SHRI RAMDEOBABA COLLEGE OF ENGINEERING AND MANAGEMENT, NAGPUR

An Autonomous College of Rashtrasant Tukadoji
Maharaj Nagpur University, Nagpur, Maharashtra (INDIA)

TEACHING SCHEME & SYLLABUS
2016-17

B.E. COMPUTER SCIENCE & ENGINEERING

Published by
Dr. R.S. Pande
Principal
Shri Ramdeobaba College of Engineering & Management
Ramdeo Tekdi, Gittikhadan, Katol Road, Nagpur - 440 013
Ph. : 0712-2580011 Fax : 0712 - 2583237
ISO 9001 : 2008 CERTIFIED ORGANISATION

About the Department

The Department of Computer Science & Engineering was established in 2002, is well-equipped with state-of-the-art infrastructure.

The state of art infrastructure includes latest configuration desktops organized in four different laboratories. There are total 170 desktops with internet facility and inter-connected by a 24 hours server and CISCO router.

Computer laboratories have IBM and WIPRO servers and uses software of industry standard like Rational Rose, Oracle, DB2 AIX, and MSDN subscription for Microsoft products.

The Department is an authorized training center for Oracle Certification where students pursued certification like Oracle Certified Associate (OCA) and Oracle Certified Professional (OCP). The process of signing MOU for SUN-Java Technologies is in progress.

The Department has a distinction of consistently achieving above 95% results in the final year. Students are encouraged to appear in GATE, CAT, GRE and other competitive examinations which have resulted in increasing number of students clearing these exams. Mr. Anshul Agarwal has secured All India Rank 79 in GATE 2014 examination with GATE score of 886.

Department Vision

To continually improve the education environment, in order to develop graduates with strong academic and technical background needed to achieve distinction in the discipline. The excellence is expected in various domains like workforce, higher studies or lifelong learning.

To strengthen links between industry through partnership and collaborative development works.

Department Mission

To develop strong foundation of theory and practices of computer science amongst the students to enable them to develop into knowledgeable, responsible professionals, lifelong learners and implement the latest computing technologies for the betterment of the society.

Program Education Objectives

I. **To prepare graduates to apply the broad set of techniques, tools, and skills from science, mathematics and engineering required to solve problems in Computer Science and Engineering.**

   The field of Computer Science & Engineering is a fast evolving field and caters to multiple disciplines. The focus is to imbibe necessary skill set amongst the students and develop competencies to solve basic computer science & engineering problem.

II. **To prepare graduates to address practices in computer science and engineering using software development life cycle principles.**

   The department aims to develop good analytical and designing skills amongst students, while emphasizing on theoretical and practical aspects of computer science.

III. **To provide adequate training & opportunities to work as teams in multidisciplinary projects.**

   The department aims at encouraging team spirit through projects which are multidisciplinary in nature.

IV. **To prepare the graduates to exhibit professionalism, communication skills, ethical attitude, and practice their profession with high regard to legal and ethical responsibilities.**

   The department recognizes the need for effective communication in students and strives to enhance this aspect. The department feels that apart from curricular studies, it is necessary to impart good moral values in the students so that they are aware of their social responsibilities.

V. To prepare graduates for engaging in life-long learning, such as post graduate study & certification courses.

The department encourages the students for higher studies and certification courses to keep track with the pace of technology.

Programme Outcomes (POs)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

1. Foundation of Computer System: Ability to understand fundamental concepts of computer science & engineering, operating system, networking & data organization systems, hardware & software aspects of computing,
2. Software development Ability: Ability to understand the software development life cycle. Possess professional skills and knowledge of software design process. Familiarity and algorithmic competence with a broad range of programming languages and open source platforms.
3. Research Ability: Ability to apply knowledge base to identify research gaps in various domains, model real world problems, solve computational tasks, to provide solution for betterment of society with innovative ideas.

Teaching Scheme for First Year (Semester I and II) Bachelor of Engineering

GROUP 1: SEMESTER I / GROUP 2: SEMESTER II

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	MAT101/ MAT102	Engineering Mathematics-I / II	4	1	0	9	40	60	100	3 Hrs.
2	PHT101	Engineering Physics	4	1	0	9	40	60	100	3 Hrs.
3	PHP101	Engineering Physics lab	0	0	3	3	25	25	50	-
4	EET101	Electrical Engineering	3	1	0	7	40	60	100	3 Hrs.
5	EEP101	Electrical Engineering lab	0	0	2	2	25	25	50	-
6	CST101	Computer Programming	2	0	0	4	40	60	100	3 Hrs.
7	CSP101	Computer Programming lab	0	0	2	2	25	25	50	-
8	HUT101	Communication Skills	2	0	0	4	40	60	100	3 Hrs.
9	HUP101	Communication Skills lab	0	0	2	2	25	25	50	-
10	PEP101	Sports / Yoga	0	0	2	0	-	-	-	-
		TOTAL	**15**	**3**	**11**	**42**	**300**	**400**	**700**	

Teaching Scheme for First Year (Semester I and II) Bachelor of Engineering

GROUP 1 : SEMESTER II / GROUP 2 : SEMESTER I

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	MAT102/ MAT101	Engineering Mathematics-II / I	4	1	0	9	40	60	100	3 Hrs.
2	CHT101	Engineering Chemistry	4	1	0	9	40	60	100	3 Hrs.
3	CHP101	Engineering Chemistry lab	0	0	3	3	25	25	50	-
4	CET101	Engineering Mechanics	3	1	0	7	40	60	100	3 Hrs.
5	CEP101	Engineering Mechanics lab	0	0	2	2	25	25	50	-
6	MET101	Engineering Drawing	3	0	0	6	40	60	100	4 Hrs.
7	MEP101	Engineering Drawing lab	0	0	3	3	25	25	50	-
8	HUT102	Social Skills	2	0	0	4	40	60	100	3 Hrs.
9	INP102	Workshop	0	0	2	2	25	25	50	-
		TOTAL	**16**	**3**	**10**	**45**	**300**	**400**		

Teaching Scheme for Second year (III[rd] semester) Bachelor of Engineering

Sr. No.	Code	Course	Teaching Scheme			Credits	Maximum Marks			Exam Duration
			L	T	P		Internal Assessment	End Sem Exam	Total	
1	MAT202	Engineering Mathematics-III	3	1	0	7	40	60	100	3 Hrs.
2	CST213	Data Structure and Program design	4	1	0	9	40	60	100	3 Hrs.
3	CSP213	Data Structure and Program design lab	0	0	2	2	25	25	50	--
4	CST214	Digital Circuits & Fund. of Microprocessor	3	1	0	7	40	60	100	3 Hrs.
5	CSP214	Digital Circuits & Fund. of Microprocessor lab	0	0	2	2	25	25	50	--
6	CST215	Computer Architecture and Organization	3	1	0	7	40	60	100	3 Hrs.
7	CSP216	Advanced Programming Lab	0	0	2	2	25	25	50	--
8	CSP217	Computer Workshop - I lab	0	0	2	2	25	25	50	--
9	HUT204	Technical Communication	3	1	0	7	40	60	100	3 Hrs.
10	CHT201	Environmental Studies - I (Audit Course)	2	0	0	00	--	--	--	--
		Total	**18**	**05**	**08**	**45**	**300**	**400**	**700**	

Teaching Scheme for Second year (IV[th] Semester) Bachelor of Engineering

Sr. No.	Code	Course	Teaching Scheme			Credits	Maximum Marks			Exam Duration
			L	T	P		Internal Assessment	End Sem Exam	Total	
1	MAT245	Discrete Mathematics	3	1	0	7	40	60	100	3 Hrs.
2	CST218	Object Oriented Programming	4	1	0	9	40	60	100	3 Hrs.
3	CSP218	Object Oriented Programming lab	0	0	2	2	25	25	50	--
4	CST219	Operating Systems	3	1	0	7	40	60	100	3 Hrs.
5	CSP219	Operating Systems lab	0	0	2	2	25	25	50	--
6	CST220	Theoretical Foundations of Computer Science	4	1	0	9	40	60	100	3 Hrs.
7	CST221	Systems Programming	3	1	0	7	40	60	100	3 Hrs.
8	CSP222	Computer Workshop-II lab	0	0	2	2	25	25	50	--
9	CHT202	Environmental Studies- II (Audit Course)	2	0	0	0	--	--	--	--
		Total	**19**	**05**	**06**	**45**	**275**	**375**	**650**	

Teaching Scheme for Third year (V[th] Semester) Bachelor of Engineering

Sr. No.	Code	Course	Teaching Scheme			Credits	Maximum Marks			Exam Duration
			L	T	P		Internal Assessment	End Sem Exam	Total	
1	CST313	Mobile Application Programming	4	1	0	9	40	60	100	3 Hrs.
2	CSP313	Mobile Application Programming Lab	0	0	2	2	25	25	50	--
3	CST314	Design and Analysis of Algorithms	3	1	0	7	40	60	100	3 Hrs.
4	CST315	Software Engineering	3	1	0	7	40	60	100	3 Hrs.
5	CSP315	Software Engineering lab	0	0	2	2	25	25	50	--
6	CST316	Design Patterns	3	1	0	7	40	60	100	3 Hrs.
7	CST317	Computer Networks	3	1	0	7	40	60	100	3 Hrs.
8	CSP317	Computer Networks lab	0	0	2	2	25	25	50	--
9	CSP318	Software Tech. Lab-1 lab	0	0	2	2	25	25	50	--
		Total	**16**	**05**	**08**	**45**	**300**	**400**	**700**	

Teaching Scheme for Third year (VI[th] Semester) Bachelor of Engineering under autonomy

Sr. No.	Code	Course	Teaching Scheme			Credits	Maximum Marks			Exam Duration
			L	T	P		Internal Assessment	End Sem Exam	Total	
1	CST319	Computer Graphics and GUI Design Technologies	3	1	0	7	40	60	100	3 Hrs.
2	CSP319	Computer Graphics & GUI Design Technologies Lab	0	0	2	2	25	25	50	-
3	CST320	Advanced Data Structures	4	1	0	9	40	60	100	3 Hrs.
4	CSP320	Advanced Data Structures Lab	0	0	2	2	25	25	50	--
5	CST321	Database Management System	3	1	0	7	40	60	100	3 Hrs.
6	CSP321	Database Management System lab	0	0	2	2	25	25	50	--
7	CST322	Open Elective	3	1	0	7	40	60	100	3 Hrs.
8	CST323	Artificial Intelligence	3	1	0	7	40	60	100	3 Hrs.
9	CSP324	Software Tech Lab-II lab	0	0	3	3	25	25	50	--
		Total	**17**	**05**	**07**	**46**	**300**	**400**	**700**	

Course Code	Open Elective	Course Code	Open Elective
CST322-1	Introduction to Mainframes	CST322-5	Mobile Technology
CST322-2	Foundation of Business Intelligence	CST322-6	Insight into Cloud Computing
CST322-3	Salesforce Technology	CST322-7	Security Basics & Cyber Security
CST322-4	Business Intelligence and Its Applications		

Teaching Scheme for Fourth year (VIIth Semester) Bachelor of Engineering

Sr. No.	Code	Course	Teaching Scheme			Credits	Maximum Marks			Exam Duration
			L	T	P		Internal Assessment	End Sem Exam	Total	
1	CST411	Data Warehousing and Mining	4	1	0	9	40	60	100	3 Hrs.
2	CSP411	Data Warehousing and Mining lab	0	0	2	2	25	25	50	--
3	CST412	Language Processors	4	1	0	9	40	60	100	3 Hrs.
4	CSP412	Language Processors lab	0	0	2	2	25	25	50	--
5	CST413	ELECTIVE-I	4	1	0	9	40	60	100	3 Hrs.
6	CST414	ELECTIVE-II	4	1	0	9	40	60	100	3 Hrs.
7	CSP415	PROJECT & SEMINAR	0	0	2	4	25	25	50	--
		Total	**16**	**04**	**06**	**44**	**235**	**315**	**550**	

Course Code	Elective -I	Course Code	Elective - II
CST413-1	Web Architecture and Technologies	CST414-1	Internetworking and TCP/IP
CST413-2	Business Intelligence	CST414-2	Machine Learning
CST413-3	Advanced Object Oriented Technologies	CST414-3	Optimization Techniques in Computing

Teaching Scheme for Fourth year (VIIIth Semester) Bachelor of Engineering

Sr. No.	Code	Course	Teaching Scheme			Credits	Maximum Marks			Exam Duration
			L	T	P		Internal Assessment	End Sem Exam	Total	
8	CST416	Distributed Systems	4	1	0	9	40	60	100	3 Hrs.
9	CSP416	Distributed Systems lab	0	0	2	2	25	25	50	--
10	CST417	Information Security	4	1	0	9	40	60	100	3 Hrs.
11	CSP417	Information Security lab	0	0	2	2	25	25	50	--
12	CST418	ELECTIVE-III	4	1	0	9	40	60	100	3 Hrs.
13	CST419	ELECTIVE-IV	4	1	0	9	40	60	100	3 Hrs.
14	CSP420	PROJECT & SEMINAR	0	0	5	10	75	75	150	--
		Total	**16**	**04**	**9**	**50**	**285**	**365**	**650**	

Course Code	ELECTIVE - III	Course Code	ELECTIVE - IV
CST418-1	Grid and Cloud Computing	CST419-1	Web Intelligence and Big Data
CST418-2	Distributed and Parallel Database	CST419-2	Natural Language Processing
CST418-3	Parallel Programming Design	CST419-3	Mobile Adhoc Network
CST418-4	Industry Elective - I	CST419-4	Industry Elective - 2

Total Credits (III Sem to VIII Sem) : 275

Syllabus of Group 1 - Semester I and Group 2 - Semester I, Bachelor of Engineering

Course Code : MAT101 **Course : Engineering Mathematics-I**

L: 4 Hrs., T: 1 Hrs., P: 0 Hrs., Per week **Total Credits : 09**

Course Objective

Course objective of this course is to provide understanding the concepts of Mathematics and its application to Engineering. This course introduces the student to Differential Calculus for one and several variable, Differential Equations and Infinite Series.

Course Outcomes

On successful completion of the course, student shall be able to

1. Solve Engineering problems using the concept of Differential Calculus.
2. Get analytical solution of Ordinary Differential Equations in Engineering.
3. Test convergence of Infinite series.

Syllabus

Unit - I:

Ordinary Differential Calculus: Successive differentiation, Taylor's and Maclaurin's series for function of one variable, indeterminate forms, curvature, radius of curvature and circle of curvature.

Unit - II:

Partial Differentiation: Functions of several variables, first and higher order derivative, Euler's Theorem, Chain rule and Total differential coefficient, Jacobians. Taylor's and Maclaurin's series for function of two variables, Maxima and minima for function of two variables, Lagrange's method of undetermined multipliers.

Unit - III:

Infinite Series: Convergence, divergence and oscillation of series, General properties, Tests of convergence, Alternating series.

Unit - IV:

First Order Differential Equation: First order first degree differential equations: Linear, reducible to linear, exact and reducible to exact differential equations; Non-linear differential equations.

Unit - V:

Higher Order Differential Equation: Higher order differential equations with constant coefficient, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations, simultaneous differential equations, differential equation of the type $d^2y/dx^2 = f(x)$ and $d^2y/dx^2 = f(y)$.

Unit - VI:

Applications of Differential Equation: Applications of first order first degree differential equations: Simple electrical circuits in series. Application of higher order differential equations: Mechanical and electrical Oscillatory circuits (free, damped, forced oscillations)

Text Books:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, Delhi.
2. A text book of Applied Mathematics Volume I & II, by P. N. Wartikar and J. N. Wartikar, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India)
3. Advanced Engineering Mathematics, 2 ed , Jain ,Iynger , Narosa publication

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 8th edition, Neekunj print process, Delhi.
2. Schaum's Outline of Differential Equations, Richard Bronson , TMH, 3ed, New Delhi
3. Engineering Mathematics by Srimanta, Paul
4. A text book of Applied Mathematics I, T. Singh, K.L. Sarda, Professional Publishing House Pvt.Ltd., Nagpur.

Syllabus of Group 1 - Semester I and Group 2 – Semester II, Bachelor of Engineering

Course Code : PHT101 **Course : Engineering Physics**

L: 4 Hrs, T: 1 Hr, P : 0 Hr., Per week **Total Credits : 09**

Course Objectives :

1. To develop the ability to apply concepts in elementary physics to understanding of engineering applications;
2. To introduce more advanced physics concepts, which form the basis of modern engineering;
3. To provide a sound foundation in mathematical formulation of concepts learnt and their applications;
4. To elaborate the general nature of concepts learnt and of possibility of their cross-disciplinary application;
5. To develop skills for numerical problem solving in areas covered

Course Outcomes :

At the end of the course the students

1. will be able to recognize and analyze phenomena of interference, diffraction and polarization of light waves ;
2. will understand principles of laser action and basic working of many types of laser devices ;
3. will understand geometrical theory of optical fibre communication and the phenomena of attenuation and dispersion of electrical signals in the fibre ;
4. will understand fundamental notions in quantum mechanics such as wave particle duality, de Broglie matter waves, Heisenberg uncertainty relations, wave function of system, quantum confinement, quantization of energy and quantum tunneling of potential barriers;
5. will understand concepts like Fermi energy and density of states, understand calculation of carrier density and electrical conductivity in intrinsic and semiconductors and understand the behaviour of pn-junction;
6. will understand broad principles of electromagnetic electron lenses, cyclotron, mass spectrograph and working of the CRO;
7. will understand the reasons for novel properties at nano-scale, be familiar with elements of some of the methods of synthesis and characterization and some of the properties of such materials ;
8. will be able to understand and perform numerical calculations in areas of optics, lasers, optical fibres, quantum physics, semiconductors, charged particle devices and nano physics at the level defined above for these.

Unit-I:

Optics:

Interference in thin films, division of amplitude and wavefront, wedge-shaped films, Newton's rings, antireflection coatings; Diffraction, single slit, double slit, Different types of polarization of light, Malus' law, production of plane polarized light, birefringence, wave plates.

Unit-II:

Quantum Physics:

Wave-particle duality, wave packets, Heisenberg uncertainty relations; Wave function, probability Schrodinger's equation, time dependent equation and its separation; Infinite potential and finite potential wells, phenomenon of tunneling.

Unit-III:

LASERs and Optical Fibres:

Interaction of matter and radiation, LASER, spontaneous and stimulated emission, population inversion; Common types of lasers and their applications; Optical fibres, structure, types, propagation in a fibre, modes of propagation, signal attenuation, signal distortion.

Unit-IV:

Mass Spectrograph and Particle Accelerators :

Principles of electron optics, cathode ray tube, cathode ray oscilloscope, mass spectrographs, particle accelerators.

Unit-V:

Semiconductors:

Band structure of solids, band diagrams of insulators, semiconductors and conductors, Fermi level in conductors and semiconductors, carrier concentration, conductivity, effective mass; Junction diode and its band diagram, depletion region and barrier potential, diode rectifier equation.

Unit-VI:

Nanophysics:

What is Nanotechnology? Fullerenes and nanoparticles; Outline of methods of preparation; Elements of electron microscopy; Scanning probe microscopy, Outline of properties – physical, thermal, optical, electrical, magnetic; Quantum size-effects; CNTs; Applications.

Text Books:

1. Fundamentals of Physics: D. Halliday, R. Resnik and J. Walker, John Wiley.
2. Engineering Physics: S. Jain and G.G. Sahasrabudhe, Universities Press (2010) / Applied Physics : S. Jain Sahastrabuddhe and S.M. Pande.
3. Introduction to Nanoscience and Nanotechnology: K.K. Chattopadhyay and A.N. Banerjee, PHI Learning (2009)

Reference Books:

1. Electronic Engineering Materials and Devices: J. Allison, TMH.
2. Engineering Physics: H. Malik and A.K. Singh, TMH (2010).
3. Engineering Physics: D.K. Bhattacharya and A.Bhaskaran, Oxford University Press (2010)

Syllabus of Group 1 - Semester I and Group 2 – Semester II, Bachelor of Engineering

Course Code: PHP101 **Course: Engineering Physics Laboratory**

L: 0 Hrs., T: 0 Hrs., P: 3 Hrs., Per week **Total Credits: 03**

Course Outcomes :

1. Students should be able to perform tasks like leveling, alignment, reading vernier scales, do specific measurements, systematically record observations, do calculations from data collected and draw conclusions.
2. Students gain working familiarity with instruments like simple spectrometer, travelling microscope, lenses, prisms, ammeter, voltmeter, the CRO, power supplies etc.;
3. Students gain better understanding of concepts like interference, diffraction, polarization, energy band gap \in semiconductor etc.
4. Students gain a working knowledge of estimating errors in an experiment for which background theory is known;
5. Students should be able to subject data collected to statistical and error analysis.

A minimum of 8 experiments to be performed from the following list of experiments.

