA_Technology_A4.pdf
- http://www.slideshare.net/gkrocks/the-open-source-philosophy-8676204
- http://www.zap.org.au/elec2041-cdrom/unsw/common/gdb-intro.pdf
- https://www.debian.org/releases/wheezy/amd64/

CSE323	CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P	C
		3	0	0	3

PREREQUISITE

Computer Networks(CSE318)

COURSE OBJECTIVES

- To provide deeper understanding into cryptography, its application to network security, threats/vulnerabilities to networks and countermeasures.
- To study various approaches to Encryption techniques,symmetric key encryption and asymmetric key encryption algorithms.
- To know Digital Signature Standard and provide solutions for their issues.
- To be familiar with E mail security, web security and IP security.
- To analyze the system security.

COURSE OUTCOMES

CO1: Understand the number theory concepts
CO2: Impart knowledge on symmetric and asymmetric encryption techniques.
CO3: Create an understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works.
CO4: Examine the issues and structure of Authentication Service and Electronic Mail Security,web security and IP security.
CO5: Provide familiarity in system security.

UNIT I

Security trends – Attacks and services – Classical crypto systems – Different types of ciphers – LFSR sequences – Basic Number theory – Congruences – Chinese Remainder theorem – Modular exponentiation – Fermat and Euler's theorem – Legendre and Jacobi symbols – Finite fields – continued fractions.

UNIT II

Simple DES – Differential cryptoanalysis – DES – Modes of operation – Triple DES – AES – RC4 – RSA – Attacks – Primality test – factoring.

UNIT III

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange – ElGamal Public key cryptosystems – Hash functions – Secure Hash – Birthday attacks - MD5 – Digital signatures – RSA – ElGamal – DSA.

UNIT IV

Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – IP security – Web Security – SSL, TLS, SET.

UNIT V

System security – Intruders – Malicious software – viruses – Firewalls – Security Standards.

TEXT BOOKS

1. Wade Trappe, Lawrence C Washington, " Introduction to Cryptography with coding theory", 2nd ed, Pearson, 2007.
2. William Stallings, "Crpyptography and Network security Principles and Practices", Pearson/PHI, 4th ed, 2006.

REFERENCE BOOKS

1. W. Mao, "Modern Cryptography – Theory and Practice", Pearson Education, Second Edition, 2007.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing Third Edition – Prentice Hall of India, 2006.

WEB RESOURCES

- http://cobweb.ecn.purdue.edu/~kak/compsec/NewLectures/Lecture2.pdf
- http://csrc.nist.gov/publications/fips/fips46-3/fips46-3.pdf
- http://homes.esat.kuleuven.be/~abiryuko/Enc/e31.pdf
- http://www.quadibloc.com/crypto/co040401.htm
- http://csrc.nist.gov/publications/fips/fips197/fips-197.pdf
- http://www.deviceforge.com/articles/AT4234154468.html
- http://modular.fas.harvard.edu/edu/Fall2001/124/misc/koblitz_ecc.pdf
- http://csrc.nist.gov/publications/fips/fips180-2/fips180-2.pdf
- http://www.ietf.org/rfc/rfc3174.txt
- http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/com.ibm.aix.security/doc/security/cas_pki.htm
- http://www.x5.net/faqs/crypto/q165.html

CSE324	ETHICAL HACKING	L	T	P	C
		3	0	0	3

PREREQUISITES

- Computer Programming (**CSE102**)
- Computer networks and data Communication (**CSE318)**
- Distributed Computing(**CSE315)**
- Experience with Windows operating system and knowledge of TCP/IP and networking

COURSE OBJECTIVES

- Understand Ethical Hacking.
- Identify how intruders escalate privileges and what steps can be taken to secure a system.
- Introduce and demonstrate hacking tools for penetration testing purposes only.

COURSE OUTCOMES

CO1: Understand the Ethics Of Ethical Hacking **.**
CO2: Identify the Social Engineering Attacks **.**
CO3: Recognize and Detect Types of Attacks.
CO4: Manage Instrumented Fuzzying Tools and Techniques.
CO5: Collect Malware and Initial Analysis.

UNIT I

Ethics Of Ethical Hacking: Why you need to Understand Your Enemy's Tactics?, Recognizing The Gray Areas in Security – Vulnerability Assessment – Penetration Testing. Ethical Hacking and the Legal System: Understanding Individual Cyberlaws – 18 USC Section 1029, 1030, 2510 – Digital Millennium Copyright Act (DMCA) – Cyber Security Enhancement Act 2002. Proper and Ethical Disclosure: CERT's Current Process – Full Disclosure Policy – Organization for Internet Safety

UNIT II

Social Engineering Attacks: How A Social Engineering Attack Works? – Conducting A Social Engineering Attack – Common Attacks used in Penetration Testing – Defending Against Social Engineering Attacks. Physical Penetration Attacks: Why A Physical Penetration is important – Conducting a Physical Penetration – Common Ways into A Building. Insider Attacks: Why Simulating an Insider Attack is Important – Conducting an Insider Attack – Defending against Insider Attack.

UNIT III

Understanding and Detecting Content-Type Attacks: How do Content-Type Attacks work? - Which File Formats are Being Exploited Today? - Tools to Detect Malicious PDF Files – Tools to test your Protections against Content-Type Attacks – How to protect your Environment from Content-Type Attacks. Web Application Security Vulnerabilities: Overview of Top Web Application Security Vulnerabilities – SQL Injection Vulnerabilities – Cross-Site Scripting Vulnerabilities. VoIP Attacks

UNIT IV

Passive Analysis: Ethical Reverse Engineering – Why Bother with Reverse Engineering? – Source Code Analysis. Advanced Reverse Engineering: Overview of Software Development Process – Instrumentation Tools – Fuzzing – Instrumented Fuzzying Tools and Techniques. Finding New Browser Based Vulnerabilities. Mitigation Alternatives

UNIT V

Collecting Malware and Initial Analysis: Malware – Latest Trends in Honeynet Technology – Catching Malware – Initial Analysis of Malware. Hacking Malware: Trends in Malware – De-Obfuscating Malware – Reverse Engineering Malware.

TEXT BOOKS

1. Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, Gideon Lenkey, Terron Williams, "Gray Hat Hacking The Ethical Hackers Handbook", 3rd Edition, 2011.

REFERENCE BOOKS

1. Sharma Pankaj, "Hacking", APH Publishing, 2005.
2. Rajat Khare, "Network Security and Ethical Hacking", Luniver Press, 2006.

WEB RESOURCES

- http://aruiz.mysite.com/ethical_hacking.html
- http://www.slideshare.net/virkan/ethical-hacking-2000416?qid=df237440-e1c5-43c5-b47f-c9ed8657cb38&v=qf1&b=&from_search=5
- http://blog.backupify.com/2013/06/24/5-types-of-social-engineering-attacks/
- http://cdn.ttgtmedia.com/searchSecurity/downloads/TM_GrayHatHacking_Chapter16.pdf
- http://www.veracode.com/security/web-application-vulnerabilities
- https://www.ethicalhacker.net/columns/heffner/intro-to-assembly-and-reverse-engineering
- https://hackeracademy.com/library

CSE325	MOBILE APPLICATION DEVELOPMENT	L	T	P	C
		3	0	0	3

PREREQUISITES

- Algorithm and Complexity(CSE209)
- Software Engineering(CSE303)
- Object oriented Software Development(CSE402)

COURSE OBJECTIVE

To introduce the programming techniques and design pattern of mobile application development.

COURSE OUTCOMES

CO1: Study about the mobile application market and web services for various mobile devices
CO2: Understand and develop the various Mobile Information Design and Mobile Platforms
CO3: Design the User interface with various features of Android SDK like displaying pictures, menus etc.
CO4: Utilize the messaging, networking and location based service in Android application
CO5: Create, Debug and build the apps for the latest Windows and IOS

UNIT I INTRODUCTION

Preliminary Considerations – Cost of Development – Importance of Mobile Strategies in Business World – Mobile Web Presence – Mobile Applications – Marketing – Web Services for Mobile Devices – Creating Example Web Service _ Debugging Web Service

UNIT II MOBILE USER INTERFACE DESIGN

Effective Use of Screen Real Estate – Understanding Mobile Application Users – Understanding Mobile Information Design – Understanding Mobile Platforms – Using the Tools for Mobile Interface Design – Choosing a Mobile Web Option – Adaptive Mobile Website – Mobile Web Applications with HTML 5

UNIT III ANDROID APPLICATION DEVELOPMENT

Getting to know the Android User Interfaces – Designing Your User interface using Views – Displaying Pictures and Menus with Views – Using Image views to Display pictures – Using menus with views – Data Persistence – Saving and loading user performances - Persisting data to files – Creating and using Data bases – Content Providers.

UNIT IV ANDROID MESSAGING, NETWORKING, LOCATION BASED SERVICES

SMS Messaging, Sending E-mail – Networking – Downloading Binary Data, Text Files- Accessing Web Services – Performing Asynchronous Calls – Location Based Services – Displaying Maps – Getting Location Data – Creating your own services – Communicating between a service and an activity – Binding activities to Services

UNIT V IOS AND WINDOWS PHONE

Getting started with iOS – iOS Project – Debugging iOS Apps – Objective C Basics – Hello Word App – Building the derby app in iOS – Windows Phone 7 Project – Building Derby App in Windows Phone 7.

REFERENCE BOOKS

1. Jeff McWherter and Scott Gowell, Professional Mobile Application Development, Wrox 2012.
2. Wei – Meng Lee, Beginning Android Application Development, Wiley 2011
3. Charlie Collins, Michael Galpin and Matthias Kappler, Android in Practice, Dream Tech. 2012
4. James Dovey and Ash Furrow, Beginning Objective C, Apress, 2012
5. David Mark, Jack Nutting, Jeff LaMouche, and Fredric Olsson, Beginning iOS6 Development: Exploring the iOS SDK, Apress, 2013

WEB RESOURCES

- http://www.uky.edu/~jclark/mas490apps/History%20of%20Mobile%20Apps.pdf
- http://www.comentum.com/web-application-development-services.html
- http://www.impetus.com/mobility
- http://www.brandchannel.com/images/papers/531_apppli_wp_mobile_app_marketing_1011.pdf
- http://www.sourcebits.com/#!/app-marketing
- http://www.forbes.com/sites/allbusiness/2013/11/14/how-to-build-your-first-mobile-app-in-12-steps-part-2/
- http://www.usabilityresources.net/User%20Interface%20Design%20for%20Mobile%20Devices.pdf
- http://latemar.science.unitn.it/LODE/Laboratorio_Di_Programmazione_Di_Sistemi_Mobili_E_Tablet_2012/courses/Laboratorio_Di_Programmazione_Di_Sistemi_Mobili_E_Tablet_2012/Slides_Sources/19_Ui_Gidelines_2012-04-26/lecture1-1stPart.pdf
- http://www.lionbridge.com/files/2012/11/Lionbridge-WP_MobileApps2.pdf
- http://publications.cetis.ac.uk/wp-content/uploads/2011/10/Mobile_Web_Apps.pdf
- http://infocenter.sybase.com/help/topic/com.sybase.infocenter.dc01285.0210/doc/pdf/sup_tutorial_windowsmobile_native_application_development.pdf
- http://www.cl.cam.ac.uk/~acr31/p36/WP8%20Development%20Cambridge.pdf
- https://km.zebra.com/resources/sites/ZEBRA/content/live/WHITE_PAPERS/0/WH57/en_US/WinMobileSDK_CSharp_GettingStarted_WH.pdf
- http://www.vargr.com/files/wimo101.pdf
- http://www.cs.tau.ac.il/~hillelav/courses/p2c_8/RobMilesWindowsPhoneBlueBook.pdf
- http://www.tutorialspoint.com/ios/ios_tutorial.pdf
- http://www.iosappsforeveryone.com/GettingStarted.pdf
- http://infocenter.sybase.com/help/topic/com.sybase.infocenter.dc01213.0200/doc/pdf/sup_tutorials_ioscodegen.pdf
- https://developer.apple.com/library/ios/documentation/iPhone/Conceptual/iPhoneOSProgrammingGuide/iPhoneAppProgrammingGuide.pdf

CSE326	CLOUD COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITES

- Computer Architecture and Organization (CSE210)
- Computer Networks(CSE318)

COURSE OBJECTIVE

This course aims to introduce the students with the Cloud Computing paradigm, illustrate capabilities and limitations of current providers of Cloud Computing services and to understand the mechanisms required to apply Cloud Computing in their own endevours.

COURSE OUTCOMES

CO1: Understand the layers and types of Cloud Computing
CO2: Understand the IaaS, PaaS and SaaS
CO3: Analyze various scheduling techniques for virtual machines in cloud infrastructure
CO4: Implement private/public/hybrid Cloud infrastructure
CO5: Implement policy management system for Cloud Computing
CO6: Design of data security techniques in the Cloud Computing

UNIT I FOUNDATIONS

Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS Cloud computing platforms: Infrastructure as service: Amazon EC2,Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing

UNIT II INFRASTRUCTURE AS A SERVICE (IaaS)

Introduction to Cloud Technologies, Study of Hypervisors, Compare SOAP and REST Webservices, AJAX and mashups-Web services: SOAP and REST, SOAP versus ,REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization Multitenant software: Multi-entity support, Multi-schema approach, Multi-tenance using cloud data stores, Data access control for enterprise applications,

UNIT III PLATFORM AND SOFTWARE AS A SERVICE

Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel

efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Mapreduce, Features and comparisons among GFS,HDFS etc, Map-Reduce model

UNIT IV MONITORING AND MANAGEMENT

Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud Cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control-Identity management, Access control, Autonomic Security Cloud computing security challenges: Virtualization security management- virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud.

UNIT V GOVERNANCE AND SECURITY

Issues in cloud computing, Implementing real time application over cloud platform Issues in Intercloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment. Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Monitoring in Cloud

TEXT BOOKS

1. Cloud Computing for Dummies by Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper (Wiley India Edition)
2. Enterprise Cloud Computing by Gautam Shroff,Cambridge
3. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley-India

REFERENCE BOOKS

1. Google Apps by Scott Granneman,Pearson
2. Cloud Security & Privacy by Tim Malhar, S.Kumaraswammy, S.Latif (SPD,O'REILLY)
3. Cloud Computing : A Practical Approach, Antohy T Velte, et.al McGraw Hill,
4. Cloud Computing Bible by Barrie Sosinsky, Wiley India

WEB RESOURCES

- https://www.priv.gc.ca/resource/fs-fi/02_05_d_51_cc_e.pdf
- http://www.secc.org.eg/recocape/SECC_Tutorials_An%20Introduction%20to%20Cloud%20Computing%20Concepts.pdf
- http://c.ymcdn.com/sites/www.aitp.org/resource/resmgr/2013-ie-files/cloudrevolution.Pdf
- https://java.net/jira/secure/attachment/29265/CloudComputing.pdf

- http://bigdatawg.nist.gov/_uploadfiles/M0008_v1_7256814129.pdf
- http://csrc.nist.gov/publications/nistbul/june-2012_itl-bulletin.pdf
- http://www.oracle.com/technetwork/articles/cloudcomp/migrating-to-the-cloudchap-3-495856.pdf
- http://www.cisco.com/en/US/services/ps2961/ps10364/ps10370/ps11104/Migration_of_Enterprise_Apps_to_Cloud_White_Paper.pdf
- http://www.oracle.com/us/products/middleware/data-integration/dataintegration-for-cloud-1870536.pdf
- http://www.cloudbus.org/papers/Aneka-AzurePlatform.pdf
- http://www.vmware.com/files/pdf/VMware-Hybrid-Cloud-Brochure.pdf
- http://www.citrix.com/content/dam/citrix/en_us/documents/productssolutions/
- hybrid-cloud-provisioning-with-citrix-xendesktop-and-xenapp.pdf
- https://www.vmware.com/files/pdf/idc-hybrid-cloud-defined-white-paper.pdf
- http://research.iaun.ac.ir/pd/faramarz_safiold/pdfs/HomeWork_1591.pdf
- http://www.vmware.com/files/pdf/operational_readiness_for_cloud_computing.Pdf
- http://assets1.csc.com/cloud/downloads/IDC_WP_for_CSC_Cloud_Adoption.pdf
- http://www.centerbeam.com/uploads/pdf/CB_Cloud_Assessment.pdf
- http://www.cognizant.com/InsightsWhitepapers/cgReadinessBrochureWeb.pdf
- http://www.cloudwatchhub.eu/sites/default/files/CloudComputingSLAs-ExploitationofResearchResults.pdf
- http://www.cloudstandardscustomercouncil.org/2012_Practical_Guide_to_Cloud_SLAs.pdf
- http://www.infosys.tuwien.ac.at/staff/vincent/pub/Emeakaroha_CloudComp2010.pdf

CSE327	DATA MINING AND DATAWARE HOUSING	L	T	P	C
		3	0	0	3

PREREQUISITES

- Database Management Systems(CSE212).
- Preferred basic concepts in probability and statistics.
- Fundamentals of computers

COURSE OBJECTIVES

- To introduce students to the basic concepts and techniques of Data Mining.
- To develop skills of using recent data mining software for solving practical problems.
- To gain experience of doing independent study and research.

COURSE OUTCOMES

CO1: Understand the basic concepts of data warehouse and functionality of the various data warehousing components and how it differs from traditional data base systems and how it is helpful for data mining.
CO2: Understand the pre-processing methods on datasets and various functionality of the data mining system.
CO3: Apply classification and prediction methods for data mining.
CO4: Use various clustering algorithm for grouping data items of interest.
CO5: Understand various fields in which data mining can be applied and related tools used for mining process.

UNITI DATA WAREHOUSING

Introduction – Database Vs Data warehouse – Multidimensional Model: Data Cube – Schemas for Multidimensional Databases – Measures – Concept Hierarchies – OLAP operations – Three tier Data warehouse Architecture – Metadata repository – From Data warehouse to Data Mining.

UNITII DATA MINING

Motivation – definition - Data Preprocessing: Data Cleaning, Integration, Transformation, Reduction, Concept Hierarchy Generation for Numerical Data, Categorical Data – Data Mining Task primitives – Association Rule Mining: basic concepts, Frequent Itemset Mining Method: Apriori Algorithm, Candidate Generation – Kinds of Association Rules

UNITIII CLASSIFICATION

Basics – issues – methods: Decision tree Induction, Bayesian classification – Back propagation – other classification Techniques - prediction: Linear Regression – non linear regression – Accuracy and Error Measures.

UNITIV CLUSTERING

Basics – requirements – Types of data – Methods: partitioning Methods – K-means, K-mediods clustering – Agglomerative and Divise hierarchical clustering - BIRCH – ROCK – Density based Methods - Outlier Analysis.

UNITV TRENDS

Mining Time Series data – Spatial Data mining – Multimedia Data mining – Text Mining – Data mining Applications – Information Retrieval - Mining the World Wide Web.

TEXT BOOK

1. Jiawei Han, Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers, 3rd Edition, 2010.

REFERENCE BOOKS

1. Alex Berson, Stephen J. Smith, Data Warehousing, Data Mining,& OLAP, Tata Mcgraw-Hill, 2004.
2. Ralph Kimball, The Data Warehouse Life Cycle Toolkit, John Wiley & Sons Inc., 1998.

WEB RESOURCES

- http://www.tutorialspoint.com/dwh/dwh_schemas.htm
- http://www.cs.ccsu.edu/~markov/ccsu_courses/DataMining-2.htmL
- http://www.mimuw.edu.pl/~son/datamining/DM/4-preprocess.pdf
- http://www.tutorialspoint.com/data_mining/dm_bayesian_classification.htm
- http://iasri.res.in/ebook/win_school_aa/notes/association_rule_mining.pdf
- http://www.ijarcsse.com/docs/papers/April2012/Volume_2_issue_4/V2I40032.pdf
- http://www.ripublication.com/irph/ijict_spl/14_ijictv3n11spl.pdf
- http://dme.rwth-aachen.de/en/publications/2112
- https://www.siam.org/meetings/sdm10/tutorial3.pdf
- http://www.mimuw.edu.pl/~son/datamining/DM/Time%20Series%20Data%20Mining.pdf
- http://facweb.cs.depaul.edu/mobasher/classes/ect584/papers/cms-kais.pdf
- http://www.zentut.com/data-mining/data-mining-applications/

CSE328	C# AND .NET FRAMEWORK	L	T	P	C
		3	0	0	3

PREREQUISITES

- Programming Languages
- Object Oriented Programming

COURSE OBJECTIVE

- The ability to effectively use visual studio .NET.
- An understanding how to use forms to develop GUI programs under .NET
- An understanding of the goals and objectives of the .NET Framework. .NET is a revolutionary concept on how software should be developed and deployed
- A working knowledge of the C# programming language.
- Knowledge of some of the tools available in the .NET Framework class library. (FCL)
- Improved object-oriented programming skill through practice and insights gained by studying a new programming language.

COURSE OUTCOMES

CO1: Understand the programming concepts of C#.
CO2: Apply the object oriented concepts of C# for application development.
CO3: Create distributed data driven applications using the .NET framework and C#
CO4: Develop web-based distributed applications using C#, SQL Server and ADO.NET
CO5: Utilize XML in the .NET environment to create Web Service-based applications and components.

UNIT I

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

UNIT II

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

UNIT III

C# Concepts for creating Data Structures - File Operation – File Management systems – Stream Oriented Operations- Multitasking – Multithreading – Thread Operation – Synchronization.

UNIT IV

Working with XML – Techniques for Reading and Writing XML Data - Using XPath and Search XML - ADO.NET Architecture – ADO.NET Connected and Disconnected Models – XML and ADO.NET – Simple and Complex Data Binding– Data Grid View Class.

UNIT V

Application Domains – Remoting – Leasing and Sponsorship - .NET Coding Design Guidelines –Assemblies – Security – Application Development – Web Services - Building an XML Web Service - Web Service Client – WSDL and SOAP – Web Service with Complex Data Types – Web Service Performance.

TEXT BOOKS

1. S. Thamarai Selvi and R. Murugesan "A Textbook on C# ", Pearson Education,2003.
2. Stephen C. Perry " Core C# and .NET", Pearson Education,2006.

REFERENCE BOOKS

1. Jesse Liberty, "Programming C#", Second Edition, O'Reilly Press, 2002.
2. Robinson et al, "Professional C#", Fifth Edition, Wrox Press, 2002.
3. Herbert Schildt, "The Complete Reference: C#", Tata McGraw Hill, 2004.
4. Andrew Troelsen, "C# and the .NET Platform", A! Press, 2003.

WEB RESOURCES

- http://en.wikibooks.org/wiki/C_Sharp_Programming/NET_Framework_overview
- https://msdn.microsoft.com/en-us/library/zw4w595w(v=vs.110).aspx
- https://msdn.microsoft.com/en-us/library/a4t23ktk(v=vs.90).aspx
- http://csharp.net-tutorials.com/classes/inheritance/
- https://msdn.microsoft.com/en-IN/library/ms173152.aspx
- http://www.aspdotnet-suresh.com/2013/09/polymorphism-in-c-with-example-types-of-polymorphism.html
- http://csharp.net-tutorials.com/xml/introduction/
- http://stackoverflow.com/questions/220867/how-to-deal-with-xml-in-c-sharp
- http://www.csharpcorner.com/UploadFile/mahesh/ReadWriteXMLTutMellli211128200504 1517AM/ReadWriteXMLTutMellli21.aspx
- http://blogs.wrox.com/article/web-services-with-aspnet/
- http://stackoverflow.com/questions/4452724/parse-complex-wsdl-parameter-information
- http://www.w3schools.com/webservices/

CSE329	UNIX INTERNALS	L	T	P	C
		3	0	0	3

PREREQUISITES

- CSE102 – Programming Languages
- CSE182 – Programming Languages Lab
- CSE207 – Operating System

COURSE OBJECTIVES

To provide a fair knowledge of Unix concepts. To gain sharp skills in Unix Shell programming.The course exercises are designed to support an intensive introductory course on UNIX or to act as a reference to users who are new to UNIX. This course was designed particularly for use with the Linux operating system but much of it applies to other UNIX systems as well.

COURSE OUTCOMES

CO1: Graduates will acquire fundamental knowledge and concepts of UNIX Operating System
CO2: Graduates will acquire the concepts of UNIX shell as a beginner user
CO3: Graduates will acquire knowledge about text processing utilities like grep, sed and awk in UNIX
CO4: Graduates will acquire fair knowledge about programming features of UNIX shells sh
CO5: Graduates will have basic knowledge of process management and system operation of UNIX.

UNIT I

General Review of the System-History-System structure-User Perspective-Operating System Services- Assumptions About Hardware. Introduction to the Kernel-Architecture System Concepts-Data Structures- System Administration.

UNIT II

The Buffer Cache-Headers-Buffer Pool-Buffer Retrieval-Reading and Writing Disk Blocks - Advantages and Disadvantages. Internal Representation of Files-Inodes-Structure-irectories-Path Name to Inode- Super Block-Inode Assignment-Allocation of Disk Blocks -Other File Types.

UNIT III

System Calls for the File System-Open-Read-Write-Lseek-Close-Create-Special files Creation - Change Directory and Change Root-Change Owner and Change Mode-Stat-Fstat-Pipes-Dup-Mount-Unmount-Link-Unlink-File System Abstraction-Maintenance.

UNIT IV

The System Representation of Processes-States-Transitions-System Memory-Context of a Process-Saving the Context-Manipulation of a Process Address Space-Sleep Process Control-signals-Process Termination-Awaiting-Invoking other Programs-The Shell-System Boot and the INIT Process.

UNIT V

Memory Management Policies-Swapping-Demand Paging-a Hybrid System-I/O Subsystem-Driver Interfaces-Disk Drivers-Terminal Drivers.

TEXT BOOK

1. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education, 2002.

REFERENCE BOOKS

1. Uresh Vahalia, "UNIX Internals: The New Frontiers", Prentice Hall, 2000.
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. M. Beck et al, “Linux Kernel Programming”, Pearson Education Asia, 2002

WEB RESOURCES

- http://www.prenhall.com/glass_ables/content/chapter14.html
- http://www.ksvali.com/wp-content/uploads/2009/03/unix_internals_part1.pdf
- http://nptel.ac.in/courses/106108101/pdf/Lecture_Notes/Mod%2010_LN.pdf
- http://nptel.ac.in/courses/106108101/pdf/Lecture_Notes/Mod%2014_LN.pdf
- http://freevideolectures.com/Course/3049/Real-Time-Systems/24
- http://www.theunixschool.com/2012/03/internal-vs-external-commands.html
- https://flossstuff.wordpress.com/2011/05/04/linux-command-types-internal-and-external/

CSE403	SOFT COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITE

Artificial Intelligence(CSE307)

COURSE OBJECTIVES

- To familiarize with soft computing concepts.
- To introduce the ideas of Neural networks, fuzzy logic and use of heuristics based on human experience.
- To introduce the concepts of Genetic algorithm and its applications to soft computing using some real time applications.

COURSE OUTCOMES

CO1: Explain the major part of Fuzzy sets, Genetic algorithm and Artificial Neural Network.

CO2: Understand and Apply Neuro-fuzzy technology.

CO3: Analyze and evaluate existing soft computing methods.

CO4: Create and define innovative soft computing based solutions for real world problem.

CO5: Apply Genetic Algorithms and Artificial Neural Networks as computational tools to solve a variety of problems in their area of interest ranging from Optimization problems, pattern recognition and control tasks.

