Curriculum & Syllabus

of

B.E. Computer Science and Engineering

(For the batch admitted in 2012-13 and 2013-14 onwards)

R 2010

K.S.RANGASAMY COLLEGE OF TECHNOLOGY
TIRUCHENGODE – 637 215

(An Autonomous Institution affiliated to Anna University Chennai and approved by AICTE New Delhi)

K.S.Rangasamy College of Technology - Autonomous Regulation	**R 2010**
Department	Computer Science and Engineering
Programme Code & Name	CS : B.E. Computer Science and Engineering

K.S.RANGASAMY COLLEGE OF TECHNOLOGY TIRUCHENGODE - 637 215

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DECLARATION

Hereby it is certified that the content of curriculum and syllabus available in this book is the final version, modified as per the suggestions of Board of Studies and Academic Council. Further, the content and course codes are verified and found to be correct to the best of our knowledge.

Sl. No.	Name of Internal Members of BoS	Designation	Signature with Date
1.		BoS Chairman, Computer Science and Engineering	
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K.S.Rangasamy College of Technology, Tiruchengode – 637 215								
Curriculum for the Programmes under Autonomous Scheme								
Regulation	R 2010							
Department	Department of Computer Science and Engineering							
Programme Code & Name	CS: B.E. Computer Science and Engineering							
Semester I								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 EN 101	Technical English	3	0	0	3	50	50	100
10 MA 101	Engineering Mathematics I	3	1	0	4	50	50	100
10 PH 102	Physics of Materials (CS, EC, EE,EI,IT)	3	0	0	3	50	50	100
10 CH 101	Engineering Chemistry (BT, CS, EC, EE, TT)	3	0	0	3	50	50	100
10 GE 102	Engineering Graphics (BT, CS, EC, EE,EI,IT)	2	0	3	4	50	50	100
10 GE 104	Basics of Civil and Mechanical Engineering (CS, EC, EE,EI,IT)	4	0	0	3	50	50	100
	PRACTICAL							
10 CH 100	Engineering Chemistry Laboratory (BT, CS, EC, EE, TT)	0	0	3	2	50	50	100
10 GE 1P1	Engineering Practices Laboratory (BT, CS, EC, EE, TT)	0	0	3	2	50	50	100
Total		18	01	09	24	800		
Semester II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 EN 102	Communication Skills	3	0	0	3	50	50	100
10 MA 102	Engineering Mathematics II	3	1	0	4	50	50	100
10 CH 102	Environmental Engineering (BT, CS, EC, EE, TT)	3	0	0	3	50	50	100
10 PH 101	Engineering Physics (BT, CS, EC, EE, TT)	3	0	0	3	50	50	100
10 GE 101	Fundamentals of Programming (BT, CS, EC, EE, TT)	3	1	0	3	50	50	100
10 GE 105	Basics of Engineering Mechanics (CS, EC, EE,EI,IT)	3	1	0	4	50	50	100
	PRACTICAL							
10 PH 100	Engineering Physics Laboratory (BT, CS, EC, EE, TT)	0	0	3	2	50	50	100
10 GE 1P2	Fundamentals of Programming Laboratory (BT, CS, EC, EE, TT)	0	0	3	2	50	50	100
Total		18	03	06	24	800		

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Semester III								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 MA 003	Engineering Mathematics III	3	1	0	4	50	50	100
10 EE 001	Basics of Electrical Engineering (CS, IT)	3	0	0	3	50	50	100
10 EC 002	Electronic Devices and Circuits (CS, IT)	3	0	0	3	50	50	100
10 EC 003	Digital Principles and System Design (CS, EC, IT)	3	0	0	3	50	50	100
10 CS 311	Object Oriented Programming and C++	3	0	0	3	50	50	100
10 CS 001	Data Structures Using C (CS, EE, EI, IT)	3	0	0	3	50	50	100
	PRACTICAL							
10 EC 0P1	Electronic Circuits and Digital Laboratory (CS, IT)	0	0	3	2	50	50	100
10 CS 3P1	Object Oriented Programming and C++ Laboratory	0	0	3	2	50	50	100
10 CS 0P1	Data Structures using C Laboratory (CS, EE, EI, IT)	0	0	3	2	50	50	100
10 TP 0P1	Career Competency Development I	0	0	2	0	100	00	100
Total		18	1	11	25	1000		
Semester IV								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 MA 006	Discrete Mathematics	3	1	0	4	50	50	100
10 CS 003	Design and Analysis of Algorithm (CS, IT)	3	0	0	3	50	50	100
10 EC 007	Microprocessors and Microcontrollers (CS, EC, IT)	3	0	0	3	50	50	100
10 CS 411	Computer Architecture	3	0	0	3	50	50	100
10 CS 412	Java Programming	3	0	0	3	50	50	100
10 CS 413	Operating Systems	3	0	0	3	50	50	100
	PRACTICAL							
10 EC 0P3	Microprocessors and Microcontrollers Laboratory (CS, EC, IT)	0	0	3	2	50	50	100
10 CS 4P1	Java Programming Laboratory	0	0	3	2	50	50	100
10 CS 4P2	Operating Systems Laboratory	0	0	3	2	50	50	100
10 TP 0P2	Career Competency Development II	0	0	2	0	100	00	100
Total		18	1	11	25	1000		

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Semester V								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 MA 008	Probability and Queuing Theory	3	1	0	4	50	50	100
10 CS 005	Database Management Systems (CS, IT)	3	1	0	4	50	50	100
10 CS 511	System Software	3	`	0	3	50	50	100
10 CS 512	Data Communication and Networks	3	0	0	3	50	50	100
10 CS 513	Web Technology	3	0	0	3	50	50	100
10 CS 514	Graphics and Multimedia System	3	0	0	3	50	50	100
	PRACTICAL							
10 CS 0P4	Database Management Systems Laboratory	0	0	3	2	50	50	100
10 CS 5P1	Web Technology Laboratory	0	0	3	2	50	50	100
10 CS 5P2	Graphics and Multimedia System Laboratory	0	0	3	2	50	50	100
10 TP 0P3	Career Competency Development III	0	0	2	0	100	00	100
Total		18	2	11	26	1000		
Semester VI								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 HS 001	Professional Ethics	3	0	0	3	50	50	100
10 CS 611	Object Oriented Analysis and Design	3	0	0	3	50	50	100
10 CS 612	C # and .Net Frame Work	3	1	0	4	50	50	100
10 CS 615	Theory of Computation	3	1	0	4	50	50	100
10 CS 616	Software Engineering	3	0	0	3	50	50	100
10 CS E1*	Elective I	3	0	0	3	50	50	100
	PRACTICAL							
10 CS 6P2	C # and .Net Laboratory	0	0	3	2	50	50	100
10 CS 6P3	Case Tools Laboratory	0	0	3	2	50	50	100
10 CS 6P5	Mini Project	0	0	3	2	100	00	100
10 TP 0P4	Career Competency Development IV	0	0	2	0	100	00	100
Total		18	2	11	26	1000		

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Semester VII								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 HS 002	Total Quality Management	3	0	0	3	50	50	100
10 IT 001	Mobile Computing (CS, IT)	3	0	0	3	50	50	100
10 CS 711	Open Source System	3	1	0	4	50	50	100
10 CS 712	Cryptography and Network Security	3	0	0	3	50	50	100
10 CS 713	Principles of Compiler Design	3	1	0	4	50	50	100
10 CS E2*	Elective II	3	0	0	3	50	50	100
	PRACTICAL							
10 CS 7P1	Compiler Design Laboratory	0	0	3	2	50	50	100
10 CS 7P2	Open Source System Laboratory	0	0	3	2	50	50	100
10 CS 7P3	Project Work - Phase I	0	0	4	2	100	00	100
10 TP 0P5	Career Competency Development V	0	0	2	0	100	00	100
Total		18	2	12	26	1000		
Semester VIII								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 HS 003	Principles of Management	3	0	0	3	50	50	100
10 CS 811	Software Testing	3	0	0	3	50	50	100
10 CS E3*	Elective III	3	0	0	3	50	50	100
10 CS E4*	Elective IV	3	0	0	3	50	50	100
	PRACTICAL							
10 CS 8P1	Project Work - Phase II	0	0	16	8	50	50	100
Total		12	0	16	20	500		

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Elective I								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 CS E11	Data Mining	3	0	0	3	50	50	100
10 CS E12	Advanced Computer Architecture	3	0	0	3	50	50	100
10 CS E13	User Interface Design	3	0	0	3	50	50	100
10 CS E14	Pattern Recognition Techniques	3	0	0	3	50	50	100
10 CS E15	Information Storage and Management	3	0	0	3	50	50	100
10 CS E16	Distributed Computing	3	0	0	3	50	50	100
Elective II								
10 IT E21	Cloud Computing (CS, IT)	3	0	0	3	50	50	100
10 CS E21	XML and Web Services	3	0	0	3	50	50	100
10 CS E22	Embedded System Design	3	0	0	3	50	50	100
10 CS E23	Multimedia Computing	3	0	0	3	50	50	100
10 CS E24	Mobile Ad-hoc Networks	3	0	0	3	50	50	100
10 CS E25	Software Forensics	3	0	0	3	50	50	100
Elective III								
10 CS E31	Decision Support Systems and Intelligent Systems	3	0	0	3	50	50	100
10 CS E32	Artificial Intelligence	3	0	0	3	50	50	100
10 CS E33	Object Oriented Programming in Python	3	0	0	3	50	50	100
10 CS E37	Mobile Application Development	3	0	0	3	50	50	100
10 CS E35	Security Issues in Ad-hoc Networks	3	0	0	3	50	50	100
10 CS E36	Service Oriented Architecture	3	0	0	3	50	50	100
Elective IV								
10 CS E41	Parallel Computing	3	0	0	3	50	50	100
10 CS E42	Text Mining	3	0	0	3	50	50	100
10 CS E43	Semantic Web	3	0	0	3	50	50	100
10 CS E44	Agile Software Methodology	3	0	0	3	50	50	100
10 CS E45	Software Quality Assurance	3	0	0	3	50	50	100
10 CS E46	Wireless Sensor Networks	3	0	0	3	50	50	100

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		L	T	P	C	CA	ES	Total
10 EN 101	TECHNICAL ENGLISH	3	0	0	3	50	50	100
Objective(s)	To improve learners vocabulary and to enable them to use words appropriately in different academic and professional contexts, familiarize learners with different rhetorical functions of Technical English, develop strategies that could be adopted while reading texts, acquire the ability to speak effectively in English in real-life and career related situations and train learners in organized academic and professional writing.							
1	GRAMMAR AND VOCABULARY				Total Hrs	9		
Word formation with prefixes and suffixes – synonyms and antonyms – verb patterns- subject-verb agreement – tenses – voices – use of conditionals – comparative adjectives (affirmative and negative) – expanding nominal compounds – articles – use of prepositions - phrasal verbs – British and American vocabulary – error detection – abbreviations and acronyms.								
2	LISTENING				Total Hrs	9		
Extensive listening – listening for general content – listening to fill up gapped texts – intensive listening – listening for specific information: retrieval of factual information – listening to identify topic, context, function, speaker's opinion, attitude, etc. – global understanding skills and ability to infer, extract gist and understand main ideas – note-taking: guided and unguided								
3	SPEAKING				Total Hrs	9		
Verbal and non verbal communication – speech sounds – syllables – word stress (structures and content words) – sentences stress – intonation – pronunciation drills, tongue twisters – formal and informal English – oral practice – developing confidence – introducing oneself – asking for or eliciting information – describing objects – expressing opinions (agreement / disagreement) – giving instructions								
4	READING				Total Hrs	9		
Exposure to different reading techniques – reading for gist and global meaning – predicting the content – skimming the text – identifying the topic sentence and its role in each paragraph – scanning – inferring / identifying lexical and contextual meanings – reading for structure and detail – transfer of information / guided note-making – understanding discourse coherence – sequencing of sentences – cloze reading.								
5	WRITING				Total Hrs	9		
Introductions to the characteristics of technical style – writing definitions and descriptions – paragraph writing (topic sentence and its role, unity, coherence and use of cohesive expressions) – process description (use of sequencing connectives) – comparison and contrast – classifying the data – analyzing / interpreting the data – formal letter writing (letter to the editor, letter for seeking practical training, and letter for undertaking project works in industries) – editing (punctuation, spelling and grammar)								
Total hours to be taught						45		
Text book (s) :								
1	Rizvi M Ashraf, 'Effective Technical Communication', 1st Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2005.							
Reference(s) :								
1	Dr.M.Balasubraminian and Dr.G.Anbalagan, 'Performance in English' Anuradha Publications, Kumbakonan, 2007.							
2	Sharon J. Gerson, Steven M. Gerson, 'Technical Writing – Process & Product'. 3rd Edition, Pearson Education (Singapore) (p) Ltd., New Delhi, 2004.							
3	Mitra K. Barun, 'Effective Technical Communication – A Guide for Scientists and Engineers', Oxford University Press, New Delhi, 2006.							

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Semester I								
Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 MA101	ENGINEERING MATHEMATICS I	3	1	0	4	50	50	100
Objective(s)	The course is aimed at developing the basic mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many engineering fields, significantly in fluid mechanics, field theory and communication engineering.							

1	MATRICES	Total Hrs	12

Column matrix as vector – linear independent and dependent of vector –Characteristic equation – Eigen values and Eigen vectors of a real matrix –Properties of eigen values and eigenvectors – Cayley – Hamilton theorem (without proof) – Similarity transformation (concept only) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

2	GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS	Total Hrs	12

Curvature – Cartesian and polar co-ordinates – Centre and radius of curvature – Circle of curvature – Involutes and evolutes – Envelopes – Properties of envelopes and evolutes –Evolute as envelope of normals.

3	FUNCTIONS OF SEVERAL VARIABLES	Total Hrs	12

Functions of two variables – Partial derivatives – Total differential – Maxima and minima – Constrained maxima and minima – Lagrange's multiplier method – Jacobians.

4	ORDINARY DIFFERENTIAL EQUATIONS	Total Hrs	12

Linear differential equations of Second and higher order with constant coefficient when the R.H.S is e^{ax}, x^n n>0,sin ax , cos ax, e^{ax} x^n , $e^{\alpha x}$ Sinβx, $e^{\alpha x}$ cosβx, x^n sinα x and x^n cosα x – Differential Equations with variable coefficients (Cauchy's Form and Legendre's Linear Equation).

5	DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS	Total Hrs	12

Simultaneous first order linear equations with constant coefficients – Method of variation of parameters – Solution of specified differential equations connected with electric circuits, bending of beams and simple harmonic motion (Differential equations and associated conditions need be given)

Total hours to be taught	60

Text book :

1	Veerarajan. T., "Engineering Mathematics (for first year), Fourth Edition Tata McGraw- Hill Publishing Company Limited, New Delhi, 2005.
2	Grewal. B.S., "Higher Engineering Mathematics", Thirty Eighth Edition, Khanna Publishers, Delhi, 2004.

References :

1	Kandasamy. P, Thilagavathy. K and Gunavathy. K, "Engineering Mathematics" – S.Chand and Co. – New Delhi 2007.
2	Kreyszig. E., "Advanced Engineering Mathematics," Eighth Edition, John Wiley and Sons (Asia) Limited, Singapore 2001.
3	Venkataraman.M.K, "Engineering Mathematics, Volume I & II Revised Enlarged Fourth Edition".

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Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 PH 102	PHYSICS OF MATERIALS (CS, EC, EE,EI,IT)	3	0	0	3	50	50	100
Objective(s)	Impart fundamental knowledge in various engineering materials and applications, knowledge about conducting, superconducting, semiconducting, dielectric and Nanomaterials.							

1	CONDUCTING AND SUPERCONDUCTING MATERIALS	Total Hrs	9

Introduction-Classical Free electron theory-verification of Ohm's law -Electrical Conductivity- Expression for electrical Conductivity-Thermal Conductivity-Expression for thermal Conductivity-Widemann Franz Law(Derivation)- Lorentz number - Advantages and drawbacks of classical free Electron theory-Fermi distribution function- superconductivity-Properties of Superconductors-Factors affecting superconducting phenomena-penetration depth (Qualitative)- DC and AC Josephson effect (Qualitative)-BCS theory- Type-I and Type-II superconductors-High T_C Superconductors-Applications: SQUID, Cryotron, Magnetic Levitation.

2	MAGNETIC MATERIALS	Total Hrs	9

Classification of Magnetic materials-properties-Heisenberg and Domain theory of ferromagnetism-Hystersis-Hard and Soft magnetic materials-Ferrites-Structure, preparation and Applications-Magnetic Recording and read out-Bubble memory-Magnetic Tape-Floppy Disc and Magnetic hard disc.

3	SEMICONDUCTING MATERIALS	Total Hrs	9

Introduction-properties-Elemental and Compound Semiconductors-Intrinsic and Extrinsic Semiconductors-Properties-Carrier Concentration in intrinsic and Extrinsic semiconductors (Derivation)- electrical conductivity of a semiconductor- determination of band gap-Relation between electrical conductivity and mobility-Fermilevel-Variation of Fermi level with Temperature and impurities-Hall effect-Hall Coefficient-Experimental Determination of Hall Coefficient, Applications.

4	DIELECTRIC MATERIALS	Total Hrs	9

Introduction-Polarization: Electronic, ionic, orientational and space charge-Frequency and Temperature dependence of polarization-Active and Passive Dielectric-internal field-Clasius –Mosotti relation(Derivation)-Dielectric Losses –types of dielectric materials (Liquid, Solid, gaseous)-Dielectric breakdown Mechanisms-Ferroelectric materials: properties and applications.

5	NANOMATERIALS	Total Hrs	9

Introduction-Properties-Fabrication methods-Top-Down Process – Ball milling-Nanolithography-Bottom-up Process-Vapour Phase Deposition(PVD & CVD)-Molecular Beam Epitaxy(MBE)-Metal Organic Vapour Phase Epitaxy(MOVPE)-Carbon Nano Tube(CNT):Properties,Preparation and applications.