List of Experiments :

In addition to the demo experiments, the Lab turns will be utilized for performing the experiments based on the following list:

1. Study of diodes
2. Study of transistors
3. Study of thermistors
4. Study of phenomena of interference due to thin films.
5. Diffraction of light by slit(s), an edge, obstacles, etc.
6. Hall effect
7. Study of CRO
8. Graph plotting, curve fitting, visualization using Mathematica

Reference Books:

1. Physics Lab Manual written by the Teaching Faculty of Physics Department, RCOEM.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code : EET101 **Course : Electrical Engineering**

L:3 Hr., T:1 Hrs., P:0 Hrs., Per week **Total Credits : 07**

Course Outcomes :

Upon completion of this course, the students shall be able to,

1. Apply the basic laws of electric and magnetic circuits to obtain the unknown quantities.
2. Represent and interpret the sinusoidal electrical quantities mathematically as well as graphically in the form of waveforms/phasors and analyze the 1-phase/3-phase AC circuits to determine the unknown quantities.
3. Determine the power losses/efficiency and voltage drop/voltage regulation of a 1-phase transformer at full load condition and demonstrate the knowledge related with its need, construction, principle, types and applications.
4. Describe the construction, principle, applications and performance characteristics of DC machines and Induction motors.
5. Demonstrate the concept of electrical power generation, transmission, distribution and the understanding about conventional/renewable energy sources.
6. Demonstrate the understanding about necessity of electrical earthing, safety & protecting devices, electrical energy utilization, illumination sources and their selection.

Unit-I:

DC Electric Circuits: Definition of EMF, Current, Power, Energy Resistance, Variation of resistance with physical parameters viz. length, area, specific resistivity and temperature. Ohm's law, resistances in series and parallel, current and voltage division rules, KVL & KCL, star delta transformation and related numerical. Measurement of DC electrical quantities.

Magnetic Circuit: Concept of MMF, Flux, reluctance, analogy with electric circuits, B-H curve, simple numerical on series magnetic circuits.

Unit-II:

AC Circuits: Generation of single phase and three phase alternating EMF. Average and RMS values for sinusoidal waveform. Phasor representation of sinusoidal electrical quantities, Steady state behavior of RLC circuits with sinusoidal excitation. Reactance, impedance, Power & Energy in AC Circuits. Simple numerical on series and parallel AC circuits. Concept & importance of power factor & its improvement (with simple numerical).

Simple analysis of balanced three phase AC circuits, Star-delta resistive networks. Measurement of AC electrical quantities.

Unit-III:

Introduction to Electrical Power System :

Introduction to Power Generation (Thermal, Hydro, Nuclear, Wind and Solar) with block schematic representation only. Single line diagram for Generation, Transmission & Distribution through different voltage levels; Low voltage radial distribution system (Over head & underground, single phase and three phase).

Necessity of equipment earthings, Fuses (Rewirable and HRC), MCB, ELCB.Basic operation of UPS and Inverters (Block schematic representation).

Unit-IV:

Single phase Transformer :

Principle of operation, Construction Transformer ratings, No load and On load operation with leakage reluctance, losses, efficiency, Definition & formula for voltage regulation, OC/ SC test, equivalent circuit referred to primary side of transformer.

Unit-V:

Rotating Electric Machines :

DC Machines: DC Generator-Principle of working, construction (without details of armature winding), classification of DC generators. DC Motors-Back EMF, necessity of starters, speed and torque equations, characteristics of motors, speed control of DC motors (without numerical), Application of DC motors.

Three Phase Induction Motors: Working principles, types and construction of three phase Induction Motor, synchronous speed, torque, sleep, torque speed characteristics, applications of three phase Induction motor.

Single Phase Induction Motors: operating principle of capacitor start and run single phase induction motor and its applications.

Unit-VI:

Utilization of Electrical Energy :

Illumination: Definition of luminous flux, luminous intensity, Candle power, illumination, Luminance, Luminous efficiency (lumens/watt) of different types of lamps, working principle of Fluorescent/Sodium Vapour/ Mercury vapor & CFL Lamps. Simple numerical to determine number of lamps to attain a given average lux level in an area.

Electric Heating: Advantages of Electrically produced heat, types and applications of Electric heating equipment, transfer of heat (conduction, convection, radiation); Resistance ovens, Induction heating (Core & coreless type), Dielectric heating. (Note. Numerical excluded)

Tariff: One part (KWH based) tariff with simple numerical; to calculate the domestic electricity charges.

Text Books :

1. Elements of Electrical sciences: P. Mukhopadhyay, N. Chand & Bros Roorkee (1989).
2. Electrical Technology: B. L. Thareja, S. Chand Publications.
3. Basic Electrical Engineering: S. B. Bodkhe, N. M. Deshkar, P. P. H. Pvt. Ltd.

Reference Books :

1. Basic Electrical Engineering: T.K. Nagasarkar& M. S. Sukhija, Oxford Univ. Press.
2. Utilization of Electrical Energy: H. Pratab, Dhanpatrai& Sons.
3. Utilization of Electrical Energy: E. Openshaw Taylor, Orient Longman.
4. Websites: www.powermin.nic.in, www.mnes.nic.in, www.mahaurja.com.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code : EEP101 **Course: Electrical Engineering Lab**

L:0 Hr., T:0Hrs., P:2 Hrs., Per week **Total Credits : 02**

Course Outcomes :

Upon completion of this course, the students shall be able to,

1. Connect the electric circuits based on the syllabus of theory subject EET101 and test the performance by way of observation, calculations and conclusion.
2. Demonstrate the concept and significance of power factor and how it can be improved.
3. Conduct an electrical energy survey of connected load at residential premises and demonstrate the understanding of energy tariff by calculating the energy bill in accordance with the norms of State Electricity Distribution Company.

List of Experiments :

1. To verify Kirchoff's voltage and current law using D.C. source.
2. To study the R-L-C series circuit with AC source
3. To study R-L-C parallel circuit with AC source
4. To perform direct load test on 1-phase transformer for finding regulation and efficiency
5. To perform open circuit and short circuit tests on 1-phase transformer
6. To study 3-phase star delta connections and verify different relations of voltage ,current and power
7. To study the speed control techniques for DC shunt motor
8. To study the importance of power factor and improvement of power factor using static capacitors.
9. To analyze energy bill of residential category and prepare energy sheet.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code: CST101 **Courses: Computer Programming**

L: 2 Hrs. T: 0 Hrs. P: 0 Hrs. Per week **Total Credits: 4**

Course Outcomes

On successful completion of the course, students will be able to

1. Understands basics of computer, software, number systems, flowchart and algorithms.
2. Design and code well-structured C programs.
3. Write program on the basis of decision control structures and loop control structures.
4. Perform sorting and various other operations on 1-D and 2-D array.
5. Perform operations on structures, functions and pointers.

Syllabus

Unit-I:

Computer Fundamentals: Basic Structure of a computer, Input/output devices and memories and types of computer. Introduction to DOS and Windows OS, Number Systems: Decimal, Binary, Octal, Hexadecimal and conversion from one to another. Algorithm – Conventions used in writing algorithm, Software Life Cycle, Program and Programming Language System Software- Translator, Compiler, Interpreter, Linker, Loader. Languages – Procedural, Object oriented, High level, assembly, Machine Language and Flowchart

Unit-II:

C Programming Language: Keyword, Constant, Variable, Data types, Operators, Types of Statements, Preprocessor Directives, Decision Control Statement-if, if-else, Nested if-else statement, Switch case.

Unit-III:

Loop Control Structure: go to, while, for, do while, break, continue Storage class, Enumerated Data types, Renaming Data types with typedef(), Type Casting, Bitwise Operators.

Unit-IV:

Array: Introduction, array Declaration, Single and multidimensional array Pointers: Introduction, Definition and use of pointer, Pointer arithmetic, pointer operators, pointer and array, pointer to pointer

Unit-V:

Structures and Union: Declaring and using structure, Structure initialization, Structure within structure, array of structure, pointer to structure.

Unit-VI:

Function Programming: Introduction, User Defined and Library Function, Parameter passing, Return value, Recursion, pointer and function

Text Books:

1. Mastering C: K. R. Venugopal and S. R. Prasad, Tata McGraw Hill
2. Programming in ANSI C,5th ed. : E. Balguruswami McGraw Hill

Reference Books:

1. Let Us C.9thed: Yashwant Kanetkar, BPB Publication
2. Programming with C: Byron Gottfried, Schaums Outline Series.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code: CSP 101 **Course: Computer Programming Lab**

L: 0 Hrs., T: 0 Hrs., P:2 Hrs. Per week **Total Credits: 2**

Course Outcomes :

On successful completion of the course, students will be able to

1. Implement programs based on if-else, switch and loop structure.
2. Implement programs based on 1-D and 2-D numeric and character arrays.
3. Perform operation on structure and pointer.
4. Design programs based on functions.

CSP101practicals based on above CST 101 syllabus

Syllabus of Group 1- Semester I and Group 2-Semester II, Bachelor of Engineering

Course Code : HUT101 **Course:-Communication Skills**

L:2 Hrs.,T:0Hrs.,P:0Hrs.,Per week **Total Credits:4**

Course Outcomes :

1. Students have better reading comprehension, pronunciation, and functional English grammar.
2. Students are able to write letters and resumes
3. Students are able to organize their thoughts for effective presentation and writing.
4. Students are able to learn skills to present themselves well in an interview, and handle a Group Discussion

Syllabus

Unit-I :

Communication:

What is Communication, the Media of Communication, Channels of Communication, Barriers to Effective Communication, Role of Communication Skills in Society.

Unit-II :

Reading Comprehension :

The Process of Reading, Reading Strategies Central idea, Tone and Intention, Comprehension Passages for practice.

Unit-III :

Professional Speaking:

Components of an effective talk, Idea of space and time in public speaking, Tone of voice, Body language, Timing and duration of speech, Audio-Visual Aids in speech. Presentation Skills, Group Discussion and Job Interviews

Unit IV :

Orientation to Literary and Scholarly Articles:

Preferably two fictional and two non-fictional texts (Selected by the teachers and the Head). The art of writing articles on social, cultural, scientific and technical issues (Paragraph Writing), Exercises.

Unit V :

Business Correspondence:

Types and Formats of Business letters, Routine Business Letters (Inquiry, Order, Instruction, Complaint, Adjustment), Sales Letters, Resumes and Job applications, Business Memos, Emails.

Unit VI:

Grammar:

Synonym and Antonym, Give one word for, Voice, Narration and Comparison of Adjectives and Adverbs, Transformation of sentences and Common Errors, Idioms and Phrases, Note Making, Précis writing.

Text Book :

1. M. Ashraf. Rizvi. Effective Technical Communication. Tata Mc Graw-Hill Publishing Company Limited.2009

Reference Books :

1. Sanjay Kumar and Pushp Lata. Communication Skills. Oxford Publication
2. Meenakshi Raman and Sangeeta Sharma. Technical Communication. Second Edition Oxford Publication.2011
3. Anne Nicholls. Mastering Public Speaking. Jaico Publishing House.2003
4. Dr Asudani .V. H An easy approach to English. Astha Publication Nagpur. 2009 , 3rd Edition.

Syllabus of Group 1- Semester I and Group 2-Semester II, Bachelor of Engineering

Course Code : HUP101 **Course:-Communication Skills Practical**

L:0Hrs.,T:0Hrs.,P:2Hrs.,Per week **Total Credits:2**

Course Outcomes

On successful completion of the course, students will be able to

1. Learn presentation skills
2. Understand effective strategies for Personal Interview and Group Discussions
3. Learn and apply effective language skills – listening, speaking, reading and writing

Sr. No	Name of the Practical	Activities Taken	Medium of Practical
1	Speaking Skills	1. Introduction to effective ways of speaking 2. Oral presentations Extempore / Debate / JAM/Self-introduction	PPT Based, Activity Based
2	Presentation Skills	1. Preparing visual aids/PPTs on given topics	PPT Based, Activity Based, English Edge software
3	Group Discussion-Orientation	1. GD types 2. GD techniques/rules - videos 3. General/familiar topics for discussion	English Edge software Oxford Publication CD, PPT based Activity based
4	Group Discussion-Practice session	1. Divide in group of 6 2. Classification of topics 3. Feedback	PPT Based, Activity Based
5	Group Discussion-Mock	1. Divide in group of 6 2. Mock GDs - types 3. Feedback	Activity Based
6	Interview Techniques-Orientation	1. Various types of interviews 2. Types of interviews 3. Self-analysis 4. KYC sheet 5. Self-introduction	English Edge software Oxford Publication CD Activity Based
7	Interview Techniques Practice Sessions	1. Video 2. Non-verbal communication 3. Types of interview questions	Oxford Publication CD, Activity Based
8	Interview Techniques-Mock Interviews **Optional Practicals**	1. Mock Interviews (One to One) **Teacher can decide any other Practical apart from the ones mentioned below**	Activity Based
9	Listening Skills	1. Listening Barriers	PPT Based, Activity Based
10	Non Verbal Communication	1. Kinesics in com/interviews 2. Activities/Role play	English Edge software based, PPT based
11	Use Figurative Language	1. Intro phrases/ Idioms/proverbs/ pronunciation	PPT Based, Activity Based

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code :PEP101 **Course: Sports/Yoga**

L:0 Hr., T:0Hrs., P:2 Hrs., Per week **Total Credits : 00**

Course Outcomes

On successful completion of the course, students will be able to

1. More number of students are participating in sports activities.
2. Students interest toward physical fitness has been increased.
3. Students are getting basic knowledge of yoga & sports.

BRIEF OBJECTIVES OF SPORTS/YOGA PRACTICAL CLASSES

It has long been proven that a healthy body leads to a healthy mind. With a strong belief in this, Physical Education department at RCOEM will conduct sports/yoga classes with the objective of maintaining health, fitness and wellness of students as well as create awareness about need for good health and physical fitness. The objective would also be todevelop team spirit, social skills as well as identify and develop leadership qualities in students through various sports group activities. Training of students to understand the rules of various national and international games would also be an important objective. Sport activities would also be conducted with the objective to provide recreation to the students which is an important neutralizer for stress. Additionally, the objective would be to evaluate fitness of students so as to recommend and conduct specific Yoga and Sport activities.

PROGRAMME OUTLINE

1. Sports

1. Introduction to sports i.e. volleyball, cricket, football, basketball, badminton, T.T., Athletics.
2. Health and safety issues related to sports; Knowledge, recognition and ability to deal with injuries and illnesses associated with sports.
3. Awareness about sports skills, techniques and tactics.
4. Rules, regulations and scoring systems of different games (Indoor & Outdoor).
5. Trials of students to participate in inter-collegiate/University level games.

2. Yoga: Includes asanas like sitting, standing and lying, Surayanamaskar, Pranayam.

3. Physical fitness test: this would include speed, Cardiovascular Endurance, strength, skill & flexibility, body composition (fat weight & lean body weight).

Syllabus of Group 1 - Semester II and Group 2 – Semester II, Bachelor of Engineering

Course Code: MAT102 **Course: Engineering Mathematics-II**

L: 4 Hrs., T: 1 Hrs., P: 0 Hrs., Per week **Total Credits: 09**

Course Objective

The objective of this course is to expose student to understand the basic importance of Integral Calculus and Vector calculus. The student will become familiar with fitting of curves and regression analysis.

Course Outcomes

On successful completion of the course, student shall be able to

1. Understand and use the concepts of Integral Calculus for Engineering problems.
2. Apply technique of Vector differentiation and integration to various Engineering problems.
3. Know basic statistical techniques required for Engineering.

Syllabus

Unit-I:

Integral Calculus I: Beta and Gamma functions, Differentiation of definite integrals, Mean value and root mean square values.

Unit-II:

Integral Calculus II: Tracing of curves (Cartesian, polar and parametric curves), rectification of simple curve, quadrature, volumes and surface of solids of revolutions(Cartesian, polar and parametric forms).Theorem of Pappus and Guldin.

Unit-III:

Multiple Integrals and their Applications: Elementary double integrals, change of variable (simple transformation), change of order of integration (Cartesian and polar), application to mass, area, volume and centre of gravity (Cartesian and polar forms), elementary triple integrals.

Unit-IV:

Vector Calculus I: Scalar point function, Vector point function, vector differentiation, gradient, divergence and curl, directional derivatives with their physical interpretations, solenoidal and irrotational motions, Scalar potential function.

Unit-V:

Vector Calculus II: Vector integration: Line integrals, work done, conservative fields, surface integrals and volume integrals, Stoke's theorem, Gauss divergence theorem, Green's theorem and their simple applications.

Unit VI:

Statistics: Fitting of straight line, $y = a + bx$, parabola $y = a + bx + cx^2$ and the exponential curves by method of least squares, Coefficient of linear correlation, lines of regression , rank correlation, multiple regression and regression plane of the type $z = a + bx + cy$, coefficient determination.

Text Books:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, Delhi
2. A text book of Applied Mathematics Volume I & II, by P. N. Wartikar and J. N. Wartikar, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India)
3. Advanced Engineering Mathematics, 2 ed , Jain ,Iynger , Narosa publication

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 8th edition, Neekunj print process, Delhi.
2. Engineering Mathematics: Principal and Applications Srimanta, Paul, Oxford Univ Press,(2011)
3. Higher Engineering Mathematics: B.V. Ramana, TMH

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course No. CHT101 **Course : Engineering Chemistry**

L: 4 Hrs., T: 1 Hrs., P: 0 Hrs., Per week **Total Credits : 09**

Course Outcomes :

Upon successful completion of the course, the student should be familiar with and be able to gain:

1. Knowledge of water analysis, waste water analysis, boiler water chemistry and desalination of water enable the students to overcome the difficulties, to a larger extent; that often come across in the field of (i) Civil engineering, (ii) Public health and environmental engineering (iii) Ocean engineering (iv) Thermal and electrical power generation sectors and process engineering.
2. Better understanding to surmount over the difficulties faced in the selection of proper and economical constructional materials to be used; the impact of change in the physicochemical and mechanical properties of the concrete type composites due to variation in their chemical composition.
3. To apply the knowledge of 'Principles of Tribology' for reduction of friction and wear in the process engineering, manufacturing and production engineering and automotive engineering fields.
4. Knowledge for proper selection and design of engineering materials having better corrosion resistance and to implement effective measures to minimize corrosion.
5. Better insight in the selection of materials for modern technologies which demand with unusual combination of properties that cannot be met by any of the conventional metal alloys, ceramics and polymeric materials viz in aerospace applications, military warfare materials, nuclear installations, electrical electronic components devices, nano materials process engineering field etc.

Syllabus

Water Treatment :

Water Treatment for Industrial Applications: Brief introduction regarding sources, impurities in water, hardness of water and their types. Softening of water using lime-soda process: principles in hot and cold lime-soda process. Zeolite softener, demineralization by synthetic ion exchange resins. Boiler troubles: Carryover, Priming and Foaming, Scales and Sludges, Caustic Embrittlement, Boiler Corrosion-causes and effects on boiler operation and methods of prevention. External and Internal conditioning : Phosphate, Carbonate and Calgon conditioning.

Water Treatment for Domestic Water:

Domestic water treatment : Brief discussion and Chemistry involved in the process of sedimentation, coagulation, filtration and sterilization by UV, Ozone, Chlorination including Break point chlorination. Desalination of water using reverse osmosis and electro dialysis.

Numericals Based on Water Softening: Numericals based on (1) lime-soda (2) zeolite / ion-exchange water treatment processes.

Cement :

Process parameters involved in the manufacturing of portland cement, manufacture of portland cement, microscopic constituents of cement and their effects on strength; setting and hardening of cement.

Types and uses of cement : Pozzolonic; Rapid hardening, Low heat and High alumina cements. Additives and admixtures used in cement: Accelerators, Retarders, Air entrainment agents, Water repellants.

Chemical approach to Nanomaterials :

General introduction to nanotechnology, timeline and milestone, overview of different nanomaterials available, potential use of nanomaterials in electronics, sensors, medical applications, catalysis, environment and cosmetics.

Physical chemistry related to nanoparticles such as colloids and clusters: conductivity and enhanced catalytic activity compared to the same materials in the macroscopic state.

Synthesis of nanomaterials: ' Top-Down'- photolithography and 'Bottom-Up'- sol-gel method .

Carbon nanotubes: Single-walled and multi-walled carbon nanotubes, their structures, properties and applications.

Potential risks of nanomaterials- Health and environmental impact.

Fuels and combustion :

Introduction, Calorific value, Higher and Lower calorific value, flame temperature and flame intensity , determination of calorific value by Bomb calorimeter and Boy's calorimeter, numericals based on the determination of calorific value by Bomb and Boy's Calorimater.

Solid Fuels:

Types of coals, proximate and ultimate analysis of coal, its significance, Carbonization of Coal.