UNIT I AIMS OF SOFT COMPUTING

Aims of Soft Computing-Foundations of Fuzzy Sets Theory-Basic Concepts and Properties of Fuzzy Sets- Elements of Fuzzy Mathematics-Fuzzy Relations-Fuzzy Logic

UNIT II APPLICATION OF FUZZY SETS

Application of Fuzzy Sets-Fuzzy Modeling – Fuzzy Decision Making-Pattern Analysis and Classification-Fuzzy Control Systems-Fuzzy Information Processing-Fuzzy Robotics.

UNIT III ARTIFICIAL NEURAL NETWORKS

Introduction to Artificial Neural Networks- Fundamental models of Artificial Neural Network – Perceptron Networks- Feed Forward Networks – Feedback Networks- Adaptive Resonance theory – Supervised Learning Of Neural Networks -Unsupervised Learning-Rein formation Learning-Application Of Artificial neural network- Probabilistic Reasoning

UNIT IV GENETIC ALGORITHM

Genetic Algorithm Main Operators- Genetic Algorithm Based Optimization-Genetic Algorithm With Group Principle- Comparison Of Conventional And Genetic Search Algorithms-Applications-Elements Of Chaos System-Basic Concepts--Bifurcation And Handling Of Development Of Chaos-Empirical Chaos

UNIT V NEURO-FUZZY TECHNOLOGY

Fuzzy Neural Networks And Their Learning-Architecture Of Neuro-Fuzzy Systems-Generation Of Fuzzy Rules And Membership Functions-Fuzzification And Defzzyfication In Neuro-Fuzzy Systems- Neuro-Fuzzy Identification-Neuro Fuzzy Control- Neuro Fuzzy Navigation System For Intelligent Robot-Combination Of Genetic Algorithm With Neural Networks-Combination Of Genetic Algorithms And Fuzzy Logic- Neuro-Fuzzy-Genetic Approach.

TEXT BOOK

1. Aliev R.A, Aliev R.R., Soft Computing and its Application, World Scientific Publishing Co. Ptd. Ltd., 2001.

REFERENCE BOOKS

1. Cordón, O, Herrera, F, Hoffman F, Magdalena L., Genetic Fuzzy systems, World Scientific Publishing Co. Pvt. Ltd., 2001.
2. Kecman, V, Learning and Soft Computing, The MIT Press, 2001.
3. Mehrotra, K, Mohan C, K, Ranka, S, Elements of Artificial Neural Networks, The MIT Press, 1997.
4. S.N.Sivanandam,S.Sumathi,S.N.Deepa, Introduction to neural network using MATLAB 6.0, TMH private limited.
5. S.N.Sivanandam,S.Sumathi,S.N.Deepa , Principles of soft computing ,Wiley publications.

WEB RESOURCES

- www2.cs.uh.edu/~ceick/6367/Soft-Computing.pdf
- http://www.cb.uu.se/~joakim/course/fuzzy/vt07/lectures/L1_4.pdf
- http://utb.edu.vn/elib/Toan%20hoc/Fuzzy%20Mathematics.pdf
- http://reference.wolfram.com/applications/fuzzylogic/DemonstrationNotebooks/3.html
- http://fuzzy.cs.uni-magdeburg.de/ci/fs/fs_ch05_relations.pdf
- www.cse.unr.edu/~bebis/CS365/StudentPresentations/FuzzyLogic.ppt
- http://www.dca.fee.unicamp.br/~gomide/courses/IA861/transp/FSE_Chap10.pdf
- http://www.eenets.com/Files/Download/chapter_5.pdf
- http://www2.ece.ohio-state.edu/~passino/FCbook.pdf
- http://www.cool-ai.com/lecture.notes/fuzzy.logic.pdf

- http://www.cse.unr.edu/~bebis/MathMethods/NNs/lecture.pdf
- http://www.eis.mdx.ac.uk/staffpages/rvb/teaching/BIS3226/hand11.pdf
- http://www.cc.gatech.edu/~bhroleno/rnn_slides.pdf
- http://www.cs.bham.ac.uk/~jxb/INC/l12.pdf
- http://medusa.sdsu.edu/Robotics/Neuromuscular/Theses/Hongyu/chapter3.pdf
- http://www.astro.caltech.edu/~george/aybi199/Donalek_Classif.pdf
- https://graphics.ethz.ch/teaching/former/vc_master_06/Downloads/T7_SVM_Perceptrons_6.pdf
- http://www.obitko.com/tutorials/genetic-algorithms/ga-basic-description.php
- www.iitk.ac.in/kangal/papers/sadhana.ps.gz
- http://www.cmmacs.ernet.in/cmmacs/Lect_notes/choas%20theory.pdf
- http://www.softcomputing.net/gabrys.pdf
- http://www.cs.rit.edu/~lr/courses/ai/lectures/topic10.PDF
- http://gmm.fsksm.utm.my/~mariyam/BAHAN_MENGAJAR/HybridSoftComputing_ProfAjith_18FEB2009.pdf

CSE407	SOFTWARE QUALITY MANAGEMENT	L	T	P	C
		3	0	0	3

PREREQUISITES

- Software Engineering (CSE303)
- Object Oriented Software Development(CSE401)

COURSE OBJECTIVES

- To learn about the different methods and techniques used for quality management.
- To understand fundamental principles of software quality management and also have a good knowledge of responsibilities of quality manager.
- To understand the factors affecting the SQA and requirement for SQA
- To apply the quality tools and establish the steps for planning the quality
- Understanding various quality standards

COURSE OUTCOMES

CO1: Learn the needs of software quality
CO2: Understand the factors affecting the SQA and requirement for SQA
CO3: Acquire knowledge of quality and the nature of software defects
CO4: Apply the quality tools and establish the steps for planning the quality
CO5: Understanding various quality standards

UNIT I THEORY OF SOFTWARE QUALITY

Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb's approach – GQM Model

UNIT II SOFTWARE QUALITY ASSURANCE

Establishing quality goals – purpose and scope – SQA Management – Documentation – QA Techniques – Reviews and Audits

UNIT III QUALITY CONTROL AND RELIABILITY

Tools for Quality – Ishikawa's basic tools – CASE tools – Defect prevention and removal – Reliability models – Rayleigh model – Reliability growth models for quality assessment

UNIT IV QUALITY MANAGEMENT SYSTEM

Elements of QMS – Rayleigh model framework – Reliability Growth models for QMS – Complexity metrics and models – Customer satisfaction analysis.

UNIT V QUALITY STANDARDS

Need for standards – ISO 9000 Series – ISO 9000-3 for software development – CMM and CMMI – Six Sigma concepts – Trends in quality: the future

TEXT BOOKS

1. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003
2. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson Education (Singapore) Pte Ltd., 2002.

REFERENCE BOOKS

1. Mordechai Ben – Menachem and Garry S.Marliss, "*Software Quality*", Thomson Asia PvtLtd, 2008.
2. Norman E. Fenton and Shari Lawrence Pfleeger, "Software Metrics" Thomson, 2003
3. Mary Beth Chrissis, Mike Konrad and Sandy Shrum, "*CMMI*", Pearson Education (Singapore) Pvt Ltd, 2003.
4. ISO 9000-3 "Notes for the application of the ISO 9001 Standard to software development".

WEB RESOURCES

- www.researchgate.net/...Models.../0deec5190e5aa28921000000.pdf
- http://www.peterindia.net/QualityAssurance.html
- www.engr.sjsu.edu/gaojerry/course/287/QA.ppt
- http://www.hpl.hp.com/techreports/tandem/TR-96.1.pdf
- http://www.adamssixsigma.com/
- http://www.isixsigma.com/new-to-six sigma /getting-started/what-six-sigma
- http://www.sei.cmu.edu/cmmi/
- http://www.scs.shtr.org/pcmm1.html

CSE409	BIO INFORMATICS	L	T	P	C
		3	0	0	3

PREREQUISITE

Basic Knowledge in Statistics computational complexity, network analysis and data mining.

COURSE OBJECTIVES

- Use bioinformatics tools to study biology
- Recognize how to apply different bioinformatics tools
- Describe common bioinformatics algorithms
- Define what data is needed for a certain question
- Discuss the results in a biological context

COURSE OUTCOMES

CO1: Understand fundamental concepts in bioinformatics
CO2: Understand the theoretical basis behind bioinformatics.
CO3: Understand how some of the basic methods for biological sequence analysis works
CO4: Recognize how to apply different bioinformatics tools
CO5: Understand homology modelling and computational drug design.
CO6: Capable of performing simple sequence analyses using existing tools

UNIT I INTRODUCTION

The Central Dogma – Killer Application – Parallel Universes – Watson's Definition – Top Down Vs Bottom Up Approach – Information Flow – Conversance – Communications.

UNIT II DATABASE AND NETWORKS

Definition – Data Management – Data Life Cycle – Database Technology –Interfaces– Implementation– Networks: Communication Models – Transmission Technology – Protocols – Bandwidth – Topology – Contents – Security – Ownership –Implementation.

UNIT III SEARCH ENGINES AND DATA VISUALIZATION

Search Process – Technologies – Searching And Information Theory– Computational Methods – Knowledge Management – Sequence Visualizations – Structure Visualizations – User Interfaces – Animation Vs Simulation

UNIT IV STATISTICS, DATA MINING AND PATTERN MATCHING

Statistical Concepts – Micro Arrays – Imperfect Data – Basics –Quantifying – Randomness – Data Analysis – Tools Selection –Alignment – Clustering – Classification – Data Mining Methods – Technology – Infrastructure Pattern Recognition – Discovery – Machine Learning – Text Mining – Pattern Matching Fundamentals– Dot Matrix Analysis – Substitution Matrix – Dynamic Programming – Word Method – Bayesian Method – Multiple Sequence Alignment Tools.

UNIT V MODELING SIMULATION AND COLLABORATION

Drug Discovery Fundamentals – Protein Structure – System Biology Tools – Collaboration And Communication – Standards – Issues –Case Study.

TEXT BOOK

1. Bryan Bergeron, Bio Informatics Computing, Prentice Hall, 2003.

REFERENCE BOOKS

1. Affward T.K., Parry Smith D.J., Introduction to Bio Informatics,Pearson Education, 2001.
2. Pierre Baldi, Soren Brunak, Bio Informatics – The Machine Learning Approach, First East West Press, 2nd Edition, 2003

WEB RESOURCES

- http://www.ibioinformatics.org/
- http://bioinformatics.oxfordjournals.org/
- http://web.calstatela.edu/faculty/jmomand/Bioinformatics%20Manual.pdf
- http://www.cse.ucsd.edu/
- http://www.memphis.edu/binf/
- http://www.biomedcentral.com/bmcbioinformatics

CSE410	NETWORK MANAGEMENT	L	T	P	C
		3	0	0	3

PREREQUISITES

- Data Communications (Analog, Digital and Data Communications)(ECE 306)
- Basics and Fundamentals of computer Networks(CSE 318)

COURSE OBJECTIVES

- To understand the fundamental concepts of network management.
- To survey current network management systems and tools.
- To examine network management protocols.

COURSE OUTCOMES

CO1: Understand Network types and technology services.
CO2: Understand Network Management Architecture
CO3: Analyze SNMP protocol
CO4: Analyze RMON tools for Network Management
CO5: Implement Network management plan for large enterprise.

UNIT I TECHNOLOGY SERVICES AND COMPUTER NETWORK TECHNOLOGY

Introduction to Network Management-IT Services, Challenges, and Opportunities -Economics of IT Services-Network Management Systems and Organization-Network Components – Topologies - Internet Architecture - Bridged and Router Networks-Ring Networks, Virtual LANs, and Broadband Services

UNIT II NETWORK MANAGEMENT

Network Management Basics-Network Management Architectures & Applications Management Standards and Models – Network Management Functions-Configuration Management & Autodiscovery-Configuration Database & Reports-Abstract Syntax
Notation One (ASN.1)

UNIT III SNMP PROTOCOL

SNMP v1: Structure of Management Information-Std. Management Information Base (MIBs), Network Management Functions: Fault Management-Fault Identification and Isolation- Event Correlation Techniques. SNMP v2: Version 2 Protocol Specification-Version 2 MIB Enhancements-MIB-II, Case Diagrams - Security Management - Protecting Sensitive Information - Host and User Authentication-Key Management. SNMP v3: Version 3 Protocol & MIB - SNMP v3

User Based Security Model – View Based Access Model - Network Management Functions: Accounting Management - Performance Management- Network Usage, Metrics and Quotas.

UNIT IV REMOTE NETWORK MONITORING RMON

RMON1: Statistics Collection- Alarms and Filters-Remote Network Monitoring RMON 2-Monitoring Network Protocol Traffic-Application-Layer Visibility-Management Tools, Systems and Applications-Test and Monitoring Tools-Integrating Tools-Development Tools- Web-based Enterprise Management-Enterprise Network Management: Network Management System Requirements- Network Management Applications and Systems.

UNIT V TELECOMMUNICATIONS MANAGEMENT FOR SERVICE PROVIDERS

Telecommunications Network Management- ATM Management-Management of broadband Networks- Real-time OSs forNext-Generation Service Management-The Operations Systems Implications of Managing Next-Generation Networks Managing a Portfolio of Broadband Access Technologies-Next-Generation Network Design-Experiences in Establishing a Nationwide Broadband Network -Quality of Service in Heterogeneous Networks-Customer-Empowered Networking.

TEXT BOOK

1. Subramanian, M., Network Management: Principles and Practice, Addison-Wesley, 2000

REFERENCE BOOKS

1. Mauro, D.R. and Schmidt K.J., Essential SNMP, O'Reilly & Associates, Sabastopol, CA. 2001.
2. Peterson L. and Davie B, Computer Networks: A Systems Approach, Morgan Kaufmann Publishers Inc., 3rd edition, 2003.
3. Mahbub Hassan and Raj Jain, High Performance TCP/IP Networking, Prentice Hall, 1st Edition, 2004.

WEB RESOURCES

- http://www.mass.gov/Aitd/docs/policies_standards/nettworkmanagementarchitectureguidelines.pdf
- http://www.teachict.com/as_a2/topics/networks/network%20components/network_components/index.htm
- http://compnetworking.about.com/od/networkdesign/a/topologies.htm
- http://www.leapforum.org/published/internetworkMobility/split/node102.html
- http://www.cisco.com/en/US/docs/internetworking/technology/ handbook/RMON.html
- http://www.comsoc.org/iscc/2004/material/Badawi.pdf
- http://www.securelogix.com/Telecom-Network-Management.html

CSE411	FAULT TOLERANT COMPUTER SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITE

Distributed computing(CSE315)

COURSE OBJECTIVES

- Understand the different Architecture of computer system.
- examine testing techniques and algorithms in hardware, software and communications.
- an ability to select the appropriate points in an end-to-end system to embed fault-tolerant techniques.

COURSE OUTCOMES

CO1 : Understand basic levels of computer architecture.
CO2 : Identify the distribution measures and deadlocks.
CO3 : Recognize fault tolerance and recovery mechanisms
CO4 : Determine Fault tolerant Algorithms for different situations.
CO5 : Build reliable fault tolerant in real time systems.

UNIT I ARCHITECTURE

Introduction – Hardware pieces – A Quad – Processor Architecture – Language and Tools – Semaphores – Monitors – Resources – Communication Sequential Processes – Networks – Layered Architecture – Service Definition and protocol specification – Layer functions – Protocol Specification – OSI Reference Model – IEEE 802 standard – Network Concepts and Characteristics for Embedded Systems – Concurrency, Commitment and Recovery.

UNIT II DISTRIBUTION

Concepts and measures –Terminology, Definitions, and Conventions – Distributed system model – Distribution Measures – Mutual Exclusion – Problem Definition – Token Ring Algorithm – Time Ordering Algorithm – Path Reversal based – Election Algorithms – Problem Definition – Election in Ring Architecture – Broadcast Elections – Deadlock and Termination – Deadlock Problem – Deadlock Prevention in Multiple Resource Allocation – Deadlock and Termination Detection – Agreement Protocols – commit – Weighted Voting – Consensus – Approximate Agreement – Byzantine agreement.

UNIT III FAULT TOLERANCE AND RECOVERY MECHANISMS

Tolerating Faults – Fault Tolerant Concepts – Recovery in Time and Space – Fault Detection Techniques – Per formability Measures – Modeling Fault Tolerant systems – Roll – back

Mechanisms – Roll-back Mechanisms – Check pointing – N-Version Modular Redundancy – SIFT – Replicas – Alternatives – Dynamics of Replicas and Alternatives

UNIT IV FAULT TOLERANT ALGORITHMS

Handling Exceptions – Interrupts – Reaction to Exceptions – Exception Handling Model – Concurrency – Concurrency Control – Atomicity and Transactions – Partitioning – Broadcasting Solutions – Safe Systems – Safety Measures – Safety aspects in Resiliency – Fault Tolerant Allocation – Problem Definition – Definitions and Formulation – Allocation Algorithms.

UNIT V FAULT TOLERANT IN REAL TIME SYSTEMS

Allocation in Real Time Systems – Protocols for Real Time Communication –Protocols with Contention – Synchronous Protocols – Bounded Semantic Links – Fault Tolernat Real-Time Communication -Fault Tolerant Time Services- Local Resynchronization – Byzantine Clock Broadcast – Complete Time Service.

TEXT BOOK

1. Shem-Tov Levi, Ashok K. Agrawala, Fault Tolerant System Design, McGraw-Hill International Editions, 1994.

WEB RESOURCES

- www.ucsd.edu/catalog/courses/CSE.htm
- www2.cs.uidaho.edu/~krings/CS449/
- www.ntnu.edu/studies/courses/TTM4158
- www.mpi-sws.org/~bbb/teaching/ft-dist-rt-sose13/index.html
- www.cs.cmu.edu/~srini/15-441/F11/lectures/01-intro.ppt

CSE412	PERVASIVE COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITES

- Computer Architecture (CSE210)
- Operating Systems (CSE207)
- Distributed Systems (CSE419)
- Data Communication Computer Networks (CSE318)
- Programming language (CSE102)

COURSE OBJECTIVES

Pervasive computing provides an environment that is rich with computation, communication and its related devices, mobile user's interaction with speech and vision, using secure access to personal or public data. At the end of this course, students should be able to conceptualize, analyze and design select classes of pervasive computing systems.

- To introduce the characteristics, basic concepts and systems issues in mobile and pervasive computing
- Illustrate architecture and protocols in pervasive computing and to identify the trends and latest development of the technologies in the area.
- Design successful mobile and pervasive computing applications and services.
- Evaluate critical design tradeoffs associated with different mobile technologies, architectures, interfaces and business models and how they impact the usability, security, privacy and commercial viability of mobile and pervasive computing services and applications.

COURSE OUTCOMES

CO1: Outline the basic problems, performance requirements of pervasive computing applications, and the trends of pervasive computing and its impacts on future computing applications and society.
CO2: Explore the characteristics of different types of mobile networks on the performance of a pervasive computing system
CO3: Analyze and compare the performance of different data dissemination techniques and algorithms for mobile real-time applications
CO4: Develop an attitude to propose solutions with comparisons for problems related to pervasive computing system through investigation
CO5: Develop mobile computing applications based on the paradigm of context aware computing and wearable computing.

UNIT I INTRODUCTION

Introductory concepts, Pervasive Computing, market, m-Business, Application examples, devices and Interfaces, human machine interfaces, Biometrics, operating systems issues, Java in Pervasive Computing.

UNIT II DEVICE TECHNOLOGY

Device Technology, Connectivity Issues and Protocols, Management Issues and Mechanisms, Web-based Applications, Protocols, Transcoding, Authentication of Clients over Web,

UNIT III PERVASIVE DEVICES

WAP, WML, Voice Standards, Speech Applications and Security, PDA

UNIT IV WEB APPLICAION

Operating Systems, Software Components, Standards, Applications, Emerging Trends, Pervasive Web Application Architectures-Issues and Choices

UNIT V ACCESS TECHNOLOGIES (WAP, PDA, VOICE)

User Interface, Implementation of User Interface - Architectures, Smart Card-based Authentication Mechanisms over the Internet, Applications, and Wearable Computing Architectures.

TEXT BOOK

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff Pervasive Computing: Technology and Architecture of Mobile Internet Applications, Addison Wesley, Reading, 2002.

REFERENCE BOOKS

1. Uwe Hansman, Lothar Merk, Martin S. Nicklous & Thomas Stober, Principles of Mobile Computing, Springer-Verlag, New Delhi, Second Edition, , 2003.
2. Rahul Banerjee, Internetworking Technologies: An Engineering Perspective, Prentice-Hall of India, New Delhi, 2003.
3. Yi-Bing Lin & Imrich Chlamtac, Wireless and Mobile Network Architectures, John Wiley and Sons, New Delhi, 2004.

WEB RESOURCES.

- http://www.cise.ufl.edu/class/cen5531fa06/notes/IntroPervasiveComputingI.pdf
- http://www.doc.ic.ac.uk/~mss/UbiquitousComputing.pdf
- https://www.bsi.bund.de/cae/servlet/contentblob/486908/publicationFile/30670/Percenta_elay_pdf.pdf
- http://cs.nyu.edu/rgrimm/one.world/papers/one.world.pdf

CSE413	QUANTUM COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITES

- Computer Architecture and organization(CSE210)
- Algorithms&complexity(CSE209)
- Probability theory(MAT222)

COURSE OBJECTIVES

Computers get smaller and smaller; limitations in the hardware restrict our ability to build faster and faster solid state computers. Quantum computers are an attempt to design more powerful computers using the principles of quantum mechanics. Quantum computers rely on quantum entanglement and quantum parallelism for their speed, unavailable under classical computation.

COURSE OUTCOMES

CO1: Design of quantum computers using quantum bits (qubits), quantum gates and quantum circuits.
CO2: Implementation of basic quantum algorithms, including Deutsch's algorithm, Shor's factoring algorithm, and the search algorithm of Grover.
CO3: Understand the quantum Fourier transform and quantum searching.
CO4: Ability to design Quantum search for structured database
CO5: Understand the trends in Quantum Computing such as Optical Photon Computers, Optical Cavity Quantum electrodynamics.

UNIT I INTRODUCTION

Quantum bits – Quantum Computation – Quantum Algorithms – The Postulates of quantum mechanics

UNIT II QUANTUM CIRCUITS

Quantum algorithms – Single Qubit Operations – Controlled Operations – Measurement – Universal quantum gates – Summary of the quantum circuit model of Computation – Simulation of quantum systems.

UNIT III QUANTUM FOURIER TRANSFORM

Quantum Fourier Transform – Phase estimation – order finding and factoring – General applications of the quantum fourier transform.

UNIT IV QUANTUM SEARCH ALGORITHMS

Quantum Search Algorithm – Quantum search as quantum simulation – Quantum counting – Speeding up the solution of NP complete problems – Quantum search of an structured database – Optimality of the search algorithm – Black box algorithm limits.

UNIT V PHYSICAL REALIZATION

Guiding principles – Conditions for Quantum Computation – Harmonic Oscillator Quantum Computer – Optical Photon Quantum Computer – Optical Cavity Quantum electrodynamics – Ion Traps – Nuclear magnetic resonance – Other implementation schemes.

TEXTBOOK

1. Michael A Nielsoen and Isaac L Chuang, Quantum Computation and Quantum Information, Cambridge University Press, UK, (Indian Reprint), 2002.

WEB RESOURCES

- https://homes.cs.washington.edu/~oskin/quantum-notes.pdf
- http://sergeev.fiz.univ.szczecin.pl/Dydaktyka/Wyklady/Kaye.pdf
- http://www.johnboccio.com/research/quantum/notes/QC10th.pdf
- http://hodge.mathematik.uni-mainz.de/~stefan/seminare/QC/nielsen-quantum-computing.pdf
- http://www2.fiit.stuba.sk/~kvasnicka/QuantumComputing/Gruska_QC.pdf
- ttp://www.cs.berkeley.edu/~vazirani/algorithms/chap10.pdf
- http://theory.physics.helsinki.fi/~kvanttilaskenta/Lecture10.pdf

CSE414	NANO COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITE

Computer Architecture and organization(CSE210)

COURSE OBJECTIVES

Traditionally, progress in electronics has been driven by miniaturization. But as electronic devices approach the molecular scale, classical models for device behavior must be abandoned. To prepare for the next generation of electronic devices, to describe electrons at the nanoscale, this course will begin with an introduction to the principles of quantum , quantum computing and deals with properties of electons

COURSE OUTCOMES

CO1: Can understand next generation electronic devices supporting nano computing
CO2: Can understand electrons at nano scale
CO3: Can understand electronic properties of molecules and crystals
CO4: Can know about various quantum computation techniques
CO5: Can understand theory and technology of Nano fabrication

UNIT I DEVICES

Overview of current research in nano-scale electronics and devices, Semiconductor and Device 1(Materials and building blocks),Semiconductor and Device 2(Photonic Device and Materials),CMOS Device ,Limit of CMOS technology-Scaling Theory

UNIT II QUANTUM CONCEPTS

Nano-Physics-Quantum Mechanics, Quantum Device 1-Length Scales/Transport, Quantum Device 2-Ballistic Electron Transport, Coulomb Blockade, RTD, Electron-Wave Coupling Devices

UNIT III FUNDAMENTALS OF CHEMISTRY

Fundamental of chemistry, Organic Chemistry, Molecular Electronics I,(Molecular Semiconductors and Metals),Molecular Electronics II(Logic Gates),Carbon Nano tube and Its Application, Spintronics I, Spintronics II

UNIT IV QUANTUM COMPUTATION

Quantum Computation I ,Quantum Computation II,DNA Computation, Nano-Fabrication 1,-photolithography, Nano- Fabrication 2,: e-beam lithography,: Advanced Nano-lithography

UNIT V NANO CONCEPTS

Nano-Fabrication 3,: Thin Film Technology:-- MBE, CVD, PECVD, - LB and Self Assembly, Spun-Coating - Nano- Characterization 1 - Scanning Probe Microscopy – Electron Microscopy (TEM, SEM),Nano-Characterization 2 – Photon Spectroscopy - Electron Spectroscopy – Nanomanipulator

TEXT BOOK

1. Rainer Waser , Nanoelectronics and Information Technology: Advanced Electronic Materials and Novel Devices, Wiley- VCH, April 2003.

REFERENCE BOOKS

1. Sandeep Shukla and R. Iris Bahar, et al, Nano, Quantum and Molecular Computing, Kluwer Academic Publishers, 2004.
2. Poole Jr C.P.., Owens F.J. , Introduction to Nanotechnology, Wiley, 2003.
3. Petty M.C., Bryce , and D. Bloor ,Introduction to Molecular Electronics, Edward Arnold , 1995.

WEB RESOURCES

- www.bookrags.com/research/nanocomputing-csci-04/
- www.slideshare.net/myslidesharepresentation/ppt-of-nanocomputing
- cs.brown.edu/.../Lect%2003%20Overview%20Crossbar%20Computing
- www.nanoandme.org/nano-products/computing-and-electronics/
- www.cs.cmu.edu/~phoenix/nanocomputing/draftreport.pdf

CSE416	DNA COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITE

Theory of computation(CSE204)

COURSE OBJECTIVES

DNA computing is a molecular approach that may revolutionize computing-replacing silicon with carbon and microchips with DNA molecules. It is a branch of computing which uses DNA, biochemistry and molecular biology hardware, instead of the traditional silicon-based computer technologies. DNA computing, or, more generally, biomolecular computing, is a fast-developing interdisciplinary area.

COURSE OUTCOMES

CO1: Understand the Structure of DNA
CO2: Design Universal Turing machines for Molecular computation of solutions to combinatorial problems
CO3: Identify the number of states and the number of transitions in Watson Crick finite (non-deterministic) automata as a descriptional complexity
CO4: Recognize Insertion-Deleting in the Non-Deterministic Framework
CO5: Analyze Programmed and evolving systems based on Double Splicing,Multisets,and Universability Results.