Total hours to be taught	45

Text Book:

1	Dr.Arumugam M, "Engineering Physics II" Anuradha Publications, Kumbakonam, Reprint 2010.

Reference (s) :

1	Raghavan V, "Materials and Engineering", Prentice-Hall of India, New Delhi, 2007.
2	Gaur R K, Gupta S L, "Engineering Physics", Dhanpat Rai Publications, New Delhi, 2006.
3	www.howstuffworks.com

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Semester I								
Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 CH 101	ENGINEERING CHEMISTRY (BT, CS, EC, EE, TT)	3	0	0	3	50	50	100
Objective(s)	The student should be conversant with the principles involved in electro chemistry, corrosion and its inhibition, treatment of water for industrial purposes and the concept of energy storage devices, knowledge with respect to fuels and combustion and polymer and engineering materials.							
1	WATER TREATMENT				Total Hrs	9		
Water - sources and sanitary significance – Hardness of water - Estimation of hardness by EDTA method – Alkalinity. Boiler feed water- scale formation, corrosion, caustic embrittlement, priming and foaming- softening of water - Internal and external treatment - zeolite process – demineralization – desalination – electro dialysis and reverse osmosis. Domestic water treatment.								
2	ELECTRO CHEMISTRY				Total Hrs	9		
Introduction – Kohlrausch's law- applications-conductometric titration-Electrode potential-Nernst equation-problems-Reference electrode-calomel electrode-SHE-weston cadmium cell-Types of electrodes-Measurement of pH using glass electrode-Galvanic series- emf series-applications. Electro chemical cells-concentration cells-reversible and irreversible cell – EMF - measurements – Potentiometric titrations								
3	CORROSION & CORROSION CONTROL				Total Hrs	9		
Corrosion – Electrochemical and chemical – Mechanism – factors influencing rate of corrosion - corrosion reaction – types of corrosion – differential aeration – pitting – corrosion control – Sacrificial anode and Impressed current method – Inhibitors – Protective coatings – Preliminary treatment – Electroplating (Cr & Ni) – Paints – Constituents and their functions – Special paints - Mechanism of drying.								
4	FUELS & COMBUSTION				Total Hrs	9		
Introduction-solid, liquid and gaseous fuels-Difference among solid,liquid and gaseous fuels-Explosive range(or) limits of inflammability-Calorific values –Spontaneous ignition temperature- flue gas analysis – Coal – analysis of coal– carbonization of coal-metallurgical coke -manufacture of metallurgical coke – hydrogenation of coal – petroleum – Cracking – Catalytic Cracking – Polymerisation - alkylation – Octane number – improving octane number by additives – Diesel – Cetane number –natural gas, water gas, producer gas, gobar gas & LPG.								
5	POLYMERS				Total Hrs	9		
Polymer structure – Nomenclature – Polymerization – types – mechanism (free radical only) – co-ordination polymerization – mechanism – individual polymers – Polyethylene, Polypropylene, PVC, Teflon, Acrylics, Nylon6-6, Bakelite, Polyester, Epoxy, Polyurethane – Structure, Preparation, Properties and Uses – Compounding and fabrication – Compression, Injection, Extrusion and Blow moulding– Foamed plastics.								
Total hours to be taught						45		
Text book :								
1.	R.Palanivelu, B.Srividhya, K.Tamilarasu and P.Padmanaban, "Engineering Chemistry", Sakura Publishers, Erode, 4th Edition, 2010.							
References :								
1.	Jain P.C. & Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Co. New Delhi, 14th Edition, 2002.							
2.	Clair N Sawyer and Perry L Mc Carty, "Chemistry for Environmental Engineering", TMH Book Company, New Delhi, 14th Edition, 2002.							
3.	Dara S.S. "A text book of Engineering Chemistry, S.Chand & Co. Ltd., 2003.							
4.	Uppal M.M. revised by S.C.Bhatia, "Engineering Chemistry", Khanna Publishers, New Delhi, 6th Edition, 2001.							
5	www.howstuffworks.com							

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Department	Computer Science and Engineering	Programme Code & Name	CS : B.E. Computer Science and Engineering

Semester I

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 GE 102	ENGINEERING GRAPHICS (BT, CS, EC, EE,EI,IT)	2	0	3	4	50	50	100

Objective(s)	Student's skill in the graphical communication of concepts and ideas in the design of engineering products are to be obtained by training them to understand objects by making free hand sketches of simple engineering objects and computer 2D and 3D modeling techniques.

Instructions:

1. Unit – I Free Hand Sketching
2. Unit – II to V, examination will be conducted using drafting software

1	INTRODUCTION TO ENGINEERING DRAWING (Free Hand Sketching)	Total Hrs	12

Drawing Sheet Layouts - Title Block - Instruments used - Lines - Lettering – Dimensioning
Construction of Pentagon, Hexagon, Conic Sections. Construction of Ellipse, Parabola and Hyperbola (Eccentricity method only) with tangent and normal Introduction to cycloid only and Involutes of square and circle. Introduction to Drafting Software

2	ORTHOGRAPHIC PROJECTION(Using Drafting Software)	Total Hrs	12

Theory of projection - Terminology, Method of projection, introduction of First angle and Third angle projection. Conversion of pictorial views into orthographic view. Projection of points in first quadrant.

3	PROJECTION OF LINES AND PLANES(Using Drafting Software)	Total Hrs	12

Projection of lines in first quadrant - parallel to one plane and inclined to other, true length, true inclinations. Projection of planes in first quadrant inclined to one plane – Triangular, Rectangular, Pentagonal, Hexagonal, Circular planes.

4	PROJECTION OF SOLIDS AND SECTION OF SOLIDS(Using Drafting Software)	Total Hrs	12

Projection of simple solids (axis is parallel to one plane) - Prisms, Pyramids, Cylinder and Cone using change of position method. Sectioning of above solids in simple position (base is on HP and axis perpendicular to HP) by cutting plane inclined to one reference plane, true shape of section.

5	DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTION(Using Drafting Software)	Total Hrs	12

Development of lateral surfaces of simple and truncated solids - Prisms, Pyramids, Cylinders and Cones with square hole perpendicular to the axis. Principles of isometric projection. Isometric scale - isometric projections of simple solids, Prisms, Pyramids, Cylinders and Cones. Introduction to Perspective Projection (Not for examination)

Total hours to be taught	60

Text book (s) :

1	Kulkani D.M, Rastogi A.P, Sarkar A.K, "Engineering Graphics with AutoCAD", PHI Learning Private Limited, New Delhi, 2009.
2	Venugopal K., "Engineering Graphics", New Age International (P) Limited, 2002.

Reference(s) :

1	Bhatt N.D., "Engineering Drawing", Charotar Publishing House Pvt. Ltd., 49th Edition, Anand, Gujarat, 2006.
2	Natarajan K.V., "A textbook of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2006
3	Shah M.B. and Rana B.C., "Engineering Drawing", Pearson Education, 2005.

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Semester I								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 GE 104	BASICS OF CIVIL AND MECHANICAL ENGINEERING (CS, EC, EE,EI,IT)	4	0	0	3	50	50	100

BASICS OF CIVIL ENGINEERING

Objective(s)	At the end of the course the students must know the various aspect of Civil Engineering activity for society needs and developments.

1	INTRODUCTION	Total Hrs	08

Introduction – Scope of Civil Engineering – Function of Civil Engineers – Construction Materials – Classification – Uses –Requirements:- – Bricks-stone – Cement – Sand – Concrete – Steel Sections.

2	SUBSTRUCTURE & SUPERSTRUCTURE	Total Hrs	08

Substructure – Selection of site for building– Bearing capacity of soil – Requirement of good foundation – Types of foundation – Residential foundation - Superstructure – Technical terms: - Types – Brick masonry – Stone masonry – Components:- – Beams – Columns – Lintels – Types of roofing – Types of Flooring.

3	SURVEYING	Total Hrs	08

Surveying – Objectives – Types of Survey – Instruments used for Measurement of distances – Calculation of areas (Problems).e-waste management.

Total hours to be taught	24

Text book (s) :

1	Palanisamy, M.S., “Basics of Civil Engineering.”, TMH Publishing Co., New Delhi, 2008.

Reference(s) :

1	Ramamrutham.S, ″Basic Civil Engineering ″ Dhanpat Rai Publishing Co. (P) Ltd. 1999

BASICS OF MECHANICAL ENGINEERING

Objective(s)	At the end of this semester, the student should be conversant in power plant, IC Engines, R & A/C and Belt drives.

1	SOURCES OF ENERGY AND POWER PLANTS	Total Hrs	08

Introduction - classification of energy sources - conventional energy sources: working principle of steam, Gas, Diesel, Hydro-electric and Nuclear power plant - Non - conventional energy sources: working principle of Solar, Wind, Tidal and Geothermal power plant.

2	INTERNAL COMBUSTION ENGINES	Total Hrs	08

Introduction - working principle of diesel and petrol engines - Four stroke and two stroke cycles -Comparison of two stroke and four stroke engine – fuel supply system-Ignition system - calculation of Mechanical efficiency and Brake thermal efficiency.

3	REFRIGERATION AND AIR-CONDITIONING AND BELT DRIVES	Total Hrs	08

Introduction - Terminology of Refrigeration and Air conditions – working principle of vapour compression and absorption system-Layout of typical domestic refrigerator, window and split type room air conditioners - calculation of Cop -Types of Belt, selection of belt drives - material used for belt -calculation of power transmitted by belt.

Total hours to be taught	24

Text book (s):

1	Shanmugam.G, “Basic Mechanical Engineering”, Tata McGraw- Hill publishing Company Limited, New Delhi, Second Reprint, 2007.

Reference(s):

1	Khurmi.R.S, J.K. Gupta, “Theory of Machines”, Eurasia Publisher House (p) Ltd., New Delhi, 2003.
2	www.howstuffworks.com

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Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Semester I								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CH 100	ENGINEERING CHEMISTRY LABORATORY (BT, CS, EC, EE, TT)	0	0	3	2	50	50	100
Objective(s)	Educate the theoretical concepts Experimentally							
1	Estimation of hardness of water by EDTA.							
2	Estimation of alkalinity of water sample.							
3	Estimation of chloride content in water sample.							
4	Determination of dissolved oxygen in boiler feed water.							
5	Determination of water of crystallization of a crystalline salt.							
6	Conductometric titration of strong acid with strong base.							
7	Conductometric titration of mixture of acids.							
8	Precipitation titration by conductometric method.							
9	Determination of strength of HCl by pH Meter.							
10	Estimation of ferrous ion by potentiometric titration.							
11	Determination of sodium and potassium in a water sample by flame photometry (Demo only).							
12	Estimation of ferric ion by spectrophotometry (Demo only).							
Total hours to be taught						45		
Lab Manual :								
1	R.Palanivelu and B.Srividhya , “Engineering Chemistry Lab Manual”.							
Reference(s) :								
1	J. Mendham, R.C. Denney, J.D. Barnes and N.J.K. Thomas, Vogel’s Text book of Quantitative Chemical Analysis, 6th Edition, Pearson Education, 2004.							

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Semester I								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 GE 1P1	ENGINEERING PRACTICES LABORATORY (BT, CS, EC, EE, TT)	0	0	3	2	50	50	100
Objective(s)	To provide exposure to the students with hands on experience on various basic engineering practices in Mechanical Engineering							
1	FITTING				Total Hrs	9		
Safety aspects in Fitting, Study of tools and equipments, Preparation of models- Filing, Square, Vee.								
2	CARPENTRY				Total Hrs	9		
Safety aspects in Carpentry, Study of tools and equipments, Preparation of models- Planning, Tee Halving, Cross Lap, Wood turning.								
3	SHEET METAL				Total Hrs	9		
Safety aspects in Sheet metal, Study of tools and equipments, Preparation of models- Cylinder, Cone, Tray.								
4	WELDING				Total Hrs	9		
Safety aspects of welding, Study of arc welding equipments, Preparation of models -Lap, butt, T-joints. Study of Gas Welding and Equipments.								
5	ELECTRICAL WIRING AND PLUMBING				Total Hrs	9		
Safety aspects of Electrical wiring, Study of Electrical Materials and wiring components, Wiring circuit for a lamp using single and stair case switches. Wiring circuit for fluorescent lamps Study of plumbing tools, Study of pipe connection with coupling and reducer.								
Total hours to be taught						45		

I Semester - Course Outcomes

Modules	10 EN 101 – Technical English Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Comprehend the basic grammatical structures and generate new sentences in a given paradigm.
2	Explain and apply the enriched vocabulary in academic and professional contexts.
3	Identify the main idea and integrate it with supporting data to facilitate effective comprehension.
4	Infer, compare and summarize lexical & contextual meaning of various technical / general passages.
5	Recognize the basic phonetic units of language and execute it for better oral competency.
6	Recognize and interpret standard English Pronunciation & use it in diverse situations.
7	Find and classify different reading strategies and demonstrate better articulation / expression
8	Categorize words into different parts of speech and use them in different contexts.
9	Retrieve information from various sources and construct a well designed descriptive writing.
10	Identify the key words of concepts and learn to write definitions.

Modules	10 MA 101 - Engineering Mathematics – I Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Identify various operations on matrices.
2	Apply transformation techniques on matrices.
3	Analyze the properties of curvature using differential calculus.
4	Analyze the properties of envelope using differential calculus.
5	Examine the maxima and minima for functions of two variables.
6	Infer the constrained maxima and minima for functions of two variables.
7	Compute linear differential equations with constant coefficients.
8	Find the solutions of linear differential equations with variable coefficients
9	Solve pair of simultaneous linear differential equations.
10	Solve basic engineering problems represented by differential equations.

Modules	10 PH 102 - Physics of Materials Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Outline the conducting materials with their merits and demerits
2	Describe the theory of superconducting materials and its applications
3	Classify and analysis the properties of magnetic materials
4	Identify the applications of magnetic materials in storing the data
5	Compare the properties of semiconductors
6	Analyze the electrical conductivity, fermi level semiconductors and applications
7	Discuss the concept of polarization in dielectric materials
8	Classify the breakdown mechanism, and identify the applications of dielectric materials
9	Identify the importance and explain the fabrication methods of nano materials
10	Describe the properties, preparation and applications of Carbon nano tubes

Modules	10 CH 101 - Engineering Chemistry Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Identify the hardness of water and its testing methods
2	Assess the softening and desalination techniques
3	Recognize the principles involved in electrochemistry
4	Describe the measurement of pH and potentiometric titrations
5	Identify the different types of corrosion
6	Interpret the knowledge about corrosion control and mechanism of drying of oil in paints
7	Predict the analysis and combustion of fuels
8	Describe the manufacturing methods of solid, liquid and gaseous fuels
9	Write the preparation, properties and uses of polymeric materials
10	Illustrate the various moulding techniques.

Modules	10 GE 102 – Engineering Graphics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Use drawing instruments for lettering, lines and dimensioning.
2	Construct different shapes by eccentricity method; Use drafting software.
3	Draw the orthographic projection.
4	Convert pictorial view into orthographic view.
5	Draw the projection of lines.
6	Draw the projection of planes.
7	Draw the projection of simple solids.
8	Draw the sectional view of solids.
9	Develop the lateral surfaces of simple and truncated solids.
10	Draw the isometric projection of surfaces.

Modules	10 GE 104 - Basics of Civil and Mechanical Engineering Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Describe the scope and functions of civil engineering.
2	Identify the construction materials required.
3	Identify and explain the sub structure of a building.
4	Identify and explain the super structure of a building.
5	Classify surveying and carryout surveying.
6	Describe the working principle of power generation using conventional energy sources.
7	Describe the working principle of power generation using non-conventional energy sources.
8	Explain the working principle of Internal Combustion engine; Calculate efficiency.
9	Draw and illustrate the Layout of typical domestic refrigerator.
10	Describe the scope and functions of civil engineering.

Modules	10 CH 100 - Engineering Chemistry Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Estimate the hardness, alkalinity and chloride content of water.
2	Calculate the dissolved oxygen in boiler feed water.
3	Examine the water of crystalline in a crystalline salt.
4	Interpret the conductometric titration with different combinations of acid and base.
5	Test the precipitation titration by conductometric method.
6	Estimate the strength of HCl by pH meter.
7	Calculate the ferrous ion by potentiometric titration.
8	Estimate the sodium and potassium in a water sample.
9	Estimate the ferric ion by spectrophotometry.

Modules	10 GE 1P1 – Engineering Practices Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize tools for fitting, carpentry, sheet metal, welding, electrical wiring and plumbing.
2	Demonstrate the safety rules in basic engineering practices laboratory.
3	Prepare models of fitting.
4	Prepare models of carpentry.
5	Make models of sheet metal.
6	Prepare joints by arc welding.
7	Construct electrical wiring circuit and demonstrate.
8	Demonstrate plumbing work.

Department	Computer Science and Engineering	Programme Code & Name	CS : B.E. Computer Science and Engineering

Semester II

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EN 102	COMMUNICATION SKILLS	3	0	0	3	50	50	100
Objective(s)	To equip students with effective speaking and listening skills in English, help them develop the soft skills and people skills which will make them to excel in their jobs and enhance to students' performs at placement interviews							

1	LISTENING	Total Hrs	9
Barriers in Listening - Listening to academic lectures - Listening to announcements at railway stations, airports, etc - Listening to news on the radio / TV - Listening to casual conversation - Listening to live speech			
2	COMMUNICATION	Total Hrs	9
What is communication? - What does it involve? Accuracy, fluency and appropriateness - Levels of formality - Differences between spoken and written communication - Greeting and introduction - Making requests - Asking for permission, Giving / Denying permission - Giving directions - Art of small talk - Taking part in casual conversation - Making a short formal speech Describing people, place, things and events			
3	CONVERSATION SKILLS	Total Hrs	9
Using the telephone - Preparing for a call - Stages of a call - Handling calls - Identifying self – Asking for repetitions - Spelling out names or words - Giving information on the phone – Making requests - Answering calls - Leaving messages on Answer Machines - Making / changing appointments - Making complaints – Reminding - Agreeing / Disagreeing – Listening - Listening and Taking messages - Giving instructions & Responding to instructions			
4	REMEDIAL GRAMMAR & VOCABULARY	Total Hrs	9
Tenses - 'Do' forms – Impersonal Passive voice - Imperatives – using should form – Direct, Indirect speech – Discourse markers – SI Units – Numerical expressions - Use of negatives – Prepositions - Phrasal verbs - Correct use of words - Use of formal words in informal situations - Commonly confused words – Editing.			
5	WRITTEN COMMUNICATION & CAREER SKILLS	Total Hrs	9
Writing e-mails - Writing Reports – Lab Reports - Preparing Curriculum Vitae and cover letters – Facing an Interview - Presentation skills - Persuasion skills – Flow Charts, Tree diagram – Recommendations – Check List – Slide Preparation – Verbal Reasoning (Analogy, Alphabet Test, Assertion & Reason, Situation Reaction Test) – Logical Deduction (Deriving Conclusions from passages, Theme Detection, Cause and Effect Reasoning).			
Total hours to be taught			45

Text book (s) :

1	Rizvi M Ashraf, 'Effective Technical Communication', 1st Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2005.

Reference(s) :

1	Kiranmai Dutt P, Geetha Rajeevan and Prakash C L N, 'A Course in Communication Skills', by Ebek – Cambridge University Press India Pvt. Ltd.
2	Naterop, cup 'Telephoning in English' – Cambridge University Press India Pvt.Ltd., 2007
3	Richard, 'New Interchange Services (Student's Book)' – Introduction, Level – 1, Level – 2, Level – 3, Cambridge University Press India Pvt.Ltd., 2007.
4	Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.