Liquid and Gaseous Fuels:

Liquid fuels: mining & fractional distillation of crude petroleum, use of gasoline in internal combustion engine, octane number, cetane number, flash point of combustible liquid fuel, knocking. Fisher-Tropsch's process for manufacture of synthetic gasoline, thermal and catalytic cracking: fixed bed and fluid bed catalytic cracking, aviation gasoline.

Gaseous fuels:

CNG and Significance of flue gas analysis by Orsat apparatus.

Numericals based on Combustion Calculations:

Numericals based on combustion calculations for solid fuels. Numericals based on combustion calculations for liquid and gaseous fuels.

Friction, Wear and Lubricants :

Introduction, lubrication mechanism : Hydrodynamic, Boundary and Extreme pressure lubrication. Classification of lubricants- Solid, Semisolid and Liquid lubricants, Blended oils using different additives viz.:-

Anti-oxidants, E. P. additive, corrosion inhibitor, viscosity index improver, etc. synthetic lubricants viz.:- Dibasic acid esters, Polyglycol ethers and Silicones, Lubricating Emulsions. Properties of Greases: Drop point and consistency test, Properties of liquid lubricants: Viscosity and Viscosity Index, Aniline point, Cloud & Pour point and Decomposition stability. Criteria for selection of lubricants under different conditions of load and speeds.

Corrosion :

Electrochemistry and Theories of Corrosion :

Introduction to corrosion, Cause and Consequences of corrosion, Measurement of corrosion rate, Galvanic series, Dry and Wet corrosion, Pilling-Bedworth rule, factors affecting the rate of corrosion.

Types of corrosion and Preventive Methods; Different types of corrosion (Pitting, Stress, Intergranular and

Galvanic), protection against corrosion, design and selection of engineering materials, cathodic and anodic protection, Brief discussion about Protective Coatings: Metallic, Inorganic, Organic coatings, Corrosion inhibitors.

Text Books :

1. Text Book of Engineering Chemistry, S. S. Dara, S. Chand and Company Ltd., New Delhi.
2. Textbook of Engineering Chemistry, P. C. Jain and Monica Jain, Dhanpat Rai and Sons, New Delhi.
3. Text Book of Environmental Chemistry and Pollution Control, S. S. Dara; S. Chand and Company Ltd., New Delhi.
4. Textbook of Engineering Chemistry, S. N. Narkhede, R. T. Jadhav, A. B. Bhake, A. U. Zadgaonkar, Das Ganu Prakashan, Nagpur.
5. Applied Chemistry, A. V. Bharati and Walekar, Tech Max Publications, Pune.
6. Engineering Chemistry, Arty Dixit, Dr. Kirtiwardhan Dixit, Harivansh Prakashan, Chandrapur.

Reference Books :

1. Engineering Chemistry by Gyngell, McGraw Hill Publishing Company, New Delhi.
2. Engineering Chemistry (Vol I), Rajaram and Curiacose, Tata McGraw Hill Publishing Company, New Delhi.
3. Engineering Chemistry (Vol II), Rajaram and Curiacose, Tata McGraw Hill Publishing Company, New Delhi.
4. Engineering Chemistry, Saraswat and Thakur, Vikas Publication, New Delhi.
5. Engineering Chemistry, B. S. Sivasankar, Tata Mcgraw Hill Publishing Company, New Delhi.
6. Engineering Chemistry, O. G. Palan, Tata Mcgraw Hill Publishing Company, New Delhi.
7. Engineering Chemistry, R. Shivakumar, Tata Mcgraw Hill Publishing Company, New Delhi.
8. Chemistry of Cement, J. D. Lee, Mcgraw Hill Publishing Company, New Delhi.
9. Nanomaterials Chemistry, C. N. R. Rao, A. Muller, A. K. Cheetam, Wiley VCH verlag GmbH and Company, Weinheim.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code : CHP101 **Course: Engineering Chemistry Lab**

L:0 Hr., T:0Hrs., P:3 Hrs., Per week **Total Credits : 03**

Minimum of **Eight** practicals will be performed based on the theory.

Text Books :

1. Text Book on Experiments and Calculations in Engineering Chemistry: S. S. Dara; S. Chand and Company Ltd., New Delhi.
2. Practical Engineering Chemistry: S. N. Narkhede, R. T. Jadhav, A. B. Bhake, A. U. Zadgaonkar, Das Ganu Prakashan, Nagpur.

Reference Books :

1. Concise Laboratory Manual in Engineering Chemistry: R. Shivakumarand J. Prakasan, Tata McGraw Hill Publishing Company, New Delhi.

Syllabus of Group 1 - Semester II and Group 2 - Semester I, Bachelor of Engineering

Course Code: CET101 **Course: Engineering Mechanics**

L:3 Hr., T:1 Hrs., P:0 Hrs., Per week **Total Credits : 07**

Course Outcomes

After Completion of the course in Engineering Mechanics, the student should be able to

1. Define and Describe the various parameter related to statics and dynamics behaviour of the rigid bodies.
2. Understand and describe physical phenomenon with the help of various theories.
3. Explain and analyse various physical phenomenon with the help of diagrams.
4. Describe and analyse the engineering problems with the acquired knowledge of engineering mechanics

Syllabus

Unit-I:

Fundamental of Engineering Mechanics:

Fundamentals of Engineering Mechanics, axiom's of mechanics, resultant of concurrent force system. Moment of a force, couples, resultant of non-concurrent force system

Unit-II:

Equilibrium of Force System :

Equilibrium of concurrent force system, Equilibrium of non-concurrent force system Friction: Law's of friction, simple application, wedge friction, belt friction.

Unit-III:

3-D Force system & Analysis of trusses :

Moment of a force about a point and about an axis, resultant of spatial concurrent & Non concurrent force system, wrench, equilibrium of concurrent and non-concurrent force system. Analysis of simple trusses (Joint & Section Method)

Unit-IV:

Centroids and moment of inertia :

Centroids locating by first principle, centroid of composite areas, Second moment and product of inertia of plane areas. Moment of Inertia of composite areas. Transfer theorems for moment of Inertia and Product of Inertia.

Virtual work method

Virtual work principle, application of virtual work principle.

Unit-V

Kinematics & Kinetics of Particles :

Rectilinear motion of a particle with variable acceleration, Projectile motion, normal and tangential components of acceleration, kinetics of particle and several interconnected particles. D'Alembert's principle, problems on connected system of particles.

Unit-VI:

Collision of elastic bodies:

Principle of conservation of momentum, Impulse momentum equation, work energy equation, coefficient of restitution, impact of elastic bodies.

Text Books:

1. Engineering Mechanics: F. L. Singer Harper & Row Publications.
2. Fundamentals of Engineering Mechanics : A.K. Sharma, Sai Publications.
3. Engineering Mechanics :A.K.Tayal, Umesh Publications, New Delhi.
4. Engineering Mechanics : P.B. Kulkarni, Professional Publications.

Reference Books:

1. Engineering Mechanics: Timoshenko & Young, Tata McGraw Hill Publications, New Delhi.
2. Engineering Mechanics: Bear and Johnston, Tata McGraw Hill Publications, New Delhi.
3. Engineering Mechanics: I. H. Shames, Phi Pvt. Ltd., India.

Syllabus of Group 1 - Semester II and Group 2 - Semester I, Bachelor of Engineering

Course Code : CEP101 **Course : Engineering Mechanics Lab**

L:0 Hr., T:0Hrs., P:2 Hrs., Per week **Total Credits : 02**

Course Outcome

After Completion of the course in Engineering Mechanics Practical, the student should be able to

1. Define and explain different terminologies of simple lifting machines.
2. Understand and perform practicals on equilibrium of concurrent and non-concurrent force systems.
3. Describe various terminologies related to friction and mass moment of inertia.
4. Explain graphical solutions of equilibrium conditions in engineering mechanics.
5. Analyse the experimental data collected based on practicals and discuss the results.

Minimum of Eight Practical will be performed based on the theory

List of Experiment

Experiments On"Simple Lifting Machines"

1. Law of machine for Differential Axle and Wheel
2. Law of machine for Single Purchase Crab
3. Law of machine for Double Purchse Crab

Experiments On"Equilibrium of force systems"

4. Jib Crane (Equilibrium of concurrent Forces)
5. Simple Beam (Equilibrium of Non-concurrent Forces)
6. Shear Leg Apparatus(Equilibrium of 3-D concurrent forces)

Experiments On"Friction & Inertia"

7. Inclined Plane (Coefficient of friction using Inclined Plane)
8. Belt Friction(Coefficient of friction using coil friction set-up)
9. Fly-Wheel (Mass moment of Inertia of fly-wheel)

Graphical Methods in Engineering Mechanics

10. Resultant of concurrent force systems
11. Resultant of Non-concurrent force system
12. Reactions for simply supported beams
13. Forces in members of simple Trusses
14. Moment of Inertia (Mohr's Circle)

Syllabus of Group 1- Semester II & Group 2- Semester I, Bachelor of Engineering

Course Code: MET101 **Course : Engineering Drawing**

L: 3 Hrs. T: 0 Hrs. P: 0 Hrs. Per week **Total Credits: 06**

Course Outcomes : The expected learning outcome is that, the students shall be able to :

1. Draw & interpret technical drawings.
2. Convert 2-D drawing to 3-D drawing & vice-versa.
3. Represent the various positions of planes & solids in different orientations.
4. Develop the solid surface for sheet metal working.

Syllabus (Only First Angle Method of Projection)

UNIT 1

Introduction: Lines, Lettering & Dimensioning, Preparation of Sheet Layout.
Scales - Plain Scale, Diagonal Scale, Vernier Scale.
Engineering Curves; Ellipse: Directrix Focus, Concentric Circles & Rectangle Method.
Parabola: Directrix Focus, Rectangle Method, Tangent Method.
Hyperbola: Directrix Focus & Asymptote Method.

UNIT 2

Theory of Projections - Concept of Projection, First & Third angle projection methods.
Orthographic Projections: Conversion of given 3 dimensional View to 2 dimensional representation.

UNIT 3

Projections of Lines: Oblique Lines, Traces. Applications of lines.

UNIT 4

Projections of Planes - Polygonal Lamina, Circular Lamina.
Projections of Solids- Cube, Prism, Pyramid, Tetrahedron, Cylinder, Cone.

UNIT 5

Sections of Solids & Development of Lateral Surfaces- Cube, Prism, Pyramid, Tetrahedron, Cylinder, Cone.

UNIT 6

Isometric Projections: Isometric Scale, Conversion of given 2 dimensional views to Isometric Projection/View.

Books:

1. Engineering Drawing by N.D. Bhatt, Charotar Publishing House Pvt. Ltd.
2. Engineering Drawing by D. A. Jolhe, Tata McGraw Hill Publications
3. Engineering Graphics by H. G. Phakatkar, Nirali Publication.
4. Engineering Graphics by A. R. Bapat, Allied Publishers

References:

1. Engineering Drawing by R.K. Dhawan, S. Chand Publications
2. Engineering Drawing by K.L. Narayana & P. Kannaiah, SciTech Publication.

Syllabus of Group 1- Semester II & Group 2- Semester I, Bachelor of Engineering

Course Code: MEP101 **Course: Engineering Drawing Lab**

L: 0 Hrs. T: 0 Hrs. P: 3 Hrs. Per week **Total Credits: 03**

Course Outcome : The expected learning outcome is that, the students shall be able to:

1. Draw & interpret technical drawings.
2. Plan the sheet layout for the given drawing.
3. Convert 2-D drawing to 3-D drawing & vice-versa.
4. Represent the various positions of planes & solids in different orientations.
5. Develop the solid surface for sheet metal working.
6. Use & demonstrate drafting package.

List of Sheets: (50% of the sheets to be drawn in Auto CAD)

Sheet No.1: Engineering Scales & Curves

Sheet No.2: Orthographic Projections

Sheet No.3: Projection of Lines

Sheet No.4: Application of Lines

Sheet No.5: Projection of Planes

Sheet No.6: Projection of Solids

Sheet No.7: Section & Development of Solids

Sheet No.8: Isometric Projections

Books:

1. Engineering Drawing by N.D. Bhatt, Charotar Publishing House Pvt. Ltd.
2. Engineering Drawing by D. A. Jolhe, Tata McGraw Hill Publications
3. Engineering Graphics by H. G. Phakatkar, Nirali Publication.
4. Engineering Graphics by A. R. Bapat, Allied Publishers

References:

1. Engineering Drawing by R.K. Dhawan, S. Chand Publications
2. Engineering Drawing by K.L. Narayana & P. Kannaiah, SciTech Publication.
3. AutoCAD 14 for Engineering Drawing by P. Nageshwara Rao, Tata McGraw Hill Publications

Syllabus of Group 1- Semester II and Group 2-Semester I, Bachelor of Engineering

Course Code: HUT102 **Course:-Social Skills**

L:2 Hrs.,T:0Hrs.,P:0Hrs.,Per week **Total Credits:4**

Course Outcomes

On successful completion of the course, students will be able to

1. Learn the basic concepts of personnel management or manpower planning and the process of recruitment and selection that they will go through as engineers.
2. Learn leadership skills, industrial relations, work organizations, and impact of industry on society.
3. Learn about the political systems and institutions working in India, laws and legislations affecting industry and the application of political principles like democracy in industry.
4. Learn the importance and application of Economics in Engineering.
5. Learn about culture/civilization and develop cross cultural capacity.
6. Learn about Personal, Professional and social ethics.

Syllabus

Unit-I:

Industrial Sociology:-

- Meaning and scope of Industrial Sociology
- Work Organization and its types.
- Concept of Leadership: Meaning, changing roles and its types.
- Concept of Power and Authority: Meaning, Importance, sources and Delegation
- Industrial Culture in India: Effects of Industrialization and Urbanization on Indian Society.

Unit-II:

Industrial Psychology:-

- Meaning and scope of Industrial Psychology
- Recruitment, Selection and Training
- Industrial fatigue
- Motivation, Theories of motivation: Maslow's Need Priority Theory, Macgregor's X And Y Theory, McClelland's Needs Theory
- Dealing with Self: Stress, health, and coping; interpersonal relationships; gender roles; environmental adjustments.

Unit-III:

Political Orientation:-

- Indian Constitution, features and federal structure.
- Fundamental rights
- Directive principles of state policy
- Industrial Democracy.
- Role of Bureaucracy in Modern Democratic states.

Unit-IV:

Economics:-

- Development of Indian Economy
- Infrastructure in the Indian Economy: Energy, power, transport system, road transport system, Rail-Road co ordination, water transport, Civil aviation, communication system, urban infrastructure, science and technology, private investment in infrastructure.
- Role of Public and Private sector in Indian Economy.
- Challenges before Indian Economy in 21st Century.
  Poverty, Unemployment, Corruption, Regional Imbalance, Growth of educational sector.

Unit-V:

Culture and Civilization:-

- Concept of Culture and Civilization.
- Study of engineering skills with special reference to Egyptian and Indus Valley Civilization.
- Role of Engineers as agent of change with specific reference to change in Indian Society during 20th and 21st century.
- Multiculturalism: Meaning, scope and significance especially in Indian context.

Unit-VI:

Ethics and social responsibility:-

- Personal and professional ethics
- Corporate social responsibility
- Social capital, social audit.
- Role of entrepreneurship in nation building.
- Developing scientific and humanitarian outlook for the welfare of nation and society.

Text Books :

1. Social & Human Skills by Dr. Vinod Asudani & Dr. Monika Seth.
2. RuddarDatt and K.P.M.Sundharam, (67th Revised edition-2013), Indian Economy, S .Chand and Company Ltd, New Delhi.
3. Edmund G. Seebauer and Robert L Barry (2010 reprint) Fundamental of Ethics for Scientists and Engineers, Oxford University Press.

Reference Books:

1. P.C. Tripathi and P.N. Reddy, Principles of Management, (4th edition, 2008), Tata MacGraw Hill Publishing Co. Ltd., New Delhi
2. Martand.T. Telsang, Industrial and Business Management, (2001), S.Chand and Co. Ltd. New Delhi
3. Dr. V.H. Asudani: An Easy Approach To Social Science, (3rd edition, 2008), Astha Publication, Nagpur
4. Tariq Modood, Multiculturalism (Themes for 21st Century Series)(1st Publication 2007), Polity Press, Cambridge, U.K. ISBN-13:97807456-3288-9.

Syllabus of Groups 1- Semester II and Group 2 – Semester I, Bachelor of Engineering

Course Code : INP102 **Course: Workshop**

L: 0 Hr., T: 0 Hrs., Per week **Total Credits : 02**

Course Objectives :

To impart practical training (hands-on experience) regarding use and operations of various tools, equipment and machine with basic knowledge of manufacturing process and materials.

Course Outcomes :

1. Student will be able to read job drawing, identity and select proper material, tools, equipments and process / machines for manufacturing the required job.
2. Student will be use basic marking and measuring instruments to inspect the job for confirming desired dimensions and shape.
3. Student will be able observe and follow precaution during operation.

List of Experiments :

SHOP	No. of Experiments /Jobs
Fitting Shop	1. Introduction of fitting tools, equipments, machines, material & processes.
	2. Manufacturing & fitting practice for various joints & assembly.
	3. Drilling tapping & pipe threading operations.
Carpentry Shop	1. Introduction of carpentry tools, equipments, machines, material & processes.
	2. Manufacturing of carpentry joints.
	3. Turning practice on wood working lathe.
	4. Demonstration & practice on universal wood working machine.
Welding Shop	1. Introduction of welding tools, equipments, machines, material & processes.
	2. Fabrication of joints like lap, butt, corner, T etc.
	3. Fabrication of lap joint by spot welding process.
Smithy Shop	1. Introduction of smithy tools, equipments, machines, material & processes.
	2. Forging of combine circular/square/hexagonal cross section.

Text Books :

1. Elements of workshop technology vol -1 by Hajra Choudhari
2. Elements of workshop technology vol -1 by Raghuwanshi ma

Reference Book:

1. Workshop manuals
2. Manufacturing technology by P.C. Sharma
3. Workshop manuals by Kannaiah Narayan

III SEMESTER

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code:MAT202 **Course : Engineering Mathematics-III**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits:07**

Course Outcomes :

On Successful completion of course, students will be able to:

1. Understand Matrices and numerical methods to solve system of equations and Differential equations.
2. Form mathematical model corresponding to engineering problems, solve these problem and analyze its physical and graphical interpretation.
3. Understand Probability Theory and use it for analysis of data.
4. Use Z-Transform to solve difference equations.

Syllabus :

Unit I:

Matrices: Rank of matrix, consistency of system of equations. Linear dependence, Linear and orthogonal transformations, Characteristics equations, Eigen values and Eigen vectors. Reduction to diagonal form, Cayley-Hamilton theorem, Sylvester's theorem, determination of largest Eigen values and Eigen vector by iteration method.

Unit II:

Numerical Methods: Errors in numerical calculations, errors in series approximation. Rounding off errors, solution of algebraic and transcendental equations; Iteration method, False position method, Newton Raphson method and their convergence; Solution of system of linear equations, Gauss Seidal method, Crout's method; Numerical solution of ordinary differential equation by Taylor's series method, Euler modified method, Runge Kutta method

Unit III

Z-Transform: Definition and properties of Z- Transform, Inverse Z-transform Application of Z-transform to solve difference equations with constant coefficient.

Unit IV

Random Variable and Probability distribution: Random Variables: Discrete and continuous, Probability density function, probability distribution function for Discrete and continuous random variables, joint distributions.

Unit V

Mathematical expectations: Mathematical expectations, variance and standard deviation, moment generating function, other measures of central tendency and dispersion, skewness and kurtosis.

Unit VI

Probability distribution: Bernoulli distribution, Poisson distribution, relation between Binomial and Poisson distribution, Normal distribution, relation between Binomial and normal distribution; the central limit theorem, exponential distribution

Text Books:

1. M.R.Spiegal; Theory and problems of Probability and statistics; McGraw Hill Schaum Series, 2003.
2. B. S. Grewal; Higher Engineering Mathematics; Khanna Publishers Delhi (India).
3. S. S. Sashtry; Introductory Numerial Analysis; 4th Edition; *PHI* Learning Pvt. Ltd., 2005

Reference Books:

1. Erwin Kreyszig; Advanced Engineering Mathematics; 8th Edition; Wiley, India, Delhi.
2. R. K. *Jain* and S. R. K. *Iyengar; Advanced Engineering Mathematics;* 3rd *Edition*; *Narosa Publication* House; 2008.
3. *S.C. Gupta, V.K. Kapoor;* Fundamentals of Mathematical Statistics; Edition 10; Sultan Chand Publication, 2000.

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code : CST213 **Course : Data Structure and Program Design**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On Successful completion of course, students will be able to:

1. Understand memory representation and implementation of various data structures such as stacks, queues, linked list, trees and graphs.
2. Demonstrate different methods for traversing trees and graphs.
3. Design and implement an appropriate hashing function for an application.
4. Recognize and implement standard algorithm for searching and sorting based on requirement.