UNIT I DNA: ITS STRUCTURE AND PROCESSING:

The structure of DNA, Operations on DNA Molecules, Reading out the Sequence, beginning of molecular computing**:**Adleman's Experiment, Solve the Satisfiability Problem, Paradigm of Computing, Hopes and Warmings

UNIT II INTRODUCTION TO FORMAL LANGUAGE THEORY:

Basic Notions, Grammars, Automata, Grammer systems, Characterizations of recursively Enumerable Languages, Universal Turing machines and Type – 0 Grammars. sticker systems: The operations of Sticking, Sticker Systems; Classifications, Generative Capacity of Sticker Systems, Representations of Regular and Linear Languages, Regular sticker systems.

UNIT III WATSON- CRICK AUTOMATA:

Watson-Crick Finite Automata, Relationship Between the WK Families, Characterizations of Finite Transducers, Further variants of Watson-Crick finite Automata, Watson-Crick Automata, Watson-Crick Automata with a Watson-Crick memory, Universability results for Watson-Crick Automata.

UNIT IV INSERTION-DELETION SYSTEMS:

Insertion-Deleting in the DNA Framework - Characterizations of Recursively Enumerable languages, - one symbol insertion – deletion systems - splicing systems - DNA Recombination to the Splicing Operations, on-Iterated Splicing as an Operation with languages, Iterated Splicing as an operation with languages, Extended H Systems; Generative Power, Simple H Systems.

UNIT V UNIVERSABILITY BY FINITE H SYSTEMS:

Using 2-Splicing instead of 1-Splicing, permitting and Forbidding Contexts, Target languages, Programmed and evolving systems Systems based on Double Splicing, Multisets, and Universability Results. Splicing circular strings - Variants of the Splicing Operation for Circular strings, Variant and its power

TEXT BOOK

1. Gheorghe Paun, Grzegorz Rozenberg,Arto salomaa, DNA Computing, Springer; 1st edition, 2006.

WEB RESOURCES

- http://www.princeton.edu/~lfl/FRS.html
- https://liorpachter.wordpress.com/
- http://www.engineering.uiowa.edu/~jmhoward/RESEARCH/QC-1.ppt
- http://www.theory.caltech.edu/~quic/errors.html
- http://natcomp.liacs.nl/NC/slides/12%20-%20DNA%20Computing.pdf
- http://www.inf.ed.ac.uk/teaching/courses/nat/slides/nat15.pdf
- http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.54.8878&rep=rep1&type=pdf
- http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.47.1595&rep=rep1&type=pdf
- http://www.ncbi.nlm.nih.gov/pubmed/10636031
- http://www.ncbi.nlm.nih.gov/pubmed/16770339
- http://www.ncbi.nlm.nih.gov/pubmed/17669585

CSE417	VLSI DESIGN AND FABRICATION	L	T	P	C
		3	0	0	3

PREREQUISITE

Digital electronics(ECE202)

COURSE OBJECTIVES

- Get knowledge in basic electrical properties of MOS and CMOS
- know various design rules and design
- design a subsystem

COURSE OUTCOMES

CO1: Understand the VLSI design methodology
CO2: Identify basic electrical circuits
CO3: Explain the design rules
CO4: Analyze the various logic designs
CO5: Build the subsystems

UNIT I OVERVIEW OF VLSI DESIGN METHODOLOGY

VLSI Design Process – Architectural Design – Logical Design – Physical Design – Layout styles – Full Custom Semi Custom approaches – Overview of wafer fabrication – Wafer processing – Silicon gate NMOS process – CMOS process – N well – P well – Twin Tub – Silicon On Insulator

UNIT II BASIC ELECTRICAL PROPERTIES OF MOS AND CMOS CIRCUITS

NMOS and PMOS enhancement transistors – Threshold voltage – MOS device equations – Basic DC equations – Second order effect – Small signal AC characteristics – NMOS and CMOS inverter –Inverter delay – Pass Transistor – Transmission gate

UNIT III LAYOUT DESIGN RULES

Need for design rules – Mead Conway design rules for the Silicon gate NMOS process- CMOS N well / P well design rules – Sheet resistance – Area Capacitance – Wiring Capacitance

UNIT IV LOGIC DESIGN

Switch logic- Gate Logic – Inverter – Two input NAND and NOR gate- Other forms of CMOS logic – Dynamic CMOS logic – Clocked CMOS logic – Prechared domino CMOS logic – Structure Design – Simple combinational logic design examples – Parity generator – Multiplexer – Clocked sequential circuits – 2 Phase clocking – Charge storage – Dynamic Register Element – NMOS and CMOS dynamic shift register

UNIT V SUB SYSTEM DESIGN PROCESS

Design of a 4 bit shifter – 4 bit arithmetic processor – ALU Subsystem – Implementing ALU functions with an Adder – Carry look ahead adders – Multipliers – Serial/ Parallel Multipliers – Pipelined multiplier array – Modified booths algorithm – high density memory – FSM – PLA Control Implementation

TEXT BOOK

1. Douglas A Pucknell and Kamran Eshranghian, Basic VLSI Design, PHI, 3rd Edition, 2004.

REFERENCE BOOKS

1. Neil H E West and Kamran Eshranghian, Principles of CMOS VLSI Design : A System Perspective, Addison Wesley, 2nd Edition, 2002
2. Wayne Wolf, Modern VLSI Design, Pearson Education Inc., 1997

WEB RESOURCES

- http://www.asctbhopal.com/visiontechsouvenir2009/Fevertronics/VLSI%20Fabrication%20Process.pdf
- http://www.vlsitechnology.org/html/layout_rules.html
- http://www.cerc.utexas.edu/~jaa/option-iii/382m-vlsi/lectures/2-1.pdf
- http://www.slideshare.net/Vishal061/vlsi-subsystem-design-processes-and-illustration
- http://scale.engin.brown.edu/classes/EN1600S08/
- http://vlsi.cs.ucf.edu/books/intro-nmos-cmos.pdf
- http://www.ece.unm.edu/~jimp/vlsi/

CSE418	NETWORK SYSTEM DESIGN WITH NETWORK PROCESSORS	L	T	P	C
		3	0	0	3

PREREQUISITE

Computer Network(CSE318)

COURSE OBJECTIVES

- To understand the concepts of a network systems and protocols.
- To examine and compare various algorithm for protocol processing and architecture on conventional hardware.
- To study the role of network processor design, architecture and its languages.
- To discuss the various network processor and develop the network processor programming.
- To explore the tradeoffs and benchmarks of network processor architectures including active network applications.

COURSE OUTCOMES

CO1: Understand the Network Layers and Protocols in the OSI Layers
CO2: Understand Packet Processing Algorithm and Hardware Architecture.
CO3: Implantation of Network Processor Language in designing Processor Architecture.
CO4: Analyze and design of Processor Architecture.

UNIT I INTRODUCTION

Introduction and overview-Basic Terminology and Example Systems - Review of Protocols and Packet Formats.

UNIT II TRADITIONAL PROTOCOL PROCESSING SYSTEMS

Conventional computer hardware and its use in low-end network systems- Algorithms for protocol processing-packet processing functionality-Software architectures for protocol processing on conventional hardware-advanced hardware architectures

UNIT III NETWORK PROCESSOR TECHNOLOGY

Motivation for network processors-Complexity of network processor design-network processor architectures-Scaling a network processor-a review of commercial network processor architectures-languages

UNIT IV NETWORK PROCESSORS AND PROGRAMMING

Discussion of Intel® IXP2XXX network processor-Intel®: reference platform; embedded RISC processor-Intel®: programmable packet processor hardware and programming-Intel®: more on

programming the packet processors-a programming example-Programming example; switching fabrics

UNIT V ALTERNATIVE ARCHITECTURES

Network processor design tradeoffs-Active and programmable networks-Active network applications-Commercial network processors-Benchmarks for Network Processors

TEXT BOOK

1. Comer D., "Network Systems Design Using Network Processors", Prentice Hall, 2003.

WEB RESOURCES

- www.engr.siu.edu/~weng/ece526/Slides/L04-PacketProcessingI
- www.engr.siu.edu/~weng/ece526/Slides/L01-Introduction.ppt
- www.isr.umd.edu/~vahidt/Networking%20Technologies02.ppt
- www.uio.no/studier/emner/matnat/ifi/INF5061/h05/.../01-IXP-intro.ppt
- ftp://ftp.tik.ee.ethz.ch/pub/people/thiele/paper/diss_gries.pdf

CSE419	DISTRIBUTED ARCHITECTURE	L	T	P	C
		3	0	0	3

PREREQUISITE

Distributed computing(CSE315)

COURSE OBJECTIVES

In this the course, the candidates will understand the basis of the distributed systems, high performance networks, clusters and computational grids environments in both theoretical and practical aspects.

COURSE OUTCOMES

CO1: Understanding the basic of distributed architectural Model
CO2: Studying the basic connectivity about Networking and Internetworking
CO3: Analyzing the Inter Process Communication (IPC) over N/W
CO4: Explaining the Distributed File System (DFS) with N/W OS
CO5: Identifying and designing the different Name Services (NS) fos DS

UNIT I LAYERING AND ORGANIZING DOMAIN LOGIC

The Evolution of layers in Enterprise Applications – The Three Principal Layers – Service Layer – Architectural Patterns – The Behavioral Problem – Reading in Data Structural Mapping Patterns – Mapping Relationships – Inheritance – Building the Mapping – Double Mapping – Using Metadata – Database connections

UNIT II CONCURRENCY AND SESSION STATE

Concurrency Problems – Execution Contexts – Isolation and Immutability – Optimistic and Pessimistic concurrency control – Preventing inconsistent Reads – Deadlocks – Transactions – ACID – Transactional Resources – Reducing Transaction Isolation for Liveness – Business and System Transaction - Patterns for offline concurrency control – Application server concurrency – The value of statelessness – Session state – ways to store session state

UNIT III DOMAIN LOGIC PATTERNS AND DISTRIBUTION PATTERNS

Transaction Script – Domain Model – Table Module – Service layer – Remote façade – Data Transfer object – Transferring information about Albums – Serializing using XML – Optimistic offline lock – Pessimistic offline lock – Coarse Grained lock – Shared optimistic offline lock – shared Pessimistic offline lock – Root optimistic offline lock

UNIT IV MESSAGING SYSTEMS, CHANNELS AND CONSTRUCTION

Message Channel – Message – Pipes and Filters – Message Router – Message Translator – Message Endpoint – Point to Point Channel – Publish Subscribe Channel – Datatype Channel – Invalid Message Channel – Dead Letter Channel – Guaranteed Delivery – Channel Adapter – Messaging bridge – Message Bus – Command Message – Document Message – Event Message – Request, Reply, Return address – Correlation identifier – Message Sequence – Message Expiration

UNIT V MESSAGE ROUTING, TRANSFORMATION

Content based Router – Message Filter – Dynamic Router – Recipient List – Splitter – Aggregator – Resequencer – Composed Message Processor – Scatter Gather – Routing Slip – Process Manager – Message broker – Envelope Wrapper – Content Enricher – Content Filter – Claim Check – Normalizer – Canonical Data Model

TEXT BOOK

1. Martin Fowler, "Patterns of Enterprise Application Architecture" Addison Wesley, 2002.

REFERENCE BOOKS

1. Gregor Hohpe, Bobby Woolf, "Enterprise Integration Patterns: Designing, Building, and Deploying Message Solutions", Addison Wesley Signature Series, 2003.
2. Eric Evans, "Domain driven Design: Tackling Complexity in the Heart of Software", Addison Wesley, 2003.
3. Jimmy Nilsson, "Applying Domain-Driven Design and Patterns: Using .Net", Addison Wesley, 2006.

WEB RESOURCES

- www.ida.liu.se/~TDDB37/lecture-notes/lect2-3.frm.pdf
- http://blog.ag-nbi.de/wp-content/uploads/2011/10/02_DescriptiveModels_2slides.pdf
- http://www.juniper.net/documentation/en_US/junos14.2/topics/concept/layer-2-networking-layers-mx-solutions.html
- http://glasnost.itcarlow.ie/~barryp/slides/ipc.pdf
- http://glasnost.itcarlow.ie/~barryp/slides/dns.pdf
- http://glasnost.itcarlow.ie/~barryp/slides/DFSintro.pdf
- https://azmuri.files.wordpress.com/2013/09/george-coulouris-distributed-systems-concepts-and-design-5th-edition.pdf
- http://www.cs.umd.edu/~hcma/818g/
- http://h20565.www2.hp.com/hpsc/doc/public/display?docId=emr_na-c02117532-1&docLocale=en_US
- http://www.nyu.edu/classes/jcf/g22.3033-007_sp01/handouts/g22_3033_h83.htm

CSE420	DIGITAL FORENSICS	L	T	P	C
		3	0	0	3

PREREQUISITES

- Computer Network (CSE318)
- Network security (CSE319)

COURSE OBJECTIVES

The objective of this course is to gain the knowledge about Information Security & Digital Forensics technically and logically.

COURSE OUTCOMES

CO1: Develop skills in applying digital forensics investigation techniques
CO2: Understand how information is stored and used on digital devices
CO3: Analyze digital devices to establish user activity
CO4: Understand the development of new devices and technologies
CO5: Understand current digital forensics methods

UNIT I COMPUTER CRIME, FORENSICS AND SECURITY

Introduction- Human behavior in electronic age- nature of Computer Crime- Establishing a case in Computer forensics- Legal Consideration- Computer Security and its relation ship to computer forensics.

UNIT II CURRENT PRACTICES

Introduction- Electronic evidence- Forensic tools – Emerging Procedures and Standards- Computer Crime Legislation and Computer Forensics- Networks and Intrusion Forensics.

UNIT III COMPUTER FORENSICS IN LAW ENFORCEMENT AND NATIONAL SECURITY

Origin and history of computer forensics- role of computer forensics in law enforcement- principles of evidence- Computer forensics model of law enforcement- Forensic examination- Forensics resources and tools.

UNIT IV FORENSIC ACCOUNTING

Auditing and Fraud detection – Defining Fraudulent activity- Technology and Fraud detection – Fraud detection techniques- Visual analysis technique- Building a Fraud analysis model.

UNIT V INTRUSION DETECTION AND INTRUSION FORENSICS

Intrusion detection, Computer Forensics and Information warfare- IDS- Analyzing Computer Intrusion- Network Security- Intrusion Forensics.

TEXT BOOK

1. George M. Mohay, Alison Anderson, Byron Collie, Olivier de Vel, "Computer and intrusion forensics", Artech House Computer Security Series, 2003,. ISBN 1-58053-369-8, 395

REFERENCE BOOKS

1. Skoudis E., Perlman R. Counter Hack: A Step-by-Step Guide to Computer Attacks and Effective Defenses. Prentice Hall Professional Technical Reference. 2001.
2. Mandia, K., Prosise, C., Pepe. M. Incident Response & Computer Forensics. 2nd edition. Osbourne-McGraw Hill, 2003

WEB RESOURCES

- http://csrc.nist.gov/publications/nistpubs/800-86/SP800-86.pdf
- http://icsa.cs.up.ac.za/issa/2011/Proceedings/Research/Mabuto_Venter.pdf
- http://www.cnet.com/how-to/digital-storage-basics-part-1-internal-storage-vs-memory/
- http://uwf.edu/clemley/cgs1570w/notes/concepts-7.htm
- http://booksite.elsevier.com/9780123742681/Chapter_20_Final.pdf
- https://www.cerias.purdue.edu/assets/pdf/bibtex_archive/2005-27.pdf
- http://articles.forensicfocus.com/2011/08/22/the-challenges-facing-computer-forensics-investigators-in-obtaining-information-from-mobile-devices-for-use-in-criminal-investigations/
- http://thesai.org/Downloads/Volume2No12/Paper%2026-A%20New%20Approach%20of%20Digital%20Forensic%20Model%20for%20Digital%20Forensic%20Investigation.pdf
- http://www.bic-trust.eu/files/2012/04/5-kyFrankel.pdf

CSE421	SOFTWARE ARCHITECTURE	L	T	P	C
		3	0	0	3

PREREQUISITE

Software Engineering(CSE303)

COURSE OBJECTIVES

- To understand the role of a software architecture in the development of an enterprise application system
- To examine and compare various architecture view types and styles
- To develop the ability to read and understand the models that are used to document a software architecture
- To understand the nature of and the advantages and disadvantages for various architectural choices and to examine and compare centralized vs. distributed architectures
- To explore various aspects of client-server architectures including web architectures.

COURSE OUTCOMES

CO1: Understand the role of Software Architecture in designing Complex System Architecture.
CO2: Analyze the Various architecture Patterns and Framework
CO3: Understand the various architecture related to middleware technology and Web based environment.
CO4: Implement the architecture design as per the business environment

UNIT I INTRODUCTION TO SOFTWARE ARCHITECTURE

Software architecture terminologies – Evolution of Software Architectures – Necessity for software architecture – Software processes – Architecture Business Cycle (ABC) – Architectural patterns – Reference models – Reference architecture – Construction of good architecture – Structural rules of thumb

UNIT II DIMENSIONS OF SOFTWARE ARCHITECTURE

Architectural structures of software – Architectural viewtypes: Modules – Components and Connectors – Allocation viewtypes – Architectural styles (Components, connectors, relations and uses): Repository style – Pipes and filters – Client – server style – Layered architectural style – UNIX: A Case study for layered software architectural style

UNIT III CREATING SOFTWARE ARCHITECTURE

Requirements for creating software architecture – Understanding quality attributes – Achieving qualities – Designing the architecture – Documenting software architecture – Air traffic control simulation: A Case study in creating high availability architecture

UNIT IV STANDARD SOFTWARE ARCHITECTURES

Data architectures: Centralized vs. distributed data architecture – Relational vs. object oriented data architecture – Middleware architectures: DCOM – CORBA – Microsoftb Dot Net Architecture – J2EE – EJB Architecture – The Luther Architecture: A case study in mobile applications using J2EE

UNIT V EVALUATING SOFTWARE ARCHITECTURE

Analyzing software architectures – Evaluation methodologies – Stakeholders of evaluation – ATAM: Architecture Tradeoff Analysis Method: A comprehensive method for architecture evaluation – CBAM: A quantitative approach to architecture design decision making – World Wide Web: A case study in evaluating interoperability – Software product lines – Building systems from off-the-shelf components – Software architecture in future

TEXT BOOKS

1. Len Bass, Paul Clements and Rick Kazman, "Software Architecture in Practice", Pearson Education Publications, Second Edition, 2003.

REFERENCE BOOKS

1. Clements P, Bachmann F, Bass L, Gralan D, Ivers.J, Little R, Nord R and Stafford J, "Documenting Software Architectures: Views and Beyond", Addison Wesley, 2003
2. Mary Shaw and David Garlan, "Software Architecture: Perspectives on an Emerging Discipline", Prentice Hall, 2003
3. Sudha Sadasivam.G, "Distributed Component Architecture", Wiley Precise Text Book, 2007.

WEB RESOURCES

- http://www.ecs.csun.edu/~rlingard/COMP684/ArchBusCycle.ppt
- http://it.toolbox.com/blogs/bridging-gaps/systems-architecture-fundamentals-conceptual-logical-physical-designs-11352
- http://www.wcs.scu.edu.cn/~panwuming/2009Spring/1%20Intro.ppt
- http://www.ibm.com/developerworks/rational/library/feb06/eeles/
- http://www.sei.cmu.edu/architecture/glossary.html
- https://sosa.ucsd.edu/teaching/cse218/winter2003/
- Evaluating_SoftwareArchitectures_printable.pdf
- https://www.se.auckland.ac.nz/courses/SOFTENG325/lectures/Lecture21.pdf
- http://www.win.tue.nl/~mchaudro/sa2007/Documenting%20Architectural

- %20Layers%20SEI-2000-SR-004.pd
- http://www.ece.uvic.ca/%7Eitraore/seng422-06/notes/arch06-6-1.pdf
- http://www.timeoutofmind.com/pdf/Central_vs._Distributed_Systems.pdf
- http://www.objectivity.com/pages/object-oriented-database-vs-relational-database/default.html
- http://www.ece.uvic.ca/%7Eitraore/seng422-06/notes/arch06-6-1.pdf
- http://www.ece.uvic.ca/%7Eitraore/seng422-06/notes/arch06-7-1.pdf
- http://www.ece.uvic.ca/%7Eitraore/seng422-06/notes/arch06-7-2.pdf
- http://publib.boulder.ibm.com/infocenter/dmndhelp/v6rxmx/index.jsp?
- topic=/com.ibm.etools.ejb.doc/topics/cearch.html
- http://www.sei.cmu.edu/news-at-sei/features/1999/sep/1-Spotlight.sep99.pdf
- http://cse.cnu.ac.kr/~hskim401/tse_sa/17.pdf

CSE423	INFORMATION SECURITY	L	T	P	C
		3	0	0	3

PREREQUISITE

Completion of Advanced Software Development Methods, Operating Systems and Networks with a C language .

COURSE OBJECTIVES

- Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.
- Gain familiarity with prevalent network and distributed system attacks, defenses against them, and forensics for investigation and analysis.
- Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.
- Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.

COURSE OUTCOMES

CO1: Explain the ideas behind the basic security concepts as confidentiality, integrity, and availability.
CO2: Explain the concepts of data and network security as different aspects of information security.
CO3: Evaluate vulnerability of an information system and establish a plan for risk management.
CO4: Evaluate a company's security policies and procedures
CO5: List some examples of information assets and associated threats.

UNIT I INTRODUCTION

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

UNIT II SECURITY INVESTIGATION

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III SECURITY ANALYSIS

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV LOGICAL DESIGN

Blueprint for Security, Information Security Poicy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity

UNIT V PHYSICAL DESIGN

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel

TEXT BOOK

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003

REFERENCE BOOKS

1. Micki Krause, Harold F. Tipton, Handbook of Information Security Management, Vol 1-3 CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz, Hacking Exposed, Tata McGraw-Hill, 2003
3. Matt Bishop, Computer Security Art and Science, Pearson/PHI, 2002.

WEB RESOURCES

- https://www.us-cert.gov/sites/default/files/publications/infosecuritybasics.pdf
- www.csudh.edu/.../Introduction%20to%20Information%20Security.ppt
- http://uir.unisa.ac.za/xmlui/bitstream/handle/10500/1503/01article.pdf?sequence=1
- https://www.linkedin.com/jobs2/view/32046416?trk=jserp_job_details_text
- http://en.wikipedia.org/wiki/Information_security
- http://www.intosaiitaudit.org/issrmeng.pdf
- http://en.wikipedia.org/wiki/Logical_security
- www.csus.edu/indiv/e/eatonr/MIS%20175%20Notes/sysdev2.ppt
- https://www.cccure.org/Documents/HISM/675-680.html
- http://www.infosectoday.com/Articles/convergence.htm

CSE424	MULTICORE PROGRAMMING	L	T	P	C
		3	0	0	3

PREREQUISITE

Students must have Knowledge of Operating Systems, Networks, and C Programming

COURSE OBJECTIVES

- Understand key concepts in multicore application development.
- Learn the key questions to ask when going multicore.
- Build and debug multicore-ready applications

COURSE OUTCOMES

- Understand the issues involved in the design of hardware and programming languages for multicore systems,
- Able to employ algorithms and data structures for applications that are efficient on large-scale systems.
- Identify at least two programming languages used on multicore systems,
- Evaluate their program's reliability and scalability.
- Understand the research issues driving multicore technology,

UNIT I INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES

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

UNIT II PARALLEL PROGRAMMING

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

UNIT III OPENMP PROGRAMMING

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

UNIT IV MPI PROGRAMMING

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

UNIT V MULTITHREADED APPLICATION DEVELOPMENT

Algorithms, program development and performance tuning.

TEXT BOOKS

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

REFERENCE BOOKS

1. John L. Hennessey and David A. Patterson, " Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture : A hardware/ software approach" , Morgan Kaufmann/Elsevier Publishers, 1999.

WEB RESOURCES

- http://searchdatacenter.techtarget.com/definition/multi-core-processor
- http://www.multicore-association.org/
- https://computing.llnl.gov/tutorials/parallel_comp/
- http://www.cise.ufl.edu/research/ParallelPatterns/PatternLanguage/Background/Models.htm
- https://msdn.microsoft.com/en-us/library/dd460693(v=vs.110).aspx
- http://www.mcs.anl.gov/~itf/dbpp/text/node9.html
- https://computing.llnl.gov/tutorials/openMP/
- http://people.sc.fsu.edu/~jburkardt/c_src/openmp/openmp.html
- http://www.codeproject.com/Articles/19065/Begin-Parallel-Programming-With-OpenMP
- https://computing.llnl.gov/tutorials/mpi/
- http://www.mcs.anl.gov/research/projects/mpi/tutorial/mpiintro/ppframe.htm
- http://www.hpcvl.org/faqs/programming/mpi-message-passing-interface

CSE425	SOFTWARE TESTING	L	T	P	C
		3	0	0	3

PRE-REQUISITES

- Object Oriented Analysis and Design with UML
- Software Engineering
- Software Metrics
- Basics of Mathematics

COURSE OBJECTIVES

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
- To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
- To understand software test automation problems and solutions.
- To learn how to write software testing documents, and communicate with engineers in various forms.
- To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

COURSE OUTCOMES

CO1: Apply the knowledge of software testing and engineering methods.
CO2: Design and conduct a software test process for a software testing project.
CO3: Learn the needs of software test automation, and define and develop a test tool to support test automation.
CO4: Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
CO5: Analyze various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
CO6: Understand the knowledge of contemporary issues in software testing such as component-based software testing problems
CO7: Analyze software testing methods and modern tools for their testing projects.

UNIT I INTRODUCTION

Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

UNIT II TEST CASE DESIGN

Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing – Requirements based testing – positive and negative testing -— Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– cause-effect graphing – error guessing - compatibility testing – user documentation testing – domain testing Using White–Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White–box Based Test Design – code complexity testing – Evaluating Test Adequacy Criteria

UNIT III LEVELS OF TESTING

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing – defect bash elimination -System Testing – types of system testing - Acceptance testing – performance testing – Regression Testing – internationalization testing – ad-hoc testing - Alpha – Beta Tests – testing OO systems – usability and accessibility testing

UNIT IV TEST MANAGEMENT

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

UNIT V CONTROLLING AND MONITORING

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation - Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and

Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – evaluating software quality – defect prevention – testing maturity model

TEXT BOOKS

1. Srinivasan Desikan and Gopalaswamy Ramesh, " Software Testing – Principles and Practices", Pearson education, 2006.
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education,2008.

REFERENCE BOOKS

1. Boris Beizer, "Software Testing Techniques", Second Edition,Dreamtech, 2003
2. Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003.
3. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.

WEB RESOURCES

- www.qaforums.com
- www.openmentor.net
- www.onestoptesting.com
- http://www.professionaltester.com/
- http://www.bettersoftware.com/
- http://www.stickyminds.com/
- http://www.faqs.org/faqs/software-eng/testing-faq/
- http://www.rstcorp.com/c.s.t.faq.html
- http://www.exampler.com/testing-com/writings/

CSE426	WIRELESS AD HOC NETWORKS	L	T	P	C
		3	0	0	3

PREREQUISITE

Introduction to Computer Networks, or Computer Communication Networks, Ethernet and other multiple access networks, routing and network protocols, including the TCP/IP suite, and computer algorithms, computer architecture, data structures, operating systems. There are no mandatory prerequisites.