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Department	Computer Science and Engineering	Programme Code & Name	CS : B.E. Computer Science and Engineering

Semester II

Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 MA 102	ENGINEERING MATHEMATICS II	3	1	0	4	50	50	100

Objective(s)	An aim of the course is to train the students in additional areas of engineering mathematics necessary for grooming them into successful engineers. The topics introduced will serve as basic tools for specialized studies in many engineering fields, significantly in fluid mechanics, field theory and communication engineering.

1	MULTIPLE INTEGRALS	Total Hrs	12

Double integration in Cartesian and Polar coordinates – Change of order of integration – Area between two curves – Area as double integrals - Triple integration in Cartesian coordinates – Volume as triple integrals (simple problems only) .

2	VECTOR CALCULUS	Total Hrs	12

Gradient, divergence and curl – Line, surface and volume integrals – Green's, Gauss divergence and Stoke's theorems (without proof) – Verification of the above theorems and evaluation of integrals using them.

3	ANALYTIC FUNCTIONS	Total Hrs	12

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

4	COMPLEX INTEGRATION	Total Hrs	12

Cauchy's theorem (without proof) – Cauchy's integral formula – Taylor and Laurent series (without proof) – Singularities – Classification – Cauchy's residue theorem – Contour integration – circular and semi-circular contours (excluding poles on real axis).

5	LAPLACE TRANSFORM	Total Hrs	12

Laplace Transform – Conditions for existence – Transform of elementary functions – Basic properties – Derivatives and integrals of transforms – Transforms of derivatives and integrals – Initial and final value theorems – Transform of unit step function – Transform of periodic functions. Inverse Laplace transform – Convolution theorem – Solution of linear ODE of second order with constant coefficients and first order simultaneous equations with constant coefficients using Laplace transformation.

Total hours to be taught	60

Text book(s) :

1	Veerarajan. T., "Engineering Mathematics (for first year), Fourth Edition Tata McGraw- Hill Publishing Company Limited, New Delhi, 2005.
2	Grewal. B.S., "Higher Engineering Mathematics", Thirty Eighth Edition, Khanna Publishers, Delhi, 2004.

Reference(s) :

1	Kandasamy. P, Thilagavathy. K and Gunavathy. K, "Engineering Mathematics" – S.Chand and Co. New Delhi 2007.
2	Venkataraman.M.K, "Engineering Mathematics, Volume I & II Revised Enlarged Fourth Edition", The National Pub. Co., Chennai, 2004.
3	Widder. D.V., "Advanced Calculus", Second Edition, Prentice Hall of India, New Delhi, 2000.

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Department	Computer Science and Engineering		Programme Code & Name			CS : B.E. Computer Science and Engineering		
Semester II								
Course Code	Course Name	Hours / Week			Credit	Maximum marks		
		L	T	P	C	CA	ES	Total
10 CH 102	ENVIRONMENTAL ENGINEERING Engineering (BT, CS, EC, EE, TT)	3	0	0	3	50	50	100
Objective(s)	The student should be conversant with the evolution of environmentalism and the importance of environmental studies, various natural resources and the current threats to their sustainability, significance and protection of bio diversity and various forms of environmental degradation and international conventions and protocols for the protection of environment.							

1	ATMOSPHERE AND ECOSYSTEM	Total Hrs	9

Atmosphere – composition of atmosphere (troposphere, stratosphere, mesosphere and thermosphere) - Ozone and ozone depletion – Air pollution – sources, effects and control – Green house effect - Global warming – Climate change – Acid rain - Planet Earth – Biosphere – Hydrosphere – Lithosphere. Concept of ecosystem – structure and functions of ecosystem- producers, consumers and decomposers - Energy flow – Ecological succession-Food chains-Food webs- Ecological pyramids-Introduction, types, characteristic features-structures and function of forest, grassland and aquatic ecosystems (ponds and rivers) - Case Studies in current scenario.

2	WATER RESOURCES AND ITS TREATMENT	Total Hrs	9

Water – hydrological cycle – ground water – water shed – water use and quality – point and non-point sources of pollution – Oceans and fisheries – salinity – temperature – density – pressure – light – bioluminescence – Tsunamis – Glaciers – Water pollution – dissolved oxygen – surface water treatment – waste water treatment – Thermal pollution, noise pollution and control - Case Studies in current scenario.

3	LAND RESOURCES AND ITS DEGRADATION	Total Hrs	9

Land – weathering and erosion - types of weathering – types of soil – soil erosion – land slides – Wet land and deforestation- deserts – types – desertification – land degradation – features of desert – geochemical cycling – solid and hazardous waste, chemical waste, radio active waste – non hazardous waste - Case Studies in current scenario.

4	FUTURE POLICY AND ALTERNATIVES	Total Hrs	9

Future policy and alternatives – fossil fuels – nuclear energy – solar energy – wind energy – hydroelectric energy – geothermal energy – tidal energy – sustainability – green power – nano technology – international policy - Case Studies in current scenario.

5	BIO DIVERSITY AND HUMAN POPULATION	Total Hrs	9

Introduction to Bio diversity-Definition, genetic species and ecosystem diversity. Biogeographical classification of India – Biodiversity in India – India as mega diversity nation – hotspots of biodiversity in India – threats to biodiversity – endemic and endangered- habitat – conservation of biodiversity – environment protection act – issues and possible solution – population growth - population explosion – environment and human health - HIV-AIDS- Case Studies in current scenario.

Total hours to be taught	45

Text book :

1.	R.Palanivelu and B.Srividhya, “Environmental Engineering:, Sakura Publishers, Erode, 4th Edition, 2010.

Reference(s) :

1.	Linda D. Williams – “Environmental Science Demystified”, Tata McGraHill Publishing Company Limited, 2005.
2.	G. Tyler Miller, JR _ “Environmental Science “, Thomson, 2004.
3.	William P. Cunningham – “Principles of Environmental Science”, Tata McGraHill, New Delhi, 2007.
4.	Bharucha Erach –“The Biodiversity of INDIA”, Mapin Publishing Private Limited, Ahamedabad, India.
5.	Trivedi R.K., “Hand Book of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Volume I & II, Environmedia.

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Department	Computer Science and Engineering	Programme Code & Name	CS : B.E. Computer Science and Engineering					
Semester II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 PH 101	ENGINEERING PHYSICS (BT, CS, EC, EE, TT)	3	0	0	3	50	50	100
Objective(s)	To enhance students' knowledge of theoretical and modern technological aspects in physics, enable the students to correlate the theoretical principles with application oriented studies.							

1	ACOUSTICS OF BUILDING AND SOUND INSULATION	Total Hrs	9

Introduction-Classification of sound – Characteristics of musical sound – sound intensity level – Weber-Fechner law –Bel, Decibel, Phon, Sone – Acoustics of building - Reverberation – Reverberation time – Sabine's formula – Absorption co-efficient (derivation)– Factors affecting the acoustics of buildings and their remedies- Factors to be followed for good acoustics of building.

2	LASER AND APPLICATIONS	Total Hrs	9

Introduction – Principle of spontaneous emission, stimulated absorption and emission – Einstein's co-efficient (derivation)– Types of lasers: Nd:YAG, Semiconductor laser (homo junction and hetro junction), CO_2 laser – Applications: Lasers in welding, cutting, drilling and soldering- medical applications: laser endoscopy, bloodless surgery – Holography: Construction and reconstruction of hologram –applications.

3	FIBER OPTICS AND SENSORS	Total Hrs	9

Principles – cone of acceptance, numerical aperture (derivation)- Modes of propagation – Concept of bandwidth (Qualitative)- Crucible-crucible technique –zone refining (rod and tube method)- Classification based on materials, refractive index and modes– Splicing – Losses in optical fiber – Light sources for fiber optics – Detectors – Fiber optical communication links – Advantage of fiber optical cable over copper cables- Fiber optic sensors: Temperature, Displacement, Voltage and magnetic field measurement.

4	ULTRASONICS AND APPLICATIONS	Total Hrs	9

Introduction: Production of ultrasonic waves – Magnetostriction effect, magnetostriction generator-inverse piezoelectric effect, piezoelectric generator – Ultrasonic detection, properties, cavitation- acoustical grating- Industrial applications: Cleaning, SONAR, depth of sea – Non destructive testing – Pulse echo system, through transmission, resonance system- Medical applications:cardiology, neurology, ultrasonic imaging.

5	QUANTUM PHYSICS AND APPLICATIONS	Total Hrs	9

Development of Quantum theory – Dual nature of matter and radiation – de-Broglie wave length – Uncertainty principle, applications: single slit experiment, electron microscope - Schrodinger's equation time dependent and time independent – Particle in a box(one dimensional and three dimensional)- limitation of optical microscopy – electron microscope- Scanning electron microscope-transmission electron microscope-scanning transmission electron microscope-applications.

Total hours to be taught	45

Text Book:

1.	Dr.Palanisamy P.K, "Engineering Physics", Scitech Publications, Chennai, 2010.

Reference (s) :

1	Pillai S O, "Engineering Physics", New Age International Publishers, New Delhi, 2005.
2	Rajendran V, "Engineering Physics", Tata McGraw-Hill Publishers, New Delhi, 2008
3	www.howstuffworks.com

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Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering				
Semester II									
Course Code	Course Name	Hours / Week			Credit	Maximum marks			
		L	T	P	C	CA	ES	Total	
10 GE 101	FUNDAMENTALS OF PROGRAMMING (BT, CS, EC, EE, TT)	3	1	0	3	50	50	100	
Objective(s)	To enable students to learn the basic concepts of computer and developing skills in programming using C language.								
1	COMPUTER BASICS				Total Hrs	8			
Evolution of computers- Generations of computers- Applications of computers- - Computer Memory and Storage- Input Output Media – Algorithm- Flowchart- Pseudo code – Program control structures- - Programming languages- - Computer Software- Definition- Categories of Software.									
2	C FUNDAMENTALS				Total Hrs	9			
Introduction to C- Constants- Variables- Data types- Operators and Expressions- Managing Input and Output operations- Decision Making and Branching- Looping.									
3	ARRAYS AND FUNCTIONS				Total Hrs	10			
Arrays- Character Arrays and Strings- User defined functions- Storage Classes									
4	STRUCTURES AND FILES				Total Hrs	10			
Structures- Definition- Initialization- Array of Structures- Structures within structures- Structures and Functions- Unions- File Management.									
5	POINTERS				Total Hrs	8			
Pointer Basics – Pointer Arithmetic – Pointers and array Pointers and character string Pointers and functions – Pointers and structures.									
Total hours to be taught						45+15 (Tutorial) = 60			
Text book(s) :									
1	Dr.K.Duraisamy, R.Nallusamy, R.Kanagavalli, S.Ponmathangi, D.Muthusankar, P.Kaladevi, “Fundamentals of Programming”, Techvision Publishers 2008.								
2	E.Balagurusamy, “Programming in ANSI C”, TMH, New Delhi, 2002.								
Reference(s) :									
1	Rajaraman V, “Fundamentals of Computers”, Fourth Edition, PHI 2006.								
2	Byron Gottfried, “Programming with C”, II Edition, TMH, 2002.								

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Department	Computer Science and Engineering	Programme Code & Name		CS : B.E. Computer Science and Engineering				
Semester II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 GE 105	BASICS OF ENGINEERING MECHANICS (CS, EC, EE,EI,IT)	3	1	0	4	50	50	100
Objective(s)	At the end of this course the student should be able to understand the scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.							
1	FUNDAMENTALS				Total Hrs	12		
Introduction - Units and Dimensions - Laws of Mechanics – Lame's theorem, Parallelogram and triangular Law of forces –Coplanar Forces – Resolution and Composition of forces – Equilibrium of a particle – Equivalent systems of forces – Principle of transmissibility – Single equivalent force.								
2	EQUILIBRIUM OF RIGID BODIES				Total Hrs	12		
Free body diagram – Types of supports and their reactions -Types of trusses-Analysis of trusses (Method of Joints only) – requirements of stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Scalar components of a moment – Varignon's theorem - Equilibrium of Rigid bodies in two dimensions.								
3	PROPERTIES OF SURFACES AND SOLIDS				Total Hrs	12		
Determination of Areas and Volumes – First moment of area and the Centroid of sections – Rectangle, circle, triangle from integration – T section, I section, Angle section, Hollow section by using standard formula – second moment of plane area – Rectangle, triangle, circle from integration - T section, I section, Angle section by using standard formula – Parallel axis theorem and perpendicular axis theorem – Polar moment of inertia.								
4	DYNAMICS OF PARTICLES				Total Hrs	12		
Displacement, Velocity, acceleration and their relationship – Relative motion – Curvilinear motion – Newton's law – Work Energy Equation of particles – Impulse and Momentum – Impact of elastic bodies.								
5	FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS				Total Hrs	12		
Frictional force – Laws of Coloumb friction – simple contact friction – Rolling resistance – Belt friction. Translation and Rotation of Rigid Bodies; Velocity and acceleration – General Plane motion.								
Total hours to be taught						60		
Text book (s) :								
1	Beer,F.P and Johnson Jr. E.R, "Vector Mechanics for Engineers", Vol. 1 Statics and Vol. 2 Dynamics, McGraw-Hill International Edition, 1997.							
2	Rajasekaran, S, Sankarasubramanian, G., "Fundamentals of Engineering Mechanics", Vikas Publishing House Pvt. Ltd., 2000.							
Reference(s) :								
1	Ashok Gupta, "Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM)", Pearson Education Asia Pvt., Ltd., 2002.							
2	Hibbeller, R.C.,"Engineering Mechanics", Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2000.							
3	Palanichamy, M.S., Nagan, S., "Engineering Mechanics – Statics & Dynamics", Tata McGraw-Hill, 2001.							
4	www.howstuffworks.com							

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name			CS : B.E. Computer Science and Engineering		
Semester II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 PH 100	ENGINEERING PHYSICS LABORATORY (BT, CS, EC, EE, TT	0	0	3	2	50	50	100
Objective(s)	To give exposure for understanding the various physical phenomena's in optics, acoustics material science and properties of matter in engineering applications, determine the fundamental constants like acceleration due to gravity, viscosity of liquid, wave length of laser, band gap of semiconductor etc.,							

LIST OF EXPERIMENTS	
1	Determination of rigidity modulus of a wire by torsional pendulum.
2	Determination of Young's modulus of the material of a uniform bar by non-uniform bending method.
3	Determination of Young's modulus of the material of a uniform bar by uniform bending method.
4	Determination of Viscosity of liquid by Poiseuille's method.
5	Determination of acceleration due to gravity by compound (bar) pendulum.
6	Determination of wavelength of mercury spectrum by Spectrometer grating.
7	Determination of thickness of fiber by Air-wedge method.
8	Determination of wavelength of laser using grating and particle size determination.
9	Determination of velocity of ultrasonic waves and compressibility using ultrasonic interferometer.
10	Determination of band gap energy of a semiconductor.
11	Determination of radius of curvature of a Plano convex lens by Newton rings method.
12	Determination of acceptance angle numerical aperture using fibre optics.
Total hours to be taught	45
Lab Manual :	
1	"Physics Lab Manual", Department of Physics, KSRCT.

<table>
<tr><td colspan="7">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td>R 2010</td></tr>
<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="2">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="8">Semester II</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="2">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 GE 1P2</td><td colspan="2">FUNDAMENTALS OF PROGRAMMING LABORATORY (BT, CS, EC, EE, TT)</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">To enable the students to apply the concepts of C to solve real time problems</td></tr>
<tr><td colspan="8">LIST OF EXPERIMENTS</td></tr>
<tr><td colspan="8">1. Write a C program to print Pascal’s triangle.
2. Write a C program to print the sine and cosine series.
3. Write a C program to perform Matrix multiplication.
4. Write a C program to prepare and print the sales report.
5. Write a C program to perform string manipulation functions like string concatenations, comparison, find the length and string copy without using library functions.
6. Write a C program to arrange names in alphabetical order.
7. Write a C program to calculate the mean, variance and standard deviation using functions.
8. Write a C program to perform sequential search using functions.
9. Write a C program to print the Fibonacci series and to calculate the factorial of the given number using functions.
10. Write a C program to print the mark sheet of n students using structures.
11. Write a C program to merge the given two files.
12. Write a C Program to perform Swap Using Pointers.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
</table>

II Semester - Course Outcomes

Modules	10 EN 102 – Communication Skills Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Look for specific details and overcome speech barriers.
2	Pick key points by listening and improve casual conversational skills.
3	Understand different forms of communication with differences among them.
4	Know about formal speech and descriptive techniques, and use specific words in specific contexts.
5	Fine tune language for different conversational contexts and purposes.
6	Learn telephone etiquette by using language for assent and dissent.
7	Understand grammatical structures, its technical aspects and usage
8	Use discourse markers, enhance punctuation and learn discourse coherence
9	Comprehend content, generate different forms of template and enhance reference skills
10	Construct well-knit documents for job readiness and career competence

Modules	10 MA 102 - Engineering Mathematics II Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Perform double integration in Cartesian and polar coordinates.
2	Evaluate the area by using double integration and volume by using triple integration.
3	Compute the line, surface & volume integrals of a vector function
4	Define and verify the theorems of vector calculus.
5	Verify and construct analytic function.
6	Construct conformal mapping in analytic functions.
7	Classify the singularities of complex function
8	Evaluate real definite integrals by choosing integer and the contour
9	State the Laplace transform and inverse Laplace transform of different functions
10	Solve the second order linear ODE with suitable initial conditions

Modules	10 CH 102 - Environmental Engineering Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize the environmental problems caused due to pollution.
2	Describe the structure of ecosystem and its impact on environment.
3	Identify the sources of water and its pollutants.
4	Analyse the methods for treatment of water and control its pollution.
5	Explain the various resources of land and its characteristics.
6	Demonstrate the awareness among public about the waste which degrades the land.
7	Discuss the details of policy adopted to use non renewable energy sources for energy conversion.
8	Discuss the details of policy adopted to use renewable energy sources for energy conversion.
9	Describe the importance and conservation of biodiversity in India.
10	Indicate the adverse effects of population explosion and conduct the awareness programme to safeguard human health.