Syllabus:

Unit I:

General concepts and linear data structures: Abstract data structures, properties and operations, Time and space analysis of algorithms, Big oh and theta notations and omega notations, Average, best and worst case analysis, Representation of Arrays -Single and Multi dimensional, Address calculation, Representation of Stacks and queues using arrays – Circular queues, Priority Queues, De-queue, Application of stacks, Multiple stacks

Unit II:

Linked list: Linked Lists, Singly linked list, Implementation of linked list using static and dynamic memory allocation-dynamic memory allocation, circular linked list, doubly linked list, generalized list, operations on lists, linked stacks and queues

Unit III:

Trees: General and binary trees, Representations and traversals, General trees as binary trees, Binary search trees, Applications, The concept of balancing and its advantages, B-Trees, B+ Trees, AVL Trees, Threaded Binary Trees.

Unit IV:

Hashing: Hash functions, Collision resolution, Expected behavior, Applications

Unit V:

Graphs and digraphs: Representations and traversals, Connectivity algorithms, shortest path, Minimal spanning tree.

Unit VI:

Sorting: Elementary sorts: selection, insertion, bubble sort, shell sort, Radix sort, Quick sort, merge sort, heap sort, Bucket sorting, External sorting, Worst case and average behavior, Lower bound for sorting using comparisons

Text/Reference books:

1. Robert Kruse, Bruce Leung; Data structures and Program Design in C; Pearson Education, 2007.
2. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed; Fundamentals of Data Structures in C; 2nd edition; Silicon Press; 2008.
3. Langsam, Augenstein and Tenenbaum; Data Structures using C and C++; PHI Publications; 1995.
4. D. Sanantha; Classic Data Structure; PHI Publications; 2004.

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code : CSP213 **Course : Data Structure and Program Design Lab**

L:0 Hrs, T: 0 Hr, P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes:

On Successful completion of course, students will be able to:

1. Implement programs on linear data structures like stack, queues.
2. Apply dynamic memory allocation techniques for creation of linked list and perform various operations on it
3. Implement nonlinear data structure like graphs and trees.
4. Apply various sorting algorithms.

Practicals based on above CST213 syllabus

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code:CST214 **Course : Digital Circuits & Fundamentals of Microprocessors**

L : 3 Hrs, T : 1 Hr, P : 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes:

On Successful completion of course, students will be able to:

1. Understanding of various optimization techniques used to minimize and design digital circuits.
2. Analyze and design various combinational logic circuits.
3. Analyze and design various sequential circuits.
4. Design different microprocessor based components of computer system using combinational and sequential circuits.

Syllabus:

Unit I:

Motivation for digital systems: Logic and Boolean algebra, Number Systems. Logic Gates & Truth Tables, De-Morgan's law, Minimization of combinational circuits using Karnaugh maps upto five variables. Map manipulation-essential prime implicants, non essential prime implicants.

Unit II:

Design procedure: Multiplexers, Demultiplexer, Encoders, Decoders, Code Converters, Adders, Subtractor (Half, Full), BCD Adder/ Subtractor , ripple and carry look-ahead addition.

Unit III:

Storage elements, Flip-flops and latches: D, T, J/K, S/R flip-flops. Master Slave Conversion of one of type of F/F to another Sequential circuit. Analysis –Input equations, state table, analysis with J-K Flip flops. Sequential circuit Design, Design procedure, Designing with D & J-K Flip flop.

Unit IV:

Counters, asynchronous and synchronous design using state and excitation tables, Registers and Shift registers.

Unit V:

Memory & Programmable logic Devices: RAM, Array of RAM IC's, Read only Memory, PLA, PAL, Flash Memories

Unit VI:

Introduction to μp 8085, Addressing modes, Instruction set, Programming of μp 8085.

Text Books :

1. *Morris Mano*; Digital Logic Design; Fourth edition, McGraw Hill
2. R.P.Jain; Modern Digital Electronic; Fourth edition; Tata McGraw-Hill.
3. V.J.Vibhute; 8-Bit Microprocessor & Microcontrollers; fifth edition.

Reference books :

1. A. Anand Kumar; Fundamental of Digital Electronics; Second Edition, PHI
2. A.P.Godse; Digital circuit & design; Technical Publications; 2009.
3. Ramesh Gaonkar; 8 bit Microprocessor; CBS Publishers; 2011.

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code: CSP214 **Course : Digital Circuits & Fundamentals of Microprocessors Lab**

L:0 Hrs, T: 0 Hr, P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcome

On Successful completion of course, students will be able to:

1. Use logic gates for designing a digital circuits
2. Implement combinational circuits using VHDL
3. Implement sequential circuits using VHDL
4. Apply the knowledge gained for their project work based on the hardware digital circuits

Practicals based on above CST214 syllabus

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code : CST215 **Course : Computer Architecture & Organization**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On Successful completion of course, students will be able to:

1. Understand the basic components of a computer, including CPU, memories, and input/output, and their organization.
2. Understand the cost performance tradeoff in designing memory hierarchy and instruction sets.
3. Understand the execution of complete instruction and design of control unit.
4. Perform mathematical operations on arithmetic and floating point numbers.

Syllabus :

Unit I :

Basic Structure Of Computers : Functional units of computer. Instructions set architecture of a CPU-Instruction sequencing, Addressing modes, instruction set classification, subroutine & parameter passing, expanding opcode.

Unit II :

Basic Processing Unit : Bus architecture, Execution of a Complete Instruction, sequencing of control signals, Hardwired control, Micro-programmed Control.

Unit III :

Data Representation : signed number representations and their operations, Computer arithmetic – integer addition and subtraction, design of Fast Adders, Multiplication- shift and add, booth's Algorithm, bit-pair recoding, Integer Division- restoring and non-restoring division. Floating point numbers-representation, arithmetic, guard bits and rounding.

Unit IV:

Memory System Design : Semiconductor RAM memories, ROM, higher order memory design, multi-module memories, Secondary storage – Magnetic disk, Optical disk.

Unit V :

Memory Organization : Memory interleaving, concept of hierarchical memory, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policy, Virtual Memory.

Pipelining : Basic concepts of pipelining, throughput and speedup.

Unit VI :

Input/Output Organization : I/O mapped I/O and memory mapped I/O, interrupts and interrupt handling mechanisms, vectored interrupts, synchronous vs. asynchronous data transfer, Direct Memory Access

Text Books :

1. V.C.Hamacher, Z.G.Vranesic and S.G.Zaky; Computer Organisation; 5th edition; Tata McGraw Hill, 2002.
2. W. Stallings; Computer Organization & Architecture; PHI publication; 2001.
3. J. P. Hayes; Computer Architecture & Organization; 3rd edition; McGraw-Hill; 1998.

Reference books :

1. M Mano; Computer System and Architecture; PHI publication; 1993.
2. A.S.Tanenbaum; Structured Computer Organization; Prentice Hall of India Ltd.

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code : CSP216 **Course : Advanced Programming Lab**

L:0 Hrs, T: 0 Hr, P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Use files for storage and retrieval of voluminous data.
2. Apply IPC routines to implement client-server model.
3. Demonstrate Object-Oriented Programming concepts and techniques.
4. Write good program documentation.

Syllabus :

Practical to be based on following topics:

Pointers, Structures and Unions in C.

File processing in C; Socket programming and Inter Process Communication in C.

C++ pointers, address arithmetic, array pointers, references, passing addresses; Classes, objects, and User defined types; Constructors and Destructors; Function Overloading and Overriding; Friend Functions and Friend classes; Operator Polymorphism;Inheritance – multiple and multilevel.

Text books :

1. Brian Kernighan and Dennis Ritchie, The C Programming Language, 2nd Edition, Prentice Hall; 1988.
2. Linux Manual pages, GCC and G++ documentation.
3. Venugopal, Mastering C, Tata McGraw Hill, 2006.
4. Venugopal, Rajkumar and Ravishankar, Mastering C++, Tata McGraw Hill, 2006.
5. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill, 2008.

References :

1. Paul J Deitel and Harvey MDeitel, C How to Program, Prentice Hall, 2010.
2. Paul J Deitel and Harvey M Deitel, C++ How to Program, Prentice Hall, 2010.

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code : CSP217 **Course : Computer Workshop-I Lab**

L:0 Hrs,T: 0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes:

On Successful completion of course, students will be able to:

1. Learn and understand the installation and configuration of a Linux system
2. Use LINUX as a programming platform for 'C' Language.
3. Write scripts to automate tasks
4. Understand the integration of Linux with other operating environments

Syllabus:

Practical to be based on following topics:

1. Study of Unix/Linux general purpose utility commands, Study of vi editor, Study of Unix/Linux file system
2. "C" Programming with Linux
3. Introduction to using different tools for identification of possible errors in C program –gdb, concepts of "core dump", backtracing using "bt", using "info" to dump all registers, creating watch-list / watch variables.
4. Implementation of Shell Scripts – User Oriented Scripts & System Oriented Scripts
5. Implementation of AWK Scripts and Perl Scripts
6. Developing utilities using:
   a. VirtualBox (VMWare) on a PC having other operating system.
   b. Cygwin on a PC having other operating system.
   c. Unix/Linux packages.
7. Networking basic of Linux Operating System
   a. Connecting two computing devices using Linux
   b. Sharing of files and folders
   c. Handling access and generation of log reports
   d. Security basic on Linux Operating System
8. Desktop Hardware basics
   a. Assembly process of Desktop
   b. Functionality of various components
   c. Comparative study of various hardware configuration of Intel, AMD etc.
   d. Basics of Memory Management

Text Books :

1. John Goerzen : Linux Programming Bible, IDG Books,New Delhi,2000
2. Welsh & Kanufmann: Running Linux,O'Reiley & Associates,2000
3. Yeshwant Kanetkar; Unix Shell programming; BPB Publications; 2002.
4. Let us C, Kanetkar, BPB Pub.

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code : HUT201 **Course : Technical Communication**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes:

On Successful completion of course, students will be able to:

1. Understand the importance and objectives of technical communication and would develop understanding to effectively practice ethical principles of communication
2. Understand the role of audience in effective communication
3. Develop skills to carry out research, and to produce effective research and workplace documents.
4. Develop skills to enhance visual appeal of documents and learn basic grammar rules/ mechanism to bring accuracy in writing.
5. Develop skills that would make them effective communicators during and after their placement.

Syllabus :

Unit I :

Introduction : Defining technical communication, Objectives of technical communication, Promoting the product, Audience recognition and involvement.

Unit II :

Business Correspondence : Memos, Letters, Reports, Job search.

Unit III :

Preparation of Documents : Visual appeal: Document design, graphics, tables, User manual.

Unit IV :

Orientation in Research : Preparation of abstract, writing proposals, writing articles for journals, preparing papers for conferences.

Unit V :

Presentation Skills : Effective professional presentations, Interviews, Group discussions,

Negotiation strategies.

Unit VI :

Functional Grammar : Punctuations, Mechanics, Spellings, Parts of speech, Use of articles, Uses of prepositions/prepositional phrases, Modals, Tenses- active/passive forms, Concord, Transformation of sentences.

Text Books :

1. S. J. Gerson and S. M. Gerson; Technical Writing: Process and Product; 5th Edition; Pearson Education Inc., 2006.

Reference Books :

1. A. J. Rutherford, Dorling Kindersley; Basic Communication Skills for Technology; Second Edition, Pearson Education, 2001.
1. Rizvi. M. Ashraf; Effective Technical Communication; Tata McGraw-Hill Publishing Company Limited, India 2005.
2. Sanjay Kumar and Pushpa Lata; Communication Skills; Oxford University Press 2011.

Syllabus for Semester III, B. E. (Computer Science & Engineering)

Course Code : CHT201 **Course : Environmental Studies-I**

L:2 Hrs, T: 0 Hr, P: 0 Hrs, Per Week **Total Credits: 00**

Course Outcomes :

On Successful completion of course, students will be able to:

1. Exhibit role of Environmental Engineering science to protect the mother earth and environment and acquire knowledge about the multidisciplinary approach of environmental studies with Chemical sciences, Biological science, Zoological sciences.
2. Analyze different Renewable and Non renewable natural sources. Also try to restrict the over utilization of Natural resources.
3. Differentiate between biodiversity at local and national level.
4. Observe the ecosystem present in the surrounding area and try to analyze their functioning.

Syllabus :

Unit I :

Multidisciplinary Nature of Environmental Studies : Definition, scope and importance; Need for public awareness, People in environment, Institutions in environments.

Unit II :

Natural Resources Renewable and Non-renewable Resources : Natural resources and associated problems. (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. (e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources; Case studies. (f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification; Role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles.

Unit III :

Ecosystems : Concept of an ecosystem; Structure and function of an ecosystem; Producers, consumers, and decomposers; Energy flow in the ecosystem; Ecological succession; Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem (Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems i. e. ponds, streams, lakes, rivers, oceans, estuaries)

Unit IV :

Biodiversity and its Conservation : Introduction – Definition: genetic, species and ecosystem diversity; Bio-geographical classification of India; Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values; Biodiversity at global, National and local levels; India as a mega-diversity nation; Hot-sports of biodiversity; Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; Endangered and endemic species of India; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Text Books :

1. N. W. Ingole, D. M. Dharmadhikari, S.S.Patil; Environmental Chemistry and Pollution Control; Das Ganu Prakashan, Nagpur.
2. K. Bhute, et.al; Enironmental Chemistry; Celebration Infomedia, India.
3. Environmental studies by Erach Bharucha, University press.
4. Perspectives in environmental studies, Anubha Kaushik, C.P. Kaushik, New age International publishers.

IV SEMESTER

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code : MAT245 **Course : Discrete Mathematics and Graph Theory**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Analyze discrete data structure such as sets, relations, and mathematical logic.
2. Understands Algebraic Structures.
3. Derive formulas using recurrence relations and generating functions applied to sets of objects.

Syllabus :

Unit I :

Relation and Function : Basic concepts of Set theory, Power set, some operations on Sets, Venn diagram, some basic set identities, Cartesian products. Properties of binary relation in a set, Relation matrix and the graph of the relation, Partition and covering of a set. Equivalence relations, Compatibility relations Compositions of binary relations. Definition and composition of functions, inverse functions and characteristic functions of a set.

Unit II :

Mathematical Logic : Statement and notations, connectives, Negation, conjunction, disjunction, conditional & bi-conditional, statement formulas & truth tables. Tautologies, equivalence of formulas, Duality law, Tautological implications. Normal Forms – Principal disjunctive and principal conjunctive normal forms. Theory of inference for statement calculus. Theory of inference for predicate calculus.

Unit III :

Algebraic structures : Semi groups, monoids – (definition and examples), Group definitions and examples, cyclic group, permutation groups, subgroups and homomorphism, co-sets and Lagrange's theorem and Normal subgroup.

Unit IV :

Rings and field : Ring (definition and examples), sub rings, Ring homomorphism, ideals and Quotient rings, polynomial rings. Finite field, Galois field, Integral domain.

Unit V :

Lattice theory and Boolean Algebra : Lattices as partially ordered set, Definitions and examples, some properties of Lattices, Lattices as algebraic system, sub lattices, direct product, homomorphism, some special Lattices. Boolean algebra: Definitions and examples, Application of Boolean Algebra to switching circuits.

Unit VI :

Advanced counting Techniques : Pigeonhole principle, Generating functions, Binomial identities using generating functions, Solutions of Recurrence relations using generating functions.

Text Books :

1. J. P.Tremblay and R. Manohar; Discrete Mathematical Structures with Applications to Computer Science; Tata McGraw-hill Publication 1997.
2. Babu Ram; Discrete Mathematics; Pearson Education, 2011.
3. C.L. Liv and D.P. Mohapatra, Combinatorial Mathematics, 3rd edition Tata Mc Graw - Hill.

Reference Books :

1. K. D. Joshi; Foundations of Discrete Mathematics; New Age International Publication 1989.
2. Kolman, Busby & Ross; Discrete Mathematics; Pearson Publication 2003.

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code : CST218 **Course : Object Oriented Programming**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits:09**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Understand the principles of object-oriented programming, create classes, instantiate objects, invoke methods and use exception handling mechanism.
2. Understand concept of generics and collection classes.
3. Handle character and byte streams, implement threads and perform various operations on threads.
4. Design User Interface, perform database and server connectivity.

Syllabus

Unit I :

Features of Object Oriented Programming languages like data encapsulation, inheritance, polymorphism and late binding. Concept of a class, Access control of members of a class, instantiating a class, constructor and method overloading.

Unit II :

Concept of inheritance, methods of derivation, use of super keyword and final keyword in inheritance, run time polymorphism. Abstract classes and methods, interface, implementation of interface, creating packages, importing packages, static and non-static members.

Unit III :

Exceptions, types of exception, use of try catch block, handling multiple exceptions, using finally, throw and throws clause, user defined exceptions, Generics, generic class with two type parameter, bounded generics, Collection classes: Arrays, Vectors, Array list, Linked list, Hash set, Queues, Trees.

Unit IV :

Introduction to streams, byte streams, character streams, file handling in Java, Serialization Multithreading: Java Thread models, creating thread using runnable interface and extending Thread, thread priorities, Thread Synchronization, InterThread communications.

Unit V:

Swing Components and Containers, JLabel, JTextField, JList, JCombobox, Swing Buttons (button, toggle button, checkbox, radio button), JTable, JTabbedPane Event handling mechanism, Event Classes, Event Listener interfaces, delegation event model, adapter classes.

Unit VI :

Java Database Connectivity, Working with Connection, Statement and ResultSet, Data Manipulation using JDBC, Data navigation. Servlet, Servlet API, Servlet Skeleton, Servelet Life Cycle.

Text Books :

1. Herbert Schildt; JAVA The Complete Reference; Seventh Edition, Tata McGraw- Hill Publishing Company Limited 2007.
2. Cay S. Horstmann and Gary Cornell; Core JAVA Volume-II Advanced Features; Eighth Edition; Prentice Hall, Sun Microsystems Press 2008.

Reference Books :

1. Herbert Schildt and Dale Skrien; Java Fundamentals A Comprehensive Introduction; Tata McGraw- Hill Education Private Ltd 2013.
2. Cay S. Horstmann and Gary Cornell; Core JAVA Volume-II Advanced Features; Eighth Edition; Prentice Hall, Sun Microsystems Press 2008.
3. C Xavier; Java Programming: A Practical Approach; Tata McGraw- Hill Education Private Ltd 2011.

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code:CSP218 **Course : Object Oriented Programming Lab**

L:0 Hrs,T:0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes

On successful completion of the course, students will be able to:

1. Implement programs using classes, objects, inheritance with proper exception handling techniques.
2. Implement programs based on streams and threads.
3. Design user interface and perform database connectivity.

Practicals based on above CST218 syllabus

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code : CST219 **Course : Operating Systems**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to demonstrate:

1. Ability to describe the general architecture of computers, Contrast and compare differing structures for operating systems.
2. Ability to understand and analyze theory and implementation of processes and schedulers.
3. Ability to understand and design resource control (synchronization and deadlock).
4. Ability to apply knowledge of physical and virtual memory, scheduling, I/O and files.

Syllabus :

Unit I :

Introduction : Evolution of OS, Types of OS, Basic h/w support necessary for modern operating systems, services provided by OS, system programs and system calls, system design and implementation.

Unit II :

Scheduling : Process concept, Process control block, Types of scheduler, Context switch, Multithreading model, Goals of scheduling and different scheduling algorithms, Examples of WINDOWS Server & LINUX.

Unit III :

Process cooperation and synchronization : Concurrency conditions**,** Critical section problem, software and hardware solution, Semaphores, conditional critical regions and monitors, Classical Inter process Communication Problems.

Unit IV :

Deadlocks & Protection : Deadlock definition, Prevention, Avoidance, Detection and recovery, Goals of Protection, access matrix, implementation, Security problem.

Unit V :

Memory management : Contiguous allocation, Relocation, Paging, Segmentation, Segmentation with paging, Demand paging, Page faults and instruction restart, Page replacement algorithms, working sets, Locality, Thrashing.

Unit VI :

File systems : File concept, Access methods, Disk space management and space allocation strategies, Directory structures, Recovery, Log-structured File System, Disk arm scheduling strategies

Text Books :

1. Silberchatz and Galvin, Operating System concepts; 6th Edition; John Wiley and Sons, 2001.
2. Tanenbaum; Modern Operating Systems; 2nd Edition; PHI, 2001.