COURSE OBJECTIVE

This is a graduate level course emphasing research in wireless networking area with an emphasis on Ad Hoc Networks. This course will introduce students to the diverse literature on Wireless Ad-Hoc Networks, and expose them to the fundamental issues in designing and analyzing ad-hoc network systems. The goal of the course is that the students can ability to study the mathematical models, construct ad-hoc networks, analysis the performance of the ad hoc networks with various protocols and carry out the active research in the areas of wireless ad hoc networks

COURSE OUTCOMES

CO1: Understand the architecture and applications of current and next generation wireless networks:
CO2: Design and analyze various medium access and resource allocation techniques.
CO3: Evaluate MAC and network protocols using network simulation software tools.
CO4: Students are able to critique protocol designs in terms of their energy-efficiency.
CO5: Design and analyze transport layer protocols.
CO6: Understand the various security threats to ad hoc networks and describe proposed solutions.
CO7: Students are able to discuss about the issues in QoS solutions and Energy Management Schemes in Wireless Ad Hoc Networks.

UNIT I INTRODUCTION & MAC PROTOCOLS

Ad Hoc Wireless Networks Issues. MAC protocols for ad hoc Wireless Networks: Issues, Classification of MAC Protocols, Contention Based protocols, Contention-Based Protocols with Reservation Mechanisms, Contention-Based MAC Protocols with scheduling Mechanisms, MAC Protocols that use Directional Antennas.

UNIT II ROUTING PROTOCOLS

Classifications, Table Driven, On-Demand, Hybrid and Hierarchical Routing Protocols, Routing Protocols with efficient Flooding mechanism, Power aware Routing Protocols. Operation of Multicast Routing Protocols, Energy efficient Multicasting and Multicasting with QoS guarantees.

UNIT III TRANSPORT LAYER AND SECURITY PROTOCOLS

Introduction, Issues, Design Goals, Classification of Transport Layer Solutions, TCP over Ad Hoc Wireless Networks, Other Transport Layer Protocols, Security in Ad Hoc Wireless Networks, Secure Routing in Ad Hoc wireless Networks.

UNIT IV QOS

Introduction, Issues and Challenges, Classifications of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad Hoc Wireless Networks

UNIT V ENERGY MANAGEMENT

Introduction, Need for Energy Management, Classification of Energy Management Schemes, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes

TEXT BOOK

1. Siva Ram Murthy C, Manoj B.S, Ad Hoc Wireless Networks: Architectures and Protocols, Prentice Hall, 2005.

REFERENCE BOOKS

1. Chai-Keong Toh, Ad HOC Mobile Wireless Networks, PHI, 2002.
2. Charles Perkins, Ad Hoc Networking, Addison Wesley, 2001.
3. Mohammed Liyas, Handbook of Ad Hoc Wireless Networks, CRC Press, 2003.

WEB RESOURCES

- http://www.cs.jhu.edu/~cs647/mac_lecture_1.pdf
- http://hscc.cs.nthu.edu.tw/~sheujp/lecture_note/wn_Chapter_6_MAC.pdf
- www.cs.wichita.edu/~chang/lecture/cs898t/lecture/mac-adhoc.ppt
- http://www.eecis.udel.edu/~sridhara/talks/650.pdf
- http://www.ccs-labs.org/teaching/wsn/2011w/04-mac.pdf
- www.cse.buffalo.edu/~qiao/cse620/fall04/TCPoverMANETs.ppt
- cs.tju.edu.cn/faculty/ytshu/Net_U_09/3-3_TCP-ad%20hoc%2009.ppt
- http://www.stud.informatik.uni-goettingen.de/mk2/ws1011/slides/04.EnergyManagement.pdf
- web.cse.ohio-state.edu/~anish/788Notes/MAC-Lecture.ppt
- www.ecse.rpi.edu/Homepages/koushik/.../wbn2007-shiv-mac.ppt

CSE427	SERVICE ORIENTED ARCHITECTURE	L	T	P	C
		3	0	0	3

PREREQUISITE

Object Oriented Programming Language Concept, HTML

COURSE OBJECTIVES

- Understand the basic concepts of Service Oriented Architecture along with the evolution of SOA
- To learn service oriented analysis techniques and underlying the Service Design
- Integrate SOA technologies with Web Services paradigms.
- Know related technologies and implementation of SOA.
- To learn advanced concepts such as service composition, orchestration and Choreography

COURSE OUTCOMES

CO1: Understand crucial concepts of SOA
CO2: Know the integration of SOA technological points with Web Services.
CO3: Implement of SOA in development cycle of Web Services.
CO4: Build SOA based applications for Web services, some of the prevailing standards and technologies of Web Services.
CO5: The students will also learn the approaches for providing security for XML documents as well as messages exchanged among Web Services.
CO6: Implement the applications based on Java Web Services.

UNIT I FUNDAMENTALS OF SOA

Introduction-Defining SOA-Evolution of SOA-Service Oriented Enterprise-Comparing SOA to client-server and distributed internet architectures-Basic SOA Architecture-concepts-Key Service characteristics-Technical Benefits-Business Benefits.

UNIT II COMBINING SOA AND WEB SERVICES

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns- Web Service Platform-Service Contract-Service Level Data Model-Service Discovery-Service Level Security-Service Level Interaction Patterns-Atomic and Composite Services-Service Enabling Legacy System-Enterprise Service Bus Pattern.

UNIT III MULTI CHANNEL ACCESS AND WEB SERVICES COMPOSITION

SOA for Multi-Channel Access-Business Benefits-Tiers-Business Process Management-Web Service Composition-BPEL-RESTFUL Services-comparison of BPEL and RESTFUL Services.

UNIT IV JAVA WEB SERVICES

SOA support in J2EE – Java API for XML-based web services(JAX-WS)-Java Architecture for XML binding (JAXB) – Java API for XML Registries(JAXR)-Java API for XML based RPC (JAX-RPC)- Web Services Interoperability-SOA support in .NET – ASP.NET web services – Case Studies- Web Services Enhancements (WSE)

UNIT V WEB SERVICES SECURITY AND TRANSACTION

Meta Data Management-Advanced Messaging- Addressing – Reliable Messaging– Policies- WS-Policy– Security- WS-Security–Notification and Eventing-Transaction Management

TEXT BOOKS

1. Eric Newcomer, Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.
2. JamesMcGovern,Sameer Tyagi,Michael E Stevens,Sunil Mathew,”Java Web Services Architecture”,Elsevier,2003.

REFERENCE BOOKS

- Thomas Erl, “Service Oriented Architecture”,Pearson Education,2005
- Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services, An
- Architect’s Guide”, Pearson Education, 2005.
- Dan Woods and Thomas Mattern, “Enterprise SOA Designing IT for Business
- Innovation” O’REILLY, First Edition, 2006.
- Frank Cohen, “FastSOA”, Elsevier,2007.
- Jeff Davies, “The Definitive Guide to SOA”,Apress,2007

WEB RESOURCES

- http://www.ibm.com/developerworks/webservices/tutorials/ws-soa-ibmcertified/ws-soa-ibmcertified.html
- http://semanticommunity.info/@api/deki/files/17794/Fundamentals_of_SOA%5B1%5D.pdf
- http://conference.javatalks.ru/data/SOA_fundamentals_for_developers.pdf
- http://www.aw-bc.com/samplechapter/0321180860.pdf
- http://www.eu-orchestra.org/TUs/SOA/en/text/SOA.pdf
- http://www.eu-orchestra.org/TUs/SOA/en/text/SOA.pdf
- http://www.omg.org/news/meetings/workshops/MDA-SOA-WS_Manual/01-A1_Rosen.pdf
- http://www.redbooks.ibm.com/redbooks/pdfs/sg246303.pdf
- http://media.techtarget.com/tss/static/articles/pdf/J2EE-WebServices-DevGuide.pdf
- http://www.cybersource.com/developers/integration_methods/simple_order_and_soap_toolkit_api/soap_api/SOAP_toolkits.pdf

CSE428	BIG DATA ANALYTICS	L	T	P	C
		3	0	0	3

PREREQUISTES

- Database Management Systems(CSE212),
- Data mining and data warehousing(CSE404)

COURSE OBJECTIVES

Prepare the students to understand and practice Big Data Analytics using Hadoop Ecosystem and Prepare them for a Career in Analytics as a Hadoop Developer, Hadoop Administrator, Data Scientist.

COURSE OUTCOMES

CO1: Understand the key issues on big data, characteristics, data sources and the associated applications in intelligent business and scientific computing.

CO2: Acquire fundamental enabling techniques and scalable algorithms in big data analytics.

CO3: Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.

CO4: Achieve adequate perspectives of big data analytics in marketing, financial services, health services, social networking, astrophysics exploration, and environmental sensor applications, etc.

CO5: Select visualization techniques and tools to analyze big data and create statistical models a understand how to handle large amounts of data.

UNIT I INTRODUCTION TO BIG DATA

Analytics – Nuances of big data – Value – Issues – Case for Big data – Big data options Team challenge – Big data sources – Acquisition – Nuts and Bolts of Big data. Features of Big Data - Security, Compliance, auditing and protection - Evolution of Big data – Best Practices for Big data Analytics - Big data characteristics - Volume, Veracity, Velocity, Variety – Data Appliance and Integration tools – Greenplum – Informatica

UNIT II DATA ANALYSIS

Evolution of analytic scalability – Convergence – parallel processing systems – Cloud computing – grid computing – map reduce – enterprise analytic sand box – analytic data sets – Analytic methods – analytic tools – Cognos – Microstrategy - Pentaho. Analysis approaches – Statistical significance – business approaches – Analytic innovation – Traditional approaches – Iterative

UNIT III STREAM COMPUTING

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications IBM Infosphere – Big data at rest – Infosphere streams – Data stage – Statistical analysis – Intelligent scheduler – Infosphere Streams

UNIT IV PREDICTIVE ANALYTICS AND VISUALIZATION

Predictive Analytics – Supervised – Unsupervised learning – Neural networks – Kohonen models – Normal – Deviations from normal patterns – Normal behaviours – Expert options – Variable entry - Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

UNIT V FRAMEWORKS AND APPLICATIONS

IBM for Big Data – Map Reduce Framework - Hadoop – Hive - – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Hbase – Impala – Analyzing big data with twitter – Big data for Ecommerce – Big data for blogs.

REFERENCE BOOKS

1. Frank J Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley and SAS Business Series, 2012.
2. Colleen Mccue, “Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis”,Elsevier, 2007
3. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
4. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.
5. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, Wiley and SAS Business Series, 2012.
6. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGraw Hill, 2011.
7. Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch , James Giles, David Corrigan, “Harness the Power of Big data – The big data platform”, McGraw Hill, 2012.
8. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007
9. Pete Warden, Big Data Glossary, O’Reilly, 2011.
10. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier,Reprinted 2008.

WEB RESOURCES

- www.ibm.com/BigDataAnalytics
- www.pentaho.com/product/big-data-analytics
- http://www.sas.com/en_us/insights/analytics/big-data-analytics.html
- https://www.edx.org/course/data-analytics-learning-utarlingtonx-link5-10x
- www.ibm.com/IBMBigDataStreaming
- http://www-01.ibm.com/software/data/infosphere/stream-computing
- www.ibm.com/software/data/infosphere/stream-computing
- bigdatauniversity.com/bdu-wp/bdu-course/stream-computing
- www.ibm.com/software/data/infosphere/hadoop
- http://blog.cloudera.com/blog/2013/06/whats-next-for-hbase-big-data-applications-using-frameworks-like-kiji/
- http://www.percona.com/resources/mysql-webinars/how-scale-big-data-applications-using-mysql-sharding-frameworks
- http://www.dummies.com/how-to/content/characteristics-of-a-big-data-analysis-framework.html
- http://www.slideshare.net/idigdata/big-data-visual-analytics-and-predictive-analytics-tools
- http://www.predictiveanalyticstoday.com/big-data-analytics-and-predictive-analytics/
- www.statsoft.com/textbook/data-mining-techniques

CSE429	GAME THEORY	L	T	P	C
		3	0	0	3

PREREQUISITES

- Data Structures and Algorithms would be desirable but not mandatory.
- Familiarity with set theory, relations and functions, elementary linear algebra, elementary probability, linear programming would be desirable but not mandatory.

COURSE OBJECTIVES

- Game theory and mechanism design offer an important tool to model, analyze, and solve decentralized design problems involving multiple autonomous agents that interact strategically in a rational and intelligent way.
- Game Theory and mechanism design provide an important tool for solving many computer science, communications, electrical engineering, management, and industrial engineering problems as well.
- The objective of the course is to provide a sound foundation of game theory and mechanism design to enable the audience to apply them to problem solving in a rigorous way.

COURSE OUTCOMES

CO1: To Understand Game Theory
CO2: To apply game theory to problem solving
CO3: To Illustrate Game Theory through Case Studies
CO4: To Understand Nash equilibrium in strictly competitive games.
CO5: To apply Shapley value in game theoretical problems

UNIT I

Introduction-What is Game Theory? Definition of Games. Actions, Strategies, Preferences, Payoffs. Examples. Strategic form games and examples: Prisoner's Dilemma,Batch or Stravinsky, Matching Pennies. Notion of Nash Equilibrium. Examples of Nash Equilibrium. Best Response Functions. Dominated Actions. Symmetric Games and Symmetric Equilibria. Case Studies of Nash Equilibrium in popular games

UNIT II

Mixed Strategy Nash Equilibrium- Randomization of Actions, Mixed strategy Nash equilibrium, Dominated actions, Pure strategy equilibria in the presence of randomization, Illustrations: (1) expert diagnosis (2) reporting a crime. Finding all mixed strategy Nash equilibria of some representative games.

UNIT III

Extensive games with Perfect Information- Extensive games, Strategies and outcomes, Nash equilibrium, Subgame perfect equilibrium, finding subgame perfect equilibria using backward induction. Allowing for simultaneous moves in extensive games with perfect information. Example of committee decision making. Two Player Zerosum Games: Maxminimization and Nash Equilibrium. Strictly competitive games. Nash equilibrium in strictly competitive games. Minimax theorem. Solution via linear programming. Examples.

UNIT IV

Bayesian and Repeated Games- Motivational Examples. Definition of a Bayesian Game and Bayesian Nash Equilibrium and examples. Auctions: Independent private values, Nash equilibrium of first price auction and second price auction, common valuations, revenue equivalence of auctions. Idea of repeated games. Finitely repeated prisoner's dilemma, infinitely repeated prisoner's dilemma, strategies in a repeated prisoner's dilemma, Nash equilibria and equilibria payoffs in infinitely repeated prisoner's dilemma, sub-game perfect equilibria and equilibria payoffs in infintely repeated prisoner's dilemma.

UNIT V

Coalitional Games- Coaltional games. The Core. Illustrations: (1) Ownership and distribution of wealth (2) exchanging homogeneous items (3) exchanging heterogeneous items (4) voting (5) matching. Shapley value and examples.

TEXT BOOKS

1. Martin Osborne. An Introduction to Game Theory. Oxford University Press, 2003.
2. Philip D. Straffin, Jr. Game Theory and Strategy. The Mathematical Association of America, January 1993.

REFERENCE BOOKS

1. Ken Binmore, Fun and Games : A Text On Game Theory, D. C. Heath & Company, 1992.
2. Y. Narahari. Essentials of Game Theory and Mechanism Design. IISc Press, 2011.

WEB RESOURCES

- http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1968579
- https://onlinecourses.nptel.ac.in/noc15_mg02/preview
- https://www.coursera.org/course/gametheory
- http://www.gametheory.net
- http://www.gametheorysociety.org
- http://william-king.www.drexel.edu/top/eco/game/game.html
- http://levine.sscnet.ucla.edu/
- http://plato.acadiau.ca/courses/educ/reid/games/General_Games_Links.htm

CSE430	SCRIPT PROGRAMMING	L	T	P	C
		3	0	0	3

PREREQUISITES

Ability to write substantial computer programs in Java or C or PHP, equivalent to a result of CR or better in one of these courses:

- **CSE421** Software Architecture
- **CSE205** Java Programming

.**COURSE OBJECTIVES**

- **Analyse** requirements of software systems for the purpose of determining the suitability of implementing in Perl or Python;
- **Analyse** and model requirements and constraints for the purpose of designing and implementing software systems in Perl and Python;
- **Evaluate** and compare designs of such systems on the basis of specific requirements and constraints.
- **Problem Solving:** analyse problems and synthesise suitable solutions. Specifically:
- **Design and implement** Perl and Python software solutions that accommodate specified requirements and constraints, based on analysis or modelling or requirements specification.

COURSE OUTCOMES

CO1: **Understand** the differences between typical scripting languages and typical system and application programming languages.
CO2: **Apply** your knowledge of the strengths and weaknesses of scripting languages to select an implementation language.
CO3: **Create** software systems using scripting languages, including Perl and Python CGI facilities
CO4: **Remember** how to produce robust scripts in PHP using software engineering techniques such as review and extensive program testing.
CO5: **Analysis** how to produce robust programs in Python using software engineering techniques such as review and extensive program testing.

UNIT I

Introduction to Script programming in Linux and MS-Windows Perl programming

UNIT II

Python programming

UNIT III

Php programming

UNIT IV

Windows Power shell programming

UNIT V

Applications development with Client/server architecture, graphs, GUI and graphics programming using script langauages searching and search engine development using script languages.

TEXT BOOKS

1. Programming Perl, 3rd Edition By Larry Wall, Tom Christiansen, Jon Orwant O'Reilly 2000
2. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress, 2008, ISBN 1- 59059-982-9
3. PhP 5 Power programming available at: http://ptgmedia.pearsoncmg.com/images/013147149X/downloads/013147149X_book.pdf
4. Professional Windows PowerShell Programming ISBN: 978-0-470-17393-0 Wrox book Professional.

WEB RESOURCES

- http://en.wikipedia.org/wiki/Scripting_language
- http://www.sqa.org.uk/e-learning/ClientSide01CD/page_21.htm
- http://www.tutorialspoint.com/perl/
- https://www.perl.org/books/beginning-perl/
- http://www.tutorialspoint.com/javascript/
- https://docs.python.org/2/tutorial/
- http://www.sthurlow.com/python/

MINOR ELECTIVES

ECE318	INFORMATION THEORY AND CODING	L	T	P	C
		3	0	0	3

PREREQUISITES

- Programming language (CSE102)
- Operating system (CSE207)
- Computer Networks (CSE318)
- Cryptographic Algorithms (CSE405)

COURSE OBJECTIVES

- Students will acquire knowledge about information and Entropy
- Students will study the concepts in sequential search and Viterbi algorithm.
- To study the various types of redundancy
- To study some basic information theory with some channel coding theorem

COURSE OUTCOMES

CO1 : Understand the basic algebraic operations and Matrices for basic computation
CO2 : To implement the entropy and Huffman coding algorithms for various information .
CO3 : Analyze the properties of channel capacity for mutual information
CO4 : Apply various cyclic codes and parity check for detecting error
CO5 : Evaluate convolution and viterbi decoding method for reed Solomon method

UNIT I ALGEBRA

Groups – fields – binary field arithmetic – construction of Galois field – basic properties - computations, vector spaces, matrices

UNIT II INFORMATION THEORY

Information and entropy – properties of entropy of a binary memoryless source –extension of a binary memoryless source – source coding theorem – Shannon fano coding - Huffman coding

UNIT III SHANNON'S THEOREM AND MUTUAL INFORMATION

Binary symmetric channel – mutual information – properties – channel capacity – Hartley,

Shannon Law – channel coding theorem - Lempel-Ziv coding

UNIT IV LINEAR AND CYCLIC CODES

Linear block codes – generator matrices – parity check matrices – encoder – syndrome and error correction – minimum distance –error correction and error detection capabilities – cyclic codes – coding and decoding

UNIT V OTHER CODING TECHNIQUES

Convolutional codes – encoder – generator matrix – state diagram – distance properties - maximum likelihood decoding – viterbi decoding – sequential decoding –Hadamard matrices and Hadamard codes – BCH codes – description, decoding – Reed Solomon codes

TEXT BOOKS

1. Norman Abramson, Information Theory, John Wiley, 2002.
2. Shu Lin, Costello D.J., Error Control Coding - Fundamentals and Applications, PHI, 2000.

REFERENCE BOOKS

1. Simon Haykin, Digital Communications, John Wiley, 2001.
2. Taub & Schilling, Principles of Communication System, TMH, 1998.
3. Tomasi, Electronic Communication, Fundamentals Through Advanced, Pearson Education, 2001.
4. Sklar, Digital Communication, Pearson Education, 1999.
5. Cover T., and Thomas, Elements of Information Theory, John Wiley & Sons 1991.

WEB RESOURCES

- www.moser-isi.ethz.ch/scripts.html
- www2.isye.gatech.edu/~yxie77/ece587/lecture.html
- www.elearning.vtu.ac.in/EC63.html
- www.rejinpaul.com/.../anna-university-IT2302-Information-Theory-and coding
- www.inference.phy.cam.ac.uk/itprnn/book.pdf
- www.peterindia.net/InformationTheory.html
- www.haverford.edu/cmsc/slindell/Classes/235/235.html

ECE344	MULTIMEDIA COMPRESSION TECHNIQUES	L	T	P	C
		3	0	0	3

PREREQUISITE

Graphics and Visual computing(CSE320)

COURSE OBJECTIVES

- To have an understanding of taxonomy of the compression techniques and source model.
- To have a knowledge of scalar and vector quantization methods for compression.
- To know the text compression techniques in multimedia.
- To study the audio compression techniques used for multimedia.
- To focus the image compression techniques for the multimedia.

COURSE OUTCOMES

CO1 : Understand the concepts of Multimedia architecture, elements, applications and interface standards.
CO2 : Learn the different types of compression techniques and different types of data file format used in multimedia systems.
CO3 : Know the Multimedia Authoring Systems and Hypermedia message components & standards
CO4: Be able to analyze the QOs requirements and real time system model in multimedia systems
CO5: Prepared to use the presented idea in a multimedia group communications and specification methods for synchronization.

UNIT I INTRODUCTION

Overview of information theory – redundancy – need for compression – evolution of data compression - applications – Taxonomy of compression techniques – overview of source coding, source models – coding – uniquely decodable codes – prefix codes- Kraft McMillan Inequality.

UNIT II QUANTIZATION THEORY

Scalar quantization theory – overview, uniform, adaptive, nonuniform, Entropy coded Quantization – Vector quantization theory – overview, LBG algorithm –Tree structured vector, structured vector quantizers – rate distribution theory – Evaluation techniques –error analysis and methodologies.

UNIT III TEXT COMPRESSION

Compaction techniques – Huffmann coding – Adaptive Huffmann Coding – Arithmetic coding – Shannon - Fano coding – dictionary techniques – LZW family algorithms.

UNIT IV AUDIO COMPRESSION

Audio signal representation – compression techniques Frequency domain and filtering – Basic sub-band coding – G.722– MPEG audio – progressive encoding for audio – Silence compression – speech compression techniques –Vocoders.

UNIT V IMAGE COMPRESSION

Predictive techniques – DM, PCM, DPCM – optimal predictors and optimal quantization – contour based compression, Quad trees – transform coding – JPEG Standard – Sub-band coding algorithms – Design of Filter banks – Wavelet based compression –EPIC, SPIHT coders – JPEG 2000 standards.

TEXT BOOK

1. Khalid Sayood, Introduction to Data Compression, Morgan Kauffman Harcourt India,2nd Edition, 2000.

REFERENCE BOOKS

1. David Salomon, Data Compression – The Complete Reference, Springer Verlag New York Inc., 2nd Edition, 2001.
2. Yun Q.Shi, Huifang Sun, Image and Video Compression for Multimedia Engineering Fundamentals, Algorithms & Standards, CRC press, 2003.
3. Peter Symes, Digital Video Compression, McGraw Hill Pub., 2004.
4. Mark Nelson, Data compression, BPB Publishers, New Delhi, 1998.
5. Mark S.Drew, Ze-Nian Li, Fundamentals of Multimedia, PHI, 1st Edition, 2003.

WEB RESOURCES

- http://searchstorage.techtarget.com/feature/An-introduction-to-data-compression
- http://plg.uwaterloo.ca/~gvcormac/cormack-nato.pdf
- http://www.sfu.ca/~jiel/courses/861/pdf/07_Quant_1_pre.pdf
- http://www.cs.bham.ac.uk/~jxb/NN/l18.pdf
- http://www.siggraph.org/education/materials/HyperGraph/video/mpeg/mpegfaq/huffman_tutorial.html
- http://www.cs.cf.ac.uk/Dave/Multimedia/node214.html
- http://www.data-compression.com/speech.html
- http://www.waveletsandsubbandcoding.org/Repository/VetterliKovacevic95_Manuscript.pdf
- http://www.adass.org/adass/proceedings/adass98/vasils/
- http://www.ws.binghamton.edu/fowler/fowler%20personal%20page/EE523_files/Ch_15_1%20Wavelet%20Transform%20Overview%20(PPT).pdf

CE431	WIRELESS COMMUNICATION	L	T	P	C
		3	0	0	3

PREREQUISITE

Computer Network(CSE318)

COURSE OBJECTIVES

- To introduce the concepts and techniques associated with Wireless Cellular communication systems.
- To familiarize with state of art standards used in wireless cellular systems.

COURSE OUTCOMES

CO1 : Understand the radio propagation mechanism and path loss modeling.

CO2 : Compare CDMA, TDMA and TDMA approach.

CO3 : Understand the cellular network operation.

CO4 : Analyze the various wireless standards like GSM,CDMA.

CO5 : Describe about IEEE802.11,HIPERLAN and Bluetooth.

UNIT I WIRELESS MEDIUM

Air Interface Design – Radio propagation mechanism – Pathloss modeling and Signal Coverage – Effect of Multipath and Doppler – Channel Measurement and Modelling – Simulation of Radio Channel.

UNIT II WIRELESS MEDIUM ACCESS

Fixed Assignment Access for Voice Networks – Random Access for Data Networks – Integration of Voice and Data Traffic.

UNIT III WIRELESS NETWORK OPERATION

Wireless Network Topologies – Cellular Topology – Cell fundamentals – Signal to Interference Ratio – Capacity Expansion – Mobility Management – Resources and Power Management – Security in Wireless Networks.

UNIT IV WIRELESS WAN

GSM and TDMA Technology – Mobile Environment – Communication in the Infrastructure –

CDMA Technology – IS95 – IMT2000 – Mobile Data Networks – CDPD Networks – GPRS – Mobile Application Protocol.

UNIT V WIRELESS LANS AND HIPERLANS

Introduction to wireless LANs – IEEE 802.11 – WPAN IEEE 802.15 –Mobile AdHoc Networks(MANET)- Principle and operation - Wireless Home Networking – Concepts of Bluetooth Technology – Wireless Geo-location.