Modules	10 PH 101 - Engineering Physics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Categorize the sound and analyze its characteristics
2	Design buildings with good acoustics
3	Discuss the principle of laser emission and Classification
4	Identify the applications of lasers
5	Summarize the propagation of lights in fibre optic cables and characteristic parameters
6	Illustrate the fibre optic communication link and its applications
7	Express the production and detection methods of ultrasonic waves
8	Identify the applications of ultrasonic waves
9	Comprehend the development of quantum theory and its applications
10	Categorize the electron microscope and analyze its applications

Modules	10 GE 101 - Fundamentals of Programming Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize the origin and evolution of computers, generations of computers and the applicability of computer system in various fields.
2	Describe about algorithms, Pseudo code, various flow chart symbols, different programming control structures and types of software
3	Capture the fundamentals of C - Constants, Variables and Data types, different operators and Expressions in C language
4	Describe different Input and Output operations with different formats and programs using different Branching and Looping statements
5	Narrate the basic concept of Array, types of array, character arrays and strings and able to write programs using array concepts.
6	Obtain knowledge about user defined functions and scope of variables in C
7	Comprehend basic concept of Structure, nested structures and Union
8	Identify the concept of File, File operations and Types of files
9	Grasp the basics of pointers and its operation and implement the concepts of Pointers and arrays, Pointers and Character Strings
10	Illustrate the concepts of Pointers and functions & Pointers and Structures

Modules	10 GE 105 – Basics of Engineering Mechanics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Apply the laws of mechanics.
2	Identify the equilibrium conditions of particles; Calculate resultant force for the given system of forces.
3	Illustrate the free body diagram of a system; Determine the forces and reaction, moments and couples.
4	List the types of trusses, supports and calculate their reaction forces.
5	Compute the centroid and first moment of area of various sections.
6	Apply the parallel and perpendicular axis theorems to find out the moment of inertia and polar moment of inertia of various sections.
7	Calculate the displacement, velocity and acceleration of particles.
8	Analyse the relative motion, curvilinear motion and impact of elastic bodies.
9	Recognise the concept of friction and laws of friction.
10	Demonstrate the general plane motion of rigid body.

Modules	10 GE 105 – Basics of Engineering Mechanics Course Outcomes (COs)
	At the end of the course, the student will be able to

Modules	10 PH 100 – Engineering Physics Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Calculate the rigidity modulus of a wire by torsional pendulum.
2	Determination of Young's modulus of the material of a uniform bar by non-uniform and uniform bending method.
3	Evaluate the Viscosity of liquid by Poiseuille's method.
4	Calculate acceleration due to gravity by compound (bar) pendulum.
5	Illustrate the wavelength of mercury spectrum by Spectrometer grating.
6	Show the thickness of fiber by Air-wedge method.
7	Estimate wavelength of laser using grating and particle size determination.
8	Determination of velocity of ultrasonic waves and compressibility using ultrasonic interferometer.
9	Identify the band gap energy of a semiconductor.

Modules	10 GE 1P2 – Fundamentals of Programming Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate the ability to use the editor, compiler, and linker to create source, object, and executable code and debugging of a simple 'C' program.
2	Familiarize with simple programs involving the fundamental programming constructs (variables, data types, expressions, assignment, simple I/O).
3	Gain the knowledge of the data types appropriate to specific programming problems.
4	Demonstrate the use of appropriate conditional and iteration constructs for a given programming task.
5	Use various string handling functions and arrays as part of the problem solution.
6	Implement the concept of structure data type as part of the solution.
7	Elucidate the concept of functions from the portable C library and Mastering the mechanics of parameter passing, Fibonacci series using recursive function
8	Utilize pointers to efficiently solve problems, swap two integers without using third variable

Modules	10 GE 1P2 – Fundamentals of Programming Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
9	Design programs using file concepts
10	Demonstrate the ability to design, develop, and implement a fully functioning 'C' programming using structured techniques and reusable code.

K.S.Rangasamy College of Technology - Autonomous Regulation								**R 2010**
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Semester III								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 MA 003	ENGINEERING MATHEMATICS III	3	1	0	4	50	50	100
Objective(s)	The course objective is to impact analytical skills to the students in the areas of boundary value problems and transform techniques. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a prerequisite for post graduate and specialized studies and research.							
1	PARTIAL DIFFERENTIAL EQUATIONS				Total Hrs	12		
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients.								
2	FOURIER SERIES				Total Hrs	12		
Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series –Parseval's Identity – Harmonic Analysis.								
3	BOUNDARY VALUE PROBLEMS				Total Hrs	12		
Classification of second order quasi linear partial differential equations- Solutions of one dimensional wave equation – One dimensional heat equation - Fourier series solutions in Cartesian coordinates.								
4	FOURIER TRANSFORM				Total Hrs	12		
Fourier transform pair- Sine and Cosine transforms– Properties – Transforms of simple functions – Convolution theorem- Parseval's Identity – Problems.								
5	Z -TRANSFORM AND DIFFERENCE EQUATIONS				Total Hrs	12		
Z-transform - Elementary properties – Initial and final value theorem-Inverse Z – transform – Partial fraction method – Residue method - Convolution theorem - Solution of difference equations using Z - transform.								
Total hours to be taught						60		
Text book(s): :								
1	Veerarajan.T., "Engineering mathematics-III", Tata McGraw Hill Publishing Company Limited, New Delhi.							
Reference(s) :								

1	Narayanan, S., Manicavachagom Pillay, T.K. and Ramaniah, G., “Advanced Mathematics for Engineering Students”, Volumes II and III, S. Viswanathan (Printers and Publishers) Pvt. Ltd. Chennai, 2002.
2	Kandasamy, P., Thilagavathy, K., and Gunavathy, K., “Engineering Mathematics Volume III”, S. Chand & Company ltd., New Delhi, 1996.

<table>
<tr><td colspan="7">K. S. Rangasamy College of Technology – Autonomous Regulation</td><td colspan="3">R2010</td></tr>
<tr><td colspan="2">Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="3">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="10">Semester III</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours / Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td colspan="2">10 EE 001</td><td>BASICS OF ELECTRICAL ENGINEERING (CS, IT)</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="8">Exposing the students to Electrical Engineering topics like electrical circuits, magnetic circuits, various sources of electrical power & system, electrical machines and measuring instruments for electrical quantities.</td></tr>
<tr><td>1</td><td colspan="5">ELECTRICAL CIRCUITS</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="10">Electrical Circuits elements – resistance, inductance and capacitance; Basic definitions – current, voltage, Energy, Power – Ohm’s law - Kirchoff’s Law - Series and parallel resistances (simple problems using Kirchoff’s Laws);Introduction to AC circuits – Instantaneous, RMS and average value of sine wave –form factor and peak factor- single phase and three phase balanced circuits – Phasor diagram (simple problems)</td></tr>
<tr><td>2</td><td colspan="5">MAGNETIC CIRCUITS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="10">Ohm’s law of magnetic circuit – Simple and composite magnetic circuits – effect of air gap – leakage factor – Fringing effect (simple problems).
Faraday’s law of electro magnetic induction – self and mutual induced EMF – self and mutual inductances – statically and dynamically induced EMF (simple problems).</td></tr>
<tr><td>3</td><td colspan="5">DC MACHINES & TRANSFORMERS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="10">DC machines - Construction – Principle of operation – EMF equation of DC generator – Torque equation of DC motor –Torque equation of DC motor – Back EMF - Types of DC motors – characteristics – applications; Single phase transformers - construction – Types – Principle of operation – EMF equation – Regulation – Efficiency; Three phase transformers – connections – Line and phase voltages / currents (simple problems)</td></tr>
<tr><td>4</td><td colspan="5">AC MACHINES & MEASURING INSTRUMENTS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="10">Induction motor – 3 phase induction motor - Construction – Types - Principles of operation – Power flow diagram – applications; Single phase induction motor - Principle of operation – Types – applications; Synchronous machines – Principles – Construction – types – EMF equation. Stepper motor – Principle – Application.
Construction and working principle of moving coil and moving iron instruments – Dynamo meter type watt meter – 1 phase and 3 phase induction type energy meter.</td></tr>
<tr><td>5</td><td colspan="5">POWER SYSTEM</td><td colspan="2">Total Hrs</td><td>8</td></tr>
<tr><td colspan="10">Structure of electric power system – Sources of Electrical Energy – Schematic diagram of Power plants; Steam, Hydroelectric, Nuclear, Gas, Wind and Solar (Qualitative Treatment only). House and industrial wiring materials – Earthing – Lighting arrester.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="10">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="9">R. Muthusubramaniam, S. Salivahanan and KA Muraleedharan, “Basic Electrical, Electronics and Computer Engineering”, TMH 2007.(Unit I : Chapter 1,4,5) (Unit II : Chapter 2,3) (Unit III :Chapter 6) (Unit IV : Chapter 6,7)</td></tr>
<tr><td>2</td><td colspan="9">V.K.Mehta and Rohit Mehta ‘Principle of Power System’, S. Chand & Company, 2008. (Unit – V : Chapter – 1,2)</td></tr>
<tr><td colspan="10">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="9">B.L. Theraja and A.K. Theraja, ‘Electrical Technology’, S. Chand & Company LTD, New Delhi, 2009.</td></tr>
<tr><td>2</td><td colspan="9">Del Tora ‘Electrical Engineering Fundamentals’ Pearson Education, New Delhi, 2007.</td></tr>
<tr><td>3</td><td colspan="9">Edward Hughes, “Electrical Technology”, ELBS.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation			R 2010
Department	Computer Science and Engineering	Programme Code & Name	CS : B.E. Computer Science and Engineering

Semester III

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EC 002	ELECTRONIC DEVICES AND CIRCUITS (CS, IT)	3	0	0	3	50	50	100
Objective(s)	Studying about semiconductor diodes and applications, BJT,FET, Transistor Biasing, Feedback amplifiers and oscillators and Large signal amplifiers							

1	SEMICONDUCTOR DIODES AND APPLICATIONS	Total Hrs	9

Conductors, semiconductors and insulators. N type and P type semiconductors. Semiconductor conductivity. PN junction. Biased junctions - PN junction diode – characteristics and parameters. Diode approximations- Zener diodes- Rectifier - Half wave rectification, Full wave rectification. Half wave and full wave rectifier power supplies.

2	BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS	Total Hrs	9

Bipolar junction transistor operation, BJT voltage and currents- BJT amplification- BJT switching- CB, CE and CC characteristics FIELD EFECT Transistors, junction field effect transistors, JFET characteristics – MOSFETs – Enhancement and depletion types – comparison of BJT with MOSFET.

3	TRANSISTOR BIASING	Total Hrs	9

BJT biasing – dc load line and bias point. Base bias, collector to base bias, voltage divide bias., comparison of basic bias circuits. Bias circuit design. Thermal stability of bias circuits. FET biasing- Dc load line and bias point. Gate bias, self bias, voltage divider bias. Frequency response of CE amplifier.

4	FEEDBACK AMPLIFIERS AND OSCILLATORS.	Total Hrs	9

Classification of amplifier- the feedback concept- general characteristics of negative feedback amplifiers- Effect of negative feedback upon output and input resistances - voltage series, current series, current shunt and voltage shunt feedback amplifiers

Sinusoidal oscillators- Barkhausen Criterion. Mechanism for start of oscillation and stabilization of amplitude. RC phase shift oscillator - Analysis of LC Oscillators, Colpitts, Hartley oscillators.

5	LARGE SIGNAL AMPLIFIERS	Total Hrs	9

Classification of amplifiers, Class A large signal amplifier, second harmonic distortion, higher order harmonic generation, the transformer coupled audio power amplifier, efficiency, push pull amplifiers, class B amplifiers, class AB operation Crossover distortion and methods of eliminating it.

Total hours to be taught	45

Text Book(s):

1	David A. Bell, " Electronic devices and circuits ", Oxford University Press, 2008 5th edition (I, II, III Units)
2	Millman J. and Halkias .C., " Electronic devices and circuits ", Tata McGraw-Hill, 2007 (IV, V Units)

Reference(s) :

1	Floyd, Electronic Devices, Sixth edition, Pearson Education, 2003.
2	Robert L. Boylestad and Louis Nashelsky, Electronic Devices & Circuit Theory, 8th edn., PHI, 2002.
3	Schilling and Belove, "Electronic Circuits", TMH, Third Edition, 2002
4	Sedra Smith, “Micro Electronic Circuits” Oxford university Press, 2004.

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Semester III								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EC 003	DIGITAL PRINCIPLES AND SYSTEM DESIGN (CS, EC, IT)	3	0	0	3	50	50	100
Objective(s)	To introduce number systems and codes, basic postulates of Boolean algebra and show the correlation between Boolean expressions. To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits and to introduce the concept of memories and programmable logic devices.							

1	NUMBER SYSTEMS	Total Hrs	9

Binary, Octal, Decimal, Hexadecimal - Number base conversions – complements – signed Binary numbers. Binary Arithmetic - Binary codes: Weighted – BCD – 2421 - Gray code - Excess 3 code - ASCII – Error detecting code – conversion from one code to another-Boolean postulates and laws –De-Morgan's Theorem-Principle of Duality - Boolean function - Minimization of Boolean expressions – Sum of Products (SOP) – Product of Sums (POS) – Minterm – Maxterm - Canonical forms – Conversion between canonical forms – Karnaugh map Minimization – Don't care conditions.

2	LOGIC GATES & COMBINATIONAL CIRCUITS	Total Hrs	9

LOGIC GATES:
AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive NOR - Implementations of Logic Functions using gates, NAND – NOR implementations – Multi level gate implementations - Multi output gate implementations. TTL and CMOS Logic and their characteristics –Tristate gates.
COMBINATIONAL CIRCUITS:
Design procedure – Adders - Subtractors – Serial adder/ Subtractor - Parallel adder/ Subtractor - BCD adder - Magnitude Comparator – Multiplexer / Demultiplexer - encoder / decoder – parity checker – code converters: binary to gray, gray to binary, BCD to excess 3 code. Implementation of combinational logic using MUX.

3	SEQUENTIAL CIRCUIT	Total Hrs	9

Flip flops SR, JK, T, D and Master slave – Characteristic table and equation – Application table – Edge triggering – Level Triggering – Realization of one flip flop using other flip flops – Asynchronous / Ripple counters – Synchronous counters –Modulo – n counter – Classification of sequential circuits – Moore and Mealy machines – Analysis of clocked sequential circuits: state equation - State table – State diagram – State reduction & assignment - Design procedure. Register – shift registers - Universal shift register – Shift counters – Ring counters.

4	ASYNCHRONOUS SEQUENTIAL CIRCUITS	Total Hrs	9

Analysis procedure – Transition table - Flow table – Race conditions -Design of fundamental mode circuits – Primitive flow table – Reduction of state and flow table – Race free state assignment - Hazards: Static – Dynamic – Essential – Hazards elimination.

5	MEMORY DEVICES	Total Hrs	9

Classification of memories – RAM organization – Write operation – Read operation – Memory cycle - Timing wave forms – Memory decoding – memory expansion – ROM organization - PROM – EPROM – EEPROM – EAPROM – Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) - Field Programmable Gate Arrays (FPGA). Implementation of combinational logic using ROM, PAL and PLA.

Total hours to be taught	45

Text Book(s) :

1	M. Morris Mano, 'Digital Design', 4th edition, Prentice Hall of India Pvt. Ltd./Pearson education, New Delhi, 2008.

Reference(s) :

1	Donald P.Leach and Albert Paul Malvino, 'Digital Principles and Applications', 7th edition., Tata McGraw Hill Publishing Company Limited, New Delhi, 2010.
2	S. Salivahanan and S. Arivazhagan, 'Digital Circuits and Design', 3rd edition, Vikas Publishing House Pvt. Ltd, New Delhi.
3	John F.Wakerly, 'Digital Design: Principles and Practices', 4th edition, Pearson Education, 2008.
4	Charles H.Roth, 'Fundamentals of Logic Design', 5th Edition, Brooks/cole, 2004.
5	John .M Yarbrough, 'Digital Logic Applications and Design', 1st Edition, Nelson Engineering, 2006.

<table>
<tr><td colspan="8">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td>R 2010</td></tr>
<tr><td colspan="2">Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="3">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="9">Semester III</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td colspan="2">10 CS 311</td><td>OBJECT ORIENTED PROGRAMMING AND C++</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="7">Making Students study and understand the concepts of Object oriented Programming and also designing classes in object oriented programming and makeing student to write simple applications using C++.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION</td><td colspan="2">Total Hrs</td><td>8</td></tr>
<tr><td colspan="9">Object-oriented paradigm – Elements of object oriented programming – Merits and demerits of OO methodology – C++ fundamentals – Data types, Operators and expressions – Control flow – Arrays and strings.</td></tr>
<tr><td>2</td><td colspan="5">CLASSES AND OBJECTS</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="9">Modular Programming with Functions – Function over loading - Structures and Unions – Pointers and Runtime binding – Classes and objects – Friend functions and friend classes – Static data and member functions.</td></tr>
<tr><td>3</td><td colspan="5">CONSTRUCTORS AND OPERATOR OVERLOADING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Constructors – Parameterized Constructors - Constructor Overloading - Dynamic Constructors – Copy Constructors – Destructors, Dynamic objects – Pointers to objects – this pointer, Operator overloading-Unary operator overloading- Binary operator overloading.</td></tr>
<tr><td>4</td><td colspan="5">INHERITANCE AND TEMPLATES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Inheritance – Types of inheritance, Virtual functions – Pure virtual functions – Abstract classes, Generic programming with templates – Function templates – Class templates.</td></tr>
<tr><td>5</td><td colspan="5">FILE HANDLING AND EXCEPTION HANDLING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">C++ streams – Console streams – Console stream classes-Formatted and unformatted console I/O operations, manipulators, Files – File streams classes – File modes – File pointers and manipulations – Sequential and random access – Exception handling.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="2">45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">K.R.Venugopal, Rajkumar Buyya, T.Ravishankar, "Mastering C++", TMH, 2003.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">E.Balagurusamy “ Object Oriented Programming with C++”, TMH 3/e.</td></tr>
<tr><td>2</td><td colspan="8">Yashvanth Kanithkar, “Letus C++”, PBP publications.</td></tr>
<tr><td>3</td><td colspan="8">D.Ravichandran, “Programming with C++”, TMH, 2nd edition, 2007.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Semester III								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 001	DATA STRUCTURES USING C (CS, EE, EI, IT)	3	0	0	3	50	50	100
Objective(s)	Learning the systematic way of solving problems, different methods of organizing large amounts of data, Programming in C, efficient implementation of different data structures, and to implement solutions for specific problems.							
1	LISTS, STACKS AND QUEUES				Total Hrs	9		
Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT								
2	TREES				Total Hrs	10		
Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – Splay Trees – B – Trees								
3	HASHING AND PRIORITY QUEUES (HEAPS)				Total Hrs	8		
Hashing – General idea – Hash Function – Separate chaining – Open addressing – Rehashing – Extendible hashing – Priority Queues (Heaps) – Model – Simple Implementations – Binary Heap – Applications of Priority Queues – d – Heaps.								
4	SORTING				Total Hrs	9		
Preliminaries – Insertion Sort – Shellsort – Heapsort – Mergesort – Quicksort – External Sorting								
5	GRAPHS				Total Hrs	9		
Definitions – Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm, Kruskal's Algorithm – Applications of Depth-First Search – Undirected Graphs – Biconnectivity.								
Total hours to be taught						45		
Text book (s) :								
1	M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd edition, Pearson Education Asia, 2002. (chapters 3, 4.1-4.4 (except 4.3.6), 4.5, 4.6, 4.7, 5.1-5.2, 5.3, 5.4, 5.5, 5.6, 6.1-6.3.3, 6.4, 6.5, 7.1-7.7 (except 7.2.2, 7.3, 7.4.1, 7.5.1, 7.6.1, 7.7.5, 7.7.6), 7.11, 9.1-9.3.2, 9.5-9.5.2, 9.6-9.6.2).								
Reference(s):								
1	Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004							
2	Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 1998.							