Reference Books :

1. Milan Milenkovik; Operating System; 2nd Edition; Tata McGraw Hill 1997.

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code : CSP219 **Course : Operating Systems Lab**

L:0 Hrs,T:0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes

On successful completion of the course, students will be able to demonstrate:

1. Ability to use LINUX system calls and implement system commands.
2. Ability to implement process and process schedulers.
3. Ability to design and implement solution to handle synchronization and deadlock.
4. Ability to implement memory and File management algorithms

Practical's based on above CST219 syllabus

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code : CST220 **Course : Theoretical Foundations of Computer Science**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Describe the formal relationships among machines, languages and grammars.
2. Design and Optimize finite automata for given regular language.
3. Design Push Down Automata, Turing Machine for given languages.
4. Demonstrate use of computability, decidability, recursive function theory through problem solving.

Syllabus :

Unit I :

Mathematical preliminaries : Sets, operations, relations, strings, closure of relation, countability and diagonalisation, induction and proof methods- pigeon-hole principle, concept of language, grammars and production rules, Chomsky hierarchy.

Unit II :

Finite State machine, regular languages, deterministic & non deterministic finite automata, conversion to deterministic automata, E-closures, minimization of automata, Moore and Mealy machine, regular expressions

Unit III :

Pumping lemma for regular sets, closure & decision properties for regular sets, equivalence between regular language and regular grammar, Context free languages, parse trees and ambiguity, reduction of CFGS, Normal forms for CFG.

Unit IV :

Push down Automata (PDA), non determinism, acceptance by two methods and their equivalence, conversion of PDA to CFG, CFG to PDAs, closure, and decision properties of CFLs

Unit V :

Turing machines, recursively enumerable set, recursive sets TM as computer of function, Halting Problem, reductions problem, Church's hypothesis, Linear bounded automata

Unit VI :

Decidability and solvability, Introduction to recursive function theory, Post correspondence Problem (PCP).

Text Books :

1. John C. Martin; Introduction to Languages and Theory of Computation; Third Edition; Tata McGraw Hill, 2009.
2. Hopcroft, Motwani & Ulman Introduction of Automata Theory, Languages and computation; 3rd Edition; Pearson Education, 2007
3. Michael Sipser; Introduction to Theory of Computation; 2nd Edition; Cengage Learning, 2012

Reference Books :

1. Mishra and Chandrashekharan; Theory of Computer Science; 3rd Edition; PHI, 2007
2. Peter Linz; Introduction to formal languages and Automata; 3rd Edition; 2001.

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code : CST221 **Course : Systems Programming**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand the purpose of system software such as assembler, macro-processor, linker, loader, device driver and compiler.
2. Apply general design procedure for designing various system software.
3. Understand the design of modern loading schemes.
4. Understand the use of various system utilities and tools.

Syllabus :

UNIT-I :

Assembler– Introduction to System Programming & its components, M/c Architecture, Basic Assembler functions, Machine dependent & Machine Independent Assembler Features, Assembler Design, design of single pass and multi pass Assembler.

UNIT-II :

Macroprocessor- Basic Macro Processor Functions, Machine Independent Macro Processor Features, Design of macro processor.

UNIT-III :

Linker and Loader- Basic Loader Functions, Concept of static and dynamic relocation, external symbols, Machine dependent & Machine Independent Loader Features, Loader Design Options.

UNIT-IV :

System Utilities- Source code control system, make utility, link editor, symbolic debugger, GNU Debugger, Pattern matching language awk.

UNIT-V :

UNIX Device Drivers- Definition, Anatomy and Types, Device Programming, Installation and Incorporation of driver routines, Basic device driver operation, Implementation with Line Printer, Comparative study between device drivers for UNIX & Windows.

UNIT-VI :

Compiler- Phases of Compilers, Machine dependent & Machine Independent Compiler Features, Compiler Design Options & Implementation, Study of LEX & YACC.

Text Books :

1. J. J. Donovan; System Programming; Tata McGraw Hill Education; 2011 reprint
2. George Pajari; UNIX Device Drivers; Pearson Education; 1993
3. AT&T Information Systems, The UNIX System Users's Manual, PHI, 1986.
4. Levine, Mason and Brown; UNIX programming Tools LEX and YACC; O'Reilly; 1992

Reference Books :

1. D. M. Dhamdhere; System Programming and Operating systems; Tata McGraw Hill Education; 2nd edition; 1999
2. Keringham and Pike; UNIX programming Environment; PHI, 1984.
3. Leland L. Beck; System Software: An introduction to systems programming; Pearson Education; 3rd edition; 1997
4. Aho and Ullman; Principles of Compiler Design; Narosa Publication, 1977.

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code : CSP222 **Course : Computer Workshop-II Lab**

L:0 Hrs,T:0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Develop static and dynamic web pages using HTML, XML and XHTML.
2. Implement web programs using Java Scripts and JSP Struts.
3. Demonstrate client and server side programming using PHP and PERL

Syllabus :

Practical to be based on following topics :

- Development of static web pages using HTML.
- Demonstration of CGI
- Validations of web pages using JavaScript
- XML Files and Document Type Definition (DTD) to validate the XML document.
- XHTML
- Program development using JSP Struts Framework
- Implementation of PHP language
- Implementation of Perl

Text Books :

1. Web design : A Beginner's Guide ; 2 e I MeGraw Hill Education, Wendy Willard; 2010
2. An Introduction to XML and Web Technologies; Anders Moller and Michael Schwartzbacb; Addison Wesley; 2006
3. Internet and world wide web how to program; s/e; Paul Dietel, Harvey Dietel and Abbey Dietel; PHS; 2012.

Syllabus for Semester IV, B. E. (Computer Science & Engineering)

Course Code : CHT202 **Course : Environmental Studies-II**

L:2 Hrs,T: 0 Hr,P: 0 Hrs, Per WeekTotal Credits:00

Course Outcomes:

On successful completion of the course, students will be able to:

1. Contribute to sustainable development.
2. Use knowledge about precautionary measures which are to be taken in different disaster like floods, earth quake, landslides.
3. Gain awareness about the different Environmental protection acts.
4. Learn about increase in population growth which is responsible for ecological degradation.

Syllabus

Unit I :

Environmental Pollution: Definition, Cause, effects and control measures of Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, and Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes; Role of an individual in prevention of pollution, Pollution case studies; Disaster management: floods, earthquake, cyclone and landslides.

Unit II :

Social Issues and the Environment: From Unsustainable to Sustainable development; Urban problems related to energy; Water conservation, rain water harvesting, watershed management; Resettlement and rehabilitation of people; its problems and concerns, Case Studies; Environmental ethics: Issues and possible solutions; Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case Studies; Wasteland reclamation; Consumerism and waste products; Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation; Public awareness.

Unit III :

Human Population and the Environment: Population growth, variation among nations, Population explosion – Family Welfare Programme; Environment and human health; Human Rights; Value Education; HIV/AIDS; Women and Child Welfare; Role of Information Technology in Environment and human health, Case Studies.

Field work

Visit to a local area to document environmental assets river / forest / grassland / hill / mountain; Visit to a local polluted site-Urban/Rural/Industrial/Agricultural; Study of common plants, insects, birds; Study of simple ecosystems- pond, river, hill slopes, etc.

Text Books :

1. N. W. Ingole, D. M. Dharmadhikari, S. S. Patil; Environmental Chemistry and Pollution Control; Das Ganu Prakashan, Nagpur.
2. K. Bhute, A. Dhamani, A. Lonkar and S. Bakare; Environmental Chemistry; Celebration Infomedia, India.
3. Textbook of Env.Studies E.Bharucha, University Press (India) Pvt. Ltd. Hyderabad.
4. Env-studies-From crisis to cure, second edition R.Rajagopalan, Oxford Uni.press New Delhi.

V SEMESTER

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CST313 **Course : Mobile Application Programming**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes :

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

1. Define mobile computing and mobile infrastructure.
2. Discuss user interface design considerations.
3. Discuss various mobile platforms.
4. Develop apps for Android devices.
5. Develop apps for IOS devices.

Syllabus

Unit I : Introduction to Mobile Application Development

Mobile Computing Technologies: An Overview, Mobile Devices, History, Web vs. Native, Wireless Access Protocol, Content vs. Applications, Cellular Networks, CDMA, GSM, 3G Network and Services, 4G

Unit II : Designing Mobile User Interfaces

Mobile User Experience Design, Task Analysis and Contextual Inquiry, Development Cycle, Rapid Prototyping , Mobile User Interface Types ,Interactive Voice Response (IVR), SMS/MMS , Mobile Web, Native Applications, Hybrids, Text Entry , Screen Size

Unit III : Mobile Platforms

URIs for Mobile Apps , Native Runtime Platforms, Tightly Controlled (IPhone), Open (Android), Licensed (Windows Mobile), Cross Platform Development

Unit IV: Android Development Part I

Android SDK, Activities, Views, Resources, Views and Intents, resources, Views

Unit V : Android Development Part II

Intents, Intents and Storage, Storage and Threads, Data Storage, SQL, SQLLite

Unit VI : iPhone Development

Object-C Primer, Windows-based Applications and MVC , View Controllers, Provisioning, view controllers, Gestures and data, Core Data, Localization, Graphics

Text Books :

1. "Mobile and Wireless Design Essentials", **Martyn Mallick**, Wiley Publication, 2003.
2. "Mobile Application Design" , Brian Fling, O'Reily Publication.

References :

1. Harvard University Open Course Ware: Computer Science E-76

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CSP313 **Course : Mobile Application Programming Lab**

L:0 Hrs,T: 0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes :

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

1. Use various mobile platforms.
2. Develop applications for Android devices.
3. Develop applications for IOS devices.

Experiments should be based on the topics :

Native applications, Activities, Views, Resources, Intents, Storage, Threads, SQL Lite, View Controllers, Gestures, Localization and Graphics.

References :

Harvard University Open Course Ware: Computer Science E-76

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CST314 **Course : Design and Analysis of Algorithms**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Ability to understand mathematical formulation, complexity analysis and methodologies to solve recurrence relations for algorithms.
2. Ability to design algorithms using standard paradigms like: Greedy, Divide and Conquer, Dynamic Programming and Backtracking.
3. Ability to design algorithms using advance data structures and implement traversals techniques.
4. Ability to understand NP class problems and formulate solutions using standard approaches.
5. Ability to apply algorithm design principles to derive solutions for real life problems and comment on complexity of solution.

Syllabus

UNIT-I :

Mathematical foundations, summation of arithmetic and geometric series, n, n^2, bounding summations using integration, recurrence relations, solutions of recurrence relations using technique of characteristic equation and generating functions, Complexity calculation of various standard functions, principles of designing algorithms.

UNIT-II :

Asymptotic notations of analysis of algorithms, analyzing control structures, worst case and average case analysis, amortized analysis, application of amortized analysis, Sorting networks, comparison networks, bio-tonic sorting network.

UNIT-III :

Divide and conquer basic strategy, binary search, quick sort, merge sort, matrix operations, Greedy method – basic strategy, application to job sequencing with deadlines problem, minimum cost spanning trees, single source shortest path etc.

UNIT-IV :

Dynamic Programming basic strategy, multistage graphs, all pairs shortest path, single source shortest paths, optimal binary search trees, traveling salesman problem, String Editing, Longest Common Subsequence problem and its variations.

UNIT-V :

Basic Traversal and Search Techniques, breadth first search and depth first search, connected components. Backtracking basic strategy, 8-Queen's problem, graph coloring, Hamiltonian cycles etc, Introduction to Approximation algorithm.

UNIT-VI :

NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, decision and optimization problems, graph based problems on NP Principle.

Text Books :

1. Thomas H. Cormen et.al; "Introduction to Algorithms"; 3rd Edition; Prentice Hall, 2009.
2. Horowitz, Sahani and Rajasekaram; "Computer Algorithms", Silicon Press, 2008.
3. Brassard and Bratley; "Fundamentals of Algorithms", 1st Edition; Prentice Hall, 1995.
4. Richard Johnsonbaugh, "Algorithms", Pearson Publication, 2003.

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CST315 **Course:Software Engineering**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits:07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Ability to understand software engineering practices and various models.
2. Ability to understand software development Life Cycle.
3. Ability to understand software testing principles and techniques.
4. Ability to understand various software project management tasks and methods to implement them.

Syllabus :

UNIT- I :

Introduction to Software Engineering, Software Myths, Software Engineering- A Layered Technology, Software Process Framework, Software Process Models, The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process Model, Agile Process Models.

UNIT- II :

An overview, Communication Practices, Planning Practices, Modeling Practices, Construction Practice & Deployment, System Engineering Hierarchy, Business Process Engineering, Product Engineering, System Modeling, Requirements Engineering.

UNIT- III :

An overview, Requirements Analysis, Analysis Modeling Approaches, Data Modeling, Object-Oriented Analysis, Scenario-Based Modeling, Flow-Oriented Modeling, Class-based Modeling, Behavioral Model. Design Engineering Concepts, Design Model, Pattern-Based Software Design

UNIT -IV :

An overview, Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging. Software Testing Fundamentals, Black-Box Testing, White-Box Testing. Ethics for IT workers and IT Users : Professional Relationships that must be managed, Professional Codes of Ethics, IT Professional Malpractices, Common Ethical Issues for IT Users, Supporting the Ethical Practices for IT Users, Social Networking Ethical Issues, Key Ethical Issues for organizations.

UNIT -V :

An overview, Software Quality, A Framework for Product Metrics, Metrics for Analysis & Design Models, Metrics for Source Code, Metrics for Testing & Maintenance. Project management - the management spectrum, Metrics for process & project - Software measurement, metrics for software quality, metrics for small organization, Project scheduling

UNIT -VI :

Risk management - Risk strategies, Software risks, Risk identification, Risk refinement, RMMM Quality Management - Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Review, Statistical Software Quality Assurance, Software Reliability, Change Management- Software Configuration Management, SCM Repository, SCM Process, Estimation, Reengineering- Software reengineering, Reverse engineering, Restructuring, Forward Engineering

Text Books :

1. Roger Pressman; Software Engineering-A Practitioner's Approach ; Sixth Edition, McGraw Hill,2010.
2. Ian Somerville; Software Engineering; Seventh Edition; Pearson Education. 2008.
3. Ethics in Information Technology, George W. Reynolds, 4th Edition, Cengage Learning Publicaton

Reference Books :

1. David Gustafsan, Software Engineering ; Schaum's Series, Tata McGraw Hill, 2002
2. Sanjay Mohapatra; Software Project Management, First Edition, Cengage Learning, 2011

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CSP315 **Course : Software Engineering Lab**

L:0 Hrs,T:0 Hr,P:2 Hrs, Per Week **Total Credits : 02**

Course Outcomes :

On successful completion of the course, students will be able to :

1. Design Use case and activity diagram for given problem definition.
2. Design Sequence, class and state diagram for given problem definition.
3. Design Component and deployment diagrams for given problem definition.
4. Test cases using white box testing method.
5. Test cases using black box testing method.

PRACTICALS BASED ON ABOVE CST 315 SYLLABUS.

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CST316 **Course : Design Patterns**

L:3 Hrs,T:01 Hr,P:0 Hrs, Per Week **Total Credits:07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Architecture, Need, Characteristics and Ability of Design Pattern in Software Design Process.
2. Role and functionality Observer and Structural Design patterns in software design, Various abilities of observer and structural design pattern.
3. Role and functionality of Behavioral Design pattern in software design process, Behavioral pattern ability to control the complexity of software.
4. Demonstrate the designing software using Design pattern as a case study and comment on complexity of design process

Syllabus

UNIT-I :

Introduction :

Design Pattern basics, Need of Design Pattern, Classification of Design Patterns, Characteristics of Design Pattern, Role of Design Pattern in Software design, Selecting Design pattern for software design, Case study on Architecture of Design pattern.

UNIT-II :

Observer and Creational Patterns :

Role of Observer pattern, Components of Observer Pattern, Examples on implementation of observer pattern using UML, Creational Design pattern: Introduction, Types i) Abstract Factory ii) Builder iii) Factory method iv) Prototype v) Singleton, Structure of various types of creational patter and real world examples.

UNIT-III :

Structural Design Patterns :

Introduction to Structural Design Pattern, Type of Structural Design Patterns: Adapter, Bridge,Composite, Decorator, Façade, Flyweight, Proxy, UML Examples of types of structural design patterns, real world examples, Comparative study of Observer, Creational and Structural Design patterns

UNIT-IV :

Behavioral Patterns-I :

Introduction to Behavioral Design pattern, Interpreter Design patter, Language grammar handling using interpreter design pattern, Iterator design pattern, Handling aggregate objects using Iterator design pattern,Chain of Responsibility principle, Methodology of responsibility sharing using request passing approach, Example of functional responsibility of object.

UNIT-V :

Behavioral Patterns-II :

Mediator Design Pattern, Analysis of Mutual Behavior of classes, Reference control between objects, Memento Design pattern and its implementation, Observer Design Pattern, Effect of single object on set of objects, Flexibility of objects, State Design Pattern, State-wise behavior of object, Role of object in state, Strategy Design Object, Template Method, Implement run-time variable on template design pattern

UNIT-VI :

A Case Study : Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation, Summary, Complexity computation of Various Design Patterns.

Text Books :

1. Design Patterns By Erich Gamma, Pearson Education
2. Design Patterns Explained By Shalloway and Trott

REFERENCE BOOKS :

1. Pattern's in JAVA Vol-I By Mark Grand ,WileyDreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand ,WileyDreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,WileyDreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd
5. Introduction to design Patterns in C++ with Qt by Alan Ezust, Paul Ezust

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CST317 **Course : Computer Networks**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Understand basics of computer networks and reference models
2. Understand the details of Guided and Unguided media
3. Identify the Design issues of each layer of OSI model
4. Implement the protocols of OSI model

Syllabus

UNIT- I :

Uses of Computer Networks, Network Hardware:- LAN, WAN, MAN, Network Software-protocol hierarchies, design issues for layers, connection oriented and connection less services, service primitives, Services to protocol relationship. Reference models- OSI and TCP/IP.

UNIT- II :

COMMUNICATION MEDIA: GUIDED MEDIA, UNGUIDED MEDIA, Radio frequency allocation, Propagation of Radio waves, Terrestrial microwave, Satellite communication, Cellular Telephony

UNIT-III :

Data Link Layer: Error Detection and Correction, Flow Control, Error control, Selective Repeat, HDLC, PPP

UNIT- IV :

Switching and MAC Layer : Packet Switching, Circuit Switching: Multiplexing TDM FDM.

Multiple Accesses : Random Access, Controlled Access, Channelization. LAN: Token Ring, FDDI, Ethernet-Fast Ethernet. Wireless LANs: IEEE 802.11.

UNIT- V:

Network Layer : Routing Algorithms –Shortest path Algorithm, Flooding, Flow based routing, Distance vector routing, Link state routing, Hierarchical routing.

Congestion Control Algorithms: Leaky bucket algorithm, Token bucket algorithm. Congestion prevention Policies, Traffic shaping, Choke packets, Load Shedding, Jitter Control.

UNIT- VI :

Transport Layer: The Transport Service, Service provided to upper layers, Transport Service primitives, Berkeley Sockets, Elements of Transport protocols: Addressing, Connection establishment, Connection release, Flow control and Buffering, Multiplexing, Crash recovery, Introduction to Internet Transport protocol, Introduction to UDP, Application layer.

Text Books :

1. Andrew. S. Tanenbaum; Computer Networks; 5th edition; PHI Publication, 2011
2. Behrouz A. Forouzan**;** Data Communications and Networks; 4th edition; Tata McGraw Hil, 2006.
3. Larry L. Peterson and Bruce S. Davie**;** Computer Networks: A Systems Approach; 4th Edition; Morgan Kaufmann Publishers, 2007.

Reference Book :

1. Alberto Leon-Garcia and Indra Widjaja; Communication Networks; 2nd Edition; McGraw Hill, 2006.

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CSP317 **Course : Computer Networks Lab**

L:0 Hrs,T: 0 Hr,P: 2 Hrs, Per Week **Total Credits :02**

Course Outcomes

On successful completion of the course, students will be able to:

1. Simulate and then configure different types of networks.
2. Implement algorithms present in different layers of OSI model
3. Implement networking concepts like server, client and addressing mechanism.
4. Implement data communication using socket programming concepts

PRACTICALS BASED ON ABOVE CST 317 SYLLABUS

1. Simulate & configure different types of networks using network stimulation tools.
2. Implement protocols present at data link layer of OSI model.
3. Implement protocols present at network & transport layer of OSI model.
4. Implement network concept like server, client, data communication and encryption mechanism.

Syllabus for Semester V, B. E. (Computer Science & Engineering)

Course Code : CSP318 **Course : Software Tech. Lab-I**

LabL:0 Hrs,T:0 Hr,P:2 Hrs, Per Week **Total Credits : 02**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Define and analyze the problem
2. Apply software engineering and core engineering principles to the analyzed problems
3. Implement using different programming languages and software tools
4. Contribute to the society by developing solutions to real world problems

Based on current trends in IT Industry with executable project as deliverable, the topics and practicals will be discussed during the conduction**.**

VI SEMESTER

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST319 **Course : Computer Graphics and GUI Design Technologies**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to :

1. Understand the fundamental principles of Raster and Vector graphics, Graphics devices & Graphics Programming
2. Understand various Scan conversion techniques.
3. Apply the various algorithms like Windowing, Clipping, Transformations, Projections, shading and Rendering to improve the quality of image.
4. Understand the fundamentals of Multimedia & different compression techniques.