TEXT BOOK

1. William Stallings, "Wireless Communications and Networks", Second Edition Prentice Hall, India 2007

REFERENCE BOOKS

1. Kaveth Pahlavan, K.Prasanth Krishnamurthy, "Principles of Wireless Networks", Pearson Education Asia, 2002
2. Leon Garcia, Widjaja, "Communication Networks", Tata McGraw Hill, New Delhi, 2000.
3. Jon W Mark , Weihua Zhuang, "Wireless communication and Networking", Prentice Hall India 2003

WEB RESOURCES

- http://inst.eecs.berkeley.edu/~ee122/fa08/notes/20-Wirelessx6.pdf
- http://wmnlab.ee.ntu.edu.tw/951cross/Lec2.pdf
- http://wireless.ictp.it/school_2006/lectures/Struzak/RadioPropBasics-ebook.pdf
- http://www.ee.caltech.edu/EE/Faculty/babak/courses/ee161/handout3.pdf
- http://www.stanford.edu/class/ee359/lectures/lecture2.pdf
- http://www.cs.jhu.edu/~baruch/RESEARCH/Research_areas/Wireless/wireless-public_html/class-slides/wireless-medium-access.pdf
- http://www.ece.neu.edu/faculty/basagni/Classes/F016V81.503/WMAC.pdf
- http://www.dauniv.ac.in/downloads/Mobilecomputing/MobileCompChap04L02SDMATDMAFDMACDMA.pdf
- http://www.cs.illinois.edu/~haiyun/cs598hl/papers/ipds98.pdf
- http://www.ece.utah.edu/~pamini/eurasip.pdf
- http://www.ece.gatech.edu/research/labs/bwn/papers/1999/j3.pdf
- http://www.itrainonline.org/itrainonline/mmtk/wireless_en/04_Infrastructure_Topology/04_en_mmtk_wireless_basic-infrastructure-topology_slides.pdf
- http://www.ccs.neu.edu/home/rraj/Courses/6710/S10/Lectures/ CellularNetworks.pdf
- http://web.eecs.umich.edu/~zmao/Papers/netpiculet.pdf
- http://www.fang.ece.ufl.edu/mypaper/book-04ma.pdf
- http://people.cs.nctu.edu.tw/~jcc/book/ch4-6in1.pdf
- http://www.pajhohesh.ir/e-books-m-biabani/computer-en/01.pdf
- http://pauldotcom.com/WirelessNetSec.pdf
- https://www.eff.org/sites/default/files/filenode/Global%20System%20for%20Mobile%20Communication%20Technology.pdf

ECE443	WIRELESS SENSOR NETWORKS	L	T	P	C
		3	0	0	3

PRE-REQUISITE

Students must have a sound knowledge in Computer networks, probability and statistics .

COURSE OBJECTIVE

The objective of the course is to have knowledge in wireless sensor network ,wireless communications and wireless networking infrastructure. The basics of cellular concept. Propagation of wireless signals, radio propagation mechanism. After completing the course the student may able to have the knowledge about the Localization technique, under water sensor and underground sensor.

COURSE OUTCOMES

CO1: Understand the concepts in the terminology of wireless communication
CO2: Learn how reflection, diffraction, and scattering contribute to path-loss.
CO3: Understand about the time synchronization mechanisms.
CO4: Understand various routing protocols and localization techniques.
CO5: Analyze various attacks and defenses ,secure routing.

UNIT I INTRODUCTION AND ARCHITECTURES

Challenges for WSNs - Why are sensor networks different - Types of applications - Single node architecture -Hardware components - Energy consumption of sensor nodes - Operating systems and execution environments - Design principles for WSNs - Service interfaces of WSNs - Gateway concepts

UNITII PHYSICAL LAYER AND LINK LAYER

Wireless channel and communication fundamentals - Physical layer & transceiver design considerations in WSNs - Contention-based protocols - Schedule-based protocols - The IEEE 802.15.4 MAC protocol - Error control . Framing - Link management

UNITIII ADDRESSING AND TIME SYNCHRONIZATION

Fundamentals - Address and name management in wireless sensor networks - Assignment of MAC addresses - Distributed assignment of locally unique addresses -Content-based and geographic addressing - Introduction to the time synchronization problem - Protocols based on sender/receiver synchronization - Protocols based on receiver/receiver synchronization.

UNITIV ROUTING PROTOCOLS AND LOCALIZATION

Gossiping and agent-based unicast forwarding - Energy-efficient unicast - Broadcast and multicast - Geographic routing - Data-centric routing - Data aggregation . Single- hop localization, Multi .hop localization . Properties of positioning

UNITV OPERATING SYSTEMS AND SECURITY FOR WSNS

Tiny OS . Security issues and challenges . Various attacks and Defences . Secure routing

TEXT BOOK

1. Holger Karl, Andreas Willing, Protocols and Architectures for Wireless Sensor Networks, Wiley, 2005

REFERENCE BOOK

1. Feng Zhao, Leonidas Guibas, Wireless Sensor Networks . An information processing approach, Elsevier, 2005

WEB RESOURCES

- http://www.ee.ccu.edu.tw/~wl/wireless_class/Chapter1%20Cellular%20Concepts.pdf
- http://burnsidetelecom.com/whitepapers/cell_comm.pdf
- http://www.netmode.ntua.gr/courses/postgraduate/mobile_personal_communications/The%20Cellular%20Concept.pdf
- http://www.authorstream.com/Presentation/aSGuest11950-145378-radio-wave-propagation-entertainment-ppt-powerpoint/
- http://www.winlab.rutgers.edu/~narayan/Course/WSID/Lectures02/lect1.pdf
- http:// citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.113.6167.
- https://www.cs.purdue.edu/homes/fahmy/reports/leynawap.htm
- http://www.tech-ware-tips-startup-internet-business.com/Wireless-LAN-Architecture.html
- www.isi.edu/~johnh/PAPERS/Heidemann06a.pdf
- http:// cse.unl.edu/~mcvuran/ugTestbed.pdf
- http:// www.slideshare.net/hiarnavsoni/wireless-underground-sensor-networks
- www.idc.lnt.de/en/forschung/wireless-underground-sensor-networks

ECE325	ROBOTICS AND AUTOMATION	L	T	P	C
		3	0	0	3

PRE-REQUISITE

CSE307-Artificial Intelligence

COURSE OBJECTIVES

- To acquire the knowledge on advanced algebraic tools for the description of motion.
- To develop the ability to analyze and design the motion for articulated systems.
- To develop an ability to use software tools for analysis and design of robotics systems
- To provide the student with knowledge of the singularity issues associated with the operation of robotics systems.
- To acquire the knowledge and skills associated with robot control

COURSE OUTCOMES

CO1 : Ability to apply spatial transformation to obtain forward kinematics equation of robot manipulators.

CO2: Understand, apply and document the engineering design process.

CO3: Able to create, and interpret fundamental programming of robots and automated systems.

CO4: Identify and use variables in programming and also utilize a personal library of commands

CO5: Ability to identify and report on educational pathways and carrer apportunities in robotics and automation

UNITI AUTOMATION AND ROBOTICS

Automation and Robotics - Robotics in Science Fiction - A Brief History of Robotics – The Robot and Its Peripherals-Robot Activation and Feedback Components - Position Sensors – Velocity Sensors - Actuators - Power Transmissions Systems - Robot Joint Control Design- Introduction to Manipulator Kinematics - Homogeneous Transformations and Robot Kinematics - Manipulator Path Control - Robot Dynamics - Configuration of a Robot Controller.

UNITII ROBOTIC DESIGN

Types of End Effectors - Mechanical Grippers - Other Types of Grippers - Tools as End Effectors - The Robot/End Effectors' Interface - Considerations in Gripper Selection and Design - Sensors in Robotics - Tactile Sensors - Proximity and Range Sensors - Miscellaneous Sensors and Sensor-Based Systems - Uses of Sensors in Robotics - Introduction to Machine Vision – The Sensing and

Digitizing Function in Machine Vision - Image Processing and Analysis – Training and Vision System - Robotic Applications.

UNITIII ROBOT PROGRAMMING

Methods of Robot Programming . Lead through Programming Methods - A Robot Program as a Path in Space - Motion Interpolation - WAIT, SIGNAL, and DELAY Commands - Branching - capabilities and Limitations of Lead through Methods

UNITIV ROBOT LANGUAGES

The Textual Robot Languages - Generations of Robot Programming Languages – Robot Language Structure - Constants, Variables, and Other Data Objects - Motion Commands – End Effectors and Sensor Commands - Computations and operations - Program Control and Subroutines - Communications and Data Processing - Monitor Mode Commands.

UNITV ROBOT INTELLIGENCE

Introduction to robot intelligence and task planning- state space search-problem reduction-use of predicate logic-means .end analysis-problem-solving .robot learning-robot task planning- expert systems and knowledge learning

TEXT BOOKS

1. Mikell P. Groover, Mitchell Weiss, Roger N. Nagel, Nicholas G. Odrey, Industrial
2. robotics, Technology, Programming and Applications, TMH, 2008
3. K. S. Fu, R. C. Gonzalez, C. S. G. Lee, Robotics, Control, Sensing, Vision and
4. Intelligence, TMH, 2008

WEB RESOURCES

- http://www.cs.binghamton.edu/~reckert/480/robotics_lect0.PDF
- http://www.robotics.com.sg/wbn/slot/u497/History%20of%20Robotics.pdf
- http://www.g-w.com/pdf/sampchap/9781605253213_ch02.pdf
- http://cdn.intechweb.org/pdfs/379.pdf
- http://www.cds.caltech.edu/~murray/books/MLS/pdf/mls94-manipdyn_v1_2.pdf
- http://www.simbotics.org/files/pdf/robotdesign.pdf
- http://www.cs.jhu.edu/CIRL/publications/pdf/pembeci-review.pdf
- http://web.stanford.edu/class/me328/lectures/lecture6-dynamics.pdf

ECE446	RFID AND APPLICATIONS	L	T	P	C
		3	0	0	3

PREREQUISITE

Basic Knowledge about business management

COURSE OBJECTIVES

This course will introduce students to the principles and concepts around the emerging technology of Radio Frequency Identification (RFID). The primary objective of this course is to provide students with the knowledge required for designing, developing, implementing and administering RFID-based applications and to develop competency skill in the area of design RFID systems in the context of feasible business or industrial applications.

COURSE OUTCOMES

CO1: To understand the basic components and applications of RFID systems
CO2: To Analyze and characterize RFID reader architectures.
CO3: To understand the working of RFID antennas and networks
CO4: To analyze the concepts of EPC global Generation 1-EPCglobal Class 0, EPC global Class 1 Generation 1 and other Protocols in RFID systems
CO5: Understand basic data security techniques for RFID systems

UNIT I INTRODUCTION

History and Practice of RFID, RFID Systems and Terminology, Types of RFID, Frequency Bands for RFID, Tags-Passive, Semi passive, and Active Tags. Radio Basics For UHF RFID – Signal Voltage and Power, Information, Modulation, and Multiplexing, Backscatter Radio Links, Link Budgets, Effect of Antenna Gain and Polarization on Range ,Propagation in the Real World Department of ECE

UNIT II READERS & TAGS

UHF RFID Readers: A Radio's Days (and nights), Radio Architectures and Components, RFID Transmitters and RFID Receivers, Digital-Analog Conversion and Signal Processing Packaging and Power **UHF RFID Tags:** Power and Powerlessness, RF to DC , Getting Data, Talking Back, Tag IC Overall Design Challenges, Packaging

UNIT III RFID ANTENNAS

Reader Antennas: Properties of Antenna, Fundamentals of Antenna Operation ,Antennas for Fixed Readers, Antennas for Handheld or Portable Readers, Near-.eld Antennas, Cables and Connectors,

An Electron's Eyelash **Tag Antennas:** Practical challenges of Tag antenna, Impedance Matching and Power Transfer, Dipoles and Derivatives, Tags and the (local) Environment, Near-.eld and Hybrid Tag Antennas

UNIT IV RFID PROTOCOLS

Introduction, EPC global Generation 1-EPCglobal Class 0, EPC global Class 1 Generation 1 ,ISO 18000-6B (Intellitag) ,ISO 18000-6C (EPC global Class 1 Generation 2)

UNIT V RFID SECURITY, STANDARDS AND APPLICATIONS

RFID Security: Confidentiality, Integrity, Availability, Threats, Cryptography, and Threat Modeling **RFID Standards**, Laws, Regulations, Policies, and Guidelines: EPC global, ISO/IEC Item Management, Contactless Smart Cards, Animal Identification, FCC Rules for ISM Band, Identity Standards, and Guidelines for Securing RFID Systems

REFERENCE BOOKS

1. Daniel M. Dobkin, The RF in RFID: passive UHF RFID in practice, Oxford, UK: Elsevier, 2008.ISBN: 978-0-7506-8209-1. Website: http://rfidsecurity.uark.edu

WEB RESOURCES

- http://www.rfid-101.com/rfid-glossary.htm
- http://www.impinj.com/resources/about-rfid/the-different-types-of-rfid-systems/
- http://www.centrenational-rfid.com/rfid-frequency-ranges-article-16-gb-ruid-202.html
- http://www.thingmagic.com/index.php/rfid-basics
- http://skyrfid.com/RFID_Antenna_Tutorial.php
- http://ww1.microchip.com/downloads/en/AppNotes/00710c.pdf
- http://www.enigmatic-consulting.com/Communications_articles/RFID/RFID_protocols.html
- http://www.ijcaonline.org/volume24/number7/pxc3873965.pdf
- http://www.sciencedirect.com/science/article/pii/S0167923607000103
- http://www.infosec.gov.hk/english/technical/files/rfid.pdf
- http://www.thingmagic.com/index.php/rfid-security-issues

EEE409	INDUSTRIAL AUTOMATION	L	T	P	C
		3	0	0	3

PREREQUISITE

Microprocessor(CSE211)

COURSE OBJECTIVES

- Explain the General function of Industrial Automation,
- Identify Safety in Industrial Automation .
- Identify Practical Programmable Logic Controller Applications

COURSE OUTCOMES

CO1 : Understand the Supervisory Control And Data Acquisition system.

CO2 : Identify the components of Automated Systems.

CO3 : Recognize different Communication techniques.

CO4 : Manage programmable logic controllers.

UNIT I INTRODUCTION

Definition of Supervisory Control And Data Acquisition (SCADA) – applicable processes – elements of SCADA systems – SCADA Architecture – operation and control using SCADA – development from telemetry – dependence on communications and computers

UNITII COMPONENTS OF AUTOMATED SYSTEMS

Sensors, transducers and actuators – forgotten cost – special considerations – standardization and maintenance – remote terminal unit – communication interface – protocol detailed – discrete control – analog control – pulse control , serial control – monitor discrete and analog signals – monitor pulse count and serial signals – master terminal unit – communication interface – configuring a picture of the process – data storage – applications

UNIT III COMMUNICATIONS

Analog to digital conversion – communication models and types – communication standards – communications system components – protocol – modems – field buses – synchronous or asynchronous – telephone cable or radio

UNIT IV PROGRAMMABLE LOGIC CONTROLLERS

Structure of PLC – control program – programming – simple relay layouts and schematics – PLC connections – ladder logic inputs – ladder logic outputs – tutorial problems – case studies

UNIT V SUBSTATIONS AND DISTRIBUTION AUTOMATION

Substation automation – structure of subsystem automation – substation communications – substation functions through SCADA – distribution automation– functions of distribution automation – distribution automation for improved energy management – relative rating of communication media for DA – automation in process industries – SCADA systems in industries – requirements of industrial automation system – SCADA system in sugar industries– purification systems – evaporation – crystallization – centrifugation and sugar handling

TEXT BOOK

1. Stuart A. Boyer., SCADA: Supervisory Control and Data Acquisition, 3rd Edition, ISA–The instrumentation systems and Automation Society

REFERENCE BOOKS

1. ISA's Practical Guide Series, Analytical Instrumentation (1996).
2. Maintenance of Instrumentation and systems – 2nd Edition (2005)
3. Fundamentals of Industrial Control – 2nd Edition (2006).

WEB RESOURCES

- http://www.iconics.com/Home/Solutions/SCADA.aspx
- http://whatis.techtarget.com/definition/SCADA-supervisory-control-and-data-acquisition
- http://www.rockwellautomation.com/rockwellautomation/products-technologies/industrial-control-components/overview.page
- http://www.intelligentstructures.com/components.html
- http://www.nature.com/ncomms/index.html
- http://hyperphysics.phy-astr.gsu.edu/hbase/electronic/adc.html
- https://learn.sparkfun.com/tutorials/analog-to-digital-conversion
- http://www.amci.com/tutorials/tutorials-what-is-programmable-logic-controller.asp
- http://www.allaboutcircuits.com/vol_4/chpt_6/6.html
- http://www.ti.com/solution/programmable-logic-controller-diagram
- http://www.alstom.com/grid/products-and-services/Substation-automation-system/
- http://www.powersystem.org/distribution-automation
- http://new.abb.com/substation-automation
- http://electrical-engineering-portal.com/8-major-advantages-of-distribution-automation

.		L	T	P	C
EEE410	**NEURAL NETWORK AND FUZZY LOGIC**	**3**	**0**	**0**	**3**

PREREQUISITE

Soft Computing(CSE403)

COURSE OBJECTIVES

The objective of the course is to design and develop intelligent systems in the framework of soft computing, and apply to some general and scientific application-driven environments. Students who successfully complete this course will be able to

- Have a general understanding of soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, and fuzzy clustering techniques.
- Study neuro-fuzzy control and inference systems.
- Design and development of certain scientific and commercial application using computational neural network models, fuzzy models, fuzzy clustering applications.

COURSE OUTCOMES

CO1 : Understand the principles of Artificial Intelligence and Artificial Neural Network
CO2 : Learning the architecture and functioning of feed forward and feedback network
CO3 : Learning the architecture and functioning of feed forward and feedback network
CO4 : Development of neuro fuzzy system for complex problems
CO5 : Implementation of neural network and fuzzy logic for real world applications

UNIT I NEURAL NETWORKS

Overview of biological neuro-system – mathematical models of neurons – learning rules – learning paradigms – supervised – unsupervised and reinforcement learning

UNIT II FEEDFORWARD AND FEEDBACK NETWORKS

Perceptron networks – training rules – multilayer perceptron – back propagation algorithm – associative memories – Hopfield networks – Boltzman machine – self organizing map

UNIT III FUZZY LOGIC

Overview of classical sets – introduction to fuzzy logic – membership function – fuzzy rule generation – operations on fuzzy sets – compliment – intersections – unions – combinations of operations – fuzzy if-then rule – fuzzy inferencing –Mamdani, TSK Defuzzification

UNIT IV NEURO FUZZY SYSTEM

Adaptive neuro fuzzy inference systems (ANFIS) – architecture – hybrid learning algorithm – parameter identification – rule base structure identification – input selection – input space partitioning – neuro-fuzzy control

UNIT V APPLICATIONS OF NEURAL NETWORK AND FUZZY LOGIC

Applications of neural network – pattern recognition – fuzzy logic control – image processing – home heating system – biomedical applications – applications of neuro fuzzy system – character recognition – channel equalization – noise cancellation

TEXT BOOKS

1. Jang,J.S.R., Sun.C.T., E.Mizutani., Neuro-Fuzzy and Soft Computing , Prentice Hall of India (P) Ltd, New Delhi,2005
2. Timothy J. Ross., Fuzzy Logic with Engineering Applications, Tata McGraw Hill, 1997

REFERENCE BOOKS

1. Laurance Fausett, Englewood cliffs, N.J., Fundamentals of Neural Networks, Pearson Education, 1992.
2. Zimmermann, H.J., Fuzzy Set Theory & its Applications, Allied Publication Ltd., 1996.
3. John Yen & Reza Langari., Fuzzy Logic – Intelligence Control & Information, Pearson Education, New Delhi, 2003.
4. S.N.Sivanandam,S.Sumathi,S.N.Deepa , Principles of soft computing ,Wiley publications

WEB RESOURCES

- http://www.cse.unr.edu/~bebis/MathMethods/NNs/lecture.pdf
- http://www.eis.mdx.ac.uk/staffpages/rvb/teaching/BIS3226/hand11.pdf
- http://www.cc.gatech.edu/~bhroleno/rnn_slides.pdf
- http://www.cs.bham.ac.uk/~jxb/INC/l12.pdf
- http://medusa.sdsu.edu/Robotics/Neuromuscular/Theses/Hongyu/chapter3.pdf
- http://www.astro.caltech.edu/~george/aybi199/Donalek_Classif.pdf
- https://graphics.ethz.ch/teaching/former/vc_master_06/Downloads/T7_SVM_ Perceptrons_6.pdf
- http://www.obitko.com/tutorials/genetic-algorithms/ga-basic-description.php
- www.iitk.ac.in/kangal/papers/sadhana.ps.gz
- http://www.cmmacs.ernet.in/cmmacs/Lect_notes/choas%20theory.pdf

INT404	INFORMATION SYSTEM DESIGN	L	T	P	C
		3	0	0	3

PREREQUISITES

- Enterprise Resource Planning(INT408)
- Data Mining and Data Warehousing(CSE404)

COURSE OBJECTIVES

Prepare the students to be effective planners, users and managers of information technologies and systems.

COURSE OUTCOMES

CO1 : Understand the strategic importance of various information systems.

CO2 : Realize the trends in Transaction Processing Systems, Enterprise Resource Planning, Management information Systems and Decision Support System.

CO3 : Realize the potential for doing business on the web and identify a proper E-Commerce and Mobile Commerce (m-commerce) model.

CO4 : Identify and differentiate various system analysis and development approaches.

CO5 : Recognize the importance of security and trust in information system, and be able to justify the ethical and security issues of doing business on the Web.

UNIT I OVERVIEW OF INFORMATION SYSTEMS

An Introduction to Information Systems: Information Concepts – System Concepts - Business Information Systems - Information Systems in Organizations: Organizations and Information Systems - Performance-based Information Systems - Careers in Information Systems

UNIT II BUSINESS INFORMATION SYSTEMS (PART I)

Enterprise Systems: Overview – Transaction Processing Systems: Activities – Applications. Enterprise Resource Planning – Supply Chain Management – Customer Relationship Management. Information Systems: Overview and Function aspects of Management Information Systems. Decision Support Systems: Overview - Decision Making and Problem Solving – Components

UNIT III BUSINESS INFORMATION SYSTEMS (PART II)

Group Support Systems – Executive Support Systems – Knowledge Management Systems: Artificial Intelligence – Expert Systems – Specialized Information Systems: Virtual Reality and Other Specialized Systems - Electronic and Mobile Commerce: Introduction - Applications – Threats – Strategies for successful E-commerce - Technology Infrastructure required to support E-commerce and M-commerce.

UNIT IV SYSTEMS DEVELOPMENT

Investigation and Analysis: Overview – Systems Development Life Cycle – Factors affecting Systems Development Success – Systems Investigation – Systems Analysis – Systems Design – Implementation – Operation – Maintenance – Systems Review

UNIT V INFORMATION SYSTEMS IN BUSINESS AND SOCIETY

The Personal and Social Impact of Computers: Computer Waste and Mistakes – Preventing Computer-related Waste and Mistakes – Computer Crime – Preventing Computer-related Crime – Goals of Information Security – Risks to Information Systems – Risks to Online Operations – Controls – Security Measures – Recovery Measures

TEXT BOOKS

1. Ralph Stair, George Reynolds, "Principles of Information Systems: A Managerial Approach", Cengage Learning India Pvt. Ltd., 2008.
2. Effy Oz, "Management Information Systems", Cengage Learning India Pvt. Ltd., 2006

REFERENCE BOOKS

1. Lauaon Kenneth & Landon Jane, Management Information Systems: Managing the Digital firm, Eighth edition, PHI, 2004.
2. Uma G. Gupta, Management Information Systems – A Management Perspective, Galgotia publications Pvt., Ltd., 1998.
3. Kenneth E.Kendall and Julie E. Kendall, "System Analysis and Design", Seventh Edition – Pearson Education 2008.

WEB RESOURCES

- http://www.oturn.net/isfi/index.html
- http://www.pearsonhighered.com/kroenke/
- http://as.wiley.com/WileyCDA/WileyTitle/productCd-EHEP000323.html#instructor
- http://global.britannica.com/EBchecked/topic/287895/information-system
- http://www.businessdictionary.com/definition/information-system.html

INT408	ENTERPRISE RESOURCE PLANNING	L	T	P	C
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UNIT I INTRODUCTION

ERP: An Overview, Enterprise – An Overview, Benefits of ERP- ERP and Related Technologies- Business Process Reengineering (BPR)- Data Warehousing- Data Mining - On-line Analytical Processing (OLAP) – Supply Chain Management (SCM)

UNIT II ERP IMPLEMENTATION

Planning for ERP - ERP Implementation Lifecycle - Implementation Methodology - Hidden Costs - Organizing the Implementation - Vendors - Consultants and Users – Contracts with Vendors - Consultants and Employees - Project Management and Monitoring

UNIT III THE FUNCTION MODULES

Functional modules in an ERP Package – Finance (FICO) - Manufacturing - Human Resources (HR) - Plant Maintenance (PM) - Materials Management (MM) - Quality Management (QM) - Sales and Distribution (SD) – Inventory Control – Production Planning (PP) – Customer Relationship Management (CRM)

UNIT IV THE ERP MARKET

ERP Market Place - SAP AG - People soft – Baan - JD Edwards - Oracle - QAD – SSA

UNIT V ERP – PRESENT AND FUTURE

Turbo Charge the ERP System - EIA - ERP and e-Commerce - ERP and Internet - Future Directions – ERP Case Studies: Post Implementation review of ERP Packages in Manufacturing, Services and other Organizations

TEXT BOOK

1. Alexis Leon, ERP Demystified, Tata McGraw Hill, New Delhi, 2006

REFERENCES

1. Joseph A Brady, Ellen F Monk, Bret Wagner, Concepts in Enterprise ResourcePlanning, Thompson Course Technology, USA, 2001.
2. Vinod Kumar Garg and Venkitakrishnan N K, Enterprise Resource Planning – Concepts and Practice, PHI, New Delhi, 2003
3. Ashim Raj Singla, Enterprise Resource Planning, 2008 CENGAGE Learning India Pvt Ltd

INT315	BLUETOOTH TECHNOLOGY	L	T	P	C
		3	0	0	3

PREREQUISITES

- Data Base Management System (CSE212)
- Basic business operations

COURSE OBJECTIVES

To know the strategic importance of Enterprise Resource Planning.

COURSE OUTCOMES

CO1 : Realize the basics of Enterprise Resource Planning.
CO2 : Understand the key implementation issues of ERP System.
CO3 : Identify the various Functional business modules of Enterprise Resource Planning.
CO4 : Familiar about some popular products in the area of ERP.
CO5 : Study current trends and predict future trends in Enterprise Resource Planning

UNIT I BASIC CONCEPTS

Components-networks-Topologies-Protocols and Standards –ISO/OSI model-Origin- blue tooth SIG - Protocol stack - Security applications and profiles – management - test and qualification technology basics - RF and IR wireless communication.

UNIT II BLUETOOTH MODULE

Antennas patterns - gain and losses- types of antennas- on chip antennas radio interference - FH, modulation, symbol timing, power emission and control, performance parameters - RF architecture - Blur RF - Base band - Blue tooth device address system timing - Physical links - packet structuring types and construction - channel coding and time base synchronization.

UNIT III LINK CONTROLLER AND MANAGEMENT

LCP- controller states - Pico net and scattered operations - Master / slave role switching LC Architectural overview - LMC<Link set up - Quality of service - LMP version - Name represent - Test mode.

UNIT IV BLUETOOTH HOST

LLC and adaptation protocol L2 cap signaling – connections- Blue tooth profiles- Version 1.0- Generic profiles-serial and object exchange.

UNIT V SECURITY

Encryption and security Key generation - security Modes and architecture - Low power operation and QOS management.

TEXT BOOK

1. Jennifer, Sturman, "Blue tooths Connect without cables", 2nd Edition Pearson education 2005.

REFERENCE BOOKS

1. Brent A.Miller and Bisdikian C. ,Blue tooth reveeled, 2nd Edition, Pearson Education 2002.
2. Muller, J. ,Blue tooth Demystified, Nathan Tata Mc Graw Hill 2001.

WEB RESOURCES

- http://www.erpfans.com/erpfans/erpdefinition/erp001.html
- http://www.erpwire.com/
- http://www.accountingtools.com/questions-and-answers/what-is-inventory-control.html
- http://www.open-source-erp-site.com/erp-production-planning-module.html
- http://www.sap.com/solutions/business-suite/erp/index.epx
- http://www.siestyit.0fees.net/ERP%20MARKET.ppt
- http://www.netessence.com.cy/downloads/erp.pdf
- http://www.authorstream.com/Presentation/Jennarendra-154825-enterprise-resource-planning-erp-presentation-narendra-aryal-education-ppt-powerpoint/

INT423	DISTRIBUTED DATABASE SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITES

- Programming Language
- Database Management System
- Data Structures and Algorithms

COURSE OBJECTIVES

- To provide an understanding of architecture and design tradeoffs of all aspects of distributed database management systems.
- To apply heuristics to design high performing distributed database schemas.
- To learn how to create optimized distributed query execution plans as well as understand the underpinnings of transaction managment and fault tolerance.
- To characterize algorithms that are optimally solved by MapReduce, to design and query large-scale databases, and to understand tradeoffs among distributed database, cloud databases, and data warehouses.