K.S.Rangasamy College of Technology - Autonomous Regulation			R 2010
Department	Computer Science and Engineering	Programme Code & Name	CS : B.E. Computer Science and Engineering

Semester III

Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EC 0P1	ELECTRONIC CIRCUITS AND DIGITAL LABORATORY (CS,IT)	0	0	3	2	50	50	100

LIST OF EXPERIMENTS

1. Characteristics of PN Junction Diode and Zener Diode
2. Characteristics of BJT (common emitter configuration)
3. Characteristics of JFET
4 Half Wave and full wave Rectifier
5. Frequency response CE amplifier using voltage divider bias
6. RC phase shift oscillator
7. Study of logic gates
8. Study of JK, D and T flip flops
9. Study of Mod-n counter
10 Study of encoder and decoder
11 Study of multiplexer and demultiplexer
12 Study of shift register

Total hours to be taught	45

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Semester III								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 3P1	OBJECT ORIENTED PROGRAMMING AND C++ LABORATORY	0	0	3	2	50	50	100
Objective(s)	Used to develop list of environment in C++ with object oriented concept							

List of experiments

1. Implementation of Functions
   - Implementation of Call by Value, Call by Address and Call by Reference.
   - Function overloading.
2. Implementation of Simple Classes for understanding objects and member functions.
3. Implementation of friend functions and friend classes.
4. Implementation of Static data and member functions.
5. Implementation of Constructors.
   - Constructor overloading.
   - Copy constructor.
6. Implementation of this pointer.
7. Implementation of operator overloading.
   - Unary operator.
   - Binary operator
8. Implementation of Inheritance.
9. Implementation of virtual functions.
10. Implementation of Templates.
11. Implementation of File handling.
    - Sequential access.
    - Random access.
12. Implementation of Exception handling.

Total hours to be taught	45

<table>
<tr><td colspan="6">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="3">R 2010</td></tr>
<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="3">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="8">Semester III</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="2">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS 0P1</td><td colspan="2">DATA STRUCTURES USING C LABORATORY (CS,EE,EI,IT)</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Teaching the students to write programs in C , various data structures as Abstract Data Types and solving problems using the ADTs</td></tr>
<tr><td colspan="8">List of experiments

1. Array implementation of List Abstract Data Type (ADT)
2. Linked list implementation of List ADT
3. Cursor implementation of List ADT
4. Linked list implementations of Stack ADT
5. Implementation of stack applications:
(a) Program for ‘Balanced Paranthesis’
(b) Program for ‘Evaluating Postfix Expressions’
6. Queue ADT
7. Search Tree ADT - Binary Search Tree
8. Heap Sort
9. Quick Sort
10. Write a C Program to Implement Insertion sort.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name			CS:B.E.Computer Science and Engineering		
Semester III								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 TP 0P1	Career Competency Development I	0	0	2	0	100	00	100
Objective(s)	To enhance employability skills and to develop career competency							

Unit – 1	Written Communication – Part 1	Hrs
Usage of noun, pronoun, adjective (Comparative Forms), Verb, Adjectives, Adverb, Tenses, Articles and Preposition - Change of Voice - Change of Speech - Synonyms & Antonyms - One Word Substitution - Using the Same Word as Different Parts of Speech - Odd Man Out - Spelling & Punctuation (Editing) Materials: Instructor Manual, Word Power Made Easy Book		8
Unit – 2	Written Communication – Part 2	8
Analogies - Sentence Formation - Sentence Completion - Sentence Correction - idioms & Phrases - Jumbled Sentences, Letter Drafting (Formal Letters) - Reading Comprehension(Level 1) - Contextual Usage - Foreign Language Words used in English Materials: Instructor Manual, Word Power Made Easy Book		
Unit – 3	Oral Communication – Part 1	4
Self Introduction - Situational Dialogues / Role Play (Telephonic Skills) - Oral Presentations- Prepared -'Just A Minute' Sessions (JAM) Materials: Instructor Manual, News Papers		
Unit – 4	Oral Communication – Part 2	4
Describing Objects / Situations / People, Information Transfer - Picture Talk - News Paper and Book Review Materials: Instructor Manual, News Papers		
Unit – 5	Speed Maths, Quantitative Aptitude	6
Think Without Ink(TWI) Approach - Speed Maths: Squaring of Numbers - Multiplication of Numbers - Finding Square Roots - Finding Cube Roots - Solving Simultaneous Equations Faster - Number System: HCF, LCM - Decimals - Percentages - Averages - Powers and Roots - Sudoku (level 1) - Series Completion (Numbers, Alphabets, Pictures) - Odd Man Out - Puzzles Materials: Instructor Manual, Aptitude Book		
	Total	30

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	50 Questions – 30Questions from Unit 1 & 2, 20 Questions from Unit 5, (External Evaluation)	50
2	Evaluation 2 Oral Communication 1	Self Introduction, Role Play & Picture Talk from Unit-3 (External Evaluation by English and MBA Dept)	30
3	Evaluation 3 Oral Communication 2	Book Review & Prepared Speech from Unit-4 (External Evaluation by English and MBA Dept)	20
		Total	100

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, “Quantitative Aptitude”, TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note :

- Instructor can cover the syllabus by Class room activities and Assignments(5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 questions from Unit 1, 2 and Unit 5 and 5 questions from Unit 3 and 4
- Evaluation has to be conducted as like Lab Examination.

III Semester Course Outcomes

Modules	10 MA 003 - Engineering Mathematics III Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Ability to form partial differential equations by eliminating arbitrary constants and functions and understand the solutions of some standard types of first order partial differential equations.
2	Effectively apply the methods to solve Lagrange's Linear Equations and enhance the ability of solving homogeneous linear partial differential equations with constant coefficients.
3	Explain the knowledge of basic concepts of Fourier series
4	Gain the knowledge about the concept of Harmonic analysis to express the given numerical value as Harmonics
5	Understand the procedure to find the solutions of one dimensional wave equations
6	Use effective application of the procedure to find the solutions of one dimensional heat equations in steady state conditions
7	Write the concepts of Fourier transform pair, sine transform and cosine transform
8	Ability to apply convolution theorem for finding transform function and understand the usage of Parseval's identity for finding transform function.
9	Solve the concept of z- transforms and inverse z – transforms.
10	Ability to know the procedure to solve difference equations by using Z-transform

Modules	10 EE 001 - Basics of Electrical Engineering Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Analyze different combination of circuit elements and solve the DC circuits by applying basic circuital laws.
2	Measure the power in the single phase and polyphase systems.
3	Analyze the magnetic circuits and compare with electric circuits.
4	Investigate the various aspects of electromagnetic induction.
5	Identify the various parts of DC machines and analyze the performance characteristics
6	Recognize the parts of transformer and analyze its efficiency.
7	Employ the induction machine for the specific applications.
8	Identify the different types of electrical measuring instruments for suitable applications.
9	Describe the power generated from different resources.
10	Plan the wiring system for building with safety measures.

Modules	10 EC 002 – Electronic Devices and Circuits Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Describe the basic theory of semiconductors and the construction and working of diodes
2	Discuss the principle of rectification and regulation and analyze various rectifier circuits
3	Explain the construction and working of bipolar junction transistor in various configuration
4	Discuss the construction & working operation of FET in various configurations.
5	Describe the concepts of biasing, stabilization and analyze them in bipolar junction transistors.
6	Describe the types of FET biasing
7	Understand the concepts and characteristics of negative feedback amplifiers
8	Design and analyze various oscillator circuits.
9	Classify, design and analyze large signal amplifiers.
10	Discuss the concepts of different types of distortion & eliminating methods

Modules	10 EC 003 - Digital Principles and System Design Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understanding the fundamentals of numbering system and different coding techniques & their conversion.
2	Learning the concepts of theorems & minimization of Boolean functions using karnaugh map.
3	Realizing Boolean functions using logic gates and their implementation.
4	Understanding the basic characteristics of TTL & CMOS technology.
5	Learning the various combinational logic circuits.
6	Learning the characteristics table and equations.
7	Understanding the concept of Asynchronous and Synchronous counters, clocked sequential circuits.
8	Learning the basic concepts of Registers and their types.
9	Designing the Asynchronous Sequential Circuits operation using transition and flow table.
10	Learning the operation of RAM and different types of ROM, programmable devices like PLA, PAL, and FPGA.

Modules	10 CS 311– Object Oriented Programming and C++ Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Comprehend the Concepts of functions, function overloading, classes and objects and member functions and Abstract classes.
2	Implement the functions, function overloading, classes and objects and member functions and Abstract classes.
3	Comprehend the Concept of Static data and member functions , Constructors and Constructor overloading and Destructors, overloading of new and delete operators
4	Acquire the knowledge of implementing the Static data and member functions, Constructors and Constructor overloading and Destructors , overloading of new and delete operators
5	Comprehend the Concept of this pointer , operator overloading
6	Gain knowledge in the implementation of this pointer , operator overloading
7	Understand reusability concept through different types of inheritance
8	Implement reusability concept through different types of inheritance
9	Comprehend the concept of Virtual functions, Templates, File handling, Exception handling
10	Implement the Virtual functions and Templates, File handling and Exception handling

Modules	10 CS 001 - Data Structures Using C Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Express the concept of List ADT and its implementations
2	Describe the operations of Stack and Queue ADT and its applications
3	Compare the concept of Binary, Binary Search and AVL Trees with its operations
4	Gain the knowledge of Splay and B-Trees
5	Apprise the various Hashing techniques
6	Review various implementations and operations of priority Queue
7	Know the concept of Sorting and its types
8	Employ various Internal and External sorting techniques
9	Apply shortest path and minimum spanning tree algorithms
10	Illustrate the concept of Depth First Search and Biconnectivity

Modules	10 EC 0P1 - Electronic Circuits and Digital Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate the characteristics of PN junction diode and zener diode
2	Demonstrate the characteristics of transistor in Common Emitter configuration
3	Demonstrate the characteristics of JFET
4	Perform the Half Wave and full wave Rectifier
5	Perform the Frequency response CE amplifier using voltage divider bias
6	Investigate RC phase shift oscillator
7	Interpret the concept of logic gates, flipflops
8	Interpret the concept of Mod-n counter
9	Interpret the concept of encoder and decoder
10	Interpret the concept of multiplexer and demultiplexer, shift register

Modules	10 CS 3P1 - Object Oriented Programming and C++ Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Implement the functions and function overloading
2	Implement classes and objects and member functions and Abstract classes.
3	Acquire knowledge of implementing the Static data and member functions , Constructors and Destructors
4	Acquire knowledge of implementing Constructor overloading , usage of new and delete operators
5	Gain the knowledge of implementing operator overloading
6	Gain knowledge in the implementation of this pointer
7	Implementation of the reusability concept through different types of inheritance
8	Secure the knowledge of the implementation of the Virtual functions
9	Secure the knowledge of Implementation of the function Templates and class Templates
10	Obtain the knowledge of Implementation of the File handling and Exception handling

Modules	10 CS 0P1 - Data Structures Using C Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate the array implementation of List ADT
2	Perform linked list implementation of List ADT
3	Demonstrate Cursor implementation of List ADT
4	Interpret Linked list implementation of Stack ADT
5	Investigate Balanced Parenthesis and Postfix expressions with the help of Stack ADT
6	Implement Queue ADT
7	Implement Binary Search Tree ADT
8	Perform Heap Sort
9	Perform Quick Sort
10	Demonstrate Insertion sort

Modules	10 TP 0P1- Career Competency Development I Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate aptitude skills on basic level
2	Write programs using c language
3	Construct sentences in English and make correction
4	Perform oral communication for a shorter period
5	Prepare and present technical paper

<table>
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<tr><td colspan="9">Semester IV</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td colspan="2">10 MA 006</td><td>DISCRETE MATHEMATICS</td><td>3</td><td>1</td><td>0</td><td>4</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="7">At the end of the course, students would have knowledge of the concepts needed to test the logic of a program, gain knowledge which has application in expert system, data base and a basic for the prolog language. An understanding in identifying patterns on many levels, be aware of a class of functions which transform a finite set into another finite set which relates to input output functions in computer science. Exposure to concepts and properties of algebraic structures such as semi groups, monoids and groups.</td></tr>
<tr><td>1</td><td colspan="4">PROPOSITIONAL CALCULUS</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="9">Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DeMorgan’s Laws - Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments - Validity of arguments.</td></tr>
<tr><td>2</td><td colspan="4">PREDICATE CALCULUS</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="9">Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.</td></tr>
<tr><td>3</td><td colspan="4">SET THEORY</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="9">Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Relations on sets –Types of relations and their properties – Relational matrix and the graph of a relation – Equivalence relations –functions – Classification of functions –Type of functions - Examples – Composition of functions – Inverse functions</td></tr>
<tr><td>4</td><td colspan="4">LATTICE & BOOLEAN ALGEBRA</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="9">Partial ordering – Poset – Hasse diagram – Lattices and their properties – sublattices - Boolean Algebra – representation and minimization of Boolean function</td></tr>
<tr><td>5</td><td colspan="4">GROUPS</td><td colspan="2">Total Hrs</td><td colspan="2">12</td></tr>
<tr><td colspan="9">Algebraic systems – Definitions – Examples – Properties – Semigroups – Monoids – Homomorphism – Sub semigroups and Submonoids - Cosets and Lagrange’s theorem – Normal subgroups</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="2">60</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Trembly J.P and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 2003.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, “Discrete Mathematical Structures”, Fourth Indian reprint, Pearson Education Pvt Ltd., New Delhi, 2003.</td></tr>
<tr><td>2</td><td colspan="8">Kenneth H.Rosen, “Discrete Mathematics and its Applications”, Fifth Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2003.</td></tr>
<tr><td>3</td><td colspan="8">Richard Johnsonbaugh, “Discrete Mathematics”, Fifth Edition, Pearson Education Asia, New Delhi, 2002.</td></tr>
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<tr><td colspan="9">Semester IV</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS 003</td><td>DESIGN AND ANALYSIS OF ALGORITHMS (CS, IT)</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">Introducing basic concepts of algorithms, mathematical aspects and analysis of algorithms, sorting and searching algorithms, various algorithmic techniques and algorithm design methods.</td></tr>
<tr><td>1</td><td colspan="5">BASIC CONCEPTS OF ALGORITHMS</td><td colspan="2">Total Hrs</td><td>8</td></tr>
<tr><td colspan="9">Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.</td></tr>
<tr><td>2</td><td colspan="5">MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS</td><td colspan="2">Total Hrs</td><td>8</td></tr>
<tr><td colspan="9">Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.</td></tr>
<tr><td>3</td><td colspan="5">ANALYSIS OF SORTING AND SEARCHING ALGORITHMS</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="9">Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree- Traversal and Related Properties – Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search.</td></tr>
<tr><td>4</td><td colspan="5">ALGORITHMIC TECHNIQUES</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="9">Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall’s and Floyd’s Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim’s Algorithm – Kruskal’s Algorithm – Dijkstra’s Algorithm – Huffman trees.</td></tr>
<tr><td>5</td><td colspan="5">ALGORITHM DESIGN METHODS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Backtracking – n-Queen’s Problem – Hamiltonian Circuit problem – Subset-Sum Problem — Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="2">45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Anany Levitin, “Introduction to the Design and Analysis of Algorithm”, Pearson Education Asia, 2003.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, “Introduction to Algorithms”, PHI Pvt. Ltd., 2001</td></tr>
<tr><td>2</td><td colspan="8">Sara Baase and Allen Van Gelder, “Computer Algorithms - Introduction to Design and Analysis”, Pearson Education Asia, 2003.</td></tr>
<tr><td>3</td><td colspan="8">A.V.Aho, J.E. Hopcroft and J.D.Ullman, “The Design and Analysis Of Computer Algorithms”, Pearson Education Asia, 2003.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Semester IV								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EC 007	MICROPROCESSORS AND MICROCONTROLLERS (CS, EC, IT)	3	0	0	3	50	50	100
Objective(s)	To introduce the architecture and programming of 8085 and 8086 microprocessors, interfacing of peripheral devices with 8085 and 8086 microprocessors. To introduce the architecture, programming and interfacing of 8051 micro controller.							
1	8085 MICROPROCESSOR				Total Hrs	9		
8085 Architecture - Instruction set - Addressing modes - Timing diagrams - Assembly language programming - Memory interfacing – Interfacing I/O devices.								
2	PERIPHERALS INTERFACING				Total Hrs	9		
Programmable Peripheral Interface(PPI 8255) –Programmable Interval Timer(PIT 8253) – 8259 Programmable Interrupt Controller – keyboard & display controller (8279)- Interfacing serial I /O (8251)- ADC/DAC interfacing - stepper motor interfacing – Traffic light controller.								
3	8086 MICROPROCESSOR				Total Hrs	9		
8086 Internal Architecture - Addressing modes - Instruction set - Assembly language Programming- signals and timing – MIN/MAX mode of operation – Interrupts - Interfacing memory and I/O devices – System design using 8086								
4	8051 MICROCONTROLLER				Total Hrs	9		
8051 Architecture- Instruction set - Addressing modes - Assembly language programming - I/O port programming -8051 Micro controller hardware - I/O pins, ports and circuits - External memory - - Interfacing to external memory and 8255								
5	8051 PROGRAMMING AND APPLICATION				Total Hrs	9		
Interrupts -Counters and Timers- Timer and counter programming - Serial Communication - Interrupt programming - 8051 Interfacing: LCD, ADC, Sensors, Stepper Motors, Keyboard and DAC.								
Total hours to be taught						45		
Text book (s):								
1	Ramesh S Gaonkar," Microprocessor Architecture, Programming and application with 8085", 5th Edition, Prentice Hall, New Delhi,2002.(I & II)							
2	Krishna Kant, Microprocessors and microcontrollers Architecture , Programming and System design 8085,8086,8051,8096,PHI-Third Printing-2010(III,IV & V)							
Reference(s):								
1.	Mohammed Ali Mazidi and Janice Gilli Spil Mazidi, The 8051 microcontroller, Prentice Hall of India, 2006.							
2.	Douglas V.Hall,"Microprocessors and Interfacing Programming and Hardware", Tata McGraw-Hill publishing company Limited, New Delhi. Fifteenth reprint 2002							
3.	A.K. Ray and K.M.Burchandi, Intel Microprocessors Architecture Programming and Interfacing, McGraw Hill International Edition. Twelfth reprint 2009							
4.	M.Rafiquizzaman " Microprocessor - Theory and applications" Prentice Hall of India Pvt Ltd., 2005							

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Semester IV								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 411	COMPUTER ARCHITECTURE	3	0	0	3	50	50	100
Objective(s)	Having a thorough understanding of the basic structure and operation of a digital computer and discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division, to study in detail the different types of control and the concept of pipelining and study the hierarchical memory system including cache memories and virtual memory, to study the different ways of communicating with I/O devices and standard I/O interfaces.							
1	BASIC STRUCTURE OF COMPUTERS				Total Hrs	10		
Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.								
2	ARITHMETIC UNIT				Total Hrs	8		
Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.								
3	BASIC PROCESSING UNIT				Total Hrs	9		
Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.								
4	MEMORY SYSTEM				Total Hrs	9		
Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.								
5	I/O ORGANIZATION				Total Hrs	9		
Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).								
Total hours to be taught						45		
Text book (s) :								
1	Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition “Computer Organization”, McGraw-Hill, 2002.							
Reference(s):								
1	William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6th Edition, Pearson Education, 2003.							
2	David A.Patterson and John L.Hennessy, “Computer Organization and Design: The hardware / software interface”, 2nd Edition, Morgan Kaufmann, 2002.							
3	John P.Hayes, “Computer Architecture and Organization”, 3rd Edition, McGraw Hill, 1998.							