Syllabus

UNIT-I :

Introduction to Graphics: The origin and importance of Computer Graphics – Graphics Hardware – Application of Computer Graphics – Graphics programming languages. Raster and Vector Graphics: Introduction to raster and vector system – Display and Hardcopy Techniques – Raster scan Display System, Video Controller – Vector scan display system – Display of Text and natural models – Input Devices for Interactive Operation – Image Scanning.

UNIT-II :

Windows Graphics Programming (WGP) Introduction to Windows and APIs – WGP Fundamentals – Graphics Device Interface (GDI) – Device Control (DC) – GDI Coordinate system – creating and pointing Regions and Drawing models – Handling colors palettes and Bitmaps – Toolbar and status bar – Managing Windows with bitBlt – modern methods.

UNIT-III :

Polygon filling methods: Scan Conversion Algorithms: Simple Ordered edge list, Edge Fill, Fence fill and Edge Flag Algorithm, Seed fill Algorithms: Simple and Scan Line Seed Fill Algorithm, Anti-aliasing and half toning techniques.

UNIT-IV :

2D Clipping algorithms for regular and irregular windows: Sutherland Cohen Out code, Sutherland Cohen Subdivision, Mid-Point subdivision, Cyrus Beck and Sutherland Hodgeman Polygon clipping Algorithm. Clipping about Concave regions. 2D Transformations Normalized Device Coordinates and Viewing Transformations.

UNIT-V :

3D System Basics and 3D Transformations, Parallel and Perspective projections, Hidden line/surface Removal Algorithms. Rendering- Shading, Ray tracing techniques and Color Systems.

UNIT-VI :

Multimedia – Overview – Multimedia operating systems – Compression Technology for Multimedia – System Requirements and Configurations for Multimedia –Multimedia Servers – Multimedia delivery, Multimedia Tools – Databases and Multimedia – Multimedia Applications

Text Books :

1. Rogers; Procedural Elements of Computer Graphics; 3rd Edition; McGraw Hill, 2001.
2. Newman and Sproull; Principles of Interactive Computer Graphics; McGraw Hill, 1989.
3. Hearn and Baker; Computer Graphics; 2nd Edition; PHI, India, 1994.
4. N. Krishnan; Computer Graphics & Multimedia; SCITECH Publications; Chennai; 2002.
5. Ivan Harringhton; Computer Graphics - A Programming Approach; McGraw Hill Publications, 1987.
6. Prabhat K. Andeleigh, Kiran Thakrar, Multimedia system Design, PHI.
7. Heaen, Baker & Carithers, Computer Graphics with Open GL, Person, IV Edition.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CSP319 **Course : Computer Graphics and GUI Design Technologies**

LabL:0 Hrs,T:0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes

On successful completion of the course, students will be able to:

1. Implement various Raster Graphics Algorithms
2. Implement Windowing, Clipping, Transformations Algorithms.
3. Implement Advance Graphical techniques like Shading, Rendering, Hidden surface removal.
4. Implement Image Compression Algorithms for Multimedia.

PRACTICALS BASED ON ABOVE CST 319 SYLLABUS

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST320 **Course : Advanced Data Structures**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Understand implementation of symbol table using hashing techniques.
2. Develop and analyze algorithms for red-black trees, B-trees and Splay trees.
3. Develop algorithms for text processing applications.
4. Identity suitable data structures and develop algorithms for computational geometry problems.

Syllabus

Unit-I :

Dictionaries : Definition, Dictionary Abstract Data Type, Implementation of Dictionaries.

Hashing : Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.

Unit-II :

Red Black Trees : Height of a Red Black Tree, Red Black Trees Bottom-Up Insertion, Top-Down Red Black Trees, Top-Down Deletion in Red Black Trees, Analysis of Operations.

2-3 Trees: Advantage of 2-3 trees over Binary Search Trees, Search and Update Operations on 2-3 Trees, Analysis of Operations.

Unit-III :

B-Trees : Advantage of B- trees over BSTs, Height of B-Tree, Search and Update Operations on 2-3 Trees, Analysis of Operations.

Splay Trees: Splaying, Search and Update Operations on Splay Trees, Amortized Analysis of Splaying.

Unit-IV :

Text Processing : String Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem.

Unit-V :

Computational Geometry : One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees,Quad-trees, k-D Trees.

Unit-VI :

Skip Lists : Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists.

Text books :

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Fourth Edition, Pearson Education, 2002.
2. Horowitz, Sahni and Rajasekaran, Computer Algorithms, Universities Press, 2000.
3. Cormen, Leiserson, Rivest and Stein, Introduction to Algorithm, Third edition, PHI, 2009.

References :

1. Aho,Hopcroft and Ullman, Data Structures and Algorithms, Pearson Education, 2002.
2. M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002.
3. Tanenbaum, Langram and Augestien, Data Structures using C and C++, Prentice Hall of India, 2002.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CSP320 **Course : Advanced Data Structures Lab**

L:0 Hrs,T: 0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Apply template based approach to designing algorithm implementation.
2. Implement algorithms for red-black trees, B-trees and Splay trees.
3. Implement efficient hashing and searching mechanisms.
4. Implement algorithms for text processing applications.
5. Implement multi-dimensional indexing mechanism.

Practical based on the Course CST320 preferably in C++ using generic programming or in Java.

Text books :

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Fourth Edition, Pearson Education, 2002.
2. SatrajSahni, Data Structures, Algorithms and Applications in C++, Second Edition, Universities Press, 2005.

References :

1. Mark Allen Weiss, Data Structures & Problem Solving Using Java, Addison Wesley/Pearson, 2010.
2. Tanenbaum, Langram and Augestien, Data Structures using C and C++, Prentice Hall of India, 2002.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST321 **Course : Database Management System**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Understand basic database concepts and data modeling techniques used in database design.
2. Understand the use of normalization in database design.
3. Design, implement, manage, query and administrate a database for specific application.
4. Recognize the purpose of query optimization, indexing and hashing techniques in database.
5. Understand the concept of transaction, concurrency control, and recovery in database.

Syllabus

UNIT-I :

Database system concepts and Architecture – Database systems vs. File systems, view of data, Data Models, Database Languages, Database users**,** concept of relational database, Relational data model, Relational algebra, SQL, introduction to Pl/SQL

UNIT-II :

Database design – Entity Relationship approach**,** Functional dependencies and normalization, relational database design algorithms.

UNIT-III :

Physical database design – Concept of physical and logical hierarchy, storage structures like cluster, index organized table, partitions, various table storage parameters and block storage parameters, concept of index, B-trees, hash index, function index, bitmap index.

UNIT-IV :

Query processing and optimization - Various techniques for query optimization, Use of different storage structures in query optimization, cost base optimization, heuristic optimization.

UNIT-V :

Transaction Processing -Transaction and system concepts, Desirable properties of transaction, Schedules and recoverability, serialization of schedules, concurrency control, lock-base protocols and time stamp based protocols, recovery subsystem.

UNIT-VI :

Recovery System: failure classification, recovery and atomicity, log based recovery, checkpoints, buffer management, advanced recovery techniques.

Textbooks :

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan; "Database System Concepts" Fifth Edition, Tata McGraw Hill, 2009.
2. Elmasri and Navathe; "Fundamentals of Database Systems", Addison Wesley 2000.

Reference Books :

1. Raghu Ramakrishnan and Johannes Gehrke; "Database Management Systems"; Third Edition; Tata McGraw Hill Publication, 2003.
2. C.J. Date; "Database in Depth – Relational Theory for Practitioners"; O`Reilly Media, 2005.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CSP321 **Course : Database Management System**
LabL:0 Hrs,T:0 Hr,P:2 Hrs, Per Week **Total Credits:02**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Understand the use of database languages such as DDL, DML, and DCL.
2. Write simple, nested, multiple table, and advanced queries for data retrieval.
3. Write PL-SQL block structure and Trigger for specific application.
4. Implement various integrity constraints, views, sequences, indices and synonym on database.

PRACTICALS BASED ON ABOVE CST 321 SYLLABUS

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST322-1 **Course : Introduction to Mainframes–(Open Elective)**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Study Z operating system
2. Identify the responsibilities of a operating system.
3. Understand different file systems.
4. Describe the access methods for files and solve problems of disk scheduling.

Syllabus

Unit I : Evolution of Mainframe hardware (3 Hours)

Overview of Computer Architecture -Classification of Computers - micro, mini, mainframes and super computer - Mainframe computer - key features - benefits - Evolution of Mainframes - Different hardware systems

Unit II : Mainframes OS and Terminology (4 Hours)

Operating systems on mainframes, Batch processing vs. online processing - mainframe operating system. - Evolution - concepts of Address space, Buffer management - Virtual storage - paging - swapping - Dataset management in mainframes

Unit III : z/OS and its features (6 Hours)

Z-operating system (Z/OS) - Virtual storage - Paging process - storage Managers - Program execution modes - Address space - Multiple virtual systems (MVS), MVS address space, Z/OS address space - Dataset - sequential and partial dataset - Direct access storage device (DASD) -Access methods - Record formats - Introduction to virtual storage access methods (VSAM) - Catalog - VTOC

Unit IV: Introduction to JCL (7 Hours)

Introduction to Job Control language - Job processing - structure of JCL statements - Various statements in JCL - JOB statement - EXEC statement - DD statement - JCL procedures and IBM utility programs.

Unit V: COBOL Programming 1 (5 Hours)

1. Introduction – History, evolution and Features, COBOL program Structure, steps in executing COBOL
2. Language Fundamentals – Divisions, sections, paragraphs, sections, sentences and statements, character set, literals, words, figurative constants, rules for forming user defined words, COBOL coding sheet.
3. Data division – Data names, level numbers, PIC and VALUE clause, REDEIFNES, RENAMES and USAGE clause

4. Procedure Division – Input / Output verbs, INITIALIZE verb, data movement verbs, arithmetic verbs, sequence control verbs.

Unit VI : COBOL Programming 2 (5 Hours)

1. File processing – Field, physical / logical records, file, file organization (sequential, indexed and relative) and access mode, FILE-CONTROL paragraph, FILE SECTION, file operations.
2. File handling verbs – OPEN, READ, WRITE, REWRITE, CLOSE.
3. Table processing – Definition, declaration, accessing elements, subscript and index, SET statement, SEARCH verb, SEARCH ALL verb, comparison.
4. Miscellaneous verbs – COPY, CALL, SORT, MERGE, STRING, UNSTRING verbs.

Unit VII : Overview of DB2 (6 Hours)

1. Introduction to DB2 – System Service component, Database Service component, Locking Service component, Distributed Data Facility Services component, Stored Procedure component, catalogs and optimizer
2. DB2 Objects and Data Types - DB2 Objects Hierarchy, Storage groups, Database, Table space, Table, Index, Clustered index, Synonyms and aliases, Views, Data Types.
3. DB2 SQL programming – Types of SQL statements, DCL, DDL, DML, SPUFI utility.
4. Embedded SQL programming – Host variable, DECLGEN utility, SQLCA, single/multiple row manipulation, cursors, scrollable cursors.

Unit VIII : Mainframe Application Development guidelines (4 Hours)

COBOL coding standards, relation between a COBOL file handling program and JCL, Different types of ABEND codes, COBOL-DB2 program pre-compilation, DBRM (Database Request Module), Application plan/packages, program execution methods (EDIT JCL, foreground and background modes).

Text Books and Study Material will be provided by Infosys

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST322-2 **Course : Foundation of Business Intelligence (Open Elective)**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Understand basics of Business Intelligence
2. Apply BI for strategic decisions
3. Implement project in BI along with testing.
4. Understand Performance in BI – In Memory Analytics
5. Use enterprise BI tools

Syllabus

UNIT – I : Introduction to Business Intelligence [4 hours]

1. What is Business Intelligence, Why do we need Business Intelligence [40 min]
2. EIS, MIS, DSS & BI [20 min]
3. Information Pyramid – Data, Information, Knowledge & Intelligence. Basis for Operational, Tactical & Strategic Decision Making [30 min]
4. OLTP Vs. OLAP – [30 min]
5. Requirements Gathering in BI through Business Questions [30 min]
6. BI in various Domains and Functional Area [60 min]

UNIT–II : Principles of Dimensional Modelling [4 hours]

1. Foundation for Fact based decision making[30 min]
2. The STAR and SNOWFLAKE schema[60 min]
3. Pros & Cons of the STAR/SNOWFLAKE Schema Dimensional Model[30 min]
4. Slowly Changing Dimension tables [30 min]
5. Fact-less Fact Tables[30 min]
6. Aggregation Strategy [30 min]
7. Time Dimension [30 min]

UNIT – III : Business Intelligence System Architecture [4 hours]

1. Need for Enterprise Class Business Intelligence Infrastructure[30 min]
2. The BI Ecosystem [30 min]
3. Building Blocks of a N-Tier BI System – Servers & Communication Protocols [60 min]
4. The Central Repository - Metadata[30 min]

5. Information Consumption User Interfaces – Desktop Vs. Web Vs. Mobile [30 min]
6. Open Architecture [30 min]
7. Scalability, Performance in BI – In Memory Analytics [30 min]

UNIT – IV : BI Project Lifecycle [4 hours]

1. Typical BI Project Lifecycle [60 min]
2. Requirements Gathering & Analysis – Functional & Non-Functional Requirements [60 min]
3. Reports & Dashboards Design – Mock-up and Storyboarding [30 min]
4. Testing in a BI Project [30 min]
5. BI Project Deployment [30 min]
6. Post Production Support [30 min]

UNIT–V : SQL the Universal Language for Business Intelligence [8 hours]

1. Introduction to RDBMS [30min]
2. Language for retrieving Data from a database [30 min]
3. Various Clauses in a SQL [30 min]
4. Retrieving Data from multiple tables – Joins [30 min]
5. Filtering, Sorting & Grouping datasets [60 min]
6. Introduction to DDL & DML statements [60 min]
7. Various Built-in Functions in SQL [60 min]
8. Use of sub-queries [30 min]
9. Data Dictionary and dynamic SQL [30 min]
10. SQL Project [120 min]

UNIT – VI : Introduction to Enterprise Class BI Tool [8 Hours]

1. First Level of Abstraction of the Data Warehouse in MicroStrategy [30 min]
2. Building the Schema Objects – Attributes, Facts, Transformation & Hierarchies [60 min]
3. Building Reusable Application Objects – Metrics, Filters, Prompts [60 min]
4. Five Styles of BI [30 min]
5. Building Reports – Grids & Graphs [60 min]
6. Report Manipulation over the Web – Pivoting, Sorting, Drilling, Exporting etc. [30 min]
7. Setting up Report Distribution [30 min]
8. Report Project [120 min]

Text Books and Study Material will be provided by Infocepts-Nagpur

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST322-3 **Course : Salesforce Technology (Open Elective)**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On Successful completion of course, student will be able to:

1. Understand core concepts of cloud, database essentials and framework of Salesforce.
2. Explore the fundamental of apex and visual force for creating standard and custom controllers.
3. Use tools and techniques for exporting/importing data through Force.com and understanding the process of deployment of an app in the cloud.
4. Use batch processing to perform data intensive tasks offline, Utilize external APIs to integrate any third party system with Salesforce.

Syllabus

UNIT I :

Basic cloud concepts, Introduction to Salesforce, Sales Cloud, Service Cloud, Collaboration Cloud, Security, Salesforce Customer Relationship Management Concepts, Types of Orgs

UNIT II :

Database essentials: objects, fields, relationships, query language, data integration, working with custom objects, Database Security, Object-Level Security, Record-Level Security

UNIT III :

Apex Language Fundamentals, Loops, Arrays and Collections, Exception Statements, Asynchronous Execution, Governor Limits, Database Integration in Apex, Database Records as Objects, Database Queries, DML Operations. Triggers, Object-Oriented Apex

UNIT IV :

Creating Visualforce page, Customizing Visualforce Page, Standard Controllers, Custom Controllers and Controller Extensions, Using Static Resources, View Components

UNIT V :

Batch processing, Batch Apex Concepts, Batchable Interface, Limits of Batch Apex, Scheduling Batch Apex, External ID's, Basic concepts of CSS, API's and Web Services.

UNIT VI :

Data Loader Concepts, introduction to various sandboxes, Build and Deployment

TEXT BOOKS :

1. Jason Ouellette; Development with the Force.com Platform, Second Edn, Addison Wesley, 2011.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST322-4 **Course : Business Intelligence and Its Applications (Open Elective)**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

At the end of this elective, student will be able to:

1. Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence
2. Demonstrate understanding of technology and processes associated with Business Intelligence framework
3. Describe the structure of data warehouse and the process of data extraction, transformation and loading
4. Model and analyze multidimensional data
5. Design an enterprise dashboard that depicts the key performance indicators which helps in decision making

Syllabus

UNIT 1 :

Types of Digital Data: structured, unstructured and semi-structured data, Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLAP).

UNIT 2 :

Introduction to Business Intelligence : evolution of BI, BI value chain, introduction to business analytics, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities

UNIT 3 :

Basics of Data Integration: Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, data integration technologies, Introduction to data quality, data profiling concepts and applications.

UNIT 4 :

Multi-Dimensional Data Modeling : Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi-dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs.

UNIT 5 :

Basics of Enterprise Reporting: Introduction to enterprise reporting, concepts of dashboards, balanced scorecards.

UNIT 6 :

Study of open source BI tools.

Text books :

1. R N Prasad and S Acharya; Fundamentals of Business Analytics; Wiley India, 2011.
2. Ephraim Turban et.al; Business Intelligence: A Managerial Approach; 2nd Edition, Prentice Hall, 2010.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST322-5 **Course : Mobile Technology (Open Elective)**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

At the end of this elective, student will be able to:

1. Understand types of mobile application development OS and languages, ecosystem and architecture
2. Code constructs and platform used in Android, HTML5 and IOS
3. Develop simple programs using Android, HTML5 and IOS

Syllabus :

Unit1: Introduction to Mobile Eco System and Programming Skills

(Unit 1 will be a common unit for all students which would comprise of 8 hours)

Android Technology

Unit 2: Introduction to Android, IDE Usage, User Interface Designing - 1

Unit 3: User Interface Designing – 2, Broadcast Receivers, Service

Unit 4: Data Management, Threads and Processes, Component Activations

Unit 5: Inter Application Communication, Content Providers, Network Communication

Unit 6: User Interface Designing – 3, Application configuration, App Publishing, Add-ons

iPhone Technology

Unit 2: Programming Basic, Advanced Topics in C, Objective-C Basics

Unit 3: Object-Oriented Programming Basics, Tools

Unit 4: iOS SDK: UI Kit

Unit 5: iOS SDK: Media Service, Location Service, Animation

Unit 6: iOS SDK: Other Services

HTML Technology

Unit 2: Introduction to WWW and HTML, CSS Unit 3: JavaScript

Unit 4: AJAX, JavaScript Libraries

Unit 5: HTML5 Overview

Unit 6: HTML5 for Mobile

Study Material will be provided by Global Logic Academia Nagpur

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST322-6 **Course : Insight to Cloud Computing (Open Elective)**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits:07**

Course Outcomes

On Successful completion of course, student will be able to:

1) Understand object-oriented programming concepts in C#.NET.
2) Understand the concepts on ASP.NET, creation and deployment of web application.
3) Understand database connectivity using ADO.NET, creation of console application and web application.
4) Understand the basic concepts of cloud computing and various services available on Microsoft Azure cloud.
5) Deployment of web application on Microsoft Azure cloud using cloud service.
6) Using storage services available on Microsoft Azure cloud.

Syllabus

Unit I:

Understand object oriented concepts in C#.NET. Data types, statements expressions and operators available in C#, implementation of classes, objects, interfaces, properties. Creation of UI and event handling.

Unit II:

Introduction to ASP.NET, web page creation using ASP.NET, using web form development model event handling mechanism, understanding IIS configuration, using model view controller development model, understanding concepts of HTML5 and CSS3.

Unit III:

ADO.NET architecture, LINQ using ADO.NET, data type mapping in ADO.NET, understanding .NET framework data providers, implementation of data seta, using ADO.NET in console application, using ADO.NET in web application,

Unit IV:

Introduction to cloud computing, cloud computing architecture, virtualization concepts, cloud application, understanding IAAS, PAAS and SAAS categories of cloud computing services, understanding various Microsoft Azure cloud services. Sign up in Microsoft Azure cloud.

Unit V:

Understanding Microsoft Azure cloud services, creation of web page using ASP.NET, using Microsoft Azure SDK in ASP.NET, deployment of web page on Microsoft Azure cloud.