COURSE OUTCOMES

CO1: Understand the role of a database management system in an organization.
CO2: Understand basic database concepts, including the structure and operation of the relational data model.
CO3: Design simple and moderately advanced database queries using Structured Query Language (SQL).
CO4: Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
CO5: Design and implement a small database project using Microsoft Access.
CO6: Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.
CO7: Learn and discuss selected advanced database topics, such as distributed database systems and the data warehouse.
CO8: Understand the role of the database administrator.

UNIT I INTRODUCTION

Distributed Data processing - Distributed database system (DDBMSS) - Promises of DDBMSs - Complicating factors and Problem areas in DDBMSs - Overview Of Relational DBMS Relational Database concepts – Normalization - Integrity rules - Relational Data Languages - Relational DBMS

UNIT II DISTRIBUTED DBMS ARCHITECTURE

DBMS Standardization - Architectural models for Distributed DBMS - Distributed DBMS Architecture Distributed Database Design - Alternative design Strategies - Distribution design issues, Fragmentation – Allocation - Semantic Data Control - View Management - Data security - Semantic Integrity Control

UNIT III OVERVIEW OF QUERY PROCESSING

Query processing problem - Objectives of Query Processing - Complexity of Relational Algebra operations - characterization of Query processors - Layers of Query Processing Introduction To Transaction Management - Definition of Transaction - Properties of transaction - types of transaction

UNIT IV DISTRIBUTED CONCURRENCY CONTROL

Serializability theory - Taxonomy of concurrency control mechanisms - locking bases concurrency control algorithms - Parallel Database Systems - Database servers - Parallel architecture - Parallel DBMS techniques - Parallel execution problems - Parallel execution for hierarchical architecture

UNIT V DISTRIBUTED OBJECT DATABASE MANAGEMENT SYSTEMS

Fundamental Object concepts and Object models - Object distribution design - Architectural issues - Object management - Distributed object storage - Object query processing - Transaction management - Database Interoperability - Database Integration - Query processing

TEXTBOOKS

1. M.Tamer Ozsu, “Principles of Distributed Database Systems 2nd”, Patrick Valduriez, 2011.

REFERENCE BOOKS

1. StefanoCeri,Giuseppe Pelagatti, “Distributed Databases principles and systems, ,TatamcGrawHill, 2010

WEB RESOURCES

- www.cs.ualberta.ca
- http://databases.about.com
- http://dsonline.computer.org
- http://db.uwaterloo.ca/~tozsu/courses/cs748t/surveys/zhang.pdf
- http://pages.cs.wisc.edu/~dbbook/
- http://nptel.ac.in/video.php?subjectId=106106093
- http://msdn.microsoft.com/library/en-us/dnpatterns/html/ArcDataReplication.asp
- http://www.csee.umbc.edu/help/oracle8/server.815/a67784/ds_ch1.htm
- http://setiathome.ssl.berkeley.edu./
- http://www.cs.georgetown.edu/~blakeb/pubs/blake_CIKM2002_submitted.pdf
- http://www-gppd.inf.ufrgs.br/

INT326	IT INFRASTRUCTURE MANAGEMENT	L	T	P	C
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PRE-REQUISITES

Students who have completed courses on the following topics will have an added advantage in comprehending the content of the ISM course Computer systems and architecture, Networking technologies, Operating system , Database Management Systems

COURSE OBJECTIVES

- Information Storage and Management (ISM) is the only course to fill the knowledge gap in understanding varied components of modern information storage infrastructure, including virtual environments.
- It provides comprehensive learning of storage technology, which will enable you to make more informed decisions in an increasingly complex IT environment.
- ISM builds a strong understanding of underlying storage technologies and prepares you to learn advanced concepts, technologies, and products.
- You will learn about the architectures, features, and benefits of Intelligent Storage Systems; storage networking technologies such as FC-SAN, IP-SAN, NAS, Object-based and unified storage; business continuity solutions such as backup, replication, and archive; the increasingly critical area of information security; and the emerging field of cloud computing.

COURSE OUTCOMES

CO1: Understand computer terminology as it applies to data storage.

CO2: Describe and apply storage technologies from different data storage types

CO3: Design, analyze the teams to install, administer and upgrade popular storage solutions

CO4: Identify leading storage technologies that provide cost-effective IT solutions for medium to large scale businesses and data centers

CO5: Identify and install current storage virtualization technologies

UNIT I INFRASTRUCTURE MANAGEMENT OVERVIEW

Infrastructure management activities - Evolutions of Systems since 1960s (Mainframes-to Midrange-to-PCs-to-Client-server computing-to-New age systems) and their management - growth of internet - current business demands and IT systems issues – complexity of today's computing environment - Total cost of complexity issues - Value of Systems management for business.

UNIT II PREPARING FOR INFRASTRUCTURE MANAGEMENT

Factors to consider in designing IT organizations and IT infrastructure – Determining customer's Requirements - Identifying System Components to manage - Exist Processes – Data –applications - Tools and their integration - Patterns for IT systems management – Introduction to the design process for information systems – Models - Information Technology Infrastructure Library (ITIL).

UNIT III SERVICE DELIVERY PROCESSES

Service-level management - financial management and costing - IT services continuity management - Capacity management - Availability management

UNIT IV SERVICE SUPPORT PROCESSES

Configuration Management - Service desk - Incident management - Problem management - Change management - Release management

UNIT V STORAGE AND SECURITY MANAGEMENT

Introduction Security - Identity management - Single sign-on - Access Management - Basics of network security - LDAP fundamentals - Intrusion detection – firewall - security information management - Introduction to Storage - Backup & Restore - Archive & Retrieve - Space Management - SAN & NAS - Disaster Recovery - Hierarchical space management - Database & Application protection - Bare machine recovery - Data retention

TEXT BOOKS

1. Rich Schiesser, “IT Systems Management”, Pearson Education, 2010
2. Floyd Piedad, Michael Hawkins, “High Availability: Design, Techniques, and Processe”, Prentice Hall, 2001

REFERENCE BOOKS

1. Harris Kem, Stuart Gaiup, Guy Nemiro, “IT Organization: Building a Worldclass Infrastructure”, Prentice Hall, 2000
2. Jan Van Bon , “Foundations of IT Service Management: based on ITIL”,Van Haren Publishing, 2nd edition 2006

WEB RESOURCES

- http://www.dlink.com/media/Files/B2B%20Briefs/ES/dlinkstoragetechnologiesandterminology.pdf
- http://www.libraries.psu.edu/psul/pubcur/what_is_dm.html

- http://www.aiotestking.com/emc/what-are-the-five-core-elements-of-the-data-center-infrastructure/
- http://www.biztechmagazine.com/article/2012/01/6-key-elements-data-center-optimization-strategy
- https://education.emc.com/guest/certification/framework/dca/info_avail.aspx
- http://whatis.techtarget.com/definition/Confidentiality-integrity-and-availability-CIA
- http://libraryrouen.neoma-bs.fr/index.php/en/faculty-services/information-monitoring-services
- http://ctb.ku.edu/en/table-of-contents/evaluate/evaluate-community-initiatives/monitor-progress/main
- https://www.itracs.com/what-is-data-center-infrastructure-management/
- http://www.emc.com/data-center-management/index.htm
- http://www.safenet-inc.com/data-encryption/data-center-security/storage-secure-encryption/
- http://www.computerworld.com/article/2546352/data-center/top-10-ways-to-secure-your-stored-data.html
- http://www.snia.org/education/storage_networking_primer/stor_virt
- http://www.techopedia.com/definition/4798/storage-virtualization
- http://www.netapp.com/in/technology/storage.aspx
- http://www.securityweek.com/five-dns-threats-you-should-protect-against
- http://docs.openstack.org/security-guide/content/security-boundaries-and-threats.html
- https://blog.cloudflare.com/cloudflare-threat-control-making-your-website/
- https://uknow.drew.edu/confluence/display/sysnet/Introduction+to+Networked+Storage

ICT320	INFORMATION STORAGE MANAGEMENT	L	T	P	C
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PRE-REQUISITES

Students who have completed courses on the following topics will have an added advantage in comprehending the content of the ISM course.

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- Networking technologies
- Operating system
- Database Management Systems

COURSE OBJECTIVE

- Information Storage and Management (ISM) is the only course to fill the knowledge gap in understanding varied components of modern information storage infrastructure, including virtual environments.
- It provides comprehensive learning of storage technology, which will enable you to make more informed decisions in an increasingly complex IT environment.
- ISM builds a strong understanding of underlying storage technologies and prepares you to learn advanced concepts, technologies, and products.
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COURSE OUTCOMES

CO1: Understand computer terminology as it applies to data storage.

CO2: Describe and apply storage technologies from different data storage types

CO3: Design, analyze the teams to install, administer and upgrade popular storage solutions

CO4: Identify leading storage technologies that provide cost-effective IT solutions for medium to large scale businesses and data centers

CO5: Identify and install current storage virtualization technologies

UNIT I INTRODUCTION TO STORAGE TECHNOLOGY

Review data creation and the amount of data being created and understand the value of data to a business - challenges in data storage and data management - Solutions available or data storage - Core elements of a data center infrastructure - role of each element in supporting business activities.

UNIT II STORAGE SYSTEMS ARCHITECTURE

Hardware and software components of the host environment - Key protocols and concepts used by each component - Physical and logical components of a connectivity environment Major physical disk - access characteristics - and performance implications - Concept of RAID and its components - Different Raid levels and their suitability for different application environments: RAID 0 RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6 - Compare and contrast integrated and modular storage systems - High-level architecture and working of an intelligent storage system.

UNIT III INTRODUCTION TO NETWORKED STORAGE

Evolution of networked storage – Architecture – Components - and topologies of FC-SAN, NAS, and IP-SA Benefits of the different networked storage options -Understand the need for long-term archiving solutions and describe how CAS fulfills the need - Understand the appropriateness of the different networked storage options for different application environments.

UNIT IV INFORMATION AVAILABILITY & MONITORING & MANAGING DATA CENTER

List reasons for planned/unplanned outages and the impact of downtime - impact of downtime - Differentiate between business continuity (BC) and disaster recovery (DR) - RTO and RPO - Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures - Architecture of backup/recovery and the different backup/recovery topologies - replication technologies and their role in ensuring information availability and business continuity - Remote replication technologies and their role in providing disaster recovery and business continuity capabilities - Identify key areas to monitor in a data center - Industry standards for data center monitoring and management - key metrics to monitor for different components in a storage infrastructure - key management tasks in a data center.

UNIT V SECURING STORAGE AND STORAGE VIRTUALIZATION

Information security - Critical security attributes for information systems - Storage security domains - List and analyzes the common threats in each domain - Virtualization technologies - block-level and file-level virtualization technologies Processes

CASE STUDIES

1. The technologies described in the course are reinforced with EMC examples of actual solutions.
2. Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

TEXT BOOK

1. EMC, EMC Education Services, Lastemc , "Information Storage and Management: Storing, Managing, and Protecting Digital Information", John Wiley and Sons, 2010.

REFERENCE BOOKS

1. Robert Spalding, **"**Storage Networks: The Complete Reference". Tata McGraw Hill, Osborne, 2003
2. Marc Farley, "Building Storage Networks", 2nd Edition,Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

WEB RESOURCES

- http://www.dlink.com/media/Files/B2B%20Briefs/ES/dlinkstoragetechnologiesandterminology.pdf
- http://www.libraries.psu.edu/psul/pubcur/what_is_dm.html
- http://www.aiotestking.com/emc/what-are-the-five-core-elements-of-the-data-center-infrastructure/
- http://www.biztechmagazine.com/article/2012/01/6-key-elements-data-center-optimization-strategy
- https://uknow.drew.edu/confluence/display/sysnet/Introduction+to+Networked+Storage
- https://education.emc.com/guest/certification/framework/dca/info_avail.aspx
- http://whatis.techtarget.com/definition/Confidentiality-integrity-and-availability-CIA
- http://ctb.ku.edu/en/table-of-contents/evaluate/evaluate-community-initiatives/monitor-progress/main
- https://www.itracs.com/what-is-data-center-infrastructure-management/
- http://www.emc.com/data-center-management/index.htm
- http://www.safenet-inc.com/data-encryption/data-center-security/storage-secure-encryption/
- http://www.computerworld.com/article/2546352/data-center/top-10-ways-to-secure-your-stored-data.html
- http://www.snia.org/education/storage_networking_primer/stor_virt
- http://www.techopedia.com/definition/4798/storage-virtualization
- http://www.netapp.com/in/technology/storage.aspx
- http://www.securityweek.com/five-dns-threats-you-should-protect-against
- http://docs.openstack.org/security-guide/content/security-boundaries-and-threats.html
- https://blog.cloudflare.com/cloudflare-threat-control-making-your-website/

ICT322	INTERNET TECHNOLOGY	L	T	P	C
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PREREQUISITE

Computer Networks (CSE318)

COURSE OBJECTIVES

This course presents the Internet from a dynamic workplace perspective. It reflects on how emerging technologies will empower society to do more with the Internet. It covers core Internet technologies, Web page design and authoring, networking fundamentals, and technology planning,security in Internet

COURSE OUTCOMES

CO1: Students can have understanding on basic client-server model and its evolution to Internet
CO2: Can able to understand naming system followed in Internet
CO3: Can have idea about various protocols governing the Internet in the form of remote access can have idea about various mail related protocols
CO4: Can understand security measures followed in various layers of Internet

UNIT I CLIENT SERVER MODEL & SOCKET INTERFACE

Client server model, concurrency, processes, sockets, byte ordering, address transformation. Socket system calls, connectionless iterative server , UDP client server programs, connection oriented concurrent server.TCP client server Programs.

UNIT II BOOTP, DHCP & DOMAIN NAME SYSTEM

Name Space, Domain Name Space, distribution of name space, DNS in internet, Resolution, DNS massages, types of records, compression examples, encapsulation BOOTP, DHCP.

UNIT III TELNET, RLOGIN & FTP

Concept, NVT, embedding ,options & options Negotiation, sub option negotiation, controlling the server , out of band signaling , escape charter , mode of options, examples & Rlogin . FTP: connections, communication command processing, file transfer, user interface Anonymous FTP.

UNIT IV SMTP, HTTP & WWW

User agents, addresses, delayed delivery aliases, mail transfer agent, commands & responses, mail transfer phases, multipurpose internet mail extensions (MIME) mail delivery, mail access protocol, SNMP.HTTP Transaction, Request & Response messages , header & examples.WWW: Hyper text & Hypermedia Browser architecture , static documents, HTML Types of web documents.

UNIT V INTERNET SECURITY

Privacy, digital signature security in the internet, Application layer security, transport layer security, Firewalls.

TEXT BOOKS

1. TCP/IP Protocol suite - Forouzan B.A. 3rd Edition,Tata McGraw-Hill Education, 2005.
2. Network Security Essentials (Application and standard) – Williams Stallings, Pearson Education India, 2008.
3. Cryptography and Network Security- Atul Kahate, Tata McGraw-Hill Education, 2008.

REFERENCE BOOKS

1. Richards Stevens, "TCP/IP Illustrated Vol-1 and Vol-II", Dorling Kindersly (India) Pvt. Ltd., 2009
2. Richards Stevens, Unix Network Programming, Pearson Education, 2004

WEB RESOURCES

- http://www.cwru.edu/help/introHTML/
- http://javascriptkit.com/javaindex.shtml
- http://www.pageresource.com/jscript/index6.htm
- http://www.w3schools.com/dhtml/
- http://www.w3schools.com/vbscript/default.asp
- http://www.cs.tufts.edu/comp/20/oldnotes/
- http://www.htmlhelp.com/reference/css/
- http://java.sun.com/docs/books/tutorial/servlets
- http://www.w3school.com/xml/default.asp

ICT409	WEB SERVICES	L	T	P	C
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PREREQUISITES

- Required introductory course on Web technologies.
- Preferred basic concepts in distributed systems.
- Basic concepts in web designing
- Internet programming (CSE402)

COURSE OBJECTIVES

This course is the capstone course in the Internet Programming Track. It has evolved from Client Server, and Distributed systems courses. This course examines advanced techniques to distributed computing in the context of the world wide web. It provides an opportunity to integrate the knowledge and skills obtained in the prerequisite courses to the design and develop a functioning distributed middleware application. This course is concerned with the design, implementation and deployment of web services, covering both business-to-business (B2B) and business-to-consumer (B2C) scenarios. The course covers underlying theory with an emphasis on SOAP based web services and associated standards such as XML, WSDL and UDDI.

COURSE OUTCOMES

CO1 : Create, validate, parse, and transform XML documents.
CO2: Design a middleware solution based application.
CO3: Design web using different technologies
CO4: Develop web services using different technologies.
CO5: Compose set of web services using BPEL.

UNIT I XML TECHNOLOGY FAMILY

XML – benefits – Advantages of XML over HTML, EDI, Databases – XML based standards – Structuring with schemas - DTD – XML Schemas – XML processing – DOM – SAX - presentation technologies – XSL – XFORMS – XHTML – Transformation – XSLT – XLINK – XPATH – XQuery

UNIT II ARCHITECTING WEB SERVICES

Business motivations for web services – B2B – B2C – Technical motivations – limitations of CORBA and DCOM – Service-oriented Architecture (SOA) – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services

– deployment view – from application server to peer to peer – process view – life in the runtime

UNIT III WEB SERVICES BUILDING BLOCKS

Transport protocols for web services – messaging with web services - protocols - SOAP - describing web services – WSDL – Anatomy of WSDL – manipulating WSDL – web service policy – Discovering web services – UDDI – Anatomy of UDDI – Web service inspection – Ad-Hoc Discovery - Securing web services

UNIT IV INTRODUCTION TO MICROSOFT .NET PLATFORM

Introduction to .NET Platform - Building Blocks of .NET C# Language Fundamentals - Object Oriented Programming in C#. NET Framework Concepts I - console I/O-working with strings-formatting and conversion- file/O –serialization.

UNIT V GUI APPLICATIONS WITH .NET

Writing GUI Applications with the .NET Framework - Introduction to ADO.NET - Writing Web Application with the .NET framework - Writing Mobile Application with .NET Framework.

TEXT BOOK

1. Ron Schmelzer et al. XML and Web Services, Pearson Education, 2002.

REFERENCE BOOKS

1. Keith Ballinger, .NET Web Services Architecture and Implementation, Addison-Wesley Professional, 2003.
2. David Chappell,Understanding .NET A Tutorial and Analysis, Addison Wesley, 2002.
3. Kennard Scibner and Mark Costive, Understanding SOAP, SAMS 2000.
4. Alexander Nakhimovsky and Tom Myers, XML Programming: Web Applications and Web Services with JSP and ASP, Apress, 2002.

WEB RESOURCES

- http://www.w3schools.com/Webservices/default.asp
- www.w3.org/TR/soap
- www.tutorialspoint.com/wsdl/
- docs.oracle.com/javaee/6/tutorial/doc/gijvh.html
- www.service-architecture.com/.../web-services/web_services_definition
- https://msdn.microsoft.com/en-us/library/ms950421.aspx
- aws.amazon.com/
- ws.apache.org
- www.tutorialspoint.com/wsdl/

HUMANITIES ELECTIVES

HSS001	TOTAL QUALITY MANAGEMENT	L	T	P	C
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PREREQUISITE

Knowledge on Statistical Control and Reliability and Quality Engineering

COURSE OBJECTIVES

- Characterize the quality of a "product" in terms of attributes and variables.
- Explain the relationship between business strategy, business performance and quality management.
- Analyze and identify the philosophical basis from which given quality programmes emerge.
- Choose and apply standard statistical techniques, including control charts and acceptance sampling, to appropriate problems, including control of variation and product development processes.

COURSE OUTCOMES

CO1 : Understand the quality encounter process, including the supporting facility and customer requirements/characteristics

CO2 : know the principles of total quality management and peculiarities of their implementation

CO3 : Apply standard statistical techniques, including control charts and acceptance sampling, to appropriate problems, including control of variation and Business process reengineering

CO4 : Transforming Quality Function Deployment into voice of the customer and determine the impact of quality on economic performance and long-term business success of an organization

CO5 : Apply various tools and Techniques for Quality management and apply quality Taguchi management techniques, applications and the continuous improvement process

UNIT I INTRODUCTION TO QUALITY MANAGEMENT

Definitions – TOM framework, benefits, awareness and obstacles - Quality – vision, mission and policy statements - Customer Focus – customer perception of quality, Translating needs into requirements, customer retention. Dimensions of product and service quality. Cost of quality.

UNIT II PRINCIPLES AND PHILOSOPHIES OF QUALITY MANAGEMENT

Overview of the contributions of Deming, Juran Crosby, Masaaki Imai, Feigenbaum, Ishikawa, Taguchi, Shingeo and Walter Shewhart - Concepts of Quality circle, Japanese 5S principles and 8D methodology.

UNIT III STATISTICAL PROCESS CONTROL AND PROCESS CAPABILITY

Meaning and significance of statistical process control (SPC) – construction of control charts for variables and attributed - Process capability – meaning, significance and measurement – Six sigma concepts of process capability - Reliability concepts – definitions, reliability in series and parallel, product life characteristics curve - Business process re-engineering (BPR) – principles, applications, reengineering process, benefits and limitations.

UNIT IV TOOLS AND TECHNIQUES FOR QUALITY MANAGEMENT

Quality functions development (QFD) – Benefits, Voice of customer, information organization, House of quality (HOQ), building a HOQ, QFD process. Failure mode effect analysis (FMEA) – requirements of reliability, failure rate, FMEA stages, design, process and documentation.

UNIT V TAGUCHI TECHNIQUES

Taguchi techniques – introduction, loss function, parameter and tolerance design, signal to noise ratio - Seven old (statistical) tools - Seven new management tools - Bench marking and POKA YOKE.

REFERENCE BOOKS

1. Dale H.Besterfield et al, Total Quality Management, Perarson Education, Thrid edition, (First Indian Reprints 2004).
2. Shridhara Bhat K, Total Quality Management – Text and Cases, Himalaya Publishing House, First Edition, 2002.
3. William J.Kolarii, Creating quality, Mcgraw Hill, 1995
4. Poornima M.Charantimath., Total quality management, Pearson Education, First Indian Reprint, 2003.

WEB RESOURCES

- http://www.stqc.gov.in/content/quality-management-system-qms
- http://quality-one.com/eight-disciplines/
- https://www.moresteam.com/toolbox/statistical-process-control-spc.cfm
- www.qfdonline.com/qfd-tutorials/house-of-quality-qfd-example
- http://worldclassbenchmarking.com/consulting_section/case_studies.html
- http://www.smartdraw.com/software/cause-and-effect-diagram-examples.htm
- http://www.academia.edu/854589/Fish_Bone_Analysis_For_Root_Cause_Analysis_in_Software_Testing
- http://asq.org/learn-about-quality/total-quality-management/overview/implementing-tqm.html

HSS002	ENGINEERING MANAGEMENT	L	T	P	C
		3	0	0	3

PREREQUISITES

- Primarily the students should have basic knowledge about business, economics, financial management and global environment.
- For basic knowledge on current concepts on business and students need to read news papers and business magazines.
- In order to gain insights into this subject one must have practical outlook by comparing the theory and latest business practices of functional areas of business.

COURSE OBJECTIVES

- To create awareness on the functional areas of the management.
- To enable the students to focus their ideas in knowing the different functional areas and their applicability.
- To explore the ideas related to business components.

COURSE OUTCOMES

CO1 : Develop a framework for understanding the system by identifying the key physical principles

CO2: Design,develop, implement and improve a component, process, or integrated system of people, materials,

CO3: Translate the conceptual framework into an appropriate mathematical format. Also Use the techniques, skills,

CO4: Understand the impact of engineering solutions in a global, economic, environmental, and societal context.

CO5: Integrate systems using appropriate analytical, computational and experimental practices then Analyze and assess the reasonableness of the answers obtained and Communicate their findings either verbally and/or via written expression.

UNIT I INTRODUCTION

Demand and Revenue Analysis - Demand Forecasting - Production Analysis - Cost and Supply Analysis, Price and output Determination - Investment Analysis - Plant Location - Economic Optimization.

UNIT II FORMS OF BUSINESS AND FUNCTIONS

Types of Business Organisation, Forms - Planning - Organizing - Designing effective organisations - Coordination

UNIT III HUMAN RESOURCE DEVELOPMENT

Motivating individuals and workgroups - Leadership for Managerial Effectiveness -Team working and Creativity -Managerial Communication - Personal Management – Time Management - Stores Management - Career Planning.

UNIT IV FINANCIAL MANAGEMENT

Product development -Management techniques in product development - Nature of controlling - Operations Management -Just-in-Time.

UNIT V GLOBAL ENVIRONMENT

Managing World Economic Change - The global environment - Multinational Strategies - Economic Cycles and Director Investment - Change and Organisation Development - Managerial Ethics and Social responsibilities.

REFERENCE BOOKS

1. Harold Koontz& Heinz Weihrich, Essentials of Management, Tata McGraw Hill publishing company Ltd.
2. Koontz, Weihrich& Aryasri, Principles of Management, Tata McGraw Hill publishing company Ltd.
3. Tripathi, Reddy, Principles of Management, Tata McGraw Hill publishing company Ltd.
4. Hampton, Management, Tata McGraw Hill publishing company Ltd. L.M.Prasad, Principles of Management.

WEB RESOURCES

- http://www.engineering.unsw.edu.au/mechanicalengineering/sites/mech/files/uploads/co2013s1MMAN4400.pdf
- http://engineeringanywhere.colorado.edu/courses-and-programs/engineering-management/emen-5010-introduction-engineering-management
- http://www.yourarticlelibrary.com/human-resource-development/human-resource-development-features-scope-and-objectives/32371/
- http://www.engineering.unsw.edu.au/mechanicalengineering/sites/mech/files/uploads/co2013s1MMAN4400.pdf

HSS004	INDUSTRIAL PSYCHOLOGY	L	T	P	C
		3	0	0	3

PRE REQUISITES

- Have an exposure to any production or office facilities.
- Have basic idea about an organization and its functions.

COURSE OBJECTIVES

- To develop an awareness of the major perspectives underlying the field of Industrial Psychology.
- To develop an understanding of how theory in Industrial Psychology is applied in work settings.
- To develop an understanding for the potential Industrial Psychology has for society and organizations now and in the future.

COURSE OUTCOMES

CO1 : Understanding of key concepts, theoretical perspectives, and trends in industrial psychology.

CO2 : Evaluate thorough and systematic competency model

CO3 : Analyze the environment and design a job

CO4 : Create a better work environment for better performance

CO5 : Design a performance appraisal process and form

UNIT I INTRODUCTION

The role of the psychologist in industry, the field of occupational Psychology - Study of behavior in work situation and applications of Psychological principles to problems of selection, Placement, Counseling and training

UNIT II DESIGN OF WORK ENVIRONMENTS

Human engineering and physical environment techniques of job analysis, Social environment-Group dynamics in Industry Personal psychology - Selection, training, placement, promotion, counseling, job motivations, job satisfaction .Special Study of problem of fatigue, boredom and accidents.