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Department	Computer Science and Engineering		Program code & Name			CS : B.E. Computer Science and Engineering		
Semester IV								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 412	JAVA PROGRAMMING	3	0	0	3	50	50	100
Objective(s)	Gaining knowledge of core java programming concept like class, inheritance etc., network programming in java and java multi threading, RMI, awt packages							
1	JAVA FUNDAMENTALS				Total Hrs	9		
An over view of java – fundamentals of OOPS – Java Features – Constant – Variables – Data types - Operators – Arrays – Strings - vectors – control statements – Class – object – methods								
2	I/O STREAMS AND EXCEPTION HANDLING				Total Hrs	9		
IO Streams – Inheritance - Interfaces – Multiple Inheritance - Packages – Exception Handling.								
3	MULTI THREADING AND AWT				Total Hrs	9		
Multi threading - Java Thread model – Main thread – creating thread – creating multiple thread – Thread priority – methods – synchronization – IPC – Applet Life cycle – Graphics and Applet – AWT – Windows Fundamentals – Frames – creating frame window in applet – AWT controls – Layout Manager – Menu – Event Handling.								
4	JAVA NETWORKING AND RMI				Total Hrs	9		
Sockets – TCP Socket – UDP Socket – RMI – Basics – RMI Layer – Stub, Skeleton - RMI Implementation.								
5	SERVLET AND SWING PROGRAMMING				Total Hrs	9		
Server Side Programming – Servlet Architecture – Servlet Get and Post Method – Servlet Life cycle – Container – Executing simple servlet –Java Swing – Introduction to database connectivity(JDBC).								
Total hours to be taught						45		
Text book (s) :								
1	Herbert Schildt, "the Java 2 : Complete Reference", Fifth edition, TMH, 2002.							
Reference(s):								
1	Patrick Naughton " Complete Reference Java 2" Tata McGraw Hill , 2003							
2	Elliotte Rustry Harold " Java Network Programming" 'O' Ralley Publications, 2000							
3	E.Balagurusamy " Programming with Java" Tata McGraw Hill, 2rd Edition, 2008.							

<table>
<tr><td colspan="7">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td>R 2010</td></tr>
<tr><td colspan="2">Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="2">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="9">Semester IV</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td colspan="2">10 CS 413</td><td>OPERATING SYSTEMS</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="7">Knowing the components of an operating system, having the thorough knowledge of process management and having a thorough knowledge of storage management.</td></tr>
<tr><td>1</td><td colspan="4">OVERVIEW OF OS</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.</td></tr>
<tr><td>2</td><td colspan="4">PROCESS MANAGEMENT</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.</td></tr>
<tr><td>3</td><td colspan="4">PROCESS AND STORAGE MANAGEMENT</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.</td></tr>
<tr><td>4</td><td colspan="4">MEMEORY MANAGEMENT</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection.</td></tr>
<tr><td>5</td><td colspan="4">FILE SYSTEM</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management.- Design principles - Case Study Linux System Kernel Model.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="2">45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, Sixth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2003.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Harvey M. Deitel, “Operating Systems”, Second Edition, Pearson Education Pvt. Ltd, 2002.</td></tr>
<tr><td>2</td><td colspan="8">Andrew S. Tanenbaum, “Modern Operating Systems”, Prentice Hall of India Pvt. Ltd, 2003.</td></tr>
<tr><td>3</td><td colspan="8">William Stallings, “Operating System”, Prentice Hall of India, 4th Edition, 2003.</td></tr>
</table>

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Department	Computer Science and Engineering			Programme Code & Name		CS : B.E. Computer Science and Engineering		
Semester IV								
Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 EC 0P3	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY (CS,EC,IT)	0	0	3	2	50	50	100
LIST OF EXPERIMENTS								
1	Programs for sorting and searching (Using 8086 & 8051).							
2	Interfacing and programming of keyboard & display controller							
3	Interfacing and programming of interrupt controller							
4	Interfacing and programming of Timer							
5	Interfacing ADC and DAC with 8085.							
6	Parallel Communication and Serial Communication							
7	Interfacing and Programming of Traffic light controller.							
8	Interfacing and programming of digital clock using timer.							
9	Interfacing, Programming of Stepper Motor & DC Motor Speed control.							
10	Microcontroller 8051- Sample programs through IDE using KEIL.							
Total hours to be taught								45

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<tr><td colspan="7">K.S.Rangasamy College of Technology Autonomous Regulation</td><td>R 2010</td></tr>
<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Program code & Name</td><td colspan="2">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="8">Semester IV</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="2">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS 4P1</td><td>JAVA PROGRAMMING LABORATORY</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Used to develop list of experiment in Java using object oriented concept</td></tr>
<tr><td colspan="8">List of experiments</td></tr>
<tr><td colspan="8">1. Program to implement Simple Classes to understand objects, member functions and Constructors
- Classes with arrays as data members
- Classes with constant data members
- Classes with static member functions
- Classes with String functions
2. Program to implement various operations on vector class
3. Program to implement Simple Package creation.
- Developing user defined packages in Java
4. Program to implement Interfaces
- Developing user-defined interfaces and implementation
- Use of predefined interfaces
5. Program to implement Threading
- Creation of a thread in Java applications
- Multithreading
6. Program to implement Exception Handling Mechanism in Java
- Handling pre-defined exceptions
- Handling user-defined exceptions
7. Program to implement applet.
8. Program using layout in AWT.
9. Program to implement Network programming
- TCP implementation
- UDP implementation
10. Program to implement RMI.
11. Develop a program in Java using AWT and JDBC for any specified application.
12. Program to implement servlet.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
</table>

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Semester IV								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 4P2	OPERATING SYSTEMS LABORATORY	0	0	3	2	50	50	100
Objective(s)	Provides knowledge in Unix. Understanding the concepts of OS and Implement in C through Unix.							

List of experiments

1. Shell programming
   - command syntax
   - write simple functions
   - basic tests
2. Shell programming
   - loops g
   - patterns
3. - expansions
   - substitutions
4. Write programs using the following system calls of UNIX operating system:
   fork, exec, getpid, exit, wait, close, stat, opendir, readdir
5. Write programs using the I/O system calls of UNIX operating system (open, read)
6. Write programs using the I/O system calls of UNIX operating system (write,update etc)
7. Write C programs to simulate UNIX commands like ls, grep, etc.
8. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
9. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
10. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
11. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
12. Implement the Producer – Consumer problem using semaphores..

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation			
Department	Computer Science and Engineering	Programme Code & Name	CS:B.E. Computer Science and Engineering

Semester IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
		L	T	P	C	CA
10 TP 0P2	Career Competency Development II	0	0	2	0	100
Objective(s)	To enhance employability skills and to develop career competency					

Unit – 1	Written Communication – Part 3

Reading Comprehension Level 2 (Paraphrasing Poems) - Letter Drafting - Email Writing - Paragraph Writing - News paper and Book Review Writing - Skimming and Scanning - Interpretation of Pictorial Representations.
Practices: Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Editing
Materials: Instructor Manual, Word power Made Easy Book, News Papers

Unit – 2	Oral Communication – Part 3

Self Introduction - Miming (Body Language) - Introduction to the Sounds of English - Vowels, Diphthongs & Consonants, Introduction to Stress and Intonation - Extempore - News Paper and Book Review - Technical Paper Presentation.
Material: Instructor Manual, News Papers

Unit – 3	Verbal Reasoning – Part 1

Analogies - Alphabet Test - Theme Detection - Family Tree - Blood Relations (Identifying relationships among group of people) - Coding & Decoding - Situation Reaction Test - Statement & Conclusions
Material: Instructor Manual, Verbal Reasoning by R.S.Aggarwal

Unit – 4	Quantitative Aptitude – Part 1

Problem on Ages - Percentages - Profit and Loss - Simple & Compound Interest - Averages - Ratio, Proportion
Material: Instructor Manual, Aptitude Book

Unit – 5	Quantitative Aptitude – Part 2

Speed, Time & Work and Distance - Pipes and Cisterns - Mixtures and Allegations - Races - Problem on Trains - Boats and Streams
Practices : Puzzles, Sudoku, Series Completion, Problem on Numbers
Material: Instructor Manual, Aptitude Book

Total

Evaluation Criteria

S.No.	Particular	Test Portion
1	Evaluation 1 Written Test	15 Questions Each from Unit 1, 3, 4 & 5 (External Evaluation)
2	Evaluation 2 Oral Communication	Extempore & Miming – Unit 2 (External Evaluation by English, MBA Dept.)
3	Evaluation 3 Technical Paper Presentation	Internal Evaluation by the Dept.

Total

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, “Quantitative Aptitude”, TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note :

- Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 questions from Unit 1, 3, 4 and Unit 5 and 5 questions from Unit 2.
- Evaluation has to be conducted as like Lab Examination.

IV Semester Course Outcome

Modules	10 MA 006 - Discrete Mathematics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Comprehend the concepts of statements, connectives and its symbolic forms
2	Learn the truth value, validity and conclusion of arguments
3	Comprehend the predicates and statement function and its quantifiers
4	Comprehend the rules of universal specification and generalization and validity of arguments
5	Augment the knowledge of set concepts, ordered pairs and Cartesian product
6	Learn the relation , function and its inverse
7	Gain the knowledge of the partial ordering, poset, lattices and their properties
8	Learn the Boolean algebra and minimization of Boolean function
9	Learn the algebric systems , semigroup and monoid
10	Expertise to know the normal subgroups definition, theorem, cosets and lagrange's theorem

Modules	10 CS 003 – Design and Analysis of Algorithms Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Outline the basic problem types and summarize the algorithm analysis framework
2	Use notations to find time-complexity of algorithms for simple problems
3	Analyze mathematically non-recursive algorithms
4	Deduce recurrence relations and find time-complexity for recursive algorithms
5	Design algorithms using brute force, divide and conquer for different types of sorting and searching problems and analyze its complexity.
6	Comprehend insertion sort, depth first search and breadth first search using decrease & conquer strategy
7	Choose transform & conquer, dynamic programming and greedy strategies to illustrate algorithms
8	Solve problems using algorithmic techniques and analyze.
9	Apply Backtracking strategy for simple problems
10	Calculate upper bound and lower bound for the problems using Branch & Bound strategy

Modules	10 EC 007 - Microprocessors and Microcontrollers Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understanding how the processor stores and manipulates data, the basic arithmetic and logical operations performed by the 8085 microprocessor.
2	Understanding how the processor stores and manipulates data, the basic arithmetic and logical operations performed by the 8085 microprocessor.
3	Learning the architecture and functioning of 8255,8253 and interfacing with 8085
4	Introducing the stepper motor interface and Traffic light controller with 8085
5	Understand the concept of 16 bit microprocessor and its architecture.
6	Understanding the concept of I/O and memory devices interface with 8086
7	Introducing 8051 microcontroller Architecture, Instruction sets and Addressing modes.
8	Learning the Assembly language programming for 8051.
9	Understanding I/O ports and configuring methods for accessing.
10	Learning various types of serial Communication functioning of RS232.

Modules	10 CS 411 - Computer Architecture Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Describe the basic structure of computer.
2	Identify about Instruction sequencing and Addressing modes.
3	Express the basic design of Addition and subtraction for fixed point numbers.
4	Illustrate multiplication and division of fixed and basics of floating point numbers using algorithm.
5	Discuss the concept of Instruction execution and generation of control signals.
6	Gain knowledge about pipelining and hazards.
7	Outline types of RAM, ROM memories and secondary storage devices.
8	Summarize the concept of Cache memory, virtual memory.
9	Review the concept of interrupts and types of buses.
10	Gain Knowledge about Direct Memory Access and Standard I/O Interfaces.

Modules	10 CS 412 - Java Programming Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Know the basic object oriented programming concepts and the origin of java programming and its applications
2	Express the concept of classes, objects and communicate classes over objects using methods
3	Describe the byte and character input/output streams, reusability using inheritance concepts
4	Identify different operations through single packages and observe predefined and user defined Exception handling
5	Express the concept of thread execution with thread priority
6	Practice the client side programming and also enrich the web concepts of AWT, layout managers and Event handling controls.
7	Apply the concept of TCP and UDP in client server applications
8	Employ the concept of RMI to perform remote data access
9	Describe the concept of server side programming and Perform database connectivity using JDBC
10	Design the interactive web pages using swing features

Modules	10 CS 413 - Operating Systems Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize the basics of operating systems and its components.
2	Understand the process, threads and its implementation.
3	Examine the scheduling algorithms and critical section problem.
4	Describe classical synchronization problem and semaphores.
5	Analyze about deadlocks.
6	Classify the Storage Management, paging and segmentation.
7	Outline the memory management scheme and page replacement algorithms.
8	Understand the File concept and Directory structure.
9	Analyze the concept of allocation methods, directory structure and free space management.
10	Understand disk structure and disk scheduling algorithms

Modules	10 EC 0P3 - Microprocessors and Microcontrollers Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Assembly language sorting and searching programming in 8086 microprocessor and 8051 microcontroller
2	Knowledge to interface keyboard and display controller with microprocessor
3	Handling interrupt controller with microprocessor
4	Knowledge to interface Timer with microprocessor
5	Ability to use ADC and DAC with microprocessor
6	Handling parallel and serial communication with microprocessor
7	Knowledge to interface Traffic light controller with microprocessor
8	Knowledge to interface Timer with microcontroller
9	Ability to use stepper motor and DC motor speed control using microcontroller
10	Assembly language programming in 8051 by using KEIL IDE

Modules	10 CS 4P1 - Java Programming Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate the concepts of classes, objects, member functions and constructors.
2	Interpret the various operations of vector.
3	Demonstrate package creation and implement the interface concept.
4	Investigate thread and implement Inter Process Communication between threads
5	Perform the concept of exception handling and inheritance concepts
6	Demonstrate the concept of AWT, graphics window and frame windows
7	Perform event handling controls and create layout windows using layout managers
8	Demonstrate the networking applications using TCP and UDP concepts.
9	Investigate the concept of remote access using RMI and Implement Java Database Connectivity.
10	Perform server side programming using servlet

Modules	10 CS 4P2 - Operating Systems Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Implement the basic commands to implement shell programming.
2	Demonstrate the basic shell programming using patterns and loops
3	Implement the various system calls commands of UNIX.
4	Implement input system calls of UNIX operating system
5	Implement output system calls of UNIX operating system
6	Understand the concept of list particular information using ls UNIX command.
7	Identify the concept of search the pattern in the file using grep command.
8	Compute the scheduling process using first come first serve scheduling
9	Demonstrate scheduling policies concept using shortest job first scheduling
10	Compute the scheduling concept using priority scheduling

Modules	10 TP 0P2- Career Competency Development II Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate their aptitude and reasoning skills
2	Enhance their verbal ability and written ability
3	Express their programming skills in data structure
4	Perform in group discussion
5	Reveal their technical knowledge