Unit VI:

Understanding Microsoft Azure storage services, creation of database using storage service, execution of simple SQL queries on this database, creation of web page using ASP.NET and database created on cloud.

TEXT BOOKS:

1. Programming in C# by E Balagurusamy, Tata McGraw- Hill Publication, 3rd edition.
2. Programming ASP.NET by Jesse Liberty, Dan Hurwitz, O'Reilly publication.
3. Mastering cloud computing, Buyya, Vecchiola, Selvi, Tata McGraw- Hill Publication, 1st edition.

REFERENCE BOOKS

1. The Complete Reference, C#4.0, Tata McGraw- Hill Publication, 1st edition.
2. The Complete Reference, ASP.NET, Tata McGraw- Hill Publication, 1st edition

   Programming Windows Azure: Programming the Microsoft Cloud , by Sriram Krishnan, O'Reilly Media.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST322-7 **Course : Security Basics & Cyber Security (Open Elective)**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes:

At the end of this elective, student will be able to:

1. Understand concepts of cyber security to provide security solutions to the real world threats, attacks.
2. Understand the various hacking tools and techniques used for ethical hacking.
3. Distinguish between threats, APT's and their relevant countermeasure.
4. Focuses on Developing Secure Code and Secure Applications.
5. Understanding of the importance of data security and its relevance within the IT industry.

Syllabus

Unit I:

Security Basics & Cyber Security

- Information Security Overview

  Protecting information, The Importance of Information and Information Security, Information Security and Risk Assessment, Threats to the information and the Impact due to these Threats.
- Information Security Responsibilities

  Information Security Roles and Responsibilities

  Information security responsibilities for various roles in the organization.
- Information Security Principles

  The CIA Triad, Understanding the C-I-A security principles, Confidentiality, Integrity and Availability.
- Classifying Information

  Information Sensitivity, Information Classification
- Protecting Information

  Information Lifecycle overview, Information Formats, Labelling and Handling Information, Storing Information, Exchanging Information, Retaining and Deleting Information, Reusing and Destroying Media, Information Backup and Recovery, Business Continuity and Disaster Recovery, Access Control

Unit II:

- Threat Landscape

  Global Threat Landscape
- Threats and Vulnerabilities

  Social Engineering and tactics, Malwares and types
- Hacker Objectives and Techniques

  Hacker and Criminal Objectives
- Security Countermeasures

  Managing Passwords

Anti-Malware Best Practices
Security Software's on your Computer
Antivirus software, Host IDS/IPS, Firewall,VPN
Responding to Alerts and Events
Email and Web Security

- Protecting Information on the Internet
  Protecting Your Identity, Using E-mail Securely, Using Your Web Browser Securely
  Social media security basics
- Introduction to networking
  OSI Layers, Network protocols

Unit III:

Ethical Hacking

Introduction to Ethical Hacking, Footprinting and Reconnaissance, Scanning Networks

Enumeration, System Hacking, Sniffing, Social Engineering, Denial of Service, Session Hijacking, Hacking Web Applications, Hacking Wireless Networks, Hacking Mobile Platforms

Evading IDS, Firewalls and Honeypots

Unit IV:

Advanced threat protection tools and techniques

2 Case studies

Introduction to advanced persistent threats

- What are advanced persistent threats
- APT life cycle
- APT characteristics

Methods used to stop APTs

- The Sandbox environment
- Big Data Analytics and Traffic Log Analysis
- Understanding Botnet Interception
- Endpoint behaviour analysis
- Endpoint forensics

Developing Secure Code and Secure Applications

Software Development Life Cycle, Secure coding practices, Input Validation, Output Encoding

Authentication and Password Management, Session Management, Access Control, System Configuration, Database Security, File Management, Memory Management

Unit V:

Cloud Security Fundamentals

Cloud computing architectural framework, Characteristics of cloud computing Multi-tenancy, Cloud reference model.

Cloud security reference model

Governance and enterprise risk management, Legal issues: contracts and electronic discovery, Compliance and audit, Information management and data security, Traditional security, business continuity and disaster recovery, Data centre operations, Incident response, notification and remediation, Application security, Encryption and key management, Identity and access management, Virtualization, Security as a service

Data Security and Protection

Encryption, Access control, Remote access, Portable devices, Logs and audit trails, Incident response and handling, Perimeter security, Backup, Data Loss Prevention, Secure data erasure

Legal & Regulatory requirements of data protection and retention

Unit VI:

Introduction to Cyber Law Framework

IT Act 2008 (Amendment), IT Regulations

Introduction to IT Governance, Risk and Compliance

Security organisation

Vulnerability management

Security controls assessment

Remediation and exception management

Reporting and dashboards

Compliance requirements, Industry relevant security standards (PCI DSS, SOX, HIPPA, etc)

Risk management (includes risk assessment and treatment)

TEXT BOOKS

1. Study material provided by a Sequretek, Mumbai.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CST323 **Course : Artificial Intelligence**

L:3 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 07**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Understand challenges involved in designing intelligent systems by exploring human intelligence nature and its role in problem solving.
2. Represent given problem using state space representation and apply informed and uninformed search techniques on it .
3. Understand knowledge representation methods using logic programming, frames ,Scripts Semantic net etc.
4. Understand uncertainty theory based on techniques like probability theory and fuzzy logic.
5. Design Knowledge Based Systems using production rules.

Syllabus

UNIT-I :

Introduction: Scope of AI, AI problems, AI technique, Production system, Characteristics, Basics of problem solving: problem representation paradigms, Defining problem as a state space representation.

UNIT-II :

Search Techniques: Problem size, complexity, approximation and search; depth, breadth and best search; Heuristic Based Search: Heuristic search.

UNIT-III :

Knowledge representation: First order logic, Unification, Resolution in Predicate Logic. Structured. Knowledge Representation: Semantic Nets, Frames, and Scripts, Ontology.

UNIT-IV :

Uncertainty Knowledge and Reasoning: Probability and Baye's Theorem, certainty factors Statistical reasoning: Bayesian networks and Fuzzy Logic.

UNIT-V :

Learning: Types of Learning, Learning from example, knowledge in learning, learning probabilistic models.

UNIT-VI :

Expert Systems: Fundamental blocks, Knowledge Engineering, Knowledge Acquisition, Detailed Discussion from Example Domains - (From) Industry, Language, Medicine, Verification, Vision, Knowledge Based Systems.

Text Books :

1. E.Rich and K. Knight; Artificial Intelligence; 2nd Edition; Tata McGraw Hill, 2008.
2. Stuart Russel and Peter Norvig; Artificial Intelligence: A Modern Approach; Third Edition; Pearson Education, 2009.

Syllabus for Semester VI, B. E. (Computer Science & Engineering)

Course Code : CSP324 **Course : Software Tech. Lab-II Lab**

L:0 Hrs,T:0 Hr,P:3 Hrs, Per Week **Total Credits : 03**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Define and analyze the problem
2. Apply software engineering and core engineering principles to the analyzed problems
3. Implement using different programming languages and software tools
4. Contribute to the society by developing solutions to real world problems

Based on current trends in IT Industry with executable project as deliverable, the topics and practical will be discussed during the conduction**.**

VII SEMESTER

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CST411 **Course : Data Warehousing and Mining**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Understand fundamental theories and concepts of data warehousing.
2. Apply multi-dimensional modeling techniques in designing data warehouses.
3. Understand the principles of data mining.
4. Analyze and apply different methods and techniques involved in data mining.

Syllabus

UNIT-I :

Introduction to Data warehousing - Application of Data warehousing and mining, Data warehouse development life cycle, Data warehouse analysis, CUBE, ROLL UP and STAR queries.

UNIT-II :

Data Warehouse Design - Massive denormalisation, STAR schema design, Data ware house Architecture, OLAP, ROLAP and MOLAP, concepts of Fact and dimension table

UNIT-III :

Space Management in Data warehouse - Schemas for storing data in warehouse using different storage structures, B-tree index, hash index, clusters, Bitmap index functional index, domain index, Data partitions. Performance and Tuning - Query optimization, memory management, process management. I/O management for Data warehouse.

UNIT-IV :

Introduction: - What is Data mining? Data Mining on what kind of data, Data mining Functionalities, Classification of Data Mining Systems, Major Issues on Data mining, Introduction to OLAP,OLAP technology for Data Mining, Data warehousing, Data warehousing to Data mining, Optimizing Data for mining, Data preprocessing.

UNIT-V :

Data Mining Primitives:- Data mining Query language, Association Rules in large Data mining , KDD Process, Fuzzy sets and logic, , Classification and Prediction**:-** Information retrieval, Dimensional Modeling of Data, Pattern Matching, Estimation Error- Em, MLE.

UNIT-VI :

Cluster Analysis- Outlier, Cluster Vs Classification, Clustering Issues, impact of Outliers on clustering, clustering problems, Clustering Approaches.

Clustering Algorithms : Hierarchical algorithm-Single Link, MST Single Link, Complete Link, Average Link, Dendrogram. Partition Algorithm-MST, Squared Error, K-Means, Nearest Neighbor, PAM, BEA, GA, Categorical algorithm, Large Database.

Web Mining : Introduction, Web data, Web Knowledge Mining Taxonomy, Web Content mining, Web Usage Mining Research, Ontology based web mining Research, Web mining Applications.

Textbooks :

1. Jaiwei Han and Micheline Kamber; Data Mining Concepts and Techniques; 2nd edition; Morgan Kaufmann Publishers, 2006.
2. Tang and MacLennan, Data Mining with SQL Server 2005, Wiley Publishing, 2005
3. Michale Corey and Michale Abbey; Oracle 8i Data Warehousing; 2nd edition; Tata McGraw Hill, 2001.
4. Navathe and Elmasry; Fundamentals of Database Systems; Addison Wesley, 2000.
5. Arun Pujari; Data Mining; Orient Longman, 2003.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CSP411 **Course : Data Warehousing and Mining Lab**

L:0Hrs,T: 0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Practical based on Syllabus of CST411

Course Outcome

On successful completion of this course, student should be able to:

1. Understand and implement the ETL process.
2. Create a data warehouse and execute queries on it.
3. Understand data mining techniques and apply them to discover interesting patterns.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CST412 **Course : Language Processors**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Exhibit role of various phases of compilation, with understanding of types of grammars and design complexity of compiler.
2. Design various types of parses and perform operations like string parsing and error handling.
3. Demonstrate syntax directed translation schemes, their implementation for different programming language constructs.
4. Implement different code optimization and code generation techniques using standard data structures.

Syllabus

UNIT-I :

Introduction to Compilers- Compilers and translators, Phases of compiler design, cross compiler, Bootstrapping, Design of Lexical analyzer, LEX.

UNIT-II :

Syntax Analysis- Specification of syntax of programming languages using CFG, Top-down parser, design of LL(1) parser, bottom up parsing technique, LR parsing, Design of SLR, CLR, LALR parsers, YACC.

UNIT-III :

Syntax directed translation- Study of syntax directed definitions & syntax directed translation schemes, implementation of SDTS, intermediate notations- postfix, syntax tree, TAC, translation of expressions, controls structures, declarations, procedure calls, Array reference.

UNIT-IV :

Storage allocation & Error Handling- Run time storage administration stack allocation, symbol table management, Error detection and recovery- lexical, syntactic and semantic.

UNIT-V :

Code optimization- Important code optimization techniques, loop optimization, control flow analysis, data flow analysis, Loop invariant computation, Induction variable removal, Elimination of Common sub expression.

UNIT-VI :

Code generation – Problems in code generation, Simple code generator, Register allocation and assignment, Code generation from DAG, Peephole optimization.

TEXTBOOKS :

1. Aho, Sethi, and Ullman; Compilers Principles Techniques and Tools; Second Edition, Pearson education, 2008.
2. Alfred V. Aho and Jeffery D. Ullman; Principles of Compiler Design; Narosa Pub. House, 1977.
3. Vinu V. Das; Compiler Design using Flex and Yacc; PHI Publication, 2008.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CSP412 **Course : Language Processors Lab**

L: 0 Hrs,T: 0 Hr,P:2 Hrs, Per Week **Total Credits : 02**

Course Outcomes:

On successful completion of the course, students will be able to

1. Use Open Source tools, to create a lexical analyzer and a parser.
2. Design experiments for NFA and DFA.
3. Implement different types of Parsing techniques.
4. Learn code optimization techniques and improve performance of a program segment.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CST413-1 **Course : Web Architecture and Technology (Elective-I)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand need based evolution and technical modifications required in communication technology.
2. Develop simple applications in Web related platforms.
3. Understand security improvement strategies in computer networks.
4. Comprehend and cope with emerging trends and issues in the field of communications.

Syllabus

UNIT-I :

Introduction to TCP/IP: Evolution of Internet, TCP/IP: addressing and routing.

UNIT-II :

Application Protocol: Internet applications: FTP, Telnet, Email, Chat. World Wide Web: HTTP protocol.

UNIT-III :

HTML and Scripting Language

Designing web pages: HTML, forms, CGI scripts and clickable maps, JAVA applets, JAVA script, Swing, Perl. PHP, DHTML, XML, jQuery.

UNIT-IV :

Security Issues

E-Commerce and security issues including symmetric and asymmetric key, encryption and digital signature, authentication.

UNIT- V :

Emerging Trends

Emerging trends, Internet telephony and virtual reality over the web, etc. Intranet and extranet, firewall design issues.

UNIT- VI :

Web Architecture & Framework

Basic Web Architecture, Web Server, Application server, Web development Frameworks

References :

1. David Sawyer McFarland; CSS3: The Missing Manual, O'Reilly Media, 2012.
2. David Sawyer McFarland; JavaScript and jQuery: The Missing Manual; Second Edition, O'Reilly Media, 2011.
3. Andy Budd; CSS Mastery- Advanced Web Standard Solutions, Second Edition, Apress Company, 2009.
4. Dan Cederholm; Web Standards Solutions- the Markup and Style Handbook, Apress Company, 2009.
5. Larry Ullman; PHP 6 and MySQL 5, Peachpit Press, 2009.
6. Elisabeth Freeman, Eric Freeman; Head First HTML with CSS and XHTML, O'Reilly Media, 2006.
7. David Flanagan, Javascript: The Definitive Guide, O'Reilly Media, 2011.
8. Eric Meyer, CSS: The Definitive Guide, O'Reilly Media, 2004.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CST413-2 **Course : Business Intelligence (Elective-I)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Differentiate between Transaction Processing and Analytical applications and demonstrate understanding of technology and processes associated with BI systems.
2. Comprehend the BI project life cycle.
3. Design reports using various reporting tools and methods.

Syllabus :

Unit I: Types of Digital Data : structured, unstructured and semi-structured data, Introduction to OLTP and OLAP(MOLAP, ROLAP,HOLAP).

Unit II : Introduction to Business Intelligence : evolution of BI, BI value chain, introduction to business analytics, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities

Unit III: Basics of Data Integration : Concepts of data integration, need and advantages of using data integration, introduction to common data integration approaches, data integration technologies, Introduction to data quality, data profiling concepts and applications.

Unit IV : Multi-Dimensional Data Modeling : Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi-dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema.

Unit V : BI Project Lifecycle : Typical BI Project Lifecycle, Requirements Gathering And Analysis - Functional and Non-Functional Requirements ,Testing in a BI Project, BI Project Deployment , Post Production Support.

Unit VI: Basics of Enterprise Reporting : Introduction to enterprise reporting, concepts of dashboards, balanced scorecards. Introduction to business metrics and KPIs.

Text Books :

1. Fundamentals of Business Analytics, R N Prasad and S Acharya, Wiley India.
2. Business Intelligence: A Managerial Approach, Efraim Turban, Ramesh Sharda, Jay E. Aronson, David King, Pearson Prentice Hall.

Reference Books :

1. An introduction to Building the Data Warehouse, IBM.
2. Business Intelligence For Dummies, Swain Scheps.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CST413-3 **Course : Advanced Object-Oriented Technologies (Elective-I)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Implement Java Beans, EJB and JDBC for JAVA based database application.
2. Demonstrate server and client side programming using servelets and Java server page.
3. Implement Hibernate configuration and explore Spring, Hibernate architecture

Syllabus:

Unit 1: EJB

Enterprise Java Bean: Overview of EJB, Preparing a Class to be a JavaBean, Creating a JavaBeans, JavaBeans Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean.

Unit 2: JDBC

Java Database Connectivity (JDBC):

The Design of JDBC, the Structure Query Language, JDBC Configuration, Executing SQL Statement, Query Execution.

Unit 3: Servlet

Servlet Basic, The servlet Life Cycle, The servlet that generate HTML.

Handling the client Request, Form Data.: The Role of Form Data, Reading Form Data from Servlets Example: Reading Three Parameter. Handling the client Request: HTTP Request Header, Generating The Server Response: HTTP Status Code, Generating The Server Response: HTTP Response Headers

Unit 4: JSP

Java Server Pages (JSP): Overview of JSP Technology- The need of JSP, Benefit of JSP, and Installation of JSP pages, Basic Syntax. Invoking JAVA Code with JSP Scripting Elements. Integrated Servelets and JSP.

Unit 5: Spring:

MVC Architecture MVC based Web applications, study of struts Framework, spring Vs struts.

Overview of Springs Framework, Spring Bean Life Cycle, Spring Bean Scope, Spring JDBC Framework, Basic bean wiring, Advanced Bean Wiring.

Unit 6: Hibernate

Hibernate Overview, Hibernate architecture, Hibernate Environment, Hibernate Configuration, Hibernate Configuration, Hibernate Sessions, Collections Mappings, Association Mappings, Hibernate Query Language

Text Books

1. M. Deitel, P. J. Deitel, S. E. Santry; Advanced Java 2 Platform HOW TO PROGRAM; H– Prentice Hall.
2. Antonio Goncalves; Beginning JavaEE 6 Platform with GlassFish 3 From Novice to Professional.
3. Cay Horstman, Gary Cornell; Core JAVA Volume-II Advanced Features; 8th Edition.
4. Craig Walls; Spring In Action; 2nd Edition
5. Marty Hall, Larry Brown; Core Servlets and Java Server Pages Volume-1: Core Technologies; 2nd Edition.

Reference Books:

1. Kathy Sierra; Head First Java; 2nd Edition; O'Relly Media, 2005.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CST414-1 **Course : Internetworking and TCP/IP (Elective-II)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Differentiate functioning of OSI and TCP/IP Model, solve problems on IP Addressing and implement IP forwarding.
2. Classify and solve problems on various routing algorithm used for inter and intra domain Routing.
3. Able to implement services on basic application layer server configuration.
4. Recognize www Internet security services and protocols related to Multimedia.
5. Implement web application program based on dynamic/ active web document technologies.

Course Syllabus:

UNIT –I :

Introduction and Overview. Comparison of OSI Model and TCP/IP model. Networking Technologies: LANS, WANS, Connecting Devices. Internetworking concept and Architectural model. Internet Backbones, NAP, ISP's, RFC's, Internet Standards.

UNIT – II :

Purpose of Internet Protocol, Internet datagram, ARP and RARP, Routing Methods: Routing Table and Routing module, ICMP, IGMP,IP Addresses: Introduction, Address Classification, Subnetting, Supernetting, Classless addressing, Security at the IP Layer, IPSec, IPv4 and IPv6 packet formats.

UNIT –III :

UNICAST ROUTING PROTOCOLS Interior and exterior routing, RIP, OSPF, BGP, Multicasting: Introduction, Multicast Routing, Multicast Routing Protocols, Multicast Trees, DVMRP, MOSPF, CBT, PIM, MBONE.

UNIT –IV :

Host Configuration: BOOTP, DHCP; Services: Domain Name System, FTP, TFTP and Electronic Mail: SMTP, MIME, IMAP, POP.

UNIT-V :

Network Management: SNMP, WWW: HTTP, Mobile IP. Multimedia: RTP, RTCP, internet Security: IPSec, PGP, Firewalls, SSL.

UNIT VI :

Networks applications: Client-Server Interaction: The client-server paradigm,, world wide web pages browsing, dynamic web document technologies(CGI, ASP, JSP, PHP, ColdFusion), Active Web Document Technologies (Java, JavaScript), Network Management(SNMP).

Text Books :

1. Behrouz A. Forouzan; TCP/IP Protocol suite; Third Edition; TMH Pub, 2005.
2. James F. Kurose, Keith W. Ross; Computer Networking; Sixth Edition, Pearson Education, 2012.
3. Richard Stevens; TCP/IP Illustrated, Vol. I.; Addison Wesley Publisher, 2011.
4. William Stallings; High-Speed Networks: TCP/IP and ATM Design Principles; Prentice Hall; 1998.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CST414-2 **Course : Machine Learning (Elective-II)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand the basic concept and need of machine learning.
2. Understand and analyze different models of learning.
3. Understand applicability of various learning models.
4. Design hybrid machine learning model.