UNIT III UNDERSTANDING CONSUMER BEHAVIOUR

Consumer behaviour; study of consumer preference, effects of advertising, Industrial morale - the nature and scope of engineering psychology, its application to industry

UNIT IV WORK METHODS

Efficiency at work, the concept of efficiency, the work curve, its characteristics - The work methods; hours of work, nature of work, fatigue and boredom, rest pauses. The personal factors; age abilities, interest, job satisfaction The working environment - noise, illumination, atmospheric conditions - Increasing efficiency at work; improving the work methods, Time and motion study, its contribution and failure resistance to time and motion studies, need for allowances in time and motion study.

UNIT V WORK AND EQUIPMENT DESIGN

Criteria in evaluation of job-related factor, job design, human factors, Engineering information, input processes, mediation processes, action processes, methods design, work space and its arrangement, human factors in job design. Accident and Safety -The human and economic costs of accidents, accident record and statistics, the causes of accidents situational and individual factors related to accident reduction

REFERENCE BOOKS

1. Tiffin,J and McCormic E.J., Industrial Psychology, Prentice Hall, 6th Edn., 1975.
2. McCormic E.J., Human Factors engineering and design, McGraw Hill, 4th Edn.,1976.
3. Mair, N.R.F., Principles of Human relations
4. Gilmer, Industrial Psychology
5. Ghiselli & Brown, Personnel and Industrial Psychology.
6. Myer, Industrial Psychology.
7. Dunnete, M.D., Handbook of Industrial and Organizational Psychology.
8. Blum & Taylor, Industrial Psychology.

WEB RESOURCES

- http://psychology.about.com/od/psychologycareerprofiles/p/iopsychcareers.htm
- http://psychology.about.com/od/iopsychology/f/organizational.htm
- https://hbr.org/2014/10/rules-for-designing-an-engaging-workplace/
- http://occmed.oxfordjournals.org/content/50/5/299.full.pdf
- http://www.consumerpsychologist.com/
- http://business-school.exeter.ac.uk/module/?mod_code=BEMM120

- http://www.icrossing.com/online-consumer-behavior-consumer-analysis
- http://www.alleydog.com/101notes/methods.html#.VQFpoNKUfxA
- http://www.southampton.ac.uk/psychology/postgraduate/taught_courses/msc_research_methods_in_psychology.page
- http://www.stir.ac.uk/postgraduate/programme-information/prospectus/psychology/psychological-research-methods/
- http://apa.org/action/science/human-factors/education-training.aspx
- http://www.hfes.org/Web/EducationalResources/HFEdefinitionsmain.html

HSS006	PROFESSIONAL ETHICS	L	T	P	C
		3	0	0	3

PREREQUISITE

Professional Ethics in Engineering (GE2025)

COURSE OBJECTIVES

- To create an awareness on Engineering Ethics and Human values.
- To study the moral issues and decisions confronting individuals and organizations engaged in engineering profession.
- To study the related issues about the moral ideals, character, policies, and relationships of people and corporations involved in technological activity

COURSE OUTCOMES

CO1 : Understand the engineering code of ethics and be able to apply them as necessary.
CO2 : Understand moral complexities in many engineering activities and decision-making processes
CO3 : Understand some of the contemporary issues in the engineering professions
CO4 : Effectively communicate their knowledge and understanding of engineering ethics
CO5 : Students learnt the moral issues and moral problems in engineering and how to find the solution to those problems.

UNIT I ENGINEERING ETHICS

Functions of Being a Manager – Stock holder and stakeholder management - Ethical treatment of employees - ethical treatment of customers- supply chain management and other issues.

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION

Senses of Ethics – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Professions and Professionalism – Professional ideals and virtues – Theories about right action – Self-interest – Customs and religion – Use of Ethical Theories.

UNIT III ENGINEER RESPONSIBILTY FOR SAFETY

Corporate social responsibility - Collegiality and loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Discrimination.

UNIT IV RESPONSIBILITY AND RIGHTS

Moral imagination, stake holder theory and systems thinking - One approach to management Decision – making Leadership.

UNIT V GLOBAL ISSUES

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample code of conduct.

REFERENCE BOOKS

1. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, New York, 1996.
2. Charles D Fledderman, Engineering Ethics, Prentice Hall, New Mexico, 1999.
3. Laura Schlesinger, How Could You Do That: The Abdication of Character, Courage, and Conscience, Harper Collins, New York, 1996.
4. Stephen Carter, Integrity, Basic Books, New York, 1996.
5. Tom Rusk, The Power of Ethical Persuasion: From Conflict to Partnership at Work and in Private Life, Viking, New York, 1993.

WEB RESOURCES

- http://ethics.iit.edu/teaching/professional-ethics
- http://www.isaca.org/Certification/Code-of-Professional-Ethics/Pages/default.aspx
- http://www.raeng.org.uk/policy/engineering-ethics/ethics
- http://www.onlineethics.org/cms/7680.aspx
- https://www.asme.org/engineering-topics/articles/engineering-ethics/ethics-in-engineering
- http://www.academia.edu/1749178/Professional_Ethics_and_Human_Values
- https://prezi.com/exo1lgrva9l4/engineering-as-social-experimentation/
- http://everydaylife.globalpost.com/duties-responsibilities-safety-engineer-2668.html
- http://www.onlineethics.org/cms/8248.aspx
- http://www.greatsampleresume.com/Job-Responsibilities/Health-and-Safety-Engineer-Responsibilities.html
- https://prezi.com/fwaghvikv1lb/the-rights-and-responsibilities-of-engineers/
- http://www.nspe.org/resources/ethics/ethics-resources/other-resources/ethical-rights-responsibilities-practicing
- http://www.computer.org/csdl/proceedings/fie/2008/1969/00/04720352.pdf
- http://www.ineer.org/events/iceer2004/proceedings/papers/0203.pdf

HSS014	INTRODUCTION TO MARKETING MANAGEMENT	L	T	P	C
		3	0	0	3

PREREQUISITE

Fundamentals of marketing, principles of management ,consumer behavior.

COURSE OBJECTIVES

This course is designed to provide students with a basic understanding of the fundamental principles of Marketing. There will be a focus on the management of the marketing activities and how marketing relates to the overall organizational functioning and how the individual elements of marketing are coordinated in a strategic manner. Additionally, the course will aim to provide some opportunities for the practical implementation of the main concepts covered and the development of problem solving skills through the use of case studies

COURSE OUTCOMES

CO1 : Understanding of the theoretical foundations of marketing alongside current and emerging practitioner applications in the applications in marketing management, the analysis of marketing decisions, consumer behaviour and marketing research methods.

CO2 : The competence and creativity to address marketing and issues through flexible, adaptable and innovative approaches.

CO3 : Understanding of how to undertake qualitative and quantitative research and apply this knowledge in the context of a major study such as a dissertation

CO4 : An opportunity to interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.

CO5 : Develop transferable intellectual and study skills which will encourage a positive attitude to continuing personal development and lifelong learning.

UNIT I MARKETING

Meaning -concept -functions -marketing Planning & implementation marketing Programmes - Marketing environment – Market Segmentation and consumer behaviour – Influencing factors, Decision process – Marketing mix – Marketing department.

UNIT II PRODUCT

Meaning - Product planning - policies - positioning - New product development Product life cycle – BCG Matrix-branding. Packing, labeling.

UNIT III PRICING

Pricing objectives – Setting and modifying the price – Different pricing method Product line pricing and new product pricing

UNIT IV DISTRIBUTION

Nature of Marketing channels - Types of Channel flows - Channel functions - Channel co-operation, conflict and competition - Direct Marketing Telemarketing, Internet shopping.

UNIT V PROMOTION

Promotion Mix - Advertisement - Message - copy writing – Advertisement budgeting - Measuring advertisement effectiveness - Media strategy - sales promotion - Personal selling, publicity and direct marketing

REFERENCE BOOKS

1. Philip Kotler, Marketing Management- Analysis Planning and Control, Prentice Hall of India, New Delhi.
2. Cundiff, Still & Govoni, Fundamentals of Modern Marketing, Prentice Hall of India, New Delhi.
3. Ramaswamy. V S & Namakumari. S, Marketing Management-Planning Implementation and Control, Macmillan Business Books, 2002.
4. Jobber, Principles and Practice of Marketing, McGraw-Hill.

WEB RESOURCES

- http://www.entrepreneur.com/topic/marketing
- http://www.marketing.org/
- http://www.maxi-pedia.com/bcg+matrix+model
- http://www.businessnewsdaily.com/5693-bcg-matrix.html
- http://www.valuebasedmanagement.net/methods_bcgmatrix.html
- http://smallbusiness.chron.com/four-types-pricing-objectives-33873.html
- http://www.businessdictionary.com/definition/pricing-objective.html
- http://www.witiger.com/marketing/pricingobjectives.htm
- http://2012books.lardbucket.org/books/marketing-principles-v2.0/s18-01-the-pricing-framework-and-a-fi.html
- http://www.laukamm.de/fomweb/elearning/marketing/channel/kotl_channels1.htm
- http://jennyxzkong.blogspot.in/2012/02/marketing-channels-nature-and.html
- https://tristanjeremy.wordpress.com/2011/01/04/the-importance-of-marketing-channels-and-distribution-channels/
- http://managementstudyguide.com/media-strategy-in-advertising.htm
- http://www.socialmediaexaminer.com/essential-elements-social-media-marketing-strategy/

HSS015	MANAGEMENT CONCEPTS AND TECHNIQUES	L	T	P	C
		3	0	0	3

PREREQUISITE

Basic Knowledge about managerial information

COURSE OBJECTIVES

This course introduces students to the basic role of the manager in modern business. Among the topics discussed are: paradigm shifts; environmental factors affecting decision-making; ethics/social responsibility; and planning organizing, motivating and controlling organizational resources.

COURSE OUTCOMES

CO1 : Identify environmental issues as they impact management and develop strategies to adapt to these environments and also it clearly describes and discusses about the elements of effective management.

CO2 : Identify and explain issues involved in managing a diverse workforce and conduct necessary research to address these issues, then apply the planning, organizing and control processes wherever necessary.

CO3 : Identify, discuss and/or describe various theories related to the development of leadership skills, motivation techniques, teamwork and effective communication

CO4 : Communicate effectively through both oral and written presentations and Conduct more researches and then analyze information by using both human and technological resources

CO5 : Work effectively as a team member through group projects, case studies and problem analysis.

UNIT I DEVELOPMENT OF MANAGEMENT THOUGHT

Scientific Management Movement, Administrative Movement, Human- Relations Movement, Decision-Science Movement, Behavioral Movement, Systems Movement, Contingency Movement

UNIT II ESSENTIALS OF PLANNING

Objectives, goals, Programmed Decisions and Un programmed Decisions; Decision-Making, Creativity in Decision-Making, Forecasting and Strategy to Formulation.

UNIT III EFFECTIVE ORGANIZING

Span of Control, Departmentation, Authority; Responsibility, Bureaucracy and Adhocracy; Group Dynamics

UNIT IV REALITIES OF ORGANIZATIONAL LIFE

Organizational Politics, Organizational Power, Organizational Conflict

UNIT V COMMUNICATION & CONTROL

Communication Process Evaluation, Control Process, Qualities of a Good Control System, Management Audit, Human – Offset Accounting, Cost Benefit Analysis.

REFERENCE BOOKS

1. Harold Koontz & Heinz Weihrich, Essentials of Management, Tata McGraw Hill publishing company Ltd.
2. Koontz, Weihrich & Aryasri, Principles of Management, Tata McGraw Hill publishing company Ltd.
3. Tripathi & Reddy, Principles of Management, Tata McGraw Hill publishing company Ltd.
4. Hampton, Management, Tata McGraw Hill publishing company Ltd.
5. L.M.Prasad, Principles of Management.

WEB RESOURCES

- http://choo.fis.utoronto.ca/fis/courses/lis1230/lis1230sharma/history1.htm
- http://kalyan-city.blogspot.com/2010/06/management-functions-process-management.html
- http://www.authorstream.com/Presentation/kumarvivek107-2116350-development-management-thoughts/
- http://www.dsr.nsw.gov.au/sportsclubs/ryc_plan_essent.asp
- http://www.ssireview.org/blog/entry/five_essentials_of_strategic_planning
- http://www.icmrindia.org/courseware/Introduction%20to%20Management/Effective%20Organizational%20Culture%20Chap11.htm
- http://www.cliffsnotes.com/more-subjects/principles-of-management/creating-organizational-structure/concepts-of-organizing
- http://www.managementstudyguide.com/organizing_principles.htm
- http://www.palgrave.com/page/detail/mythical-inspirations-for-organizational-realities-monika-kostera/?K=9780230515734
- http://sgo.sagepub.com/content/2/4/2158244012461922
- https://www.ece.illinois.edu/research/communications.asp

HSS016	ORGANIZATIONAL PSYCOLOGY	L	T	P	C
		3	0	0	3

PRE REQUISITES

- Basic Understanding of Functions of Management.
- Having studied Principles of Management subject.

COURSE OBJECTIVES

- To introduce students to psychology theories and research at individual, group and organizational levels
- To help students understand organizational behavior and management practices by examining psychological principles
- To Improve your ability to work with and through other people.
- Improve your ability to work effectively with people who have different values, backgrounds or areas of expertise

COURSE OUTCOMES

CO1 : Understanding of personnel assessment and selection, training effectiveness and how organizational identity and culture can affect employee and organizational functioning.
CO2 : Analyze some of the main theories of Organizational Behavior
CO3 : Analyse how these theories and empirical evidence can help to understand contemporary organizational issues
CO4 : Apply theories to practical problems in organizations in a critical manner

UNIT I FOCUS AND PURPOSE

Definition, need and importance of organizational Behaviour – nature and scope – frame work.

UNIT II INDIVIDUAL BEHAVIOUR

Personality – types – factors influencing personality – theories – learning – types of learners – learning theories – organizational Behaviour modification. Attitudes – characteristics – components – formation – measurement. Perceptions – importance – factors influencing perception – interpersonal perception.

UNIT III GROUP BEHAVIOUR

Organization structure – formation – groups in organizations – influence – group dynamics – emergence of informal leaders and working norms – group decision making techniques – interpersonal relations – communication – control.

UNIT IV POWER

Leadership styles – theories – leaders Vs managers – sources of power – power centers – power and politics.

UNIT V DYNAMICS OF ORGANIZATIONAL BEHAVIOURS

Organizational climate – factors affecting organizational climate – importance. Job satisfaction – determinants – measurements – influence on behavior. Organizational change – importance – stability Vs change – proactive Vs reaction change – the change process – resistance to change – managing change. Organizational development – characteristics – objectives – team building. Organizational effectiveness – perspective – effectiveness Vs efficiency – approaches – the time dimension – achieving organizational effectiveness.

REFERENCE BOOKS

1. Stephen P.Robins, Organisational Behavior, Prentice Hall of India, 9th edition, 2001.
2. Hellriegel, Slocum and Woodman, Organisational Behavior, South-Western, Thomson Learning, 9th edition, 2001.
3. Schermerhorn, hunt and Osborn, Organisational behavior, John Wiley, 7th edition, 2001.
4. Jit S.Chand, Organisational Behavior, Vikas publishing House Pvt. Ltd. 2nd edition, 2001.
5. Fred Luthans, Organisational Behavior, McGraw Hill Book Co., 1998.
6. New Strom & Davis, Organisational behaviour, McGraw Hill, 2001.
7. Jaffa Harris and Sandra Hartman, Organisational Behaviour, Jaico, 2002.

WEB RESOURCES

- http://www.siop.org/media/What.aspx
- http://www.apa.org/ed/graduate/specialize/industrial.aspx
- http://www.psychologistworld.com/influence_personality/
- https://www.psychologytoday.com/blog/under-the-influence/201307/do-genes-influence-personality
- http://www.spring.org.uk/2009/07/10-rules-that-govern-groups.php
- http://allpsych.com/psychology101/groups/
- http://workplacepsychology.net/2010/01/30/six-leadership-styles/
- http://psychology.about.com/od/leadership/
- http://psychology.about.com/od/leadership/a/leadstyles.htm
- http://www.gsas.harvard.edu/programs_of_study/organizational_behavior.php
- http://www.referenceforbusiness.com/management/Ob-Or/Organizational-Behavior.html
- http://www.fielding.edu/generalInfo

HSS017	INTERNATIONAL ECONOMICS	L	T	P	C
		3	0	0	3

PRE REQUISITES

- Knowledge on Economic Activities in India
- Knowledge on Influence of Government influence in controlling economic effects.
- Knowledge on different economic systems.

COURSE OBJECTIVES

- To learn, understand and apply economic theories of International Trade
- To understand the political economy of International Trade
- To learn and understand the central issues in International Macro Economics

COURSE OUTCOMES

CO1 : Understand trade laws, and the national and international institutions central to trade.
CO2 : Evaluate economic integration and conflicts across countries.
CO3 : Evaluate strategic trade policies from the perspective of nations and companies.
CO4 : Explain how exchange rate is determined in the long run and the short run.
CO5 : Analyze interpret a nation's balance of payments and related accounts.
CO6 : Explain the effectiveness of national macroeconomic policy in an interdependent global economy.

UNIT I INTRODUCTION

The Traditional Theory of International Trade, The Basic Trade Model, Heckscher-Ohlin-Samuelson Model, Effects of Tariffs & Quotas, Theory of Factor Movements - New Theories of International Trade and Industrial Policies.

UNIT II EXCHANGE RATE & BALANCE OF PAYMENT

The Balance of Payments and National Accounts, Determinants of Exchange Rates The Exchange-Rate Regime Choice and a Common Currency Area, International Debt and Currency Crises.

UNIT III INTERNATIONAL REGULATORY AUTHORITY

Political Economy of Trade Disputes, the FTA and the WTO -The role of the IMF and other International Financial Organizations. Reasons for Protection World Trade, International Movements of Capital - The Balance of Trade and Other Measures of International Transactions. Export and import policies.

UNIT IV INTERNATIONAL MACROECONOMICS

European Monetary Unification and the Euro - Preferential Trading Arrangements and the NAFTA International Policies for Economic Development, Trade Outsourcing and Off shoring

REFERENCE BOOKS

1. N. Bhagwati, A. Panagariya and T. N. Srinivasan, Lectures on International Trade, MIT Press, 2nd edition, 1998.
2. M. Obstfeld and K. Rogoff, Foundation of International Macroeconomics, McGraw-Hill, 1996.
3. Romer, D., Advanced Macroeconomics, McGraw Hill, 1996.

WEB RESOURCES

- http://www.iea-world.org/
- http://www2.econ.iastate.edu/classes/econ355/choi/ho.htm
- http://www.colorado.edu/economics/courses/econ2020/section12/section12.html
- http://homes.chass.utoronto.ca/~floyd/bpx.html
- http://www.fda.gov/EmergencyPreparedness/Counterterrorism/MedicalCountermeasures/ucm412785.htm
- http://econsguide.blogspot.in/2009/05/evaluation-on-obamas-fuel-efficiency_21.html
- http://www.econlib.org/library/Topics/HighSchool/BarrierstoTrade.html
- http://www.genpact.com/home/industries/capital-markets/post-trade-processing
- http://www.cfr.org/trade/naftas-economic-impact/p15790
- http://www.nber.org/reporter/winter00/krueger.html
- http://www.ase.tufts.edu/gdae/policy_research/Carnegie.html

HSS018	COMMUNICATION SKILLS	L	T	P	C
		3	0	0	3

PREREQUISITE

English Technical communication –II(HSS102)

COURSE OBJECTIVES

The objective of this course is to improve the communication skills.

COURSE OUTCOMES

CO1 : Demonstrate ability to apply communication concepts and theories to address everyday dilemmas within dimensions (ethical, social, legal, technological, relational, and cultural) central to the student's major focus.

CO2 : Demonstrate oral and written communication skills expected of a future professional in the field.

CO3 : Demonstrate communication research skills expected of a future professional in the field.

CO4 : Demonstrate understanding of ethical values central to the communication discipline.

CO5 : Demonstrate the ability to integrate communication and business scholarship for application in work settings.

UNIT I COMMUNICATION IN BUSINESS

Systems approach, forms of business communication, management and communication, factors facilitating communication.

UNIT II COMMUNICATION PROCESS

Interpersonal perception, selective attention, feedback, variables, listening barriers to listening, persuasion, attending and conducting interviews, participating in discussions, debates and conferences, presentation skills, paralinguistic features, oral fluency development.

UNIT III BUSINESS CORRESPONDENCE

Business letter. Memos, minutes, agendas, enquiries, orders, sales letters, notice, tenders, letters of application, letter of complaints.

UNIT IV TECHNICAL REPORTS

Format, Choice of vocabulary, coherence and cohesion, paragraph writing, organization.

UNIT V PROJECT REPORTS

Project proposal, project reports, and appraisal reports.

REFERENCE BOOKS

1. Sharan J.Genrson and Steven M.Gerson, Technical Writing - Process and Product, Pearson Education, 2000.
2. Raymond V.Lesikar, John D. Pettit and Mary E.Flatley, Lesikass Basic Communication, Tata McGraw Will, 8th Edition, 1999.
3. Stevel. E. Pauley, Daniel G.Riordan, Technical Report Writing Today, AITBS Publishing & Distributors, India 5th edition, 2000.
4. Robert L.Shurter, Effective letters in business, Third Ed., 1983.
5. McGraith, Basic Managerial Skills for all Prentice Hall of India, 6th Edition, 2002.
6. Halliday, M.A.Ky R.Hasan, Cohesion in English, Longman, London, 1976.

WEB RESOURCES

- http://www.skillsyouneed.com/general/communication-skills.html
- http://www.mindtools.com/page8.html
- http://www.helpguide.org/articles/relationships/effective-communication.htm
- http://lifehacker.com/top-10-ways-to-improve-your-communication-skills-1590488550
- http://www.wikihow.com/Develop-Good-Communication-Skills
- http://www.managementstudyguide.com/business_communication.htm
- http://smallbusiness.chron.com/importance-good-communication-business-1403.html
- http://grammar.about.com/od/c/g/Communication-Process.htm
- http://www.managementstudyguide.com/components-of-communication-process.htm
- http://www.businessdictionary.com/definition/communication-process.html
- https://web.njit.edu/~lipuma/352comproc/comproc.htm
- http://www.savvy-business-correspondence.com/TypesBusinessCorrespondence.html
- https://www.prismnet.com/~hcexres/textbook/genlett.html
- http://esl.about.com/cs/onthejobenglish/a/a_basbletter.htm
- http://www.monash.edu.au/lls/llonline/writing/engineering/technical-report/index.xml
- http://www.tifr.res.in/~cccf/index.php/interns/77-general/127-how-to-write-a-structured-project-report

HSS020	HUMAN RESOURCE MANAGEMENT	L	T	P	C
		3	0	0	3

PREREQUISITES

- Knowledge on General Management
- Legal Aspects of Business

COURSE OBJECTIVES

The Objective of the course is to teach the basic principles of strategic human resource Management—how an organization acquires, rewards, motivates, uses, and generally manages its people effectively.

COURSE OUTCOMES

CO1 : Synthesize the role of human resources management as it supports the success of the Organization including the effective development of human capital as an agent for Organizational change

CO2 : Applying the knowledge of laws that impact behavior in relationships between employers and employees that ultimately impact the goals and strategies of the organization

CO3 : Understand the role of employee benefits and compensation as a critical component of Employee performance, productivity and organizational effectiveness.

CO4 : Show evidence of the ability to analyze, manage and problem solve to deal with the challenges and complexities of the practice of collective bargaining

CO5 : Demonstrate knowledge of practical application of training and employee Development as it impacts organizational strategy and competitive advantage.

UNIT I INTRODUCTION

Functions of a human resources manager - recruitment and selection processes interview methods.

UNIT II HR- EVALUATION AND DEVELOPMENT

Performance appraisal, Training and development, disciplinary procedures, collective bargaining and employee welfare.

UNIT III TRENDS IN HRM

The recent methods and trends in HRM with a few case studies in the context of globalization.

UNIT IV STRATEGIC ROLE OF HUMAN RESOURCE MANAGEMENT

Job analysis Personnel planning and recruiting Employee testing and selection, interviewing candidates, Appraising performance.

UNIT V CAREER AND COMPENSATION

Managing careers Compensation Benefits and services Labor relations and collective bargaining Employee safety and health

REFERENCE BOOKS

1. Decenzo and Robbins, Human Resource Management, Wiley, 6th edition, 2001.
2. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 2001.
3. Eugene McKenna and Nic Beach, Human Resource Management, Pearson Education.
4. Dessler, Human Resource Management, Pearson Education Limited, 2002.
5. Mamoria C.B and Mamoria S., Personnel Management, Himalaya Publishing.
6. Wayne Cascio, Managing Human Resources, McGraw-Hill, 1998.
7. Ivancevich, Human Resource Management, McGraw-Hill, 2002.

WEB RESOURCES

- http://humanresources.about.com/od/glossaryh/f/hr_management.htm
- http://managementhelp.org/humanresources/
- http://www.whatishumanresource.com/human-resource-management
- http://www.ntt.com/csr_e/report2011/data/of_education.html
- http://www.cipd.co.uk/hr-resources/factsheets/evaluating-learning-talent-development.aspx
- https://www.humrro.org/corpsite/service-page/evaluating-leadership-development-programs
- http://www.hrwale.com/general-hr/current-trends-in-human-resource-management/
- http://blog.originlearning.com/latest-trends-in-human-resource-management/
- http://www.news-sap.com/the-top-7-trends-in-hr/
- http://smallbusiness.chron.com/strategic-role-human-resource-managers-11782.html
- http://catalog.flatworldknowledge.com/bookhub/5?e=carpenter-ch16_s01
- http://www.hrwale.com/general-hr/role-of-hrm-in-strategic-management/
- http://www.sibson.com/services/performance-and-rewards/career-frameworks/
- http://www.hr.ucsb.edu/compensation/career-tracks/job-architecture-framework
- http://www.careerframework.ubc.ca/introduction/

HSS023	ENTREPRENEURSHIP DEVELOPMENT	L	T	P	C
		3	0	0	3

PREREQUISITE

Basic Knowledge about business management

COURSE OBJECTIVES

This course develops an awareness of the state of entrepreneurship. Students are introduced to elements of successful entrepreneurship, opportunity identification and assessment, economic development potential of small business, alternative forms of work arrangements in the new economy balancing an entrepreneurial lifestyle.

COURSE OUTCOMES

CO1 : Understand the concept of entrepreneurship and its close relationship with enterprise and owner-management.

CO2 : To understand the Bussiness environment, Central and State Government Industrial Policies and Regulations of International Business.

CO3 : Understand the concepts of innovation and creativity and the roles that both play in entrepreneurship and business development.

CO4: To Organise and utilise the components of the planning process in the development of an new project or the exploitation of a new opportunity to develop an existing business, launch a new venture, or initiate a social enterprise

CO5: To evaluate the Effective management of Business Units.

UNIT I ENTREPRENEURIAL COMPETENCE

Entrepreneurship concept – Entrepreneurship as a Career – Entrepreneur – Personality Characteristics of Successful. Entrepreneur – Knowledge and Skills Required for an Entrepreneur.

UNIT II ENTREPRENEURIAL ENVIRONMENT

Business Environment - Role of Family and Society - Entrepreneurship Development Training and Other Support Organisational Services - Central and State Government Industrial Policies and Regulations - International Business.

UNIT III BUSINESS PLAN PREPARATION

Sources of Product for Business - Prefeasibility Study - Criteria for Selection of Product - Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria.

UNITIV LAUNCHING OF SMALL BUSINESS

Finance and Human Resource Mobilization Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching.

UNIT V MANAGEMENT OF SMALL BUSINESS

Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units.Effective Management of small Business.