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<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="3">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="8">Semester V</td></tr>
<tr><td rowspan="2">Course Code</td><td colspan="2" rowspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="2">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 MA 008</td><td colspan="2">PROBABILITY AND QUEUING THEORY</td><td>3</td><td>1</td><td>0</td><td>4</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Gaining a fundamental knowledge of the basic probability concepts. Have a well – found knowledge of standard distributions which can describe real life phenomena. Acquire skills in handling situations involving more than one random variable and functions of random variables. Understand and characterize phenomena which evolve with respect to time in a probabilistic manner. Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.</td></tr>
<tr><td>1</td><td colspan="5">PROBABILITY AND RANDOM VARIABLE</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="8">Axioms of probability - Conditional probability - Total probability – Baye’s theorem- Random variable - Probability mass function - Probability density function - Properties.</td></tr>
<tr><td>2</td><td colspan="5">DISCRETE STANDARD DISTRIBUTIONS</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="8">Moments - Moment generating functions and their properties, Binomial, Poisson, Geometric, Negative Binomial, and their properties.</td></tr>
<tr><td>3</td><td colspan="5">CONTINUOUS STANDARD DISTRIBUTIONS</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="8">Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties.</td></tr>
<tr><td>4</td><td colspan="5">TWO DIMENSIONAL RANDOM VARIABLES</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="8">Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression – Rank correlation - Central limit theorem (Statement) - Problems.</td></tr>
<tr><td>5</td><td colspan="5">QUEUEING THEORY</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="8">Markovian models – M/M/1, M/M/C, finite and infinite capacity - M/G/1 queue – Pollaczek – Khintchine formula.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>60</td></tr>
<tr><td colspan="8">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="7">T. Veerarajan, : “Probability, Statistics and Random Process with Queueing Theory and Queueing Networks” Tata MCGraw Hill Education Private Limited, New Delhi.</td></tr>
<tr><td colspan="8">Reference(s):</td></tr>
<tr><td>1</td><td colspan="7">N. Subramaniam, “Probability & Queueing theory”, SCM Publisher, Erode-1.</td></tr>
<tr><td>2</td><td colspan="7">V. Sundarapandian, “Probability, Statistics & Queueing Theory “PHI Learning Private Limited, New Delhi, 2009.</td></tr>
<tr><td>3</td><td colspan="7">R.H.Chitale, “Probability & Queueing theory”, Technical Publications, Pune.</td></tr>
<tr><td>4</td><td colspan="7">Karti Swarup, P.K. Gupta, Manmohan, “Operations Research, Sultan chand and sons, Educational Publishers, New Delhi.</td></tr>
</table>

K.S.Rangasamy College of Technology Autonomous Regulation								R 2010
Department	Computer Science and Engineering			Programme code & Name		CS : B.E. Computer Science and Engineering		
Semester V								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 005	DATABASE MANAGEMENT SYSTEMS (CS, IT)	3	1	0	4	50	50	100
Objective(s)	Learning the fundamentals of data models and to conceptualize, depict a database system using ER diagram and the study of SQL, relational database design techniques which will help in physical DB design and recovery procedure and to have an introductory knowledge about the emerging trends in the area of distributed DB- OO DB- Data mining and Data Warehousing and XML							
1	INTRODUCTION AND CONCEPTUAL MODELING						Total Hrs	12
Introduction to File and Database systems- Database system structure – Data Models – ER model – Relational Model – Relational Algebra and Calculus.								
2	RELATIONAL MODEL						Total Hrs	12
SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependencies - Normalization for Relational Databases (up to BCNF).								
3	DATA STORAGE AND INDEXING CONCEPTS						Total Hrs	12
Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree								
4	TRANSACTION MANAGEMENT						Total Hrs	12
Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serializability – Concurrency Control – Types of Locks- Two Phase locking- Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging.								
5	CURRENT TRENDS						Total Hrs	12
Object Oriented Databases – Need for Complex Data types - OO data Model- Nested relations – Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage – XML – Structure of XML- DTD XML Document- Schema- Querying and Transformation. –Data Mining and Data Warehousing.								
Total hours to be taught								60
Text book (s) :								
1	Abraham Silberschatz, Henry F. Korth and S. Sudarshan - “Database System Concepts”, sixfth Edition, McGraw-Hill, 2011.							
Reference (s) :								
1	Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Fifth Edition, Pearson Education, 2009.							
2	Raghu Ramakrishnan, “Database Management System”, Tata McGraw-Hill Publishing Company, 2003.							
3	Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- “Database System Implementation”- Pearson Education- 2003.							
4	Peter Rob and Corlos Coronel- “Database System, Design, Implementation and Management”, Thompson Learning Course Technology- Fifth edition, 2003.							

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Semester V								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 511	SYSTEM SOFTWARE	3	0	0	3	50	50	100
Objective(s)	Understanding the relationship between system software and machine architecture. The design and implementation of assemblers, Implementation of linkers and loaders, Macro processors, System software tools.							

1	INTRODUCTION	Total Hrs	8
System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming – Traditional CISC Machines – VAX Architecture – RISC Machines – UltraSPARC Architecture- Introduction to compilers			
2	ASSEMBLERS	Total Hrs	10
Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.			
3	LOADERS AND LINKERS	Total Hrs	9
Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker.			
4	MACRO PROCESSORS	Total Hrs	9
Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.			
5	SYSTEM SOFTWARE TOOLS	Total Hrs	9
Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.			
Total hours to be taught			45
Text book (s) :			
1	Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3rd Edition, Pearson Education, sixth Impression 2009.		
Reference(s):			
1	John J. Donovan “Systems Programming”, Tata McGraw-Hill Edition, 1991		
2	D. M. Dhamdhere, “Systems Programming and Operating Systems”, Second Revised Edition, Tata McGraw-Hill, 1999.		

K.S.Rangasamy College of Technology Autonomous Regulation								R 2010
Department	Computer Science and Engineering			Programme Code & Name			CS : B.E. Computer Science and Engineering	
Semester V								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 512	DATA COMMUNICATION AND NETWORKS	3	0	0	3	50	50	100
Objective(s)	Understanding the concepts of data communications, functions of different layers, IEEE standards employed in computer networking, and to make the students to get familiarized with different protocols and network components.							

1	DATA COMMUNICATIONS	Total Hrs	8
Networks – Components and Categories –Line Configuration – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Coaxial Cable – Fiber Optics –Interfaces(RS232 Standard) and Modems .			
2	DATA LINK LAYER	Total Hrs	10
Error – detection and correction – Parity – LRC – CRC – Hamming code – Flow Control and Error control – Stop and wait – go back-N ARQ – selective repeat ARQ- sliding window – HDLC. - LAN - Ethernet IEEE 802.3 – Connecting devices-Repeaters-Hubs-Bridges.			
3	NETWORK LAYER	Total Hrs	9
Internetworks – Circuit Switching – Packet Switching– IP addressing methods – Subnetting –– Routers- Routing Algorithms – Distance Vector Routing – Link State Routing.			
4	TRANSPORT LAYER	Total Hrs	9
Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS)-Techniques.			
5	APPLICATION LAYER	Total Hrs	9
Domain Name Space (DNS) – Email (SMTP)-File Transfer protocol (FTP) – HTTP – HTTPS-World Wide Web.			
Total hours to be taught			45

Text book (s) :

1	Behrouz A. Forouzan, “Data communication and Networking Update ”, Tata McGraw-Hill, Third Edition , 2006.

Reference (s) :

1	James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 2003.
2	Larry L.Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., Second Edition.
3	Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2003.
4	William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000.

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering			Programme Code & Name		CS : B.E. Computer Science and Engineering		
Semester V								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 513	WEB TECHNOLOGY	3	0	0	3	50	50	100
Objective(s)	Enable the students to learn basic web concepts, scripting languages and server side programming. To make aware of the students about development in web technologies.							
1	INTRODUCTION					Total Hrs		9
Introduction – Web concepts – HTML – HTML Forms – Cascading Style Sheets – Scripting Languages: JavaScript.								
2	COMMON GATEWAY INTERFACE					Total Hrs		9
Programming CGI Scripts – PERL – Applications - Server Side Includes – DBI to connect to a database – Cookies and Perl – XML.								
3	DYNAMIC HTML					Total Hrs		9
Dynamic HTML – introduction – object model and collections – event model – filters and transition – data binding – data control – handling of multimedia data.								
4	SERVER SIDE PROGRAMMING					Total Hrs		9
Server side Programming –Java server pages – Java Servlets: Introduction – Servlet overview and architecture – HTTP GET and POST requests – Redirecting requests – Session tracking – simple web applications – multitier applications.								
5	APPLICATIONS					Total Hrs		9
e-Business Models – Building an e-Business – e-Marketing – Database connectivity – Online Payments – Security - XML and e-Commerce – m-Business.								
Total hours to be taught								45
Text book (s) :								
1	H.M.Deitel, P.J.Deitel, A.B.Goldberg, “INTERNET and WORLD WIDE WEB – How to program”, Pearson education, Third Edition, 2004.							
Reference(s):								
1	D.Norton and H. Schildt, “Java 2: The complete Reference”, TMH, 2000.							
2	Eric Ladd and Jim O’Donnell, et al, “USING HTML 4, XML, and JAVA1.2”, PHI publications, 2003.							
3	Jeffy Dwight, Michael Erwin and Robert Nikes “USING CGI”, PHI Publications, 1997.							

<table>
<tr><td colspan="7">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td>R 2010</td></tr>
<tr><td colspan="2">Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="2">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="9">Semester V</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="4">Hours/Week</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td colspan="2">10 CS 514</td><td>GRAPHICS AND MULTIMEDIA SYSTEM</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="7">Understanding the graphics techniques and algorithms. The multimedia concepts and various I/O technologies. The students to develop their creativity.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION TO GRAPHICS SYSTEMS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Introduction - Line, Circle and Ellipse Drawing Algorithms – Attributes – Two-Dimensional Geometric Transformations :Basic, Composite and other transformation – Two-Dimensional Clipping and Viewing : Point, Line, Curve.</td></tr>
<tr><td>2</td><td colspan="5">THREE-DIMENSIONAL CONCEPTS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Introduction - Three-Dimensional Object Representations: polygon surface, Quadric surface, beizer curves and surfaces – Three-Dimensional Geometric and Modeling Transformations – Three-Dimensional Viewing – Color models and Color Applications– Animation.</td></tr>
<tr><td>3</td><td colspan="5">MULTIMEDIA SYSTEMS DESIGN</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">An Introduction – Multimedia applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Multimedia Databases.</td></tr>
<tr><td>4</td><td colspan="5">MULTIMEDIA FILE HANDLING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Types of Compression & Decompression – Data & File Format standards – Multimedia I/O technologies - Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval Technologies.</td></tr>
<tr><td>5</td><td colspan="5">MULTIMEDIA APPLICATION DESIGN</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Fundamental Design issues - Multimedia Application Classes – Types of Multimedia Systems – Virtual reality design – Components of Multimedia systems – Components of Multimedia Systems – Organizing Multimedia Databases – Application Workflow design – Distributed Application Design issues – User Interface Design</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="8">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="7">Donald Hearn and M.Pauline Baker, “Computer Graphics C Version”, Second Edition, Pearson Education, 2003.</td></tr>
<tr><td>2</td><td colspan="7">Prabhat K Andleigh and Kiran Thakrar, “Multimedia Systems Design”, PHI, 2007.</td></tr>
<tr><td colspan="8">Reference(s):</td></tr>
<tr><td>1</td><td colspan="7">Judith Jeffcoate, “Multimedia in practice technology and Applications”, PHI, 1998.</td></tr>
<tr><td>2</td><td colspan="7">Foley, Vandam, Feiner, Huges, “Computer Graphics: Principles & Practice”, Pearson Education, second edition 2003.</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation			R 2010
Department	Computer Science and Engineering	Programme Code & Name	CS : B.E. Computer Science and Engineering

Semester V

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 0P4	DATABASE MANAGEMENT SYSTEMS LABORATORY	0	0	3	2	50	50	100
Objective(s)	Improving knowledge in the Storage Techniques							

List of experiments

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. Database design using E-R model and Normalization.
4. Sub queries.
5. High-level language extension with Cursors.
6. High level language extension with Triggers
7. Utilization of view.
8. Procedures and Functions.
9. Representation of BCNF.
10. Embedded SQL.
11. Design and implementation of Payroll Processing System.
12. Design and implementation of Banking System.
13. Design and implementation of Library Information System.

Total hours to be taught	45

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<tr><td colspan="8">Semester V</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="2">Maximum Marks</td><td></td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS 5P1</td><td>WEB TECHNOLOGY LABORATORY</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Imparting practical knowledge in client-side programming and server-side programming, designing and implementing online web applications and creating dynamic web pages.</td></tr>
<tr><td colspan="8">List of experiments</td></tr>
<tr><td colspan="8">1. Design a personal web page using HTML and DHTML.
2. Design a data entry form in HTML.
3. Write a Java Script program using Window and document objects and their properties and various methods like alert (), eval (), ParseInt () etc. methods to give the dynamic functionality to HTML web pages.
4. Write a Java Script program which make use of Java Script's inbuilt as well as user defined objects like navigator, Date Array, Event, Number etc
5. Writing XML web Documents which make use of XML Declaration, Element Declaration, Attribute Declaration.
6. Design a web page using PERL.
7. Write a program in java to implement Database Connectivity
8. Write a program in java using servlets to invoke servlets from HTML forms.
9. Write a JSP program with JDBC.
10. Write a JSP program to implement online shopping.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
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<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="2">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS 5P2</td><td colspan="2">GRAPHICS AND MULTIMEDIA SYSTEM LABORATORY</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Understanding the C graphics, to develop their creativity, to have a hands on experience in image editing and animation and to understand the graphics algorithms</td></tr>
<tr><td colspan="8">List of experiments</td></tr>
<tr><td colspan="8">1. To implement Bresenham’s algorithms for line, circle and ellipse drawing
2. To perform 2D Transformations such as translation, rotation, scaling, reflection and shearing.
3. To implement Cohen-Sutherland 2D clipping and window-viewport mapping
4. To perform 3D Transformations such as translation, rotation and scaling.
5. To visualize projections of 3D images.
6. To convert between color models RGB to CMY and CMY to RGB.
7. To implement text compression algorithm
8. To implement Assigning Actions to an object
9. To perform animation using any Animation software
10. To perform basic operations on image like mirroring an object, attaching objects, overlapping objects. .</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation			R 2010
Department	Computer Science and Engineering	Programme Code & Name	CS:B.E.Computer Science and Engineering

Semester V

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 TP 0P3	Career Competency Development III	0	0	2	0	100	00	100
Objective(s)	To enhance employability skills and to develop career competency							

Unit – 1	Written and Oral Communication – Part 1	Hrs
Reading Comprehension Level 3 - Self Introduction - News Paper Review - Self Marketing - Debate- Structured and Unstructured GDs Psychometric Assessment – Types & Strategies to answer the questions Practices: Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Interpretation of Pictorial Representations - Editing - GD - Debate. Materials: Instructor Manual, Word power Made Easy Book, News Papers		6
Unit – 2	Verbal & Logical Reasoning – Part 1	8
Syllogism - Assertion and Reasons - Statements and Assumptions - Identifying Valid Inferences - identifying Strong Arguments and Weak Arguments - Statements and Conclusions - Cause and Effect - Deriving Conclusions from Passages - Seating Arrangements Practices: Analogies - Blood Relations - Statement & Conclusions Materials: Instructor Manual, Verbal Reasoning by R.S.Aggarwal		
Unit – 3	Quantitative Aptitude – Part 3	6
Probability - Calendar- Clocks - Logarithms - Permutations and Combinations Materials: Instructor Manual, Aptitude Book		
Unit – 4	Quantitative Aptitude – Part 4	6
Algebra - Linear Equations - Quadratic Equations - Polynomials Practices: Problem on Numbers - Ages - Train - Time and Work - Sudoku - Puzzles Materials: Instructor Manual, Aptitude Book		
Unit – 5	Technical & Programming Skills	4
C Language - Control Structures – Data Types – Arrays – Operators -Functions- Structures – Pointers-Files Practices : Programs and Find Output and Errors Materials: Instructor Manual , Exploring C by Yashwant Kanetkar		
	Total	30

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2, 3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and Debate (External Evaluation by English, MBA Dept & External Trainers)	20
3	Evaluation 3 – Technical Paper Presentation	Internal Evaluation by the Dept.	20
		Total	100

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, “Quantitative Aptitude”, TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note :

- Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 Questions from Unit 1,2,3,4 and 5 and 5 Questions from Unit 1
- Evaluation has to be conducted as like Lab Examination.

V Semester Course Outcome

Modules	10 MA 008 - Probability and Queuing Theory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understand the need of probability & Baye's Theorem
2	Understand the importance of Random Variables
3	Understand the Binomial, Poisson, Geometric, Negative Binomial distributions for engineering applications
4	Select the appropriate discrete distributions and Specify discrete distributions for engineering applications
5	Understand the uniform, exponential, gamma, weibul and normal distributions for engineering applications
6	Select the appropriate continuous distributions and Specify continuous distributions for engineering applications
7	Understand the concept of moments & moment generating function and Distinguish one-dimensional and two-dimensional Random Variables
8	Understand the concept of covariance correlation & regression
9	Understand the markovian models in queuing theory Select the appropriate model for queuing problems
10	Understand the concept of general queue.

Modules	10 CS 005 - Database Management Systems Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Express the knowledge of data base systems and analyze the various data models
2	Apply Relational Algebra and Relational Calculus to retrieve the data from database
3	Employ the concept of Data Definition Language and Data Manipulation Language
4	Apply the various Normal Forms in database design
5	Express the knowledge of secondary storage device to store the data
6	Appraise the concepts of hashing, B Tree, B^+ Tree in indexing to retrieve the data efficiently from the database
7	Apply the various concurrency control techniques in database transactions
8	Describe the various techniques that ensures database recovery
9	Know the recent databases such as object based, object oriented and distributed
10	Express the knowledge of extended markup language, data warehousing and data mining

Modules	10 CS 511 - System Software Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understand the system software and the machine architectures of SIC and SIC/XE.
2	Know the architectures of two machines such as VAX and UltraSPARC architectures.
3	Understand the basic assembler functions and machine dependent and independent assembler features.
4	Examine the design options of an assembler and MASM assembler for real machines.
5	Understand the basic loader functions and machine dependent and independent loader features.
6	Examine the design options of loader and MS-DOS linker for real machines.
7	Know the basic macro processor functions and machine independent macro processor features.
8	Examine the design options of macro processor and implementation examples for real machines.
9	Understand the interactive text editors and editor structure.
10	Describe the relationship of debugger with other parts of the system.