Course Syllabus:

UNIT I:-

The concept learning task, General-to-specific ordering of hypotheses. Version spaces. Inductive bias. Decision Tree Learning. Rule Learning: Propositional and First-Order, Over-fitting, Cross-Validation. Experimental Evaluation of Learning Algorithms.

UNIT II:-

Instance-Based Learning: k-Nearest neighbor algorithm, Radial basis functions. Case-based learning. Computational Learning Theory: probably approximately correct (PAC) learning. Sample complexity. Computational complexity of training. Vapnik-Chervonenkis dimension.

UNIT III:-

Artificial Neural Networks: Linear threshold units, Perceptions, Multilayer networks and back-propagation, recurrent networks.

UNIT IV:-

Probabilistic Machine Learning Maximum Likelihood Estimation, MAP, Bayes Classifiers Naive Bayes. Bayes optimal classifiers. Minimum description length principle.

UNIT V:-

Bayesian Networks, Inference in Bayesian Networks, Bayes Net Structure Learning Unlabelled data: EM, preventing over fitting, cotraining Gaussian Mixture Models, K-means and Hierarchical Clustering,

UNIT VI:-

Clustering and Unsupervised Learning, Hidden Markov Models, Reinforcement Learning, Support Vector Machines, Ensemble learning: boosting, bagging.

Text Books:-

1. Tom Mitchell; Machine Learning- an Artificial Intelligence Approach, Volume-II; Morgan Kaufmann, 1986.
2. Soumen Chakrabarti; Mining the Web: Discovering Knowledge from Hypertext Data, Morgan-Kaufmann, 2003.
3. Christopher Bishop, Pattern Recognition and machine learning; Springer Verlag, 2006.
4. A. K. Jain and R. C. Dubes; Algorithms for Clustering Data; Prentice Hall PTR, 1988

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CST414-3 **Course : Optimization Techniques in Computing (Elective-II)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand basic components & subcomponents of problem & use for designing model.
2. Understand role of search activity in optimization process & its usage in multi object optimization.
3. Understand optimization process for real world applications.

Course Syllabus:

UNIT I: Problem Formulation and Setup

System characterization, System-level coupling and interactions, Visualization techniques in design optimization, Subsystem model development, Subsystem model selection, Model and simulation development and validation

UNIT II: Optimization and Search Methods

Optimization and exploration techniques, Review of linear and nonlinear programming, Heuristic techniques Design Space Exploration, Full factorial search, parameter study, Taguchi/orthogonal arrays, Latin hypercube, Mixed integer programming

UNIT III: Multi objective and Stochastic Challenges

Multi objective optimization, Weighted sum optimization, Weak and strong dominance, Pareto front computation, Goal programming and is performance, Physical Programming, Multi attribute Utility Theory, Introduction to robust, Reliability analysis, Taguchi methods

UNIT IV: Implementation Issues and Real World Applications

System assessment and extensions, what is optimality? Design for value: including lifecycle costing, Optimizing product families and platforms, Implementation issues:, Model reduction, Approximation techniques: response surfaces, kriging, neural networks, Concurrent design.

Text Books

1. Papalambros, Panos Y., and Douglass J. Wilde; Principles of Optimal Design: Modeling and Computation; 2nd edition; Cambridge, UK: Cambridge University Press; 2000. ISBN: 9780521627276.
2. Vanderplaats, Garret N.; Numerical Optimization Techniques for Engineering Design; 3rd edition; Colorado Springs, CO: Vanderplaats Research and Development Inc; 2001. ISBN: 9780944956014.
3. Steuer, Ralph E.; Multiple Criteria Optimization: Theory, Computation and Application; New York, NY: John Wiley and Sons, Inc.; 1986. ISBN: 9780471888468.

4. Goldberg, David E.; Genetic Algorithms in Search, Optimization and Machine Learning; Reading, MA: Addison-Wesley; 1989. ISBN: 9780201157673.
5. Natalia M., Alexandrov, and M. Y., Hussaini; Multidisciplinary Design Optimization: State of the Art. (Proceedings in Applied Mathematics Series; No. 80). Philadelphia, PA: Society for Industrial & Applied Math; 1997. ISBN: 9780898713596.
6. Owens, Lawrence J., Alvin J. Walsh, and Michael J. Fogel.; Artificial Intelligence through Simulated Evolution; New York, NY: John Wiley and Sons, Inc.; 1966.
7. Statnikov, Roman B., and Joseph B. Matusov; Multicriteria Optimization and Engineering; New York, NY: Springer-Verlag; 1995. ISBN: 9780412992315.

Syllabus for Semester VII, B. E. (Computer Science & Engineering)

Course Code : CSP415 **Course : Project and Seminar**

L:0 Hrs,T: 0 Hr,P:2 Hrs, Per Week **Total Credits : 04**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Define and analyze the problem
2. Apply software engineering and core engineering principles to the analyzed problems
3. Implement using different programming languages and software tools
4. Contribute to the society by developing solutions to real world problems

Based on current trends in IT Industry with executable project as deliverable, the topics and practicals will be discussed during the conduction.

VIII SEMESTER

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CST416 **Course : Distributed Systems**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand and apply knowledge of basic distributed system techniques and concepts.
2. Comprehend issues in mutual exclusion, deadlock detection, and agreement protocols in the context of distributed systems.
3. Realize design issues for distributed file system, distributed shared memory and distributed scheduling.
4. Recognize the importance of fault tolerance and failure recovery in a distributed environment.

UNIT-I

Introduction to Distributed systems - Examples of distributed systems, challenges, architectural models, issues in distributed operating systems, communication primitives, Case study: Unix IPC and Java RMI.

Theoretical Foundations - inherent limitations of a distributed system, Lamports logical clocks, vector clocks, casual ordering of messages, global state, cuts of a distributed computation, termination detection.

UNIT-II

Distributed Mutual Exclusion – introduction, the classification of mutual exclusion and associated algorithms (token based and non-token based approach), a comparative performance analysis.

UNIT-III

Distributed Deadlock Detection -Introduction , deadlock handling strategies in distributed systems , issues in deadlock detection and resolution ,control organizations for distributed deadlock detection , centralized and distributed deadlock detection algorithms ,hierarchical deadlock detection algorithms.

Agreement protocols – introduction, the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms.

UNIT-IV

Distributed File system: Introduction to DFS , design issues , File service architecture , Case study - Sun network file system, Sprite file system

Distributed shared memory: design issues, Architecture, algorithms for implementing DSM, memory coherence and protocols, Case studies.

UNIT-V

Distributed Scheduling: Introduction, issues in load distributing, components of a load distributing algorithm, load distributing algorithms, performance comparison, selecting a suitable load sharing algorithm, requirements for load distributing, task migration and associated issues.

UNIT-VI

Failure Recovery: introduction, basic concepts, classification of failures, backward and forward error recovery, backward error recovery, recovery in concurrent systems, consistent set of check points, synchronous and asynchronous check pointing and recovery.

Fault Tolerance: Introduction, Atomic Actions and committing, Commit protocols, Non Blocking Commit Protocols, Voting Protocols, Dynamic Voting Protocols, Dynamic vote reassignment protocols.

Protection: preliminaries, the access matrix model and its implementations, safety in matrix model, advanced models of protection.

Text Books:

1. Mukesh Singhal, NiranjanG.Shivaratri, "Advanced concepts in operating systems: Distributed,Database and Multiprocessor operating systems", TMH, 2001
2. Distributed Systems Concepts and Design – Coulouris, Dollimore, Kindberg Pearson Education.

Reference Books:

1. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2003
2. PradeepK.Sinha, "Distributed Operating System-Concepts and Design", PHI, 2003.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CSP416 **Course : Distributed Systems Lab**

L:0 Hrs,T:0 Hr,P:2 Hrs, Per Week **Total Credits : 02**

Practical based on Syllabus of CST416

Course Outcomes:

On successful completion of the course, students will be able to:

1. Implement timing and event relation in distributed environment.
2. Apply basic concepts of remote procedure call, RMI, and mutual exclusion.
3. Employ a solution for a given distributed computing protocol.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CST417 **Course : Information Security**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Solve and perform cryptanalysis task on basic cipher implementation of Cryptography techniques.
2. Identify applications and Solve problems based on Key generation and key management algorithms
3. Classify roles of authentication applications protocols used in information security.
4. Develop applications based on public key cryptography.
5. Comprehend Goals of Security and Analyse web security protocols using available tools.

Syllabus:

UNIT-I

Introduction to the concepts of security**:** need, principles, Types of Attacks, Services, Mechanisms, A model for network security, Encryption model.

UNIT-II

Classical encryption techniques: Block ciphers**:** simplified DES, Block cipher principles, Data encryption standard, Strength of DES, Block cipher design principles, Block cipher mode of operation, Characteristics of advanced symmetric block ciphers.

UNIT-III

Confidentiality using symmetric Encryption: Placement of encryption function, Traffic confidentiality, Key distribution, Random number generation, Public key cryptography.

UNIT-IV

Message authentication & Hash functions: Authentication requirements, Functions, Codes, Hash functions, Security of hash function. Hash algorithms, Digital signatures and authentication protocols, Digital signatures, Authentication protocols, Digital signature standard.

UNIT-V

Networks security practice: Authentication applications–Kerberos, E-mail security**-** S/MIME, IP security: Overview, Architecture, Authentication header, Encapsulating security payload, Combining security associations.

UNIT-VI

Web security: Web security considerations, Secure Socket Layer and Transport Layer Security, SHTTP. Security systems: Intruders, Intrusion detection, Firewalls design principles, Trusted systems, Virtual private networks.

Textbooks :

1. William Stallings; Cryptography & Networks Security Principles and Practice; 6th Edition; Pearson Education, 2013.
2. William Stallings; Networks Security Essentials Applications and Standards; 4th Edition; Pearson Education, 2010.

REFERENCES

1. Atul Kahate; Cryptography and Network Security; 1st Edition; Tata McGraw Hill, 2008.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CSP417 **Course : Information Security Lab**

L:0 Hrs,T:0 Hr,P: 2 Hrs, Per Week **Total Credits : 02**

Practical based on Syllabus of CST417

Course Outcomes:

On successful completion of the course, students will be able to:

1. To apply testing on basic encryption techniques.
2. To implement modes of operation for block cipher.
3. To apply key generation technique for developing an application.
4. To be able to test various types of attacks on key management.
5. To conduct research in network security.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CST418-1 **Course : Grid and Cloud Computing (Elective-III)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understanding the key dimensions of the challenge of Cloud Computing
2. Assessment of the economics , financial, and technological implications for selecting cloud computing for own organization
3. Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
4. Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas.
5. Understanding Grid computing in business application.

Syllabus:

UNIT I

UNDERSTANDING CLOUD COMPUTING

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II

DEVELOPING CLOUD SERVICES

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

UNIT III

CLOUD COMPUTING FOR EVERYONE

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV

USING CLOUD SERVICES

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files.

UNIT V

OTHER WAYS TO COLLABORATE ONLINE

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

UNIT VI

GRID Computing

Introduction to Grid Computing & its value in business computing, Grid technologies, issues and solutions,

Text Book:

1. Michael Miller; Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online; Que Publishing; August 2008.
2. Haley Beard; Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs; Emereo Pty Limited; July 2008

Reference Books:

1. George Reese; Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, O'Reilly Media, 2009.
2. John Rhoton; Cloud Computing Explained: Implementation Handbook for Enterprises, Second Illustrated Edition, Recursive Limited, 2009.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CST418-2 **Course : Distributed and Parallel Databases (Elective-III)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand the design principles and concepts of various distributed and parallel architectures.
2. Exploring and ensuring correctness of design principles and database concepts such as transactions, concurrency, recovery and reliability in the context of distributed database.
3. Deals with distributed query processing and various heuristics in distributed query processing.
4. Applications and state of the art technologies in distributed and parallel database.

Syllabus:

Unit-I:

Architecture of Parallel Databases, Database design in parallel Database, Scheduling in parallel Database, Architecture of Distributed Database, Client Server Systems and collaborative systems.

Unit-II:

Storage Management in parallel Database and Distributed Database, horizontal and vertical fragmentation, Data partitions and clusters, indexing techniques.

Unit-III:

Transaction and concurrency control, Two phase commit, implementation of ACID properties in parallel and distributed Database.

Unit-IV:

Query optimization, computation of join costs and access costs, semijoins and antijoins, Using Heuristics in Query optimization.

Unit-V:

Backup, and Recovery concepts, Transaction recovery, replication concepts, multimaster and snapshot replication conflict resolution.

Unit-VI:

Application of parallel and distributed database in highly transactional and Data mining systems, use of parallel and distributed database in data warehousing.

Text Books :

1. D. Bell and J.Grimson; "Distributed Database Systems"; Addison-Wesley 1992.
2. S. Ceri and G. Pelagati; "Distributed Database Systems"; McGraw Hill, 2002 Reprint.
3. Tamer Ozstu; "Principles of Distributed Database Systems"; Prentice Hall, 1991.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CST418-3 **Course : Parallel Programming Design (Elective-III)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits :09**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Explore dependency analysis in a code segment and shall be able to apply loop transformation techniques for optimizations
2. Understand the design principles and comparisons among the various parallel computation models
3. Exhibit concepts dealing with shared memory parallel programming and use of MPI
4. Implement Parallel searching, sorting techniques on different computational models

Unit 1 :

Introduction:

Introduction to parallel programming, parallel programming platforms, principles of parallel algorithm designs, Dependence analysis for single loop, double loop, perfect loop nest, Loop Transformation techniques

Unit II :

Parallel Programming Paradigms:

Parallel architectures and computational models, Comparisons among different computational models, basic communication operations, Interconnection topologies, Issues related to scalability and speedup, Amdahl's Law

Unit III :

OpenMP:

Introduction, Shared memory Models, Parallel constructs, Work Sharing and Synchronization constructs, Best practices in OpenMP and Optimization measures, Advanced Techniques in OpenMP

Unit IV :

Introduction to message passing programming:

Basics of message passing, Distributed Memory and Message passing interface: Introduction, blocking and non blocking calls, Combination of OpenMP and MPI

Unit V :

Searching and Sorting:

Issues in sorting on parallel computers, sorting networks, search algorithms for discrete optimization problems, sequential search algorithms, search overhead factors, parallel Searching and parallel sorting on different computation models

Unit VI :

Advanced Topics:

Load balancing techniques, lock based and lock free synchronization techniques, Introduction to memory wall, ILP wall and Power wall

Text Books :

1. Introduction to Parallel Computing by Ananth Grama, George Karypis, Vipin Kumar, and Anshul Gupta.
2. Dependence Analysis by Utpal Banerjee, INTEL Corporation
3. The Design and Analysis of Parallel Algorithms by Selim G. Akl, Queen's University

Reference Books :

1. Parallel Programming in C with OpenMP and MPI by M J Quinn

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CST419-1 **Course : Web Intelligence and Big Data (Elective-IV)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcome:

On Successful completion of this course, students will able to:

1. Understand new systems mainly based on intelligent web analysis.
2. Understand big data technology paradigm and write parallel map reduce applications.
3. Implement various techniques to analyze huge data statistically as well as textually.
4. Interpret statistics and examine real world data mining questions using approaches such as the use of statistical, Bayesian classifiers and can perform predictive analysis on data.

Syllabus:

UNIT I:

Introduction and Overview Look: Search, Indexing and Memory.

UNIT II:

Listen: Streams, Information and Language, Analyzing Sentiment and Intent Load: Databases and their Evolution, Big data Technology and Trends.

UNIT III:

Programming: Map-Reduce-Learn: Classification, Clustering, and Mining, Information Extraction.

UNIT IV:

Connect: Reasoning: Logic and its Limits, Dealing with Uncertainty.

UNIT V:

Programming: Bayesian Inference for Medical Diagnostics.

UNIT VI:

Predict: Forecasting, Neural Models, Deep Learning, and Research Topics Data Analysis: Regression and Feature Selection.

Text Books:

1. Michael Minelli and Michele Chambers; Big Data, Big Analytics: Emerging Business Intelligence and Analytic trends for Today's Business, John Wiley & Sons, 2013.
2. Judith Hurwitz and Alan Nugent; Big Data for Dummies; John Wiley & Sons, 2013.

References:

1. Eric Siegel, Thomas H. Davenport; Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die, John Wiley & Sons, 2013.
2. Anand Rajaraman, Jeffrey D Ullman and Jure Leskovec; Mining of Massive Datasets, Cmbridge University Press, 2012.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CST419-2 **Course : Natural Language Processing (Elective-IV)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes :

On successful completion of the course, students will be able to:

1. Implement methods for morphological analysis, tagging, and evaluate such systems
2. Write formal grammars for Natural Languages.
3. Implement important parsing algorithms, and evaluate parsing systems.
4. Implement methods for capturing and/or classifying the content of texts in natural language.

Syllabus:

Unit-I: Introduction

NLP tasks in syntax, semantics, and pragmatics. Key issues &Applications such as information extraction, question answering, and machine translation. The problem of ambiguity. The role of machine learning. Brief history of the field.

Unit-II: N-gram Language Models

Role of language models. Simple N-gram models. Estimating parameters and smoothing. Evaluating language models. Part Of Speech Tagging and Sequence Labeling Lexical syntax. Hidden Markov Models. Maximum Entropy models.

Unit-III: Syntactic parsing

Grammar formalisms and tree banks. Efficient parsing for context-free grammars (CFGs). Statistical parsing and probabilistic CFGs (PCFGs). Lexicalized PCFGs.

Unit-IV: Semantic Analysis

Lexical semantics and word-sense disambiguation. Compositional semantics. Semantic Role Labeling and Semantic Parsing.

Unit-V: Information Extraction (IE)

Named entity recognition and relation extraction. IE using sequence labeling. Automatic summarization Subjectivity and sentiment analysis.

Unit-VI : Machine Translation (MT)

Basic issues in MT. Statistical translation, word alignment, phrase-based translation, and synchronous grammars.

Textbook:

1. D. Jurafsky and R. Martin; Speech and Language Processing; 2nd edition, Pearson Education, 2009.
2. Allen and James; Natural Language Understanding; Second Edition, Benjamin/Cumming, 1995. Charniack & Eugene, Statistical Language Learning, MIT Press, 1993.

Reference Book:

1. Akshar Bharati, Vineet Chaitanya, and Rajeev Sangal; NLP: A Paninian Perspective, Prentice Hall, New Delhi, 1994.
2. T. Winograd; Language as a Cognitive Process; Addison-Wesley, 1983.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CST419-3 **Course : Mobile Adhoc Network (Elective-IV)**

L:4 Hrs,T: 1 Hr,P: 0 Hrs, Per Week **Total Credits : 09**

Course Outcomes:

Upon Successful Completion of this course, student should be able to :

1. Classify various mobile models in Ad hoc Network and Differentiate MAC Protocol standards.
2. Recognize and implement Various Routing algorithm under their classification.
3. Identify research problem related to ad hoc Transport Protocol and simulate security attacks.
4. Demonstrate few optimization techniques related to cross layer Design.
5. Solve problems on Energy management in ad hoc network.

UNIT I :

Introduction to ad hoc networks – definition, characteristics features, applications. Characteristics of Wireless channel, Ad hoc Mobility Models: Indoor and outdoor models.

UNIT II :

MAC Protocols: design issues, goals and classification. Contention based protocols- with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.

UNIT III :

Routing Protocols : Design issues, goals and classification. Proactive Vs reactive routing, Unicast routing algorithms, Multicast routing algorithms, hybrid routing algorithm, Energy aware routing algorithm, Hierarchical Routing, QoS aware routing.

UNIT IV :

Transport layer: Issues in designing- Transport layer classification, ad hoc transport protocols. Security issues in ad hoc networks: issues and challenges, network security attacks, secure routing protocols.

UNIT V :

Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, Cross layer cautionary perspective. Integration of ad hoc with Mobile IP networks.

UNIT VI :

Energy management in ad hoc network, Need, classification of energy management scheme, transmission power management, system power management. MANET Simulation Tools : NS-2/OMNET + + .

TEXT BOOKS :

1. C.Siva Ram Murthy and B. S. Manoj, Ad hoc Wireless Networks Architectures and protocols, 2nd edition, Pearson Education. 2007.
2. Charles E. Perkins, Ad hoc Networking, Addison – Wesley, 2000.

Syllabus for Semester VIII, B. E. (Computer Science & Engineering)

Course Code : CSP420 **Course : Project and Seminar**

L:0 Hrs,T: 0 Hr,P: 5 Hrs, Per Week **Total Credits :10**

Course Outcomes:

On successful completion of the course, students will be able to:

1. Define and analyze the problem
2. Apply software engineering and core engineering principles to the analyzed problems
3. Implement using different programming languages and software tools
4. Contribute to the society by developing solutions to real world problems

Based on current trends in IT Industry with executable project as deliverable, the topics and practicals will be discussed during the conduction.