REFERENCE BOOKS

1. Hisrich, 'Entrepreneurship', Tata McGraw Hill, New Delhi, 2001.
2. P. Saravanavel, 'Entrepreneurial Development', Ess Pee kay Publishing House, Chennai - 1997.
3. S.S.Khanka, 'Entrepreneurial Development', S.Chand and Company Limited, New Delhi, 2001.
4. Prasama Chandra, Projects – 'Planning, Analysis, Selection, Implementation and Reviews', Tata McGraw-Hill Publishing Company Limited 1996.
5. P.C.Jain (ed.), 'Handbook for New Entrepreneurs', EDII, Oxford University Press, New Delhi, 1999.
6. Staff College for Technical Education, Manila and Centre for Research and Industrial Staff Performance, Bhopal, 'Entrepreneurship Development', Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1998.

WEB RESOURCES

- http://tlp.excellencegateway.org.uk/tlp/xcurricula/enterprise/assets/documents/ent_knowledge_skills_attitudes.pdf
- http://www.huffingtonpost.com/neal-jenson/entrepreneurship-skills_b_3228479.html
- http://dipp.nic.in/English/Policies/Industries_act1951.pdf
- www.svensktnaringsliv.se/...role...business...society.../The%20role%20of..
- www.asapm.org/articles/SelectionCriteria.pdf
- ec.europa.eu/environment/eco.../files/.../business_plan_guidelines.pdf
- www.inc.com/guides/small-business-growth-strategies.html
- web.csulb.edu/~skukalis/Ch%2006.ppt
- https://smallbusiness.yahoo.com/advisor/5-steps-staging-more-successful-product-launch-134647944.html

HSS036	TECHNOLOGY AND DEVELOPMENT	L	T	P	C
		3	0	0	3

Development of Scientific thought from Aristotle, Francis Bacon to Modern Times. Significant developments in Technology and their impact on society from prehistoric times to present day. The present technological situation in India. The problems of Rural Development, urban Proliferation and of Technology gap. The course will be given from readings from various renowned authors and will be in the form of an introduction of the ideas and discussion on the same.

FREE ELECTIVES (BASIC SCIENCE AND MATHEMATICS)

BPY502	LASER PHYSICS (common to B.Sc Physics)	L	T	P	C
		3	0	0	3
Prerequisite	Basic ideas on properties of lasers				
Objective	This paper deals with the fundamental concepts of laser				

Course Outcomes

CO1	At the end of the course, students should be able to: Know about the fundamentals of laser
CO2	Get the basic ideas on the production of laser
CO3	Understand the classification of laser
CO4	Acquire the knowledge on applications of laser in various fields
CO5	Carry out the research work on laser

Mapping of COs with Pos

CO	PO1	PO2	PO3	PO4	PO5
CO1	**H**				**L**
CO2	**H**				**L**
CO3	**H**		**L**		
CO4	**H**				**L**
CO5	**H**		**M**		**L**

Course Delivery Methodologies: PowerPoint presentation, Lecture notes

Assessment Tools

Direct Method	Indirect Method
1) Asking questions relevant to the topic conducted. 2)Conducting Exams	1) Assigning new problems 2) Making assignments

Course Topics

Fundamentals of LASER

Spontaneous emission – stimulated emission – meta stable state – Population inversion – pumping – Laser Characteristics

Production of LASER

Helium – Neon Laser – Ruby Laser – CO2 Laser – Semiconductor Laser

Industrial Applications of LASER

Laser cutting – welding – drilling – Hologram – Recording and reconstruction of hologram

Lasers in Medicine:

Lasers in Surgery – Lasers in ophthalmology – Lasers in cancertreatment

Lasers in Communication

Optic fibre communication- Total internal reflection – Block diagram of fibre optic communication system – Advantages of fibre optic communication

Text Books

1. Laser fundamentals – William T. Silfvast Cambridge University Press – Published in South Asia by foundation books, 23, Ansari Road, New Delhi , 2008
2. An introduction to LASERS – N. Avadhanulu, S. Chand & Company, 2001.

References

1. LASER Theory and Application – K. Thyagarajan and A.K. Ghatak, Mac millan, India Ltd., 1981.
2. Lasers and non-linear optics, B. B. Laud, New Age International (P) Ltd., IIIrdEdn., 2011

BPY503	NON-LINEAR OPTICS	L	T	P	C
		4	1	0	4

Prerequisite	Basic ideas on properties of non linear optics
Objective	This paper deals with physics of non-linearity and their applications.
Course Outcomes	
CO1	At the end of the course, students should be able to: Get the basic ideas on information in light.
CO2	Get the basic ideas on the electromagnetic phenomena
CO3	Acquire the knowledge on photophysical phenomena
CO4	Find out the applications in non linear optics
CO5	Get the ideas on Fiber optics

Mapping of COs with Pos

CO	PO1	PO2	PO3	PO4	PO5
CO1	**H**				
CO2	**H**		**L**		
CO3	**H**		**L**		
CO4	**H**		**L**		
CO5	**H**	**L**			**L**

Course Delivery Methodologies: Power point presentation, Lecture notes

Assessment Tools

Direct Method	Indirect Method
1) Asking questions relevant to the topic conducted. 2)Conducting Exams	1) Assigning new problems 2) Making assignments

Course Topics

Information in Light

Semiconductors for optoelectronics - Optoelectronic semiconductor devices - Bright light from cool solids - Seeing The Light- The human eye - Color vision - Color blindness - Polarization sensitivity - Speed of response - Optical illusions - Contemporary Optics- Waveguides - Optical fibres - Optical amplification - Conveying sound by light - The long and the short of optical communication.

Fundamental Tools

Electromagnetic Phenomena - Gauss' Law - Gauss Law For Magnetic Fields - Faraday's Law - Ampere's Law - Maxwell's Adjustment To Ampere's Law - Polarization of Materials - Plane Wave Solutions To The Wave Equation - Complex Plane Waves - Real And Complex Indices of Refraction - The Lorentz Model of Dielectrics - Poynting's Theorem - Irradiance of A Plane Wave - Energy Density of Electric And Magnetic Fields.

Photophysical Phenomena

Optical Propagation in Media - Diffraction and Dispersion effects - Wave Propagation in Homogeneous Linear Isotropic Media - Anisotropic media - The Origin and Modeling of Optical Nonlinearity - A Simple Physical Model for Optical Nonlinearity - Physical Effects of Nonlinear Polarization - Mathematical Modeling of Optical Nonlinearities - An Alternative Approach For Reflection And Refraction:-Refraction at an Interface - The Fresnel Coefficients' - Reflectance - Transmittance - Double-Interface Problem Solved Using Fresnel Coefficients' - Beyond Critical Angle: Tunneling of Evanescent Waves - Multiple Interfaces - Multilayer Coatings.

Physics of Non-Linearities The Physics of Second Harmonic Generation - SHG in Crystals - Frequency Doubling and Mixing - Optical Parametric Generation Amplification - Oscillation - Mathematical Formulation - Phase Matching in Anisotropic Crystal – Nonlinear Transverse Effects in Second Harmonic Generation - Self-Refraction of Optical/Gaussian Beams - Optical Bistability phenomena - Optical Phase conjugation effects.

Optical Communication Today

Components - Fabrication And Materials - Light Sources – Coupling- Micro Components Tapers - Splices/Connectors - Characteristics of optical fibers - Diameter Control And Measurement - Attenuation - NLO Properties In Media - Fiber-Optic Solitons - Magnetic Solitons - Optical Shocks And Self-Steepening Of Pulses - Two-Wave Mixing In Photorefractive Materials - Four- Wave Mixing And Phase Conjugation In Photorefractive Materials - Self-Phase Conjugation And Edge Enhancement - Non-Linearities In Nematic Liquid Crystals - Photonic Bandgap Structures

Text Books

1. Richard L Sutherland, *Handbook of Nonlinear Optics, 2nd Edition (Revised and Expanded)*, Marcel Dekker, Inc, 2003.
2. Newell, Alan C., and Jerome V. Moloney, *Nonlinear optics*, Addison-Wesley, 1992.

References

1. Justin Peatross and Michael Ware, *Physics of Light and Optics*, 2013.
2. David A. Boas, Constantinos Pitris and Nimmi Ramanujam, *Handbook of Biomedical Optics*, CRC Press, Taylor and Francis Group, 2011.
3. David Greene, *Light and Dark* Institute of Physics Publishing Ltd, 2003.
4. Goure P and Verrier I, *Optical Fibre Devices Series in Optics and Optoelectronics*,Institute of Physics Publishing Ltd, 2002

BPY506	NUCLEAR PHYSICS (common to B.Sc Physics)	L	T	P	C
		3	0	0	3
Prerequisite	Basic ideas on nuclear physics				
Objective	This paper deals with the detailed theoretical and experimental concepts on radioactivity and elementary particles				

Course Outcomes

CO1	At the end of the course, students should be able to: Gain knowledge on nucleus and nuclear models.
CO2	Get the basic ideas on the nuclear reactions
CO3	Acquire the knowledge on fundamentals in elementary particles
CO4	Carry out research in nuclear physics
CO5	Acquire the knowledge on Radioactive materials

Mapping of COs with Pos

CO	PO1	PO2	PO3	PO4	PO5
CO1	**H**				
CO2	**H**				
CO3	**H**				**L**
CO4	**H**			**L**	
CO5	**H**				**L**

Course Delivery Methodologies: PowerPoint presentation, Lecture notes

Assessment Tools

Direct Method	Indirect Method
1) Asking questions relevant to the topic conducted. 2)Conducting Exams	1) Assigning new problems 2) Making assignments

Course Topics

Nucleus and nuclear models

Introduction to nucleus- classification of nuclei – general properties of nucleus – charge, mass, spin , magnetic moment, quadruple moment – mass defect - binding energy- models of nuclear structure - liquid drop model – shell model.

Radioactivity

Introduction – discovery of radioactivity - natural radioactivity - alpha, beta and gamma rays - properties of the rays - experimental measurement of the range of alpha particles – beta ray spectra – origin of the line and continuous spectrum – the neutrino theory of beta decay.

Nuclear Reactions

Soddy Fajan's displacement law - law of radioactive disintegration - the mean life - measurements of decay constants - units of radioactivity - law of successive disintegration - radioactive dating -nuclear reactions - energy balance in nuclear reactions - threshold energy of an endoergic reaction- applications of radio isotopes.

Particle accelerators, detectors, Cosmic rays

GM Counter - Wilson cloud chamber - bubble chamber – cyclotron – synchrotron – synchrocyclotron - betatron – Cosmic rays : introduction – discovery of cosmic rays –cosmic showers –origin of cosmic radiation.

Elementary particles

Introduction – fundamental interactions - elementary particle quantum numbers – quark model.

Text Book

1. Modern Physics by R. Murugesan and KiruthigaSivaprasath, S.Chand& Co., 2005.

References

1. Atomic and Nuclear Physics by Shatendra Sharma, Dorling Kindersley India, 2005.
2. Nuclear Physics by D.C. Tayal, Himalaya Publishing House, reprint 2007.
1. Nuclear Physics, An introduction by S.B.Patel, New Age international(P) Ltd., (reprint 2003)

BPY507	SPACE PHYSICS (common to B.Sc Physics)	L	T	P	C
		3	0	0	3
Prerequisite	Basic ideas on space physics				
Objective	This paper deals with the detailed concepts on space science.				

Course Outcomes

CO1	At the end of the course, students should be able to: Know about the earth's atmosphere.
CO2	Get the basic ideas on the interplanetary medium
CO3	Acquire the knowledge on planets
CO4	Carry out the research work on space physics
CO5	Acquire the knowledge on sun atmosphere

Mapping of COs with Pos

CO	PO1	PO2	PO3	PO4	PO5
CO1	**H**				
CO2	**H**				**M**
CO3	**H**				**M**
CO4	**H**		**L**		**M**
CO5	**H**				**M**

Course Delivery Methodologies: PowerPoint presentation, Lecture notes

Assessment Tools

Direct Method	Indirect Method
1) Asking questions relevant to the topic conducted. 2)Conducting Exams	1) Assigning new problems 2) Making assignments

Course Topics

The Earth's Upper Atmosphere

Variations of atmospheric densities and temperature. Formation and structure of Ionosphere. Studies of ionosphere by ground based and space techniques. The radiation belts. Auroras. Lyman glow of the night sky. The geo-corona and airglow studies.

Sun

Structure of solar atmosphere. Solar convection and differential rotation. Large scale and small scale magnetic fields. Solar granulation and super granulation. Sunspots. Solar flares.

Unit III Interplanetary Medium

Xray and g-ray studies of sun. Solar X-ray and radio bursts. Solar wind. Interaction with planetary atmosphere. Structure of bow shocks. Magnetosphere. Ring Current. Radiation belts and interplanetary magnetic field.

Unit - IV Moon

Origin of Moon. Solar and Lunar eclipses. Lunar ranging experiments. Studies of lunar surface from various space missions and their results. Satellites of other planets of the solar system.

Unit - V Planets

Infrared spectroscopy of planetary atmospheres. Principal results of the Mariner, Venera and Viking Space Missions to Mars and Venus. Voyager space mission studies of outer planets and their satellites and rings. Comparative studies of planetary atmospheres. Planetary ionospheres. Extra-solar system planets.

Text Books

1. Sun, Earth and radio: An Introduction to the Ionosphere and Magnetosphere, J.A.Ratcliffe, 1970, Littlehampton Book Services Ltd
2. An Intoduction to Planetary Physics: The Terrestrial Plants, Kaula. W.M, 1969, John Wiley & Sons Inc.
3. Harold Zirin: Astrophysics of the Sun, 1988, Cambridge University Press

References

1. W.N.Hess and G.Mead(Ed): Introduction to Space Science, 1965, Gorden and Breach,
2. V.Bumba and Kleczek, Basic Mechanism of Solar Activity, 1976.
3. W. J. Kaufmann, Exploration of the Solar System, Mac Millan, 1978, New york.

BCY501	NANO CHEMISTRY	L	T	P	C
		3	0	0	3
Objective(s)	Educate them in synthesis and characterization of nano materials				
Course Outcome(s)					
CO1	Summarize the basis of nano technology				
CO2	Compare the properties of nanomaterials with micro and macro materials				
CO3	Sketch the synthesis of nanomaterials				
CO4	Illustrate the synthesis techniques of nanomaterials				
CO5	Choose best technologies for characterization of nanomaterials				

Unit-I: Basics of Nano chemistry

Basics of nanomaterials: Properties of nanomaterials, quantum confinement effect, surface to volume ratio, surface properties of nanoparticles. Classification of the nano materials – zero dimensional, one dimensional, two dimensional and three dimensional nanostructures.

Unit-II: Properties of Nanomaterials

Mechanical, optical, electronic, magnetic, thermal and chemical properties of nanomaterials. Size dependent properties-size dependent absorption spectra

Unit-III: Synthetic Techniques

Chemical methods: sol-gel synthesis, solvothermal synthesis, thermolysis route. Physical methods: Pulsed laser deposition- Magnetron sputtering

Unit-IV: Applications of Nanomaterials

Catalysis on nanoparticles, semiconductors, sensors, and electronic devices, photochemistry and nanophotonics, applications of CNTs, nanomaterials in biology and medicine.

Unit-V: Characterization Techniques

X-ray diffraction- Electron microscopes – scanning electron microscopes (SEM) – transmission electron microscopes (TEM) – scanning probe microscopy – atomic force microscopy (AFM) – scanning tunneling electron microscope (STEM) – basic principles only.

Reference Books:

1. S.Shanmugam, Nanotechnology, , MJP Publishers, Chennai (2010).
2. Patrick Salomon , A Handbook on Nanochemistry,, Dominant Publishers andDistributers, New Delhi.
3. S. Balaji , Nanobiotechnology, MJP Publishers, Chennai (2010).
4. CNR Rao The Chemistry of Nanomaterial: Synthesis, Properties and Applications, Vol. I and II, Springer (2006).
5. Nanotechnology: Basic Science and Emerging Technologies, Mick Wilson, KamaliKannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, Overseas Press, (2005).
6. G. B. Segreev, Nanochemistry, , Elsevier, Science, New York, (2006).
7. C. N. R. Rao, A. Mu¨ller, A. K. Cheetham, "The Chemistry of Nanomaterials:Synthesis, Properties and Applications" WILEY-VCH Verlag GmbH & Co. KGaA, weinheim, 2004
8. C.N.R. Rao, G.U. Kulkarni, P.J. Thomas, Nanocrystals: Synthesis, Properties and Applications" Springer Series in materials science-95, Springer-Verlag Berlin Heidelberg 2007
9. Znong Lin Wang, "Characterization of nanophase materials" WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, 2000.

BCY504	APPLIED CHEMISTRY	L	T	P	C
		3	0	0	3
Objective(s)	Awareness about recent technologies in applied chemistry				
Course Outcome(s)					
CO1	Solve water related problems				
CO2	Illustrate electrochemical concepts				
CO3	Employ corrosion prevention methodologies				
CO4	Develop innovative fuels				
CO5	Formulate novel polymers				

Unit-I: Water Treatment

Brief introduction regarding sources, impurities in water. Hardness of water, types, determination of hardness using EDTA method. Brief discussion and chemistry involved in the process of sedimentation, coagulation, filtration and sterilization, UV, Ozone, chlorination including break point chlorination. Softening of Water: (i) Lime-soda, process: Principles in hot, cold, lime-soda process. (ii) Zeolite softener, demineralization by synthetic ion exchange resins, Comparison between lime-soda, Zeolite and ion exchange process.

Unit-II: Electrochemistry

Introduction, Arrhenius ionic theory, Debye-Huckel theory of strong electrolytes, Activity and Activity coefficient, Conductivity of electrolytes, Kohlrausch's law of independent migration of ions, Oswald's dilution law, Acids and Bases, Concept of pH and pOH , Buffer solutions, Solubility product, common ion effect, Hydrolysis of salts, Conductometric titrations, transport number. Potentiometric titrations.

Unit-III: Corrosion of Metals and Alloys

Definition and classification of corrosion. Electrochemical corrosion- General revision of concept of electrode potential, galvanic cells, electrochemical and galvanic series, causes of corrosion, mechanism of direct chemical attack, pilling- Bed worth rule, concentration cells. Differential aeration theory of corrosion, types of corrosion, pitting corrosion, intergranular stress, waterline and microbial corrosion. Corrosion prevention : (a) Design and material selection, (b) Anodic and Cathodic inhibitors, (c) Cathodic and Anodic protection, (d) Protective coatings- types of surface, coatings and its application.

Unit-IV: Fuels

Introduction, Classification of fuels, Calorific value, Characteristics of a good fuel, comparison between solid, liquid and gaseous fuels. Bomb calorimeter. Calorific value of a gaseous fuel, Theoretical calculation of calorific value of a fuel, Wood, Coal, Classification of coal, selection of coal , analysis of coal, Types of carbonization of coal. Diesel engine fuel, Petroleum, synthetic petrol. LPG as a fuel. Non petroleum fuels, Natural gas, Coal gas, water gas. Non conventional sources of energy-bio mass, biogas, wind energy, solar.

Unit-V: Polymers

Introduction, Nomenclature and functionality of polymers, Classification of polymers, Types of polymersation. Methods of polymerization, Characteristics of polymers, structure and properties of polymers. Plastics, Inorganic polymers, Silicones, Rubbers, vulcanization of rubbers, synthetic rubber or elastomers, Application of rubber, Conducting polymers and bio polymers.

Reference Books:

1. S.S. Dara, A Text Book of Engineering Chemistry, S.Chand& Co. New Delhi, first Edition, 1985.
2. P.C.Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai & Sons, New Delhi, Fifteenth Edition,2009.
3. Fontana and Green , Corrosion Engineering, Tata McGraw Hill International Book Co. 2nd edition, 2005.
4. V.R.Gowariker, N.V.Viswanathan, Jayadevsreedhar, Polymer Science, New Age International publishers, (1986) Reprint 2010.

BMA332	MATHEMATICAL MODELLING	L	T	P	C
		3	0	0	3

UNIT I

Mathematical Modeling through Ordinary Differential Equations of First order: Linear Growth and Decay Models – Non-Linear Growth and DecayModels – Compartment Models – Dynamic problems – Geometrical problems.

UNIT II

Mathematical Modeling through Systems of Ordinary Differential Equations of First Order: Population Dynamics – Epidemics – Compartment Models –Economics – Medicine, Arms Race, Battles and International Trade – Dynamics.

UNIT III

Mathematical Modeling through Ordinary Differential Equations of Second Order: Planetary Motions – Circular Motion and Motion of Satellites –Mathematical Modeling through Linear Differential Equations of Second Order –Miscellaneous Mathematical Models.

UNIT IV

Mathematical Modeling through Difference Equations: Simple Models – BasicTheory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics and Genetics – Probability Theory.

UNIT V

Mathematical Modeling through Graphs: Solutions that can be Modelled Through Graphs – Mathematical Modeling in Terms of Directed Graphs, SignedGraphs, Weighted Digraphs and Unoriented Graphs.

Text Book:

1. Mathematical Modeling, J.N. Kapur, Wiley Eastern Limited, New Delhi, 1988.

Reference:

1. J.N. Kapur, Mathematical Models in biology and Medicine, EWP, New Delhi,1985.

BCY506	ENVIRONMENTAL CHEMISTRY	L	T	P	C
		3	0	0	3
Objective(s)	Demonstrate the analysis of environmental degradation				
Course Outcome(s)					
CO1	Examine various water quality parameters				
CO2	Model instrumental methods of water analysis				
CO3	Identify gaseous pollutants and its effects				
CO4	Point out degradation of atmosphere by electromagnetic radiation				
CO5	Categorize various soil pollutants				

Unit-I: Environmental Chemistry of Water

The principles and application of aqueous chemistry to the environmental systems. Unique properties of water, Water Quality Parameters: physico-chemical, biological, bacteriological; Water Quality Criteria and Standards; Water quality monitoring and management aspects, Chemical methods involved in treating water and wastewater, Removal of dissolved organics and inorganics, Heavy metal pollution and its abatement.

Unit-II: Water and Wastewater Analysis

Basic concepts and Instrumental methods of analysis; Determination of major parameters of water such as pH, acidity, alkalinity, hardness, BOD, COD, solids, fluoride, nitrogen, iron, manganese, sulphate, phosphate, volatile acids and trace contaminants.

Unit-III: Atmospheric Chemistry

Structure and properties of atmosphere, Classification and chemistry of major air pollutants and their control. Types and sources of air pollution-natural, Combustion and other combustion sources. Atmospheric Composition &Behaviour: Gaseous & particulate constituents of the atmosphere, Temperature and pressure profile of atmosphere, General circulation of atmosphere.

Unit-IV: Atmospheric Photochemistry

Electromagnetic radiations, Kinetics of thermal and photochemical processes, Reactions in the upper atmosphere, Photo processes in the troposphere, Photochemical smog, Photosynthesis, Ozone chemistry.

Unit-V: Soil Chemistry

The nature and importance of soil; Soil in the natural and man-made environment, Soil properties; Acid-Base and Ion-exchange reactions in soils. Macro and Micronutrients; Fertilisers and other soil amendments.

Waste and pollutants in soil, Heavy metals and radio-nuclides in soil. Colloidal chemistry of inorganic constituents, clays, OM and soil humus; Absorption in soils - forces and isotherms; Soil as cation and anion exchanger; Degradation of natural substances; Remediation of metal contaminated soil.

Reference Books:

1. T.G. Spiro and W.M.Stigliani, Chemistry of the Environment, 2nd ed., Tsinghua University Press, 2003.
2. V.Snoeyink and D.Jenkins, Water Chemistry, J.Wiley and Sons, 1980.
3. Shugui Dai, Environmental Chemistry, (ed.), Higher Education Press, 1997.
4. C.N. Sawyer, P.L. McCarty, G. F. Parkin, Chemistry for Environmental Engineering, McGraw Hill, 4th edition, 2002.
5. L.D. Bene_eld, J. F. Judkins and B. L. Weand, Process Chemistry for Water and Wastewater Treatment, Prentice Hall, 1982.
6. R.A. Bailey, H. M. Clark, J. P. Ferris, S. Krause, R. L. Strong, Chemistry of the Environment, Academic Press Second Edition, 2002.

BMA331	COMBINATORICS	L	T	P	C
		3	0	0	3

Unit I

Basic Combinatorial Numbers – Stirling Numbers of the First Kind – Stirling Numbers of the Second Kind.

Unit II

Generating Functions and Recurrence Relations – Symmetric Functions.

Unit III

Multinomials – Multinomial Theorem – Inclusion and Exclusion Principle.

Unit IV

Euler Function – Permutations with Forbidden Positions – The 'Menage' Problem – Problem of Fibonacci.

Unit V

Polya Theory – Necklace Problem and Burnside's Lemma – Cycle Index of a Permutation Group – Polya's theorems and their Immediate Applications.

Text Book:

1. Kenneth P. Boggart, Introductory Combinatorics, Pitman Books Ltd, 1983.

Reference Books:

1. V. Krishnamurthy, Combinatorics Theory and Applications, East –West Press, 1989.
2. V.K. Balakrishnan, Theory and Problems of combinatorics, Schaums outline series – McGraw Hill, 1994.
3. Ian Anderson, Combinatorics of finite sets, Oxford Science Publication, 2011.

BCY505	INSTRUMENTAL METHOD OF ANALYSIS	L	T	P	C
		3	0	0	3
Objective(s)	Educate them in operating analytical instruments				
Course Outcome(s)					
CO1	Summarize chromatographic techniques				
CO2	Interpret spectroscopic data				
CO3	Compute the spectral results				
CO4	Employ gas chromatography in separating mixture of compounds				
CO5	Identification of elements using microscopic analysis				

Unit-I: Chromatography

Introduction – solvent extraction (basic concepts only) – ion exchange (basic concepts only) – electrophoresis (basic concepts only) – column and thin layer chromatography - Principles, instrumentation, theory and applications of GC and HPLC.

Unit-II: Qualitative Optical Spectroscopy

Introduction-Principles, instrumentation, theory and applications of Infrared spectroscopy, Raman spectroscopy, Nuclear Magnetic Resonance (NMR) spectroscopy and X-ray diffraction methods.

Unit-III: Quantitative Optical Spectroscopy

Introduction - Principles, instrumentation, theory and applications of Atomic absorption spectroscopy(AAS)–Inductively coupled plasma atomic emission spectroscopy- Inductively coupled plasma mass spectrometry - Atomic fluorescence spectroscopy-X-ray fluorescence spectroscopy – Ultraviolet (UV)-visible spectroscopy.

Unit-IV: Mass Spectrometry

Introduction-Principles, instrumentation, theory and applications of Gas chromatography mass spectrometry (GCMS) – High performance liquid chromatography electrospray ionization mass spectrometry (LC-ESI-MS) – Laser mass spectrometry (MALDI).

Unit-V: Microscopic and Surface Analysis

Introduction-Principles, instrumentation, theory and applications of Atomic force microscopy (AFM)–Auger electron spectroscopy-X-ray photoelectron spectroscopy (XPS)- Scanning electron microscopy (SEM)–Transmission electron microscopy (TEM).

Reference Books:

1. Frank A.Settle (Editor), Handbook of instrumental techniques for analytical chemistry, Prentice-Hall Inc., New Jersey, 1997.
2. Vogel's Textbook of quantitative chemical analysis, G.H.Jefferey, J Bassett, J Mendham, and R C Denney, Longman scientific and technical publishers, London
3. D.A.Skoog, F.J.Holler, S.R.Crouch, Instrumental Analysis, Cengage Learning, New Delhi, 2007.
4. H.H. Willard, L.L.Merritt, and J.A.Dean, Instrumental Methods of Analysis,6th Edition (1986),CBS Publishers & Distributors, Shahdara, Delhi.