Modules	10 CS 512 - Data Communication and Networks Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Know the concept of components, categories and ISO/OSI model of networks
2	Identify the purpose of various transmission media and interfaces
3	Describe the Concept of various error detection techniques and Flow, Error control
4	Review the applications of Ethernet and connecting devices
5	Compare the concept of Circuit switching and Packet switching
6	Gain the knowledge of various Routing algorithms
7	Appraise User datagram and Transmission control protocol
8	Gain the knowledge of Congestion control and QoS Techniques
9	Identify the Purpose of Domain Name Space , Email and FTP
10	Compare HTTP and HTTPS in world wide web

Modules	10 CS 513 - Web Technology Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Express the features of HTML and employ various style sheet concepts in HTML.
2	Identify the purpose of CGI, scripting and its control structures
3	Describe the purpose of PERL language and different data types in PERL.
4	Compare DHTML and XML and know the purpose of XML with its Document Type Definition
5	Analyze various visual effects, Power point effects through different filters and Transitions.
6	Know the concept of Data binding and its features.
7	Gain the knowledge of JSP in server side programming and its elements.
8	Identify the needs of Servlets concepts and its various features
9	Analyze the different types of e-business models and various strategies in e-Marketing
10	Asses the various security features available for online Payments in e-Business

Modules	10 CS 514 - Graphics and Multimedia Systems Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Acquire knowledge in different Line, Circle and Ellipse Generating Algorithms.
2	Comprehend Two-Dimensional Geometric Transformations, Two-Dimensional Clipping and Viewing
3	Outline Three-Dimensional Object Representations
4	Predict Three-Dimensional Viewing of object projections
5	Relate animating objects and creating new animations.
6	Comprehend different multimedia applications such as audio, video, animated images and Electronic messaging.
7	Study the Architecture of Multimedia Systems, Evolving Technologies for Multimedia Systems, Data interface standards of multimedia, Multimedia data in a Database
8	Compare different Data & File Format standards of multimedia system
9	Identify different types of Multimedia Systems, Virtual Reality design,
10	outline factors involved in Distributed Application Design issues, User Interface Design

Modules	10 CS 0P4 - Database Management Systems Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Implement the Data Definition Language commands in RDBMS
2	Demonstrate the Data Manipulation Language and Data Control Language Commands in RDBMS
3	Employ the Sub queries to retrieve data from multiple tables
4	Implement the High-level language extension with Cursors
5	Demonstrate the High-level language extension with Triggers
6	Implement the Procedures and Functions in PL/SQL
7	Perform the database design using E-R model and Normalization
8	Design and implementation of payroll, banking and library management system
9	Demonstrate the views in RDBMS
10	Implement the Embedded SQL

Modules	10 CS 5P1 - Web Technology Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Design a personal web page using HTML and DHTML.
2	Create a data entry form in HTML.
3	Demonstrate the Java Script program using Window and document objects and their properties
4	Demonstrate the Java Script program which makes use of Java Script's inbuilt as well as user defined objects.
5	Interpret the concepts of XML declaration, Element Declaration, and attribute Declaration for XML documents
6	Design a web page using PERL.
7	Perform database connectivity using Java.
8	Demonstrate the servlets to invoke data from HTML forms using Java.
9	Implement Java Server Pages with JDBC.
10	Create a webpage using Java Server Pages for Online shopping

Modules	10 CS 5P2 - Graphics and Multimedia Systems Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Implement Bresenham's algorithms for line, circle and ellipse drawing
2	Perform 2D Transformations such as translation, rotation, scaling, reflection and shearing
3	Implement Cohen-Sutherland 2D clipping and window-viewport mapping
4	Perform 3D Transformations such as translation, rotation and scaling
5	Visualize projections of 3D images
6	Convert color models RGB to CMY and CMY to RGB.
7	Implement text compression algorithm
8	Assigning Actions to an object.
9	Perform animation using any Animation software
10	Perform basic operations on image like mirroring an object, attaching objects, overlapping objects

Modules	10 TP 0P3- Career Competency Development III Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Review the aptitude skills on data analysis
2	Organize, justify and conclude on the given information
3	Develop programs in object oriented programming concept
4	Interact on the recent topics
5	Appraise their technical knowledge and interpersonal skills

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering	Program code & Name	CS : B.E. Computer Science and Engineering					
Semester VI								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 HS 001	PROFESSIONAL ETHICS	3	0	0	3	50	50	100
Objective(s)	Creating an awareness on Ethics and Human Values and instill Moral and Social Values in Students.							

1	INTRODUCTION	Total Hrs	9

Ethics defined – Engineering as a profession – Core qualities of professional practitioners – Theories of right action – Major ethical issues – Three types of inquiry – Kohlberg's stages of moral development – Carol Gilligan theory – Moral dilemmas – Moral autonomy – Value based ethics

2	ENGINEERING AS SOCIAL EXPERIMENTATION	Total Hrs	9

Comparison with standard experiments – Relevant information – Learning from the past – Engineers as managers, consultants and leaders – Accountability – Role of codes – Code of ethics for engineers; introduction, rules of practice and professional obligations – The space shuttle challenger case study.

3	ENGINEERS RESPONSIBILITY FOR SAFETY AND RISK	Total hrs	9

Safety and Risk – Types of risks – Safety and the engineer – Designing for safety – Risk Benefit analysis – Accidents - The three mile Island disaster case study – The Chernobyl disaster case study.

4	RESPONSIBILITIES AND RIGHTS	Total Hrs	9

Collegiality – Two senses of loyalty – Professional rights and responsibilities – Conflict of Interest – Collective Bargaining – Confidentiality – Acceptance of bribes / gifts – Occupational crimes – Whistle Blowing

5	GLOBAL ISSUES	Total Hrs	9

Globalization – Cross Cultural Issues – The Bhopal gas tragedy case study – Computer ethics – Weapons development – Intellectual property rights (IPR)

Total hours to be taught	45

Text book :

1	Govindarajan M, Natarajan S, Senthil Kumar V.S, "Engineering Ethics", Prentice Hall of India (P) Ltd, New Delhi, 10th Reprint 2009.

References:

1	Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw-Hill Publishing Company Limited, New Delhi, 2007.
2	Govindan K.R., and Sendhil Kumar S., "Professional Ethics and Human Values", Anuradha Publications, Chennai, 2007.

K.S.Rangasamy College of Technology - Autonomous Regulation			R 2010
Department	Computer Science and Engineering	Programme Code & Name	CS : B.E. Computer Science and Engineering

Semester VI

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 611	OBJECT ORIENTED ANALYSIS AND DESIGN	3	0	0	3	50	50	100
Objective(s)	Understanding the object oriented life cycle and knowing how to identify objects, relationships, services and attributes through UML and understanding the use-case diagrams and knowing the Object Oriented Design process about software quality and usability.							

1	INTRODUCTION	Total Hrs	12
An Overview of Object Oriented Systems Development - Object Basics – Object Oriented Systems Development Life Cycle.			
2	OBJECT ORIENTED METHODOLOGIES	Total Hrs	12
Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns – Frameworks			
3	UNIFIED MODELING LANGUAGE		12
Unified Approach — Use case - class diagram - Interactive Diagram - Package Diagram - Collaboration Diagram - State Diagram - Activity Diagram.			
4	OBJECT ORIENTED ANALYSIS	Total Hrs	12
Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.			
5	OBJECT ORIENTED DESIGN	Total Hrs	12
Design axioms - Designing Classes – Access Layer - Object Storage - Object Interoperability.			
Total hours to be taught			60

Text book (s) :

1	Ali Bahrami, “Object Oriented Systems Development”, Tata McGraw-Hill, 2011.

Reference(s):

1	Martin Fowler, “UML Distilled”, Second Edition, PHI/Pearson Education, 2002.
2	Stephen R. Schach, “Introduction to Object Oriented Analysis and Design”, Tata McGraw-Hill, 2003.
3	James Rumbaugh, Ivar Jacobson, Grady Booch “The Unified Modeling Language Reference Manual”, Addison Wesley, 1999.
4	Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, “UML Toolkit”, OMG Press Wiley Publishing Inc., 2004.

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2010
Department	Computer Science and Engineering			Programme Code & Name			CS : B.E. Computer Science and Engineering		
Semester VI									
Course Code	Course Name	Hours/Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
10 CS 612	C# AND .NET FRAME WORK	3	1	0	4	50	50	100	
Objective(s)	The student will gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the framework and they will gain programming skills in C# both in basic and advanced levels. By building sample applications, the student will get experience and be ready for large-scale projects.								
1	INTRODUCTION TO C#				Total Hrs	12			
Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, and Enumerations.									
2	OBJECT ORIENTED ASPECTS OF C#				Total Hrs	12			
Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.									
3	THE CLR AND THE .NET FRAMEWORK				Total Hrs	12			
Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using Single Call, Threads.									
4	WEB BASED APPLICATION DEVELOPMENT ON .NET				Total Hrs	12			
Introducing .NET - The .NET Framework , Developing ASP.NET Applications – Creating Websites , The Anatomy of a web form , writing code, Webform Fundamentals – Introducing Server Controls , HTML Control Classes , The page class , Application , Events , ASP.NET Configuration, Web controls , Validation Controls.									
5	WORKING WITH DATABASE				Total Hrs	12			
ADO.NET Fundamentals , Understanding Databases , The Data Provider Model , Direct Data Access , Disconnect Data Access , DataBinding , Single Value DataBinding , Repeted-Value Data Binding , Data Source Controls , Data Controls - Grid View									
Total hours to be taught						60			
Text book (s) :									
1	E. Balagurusamy, “Programming in C#”, Premier third edition Tata McGraw-Hill, 2011.								
2	“Beginning ASP.NET 4 in C# 2010” Matthew Mac Donald , 2010 Apress , Berkely, CA ,USA.(2011)								
Reference(s):									
1	J. Liberty, “Programming C#”, 2nd ed., O’Reilly, 2002. Fourth edition, reprint 2007.								
2	Herbert Schildt, “The Complete Reference: C#”, Tata McGraw-Hill, 2004.								
3	Robinson et al, “Professional C#”, 2nd ed., Wrox Press, 2002.								
4	Andrew Troelsen, “C# and the .NET Platform”, A! Press, 2003.								
5	Thamarai Selvi, R. Murugesan, “A Textbook on C#”, Pearson Education, 2003.								

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
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Semester VI								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 615	THEORY OF COMPUTATION	3	1	0	4	50	50	100
Objective(s)	To understand the types of finite automata, the relationship between finite automata and regular Expressions the Equivalence of pushdown automata and context free grammar, the programming techniques of Turing machine and undecidable problems.							
1	AUTOMATA					Total Hrs		9
Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA)– Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.								
2	REGULAR EXPRESSIONS AND LANGUAGES					Total Hrs		9
Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.								
3	CONTEXT-FREE GRAMMAR AND LANGUAGES					Total Hrs		9
Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata.								
4	PROPERTIES OF CONTEXT-FREE LANGUAGES					Total Hrs		9
Normal forms for CFG – Pumping Lemma for CFL - Closure Properties of CFL – Turing Machines – Programming Techniques for TM.								
5	UNDECIDABILITY					Total Hrs		9
A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem - The classes P and NP.								
TUTORIAL								15
Total hours to be taught								60
Text book (s) :								
1	J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2003.							
Reference(s):								
1	H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pears Education/PHI, 2003							
2	J.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2003.							
3	Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.							

<table>
<tr><td colspan="7">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="3">R 2010</td></tr>
<tr><td colspan="2">Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="3">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="10">Semester VI</td></tr>
<tr><td colspan="2" rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td colspan="2">10 CS 616</td><td>SOFTWARE ENGINEERING</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td colspan="2">Objective(s)</td><td colspan="8">Making aware of different life cycle models, Requirement dictation process, Analysis modeling and specification, Architectural and detailed design methods, Implementation and testing strategies, Verification and validation techniques, Project planning and management.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION TO SOFTWARE ENGINEERING AND SOFTWARE PROCESS</td><td colspan="2">Total Hrs</td><td>8</td></tr>
<tr><td colspan="10">The Nature of Software – The unique nature of WebApps – Software Engineering – The software Process – Software Engineering Practice - Software Myths.
Process Model: A Generic Process Model - Process Assessment and Improvement - Prescriptive Process Models - Specialized Process Models - The Unified Process - Personal and Team Process Models</td></tr>
<tr><td>2</td><td colspan="5">MODELING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="10">Understanding Requirements: Requirements Engineering - Establishing the Groundwork - Eliciting Requirements - Developing Use Cases - Building the Requirements Model - Negotiating Requirements - Validating Requirements.
Requirements Modeling : Requirements Analysis - Scenario-Based Modeling - UML Models that Supplement the Use Case - Data Modeling Concepts - Class-Based Modeling - Requirements Modeling Strategies - Flow-Oriented Modeling - Creating a Behavioral Model - Patterns for Requirements Modeling -</td></tr>
<tr><td>3</td><td colspan="5">DESIGN CONCEPTS</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="10">The Design Process - Design Concepts - The Design Model - Architectural Design - Component-Level Design - User Interface Design - Pattern-Based Design</td></tr>
<tr><td>4</td><td colspan="5">TESTING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="10">Software Testing Strategies : A strategic Approach for Software testing-Test Strategies for conventional software- Test Strategies for Object-Oriented Software - Validation Testing - System Testing-The Art of Debugging.
Testing Conventional Applications : Software testing Fundamentals-Internal and External Views of Testing-White Box Testing-Basis Path Testing-Control Structure Testing-Black Box Testing- Model Based testing-Testing for Specialized Environments, Architectures and Applications</td></tr>
<tr><td>5</td><td colspan="5">EMERGING TRENDS</td><td colspan="2">Total Hrs</td><td>7</td></tr>
<tr><td colspan="10">Emerging trends in Software Engineering-Identifying “Soft Trends”-Technology Directions-Tools-Related Trends-Agile Development-Agile process-Extreme Programming-Other Agile Process Models-A Tool set for the Agile Process.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="10">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="9">Roger S.Pressman, Software engineering- A practitioner’s Approach, McGraw-Hill International Edition, 7th edition, 2010.</td></tr>
<tr><td colspan="10">Reference(s):</td></tr>
<tr><td>1</td><td colspan="9">Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.</td></tr>
<tr><td>2</td><td colspan="9">Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.</td></tr>
<tr><td>3</td><td colspan="9">James F Peters and Witold Pedryez, “Software Engineering – An Engineering Approach”, John Wiley and Sons, New Delhi, 2000.</td></tr>
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<tr><td>10 CS 6P5</td><td>MINI PROJECT</td><td>0</td><td>0</td><td>3</td><td>2</td><td>100</td><td>00</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7"></td></tr>
<tr><td>Aim</td><td colspan="7">• To Improve the problem solving skills
• To improve the programming skills</td></tr>
<tr><td>Guide Lines</td><td colspan="7">• 3 Reviews have to be conducted
• Zeroth review – Abstract and title submission (20 Marks)
• First Review – Presentation and work process (40 Marks)
• Second Review – Demonstration and Explanation (40 Marks)</td></tr>
<tr><td colspan="8">Mini Projects in Various Applications</td></tr>
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<tr><td>10 CS 6P2</td><td>C # and .Net Laboratory</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Used to develop list of environment in C# with object oriented concept and to develop simple windows based application, an application using ADO.NET and a web based application.</td></tr>
<tr><td colspan="8">List of experiments</td></tr>
<tr><td colspan="8">1. Implementation of Methods.
- Implementation of Pass by Value and Pass by Reference.
- Method overloading.
2. Implementation of Arrays and processing elements using for each loop.
3. Implementation of Simple Classes for understanding objects and member functions.
4. Implementation of Constructors.
- Constructor overloading.
- Copy constructor.
5. Implementation of Inheritance.
6. Implementation of Abstract class and Abstract methods.
7. Implementation of Interfaces.
8. Implementation of operator overloading.
- Unary operator.
- Binary operator
9. Implementation of Delegates.
- Multicast Delegates.
10. Implementation of Exception Handling.
11. Develop a simple web based application in ASP .NET.
12. Build a web based application using all Validation Controls.
13. Develop a web application using ADO .NET
14. Additional programs / Mini-project work</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
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<tr><td>10 CS 6P3</td><td>CASE TOOLS LABORATORY</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Understanding the concept of UML diagrams and developing the program using UML representation</td></tr>
<tr><td colspan="8">List of experiments
1. Prepare the following documents for two or three of the experiments listed below and develop the software engineering methodology.
2. Program Analysis and Project Planning.
3. Thorough study of the problem – Identify project scope, Objectives, Infrastructure.
4. Software requirement Analysis
5. Describe the individual Phases / Modules of the project, Identify deliverables.
6. Data Modeling
Use work products – Data dictionary, Use diagrams and activity diagrams, build and test lass diagrams, Sequence diagrams and add interface to class diagrams.
7. Software Development and Debugging
8. Software Testing
Prepare test plan, perform validation testing, Coverage analysis, memory leaks, develop test case hierarchy, Site check and Site monitor.
SUGGESTED LIST OF APPLICATIONS
1. Student Marks Analyzing System
2. Quiz System
3. Online Ticket Reservation System
4. Payroll System
5. Course Registration System
6. Expert Systems
7. ATM Systems
8. Stock Maintenance
9. Real-Time Scheduler
10. Remote Procedure Call Implementation</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
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K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS:B.E. Computer Science and Engineering			
Semester VI								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 TP 0P4	Career Competency Development IV	0	0	2	0	100	00	100
Objective(s)	To enhance employability skills and to develop career competency							

		Hrs
Unit – 1	Written and Oral Communication – Part 2	
Self Introduction – GD - Personal Interview Skills Practices on Reading Comprehension Level 2 – Paragraph Writing - News paper and Book Review Writing - Skimming and Scanning – Interpretation of Pictorial Representations - Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Editing Materials: Instructor Manual, Word power Made Easy Book, News Papers		4
Unit – 2	Verbal & Logical Reasoning – Part 2	8
Analogies – Blood Relations – Seating Arrangements – Syllogism - Statements and Conclusions, Cause and Effect – Deriving Conclusions from Passages – Series Completion (Numbers, Alphabets & Figures) – Analytical Reasoning – Classification – Critical Reasoning Practices: Analogies – Blood Relations - Statement & Conclusions Materials: Instructor Manual, Verbal Reasoning by R.S.Aggarwal		
Unit – 3	Quantitative Aptitude - Part – 5	6
Geometry - Straight Line – Triangles – Quadrilaterals – Circles – Co-ordinate Geometry – Cube – Cone – Sphere. Materials: Instructor Manual, Aptitude book		
Unit – 4	Data Interpretation and Analysis	6
Data Interpretation based on Text – Data Interpretation based on Graphs and Tables. Graphs can be Column Graphs, Bar Graphs, Line Charts, Pie Chart, Graphs representing Area, Venn Diagram & Flow Charts. Materials: Instructor Manual, Aptitude Book		
Unit – 5	Technical & Programming Skills – Part 2	6
Programming Language C++ - Classes – Objects – Polymorphism – Inheritance – Abstraction		
	Total	30

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2, 3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and HR Interview (External Evaluation by English, MBA Dept.)	20
3	Evaluation 3 – Technical Interview	Internal Evaluation by the Dept. – 3 Core Subjects	20
		Total	100

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, “Quantitative Aptitude”, TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications

Note:

- Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough Work pages
- Each Assignment has 20 questions from Unit 1,2,3,4,5 and 5 questions from Unit 1(Oral Communication) & Unit 5(Programs)
- Evaluation has to be conducted as like Lab Examination.

VI Semester - Course Outcomes

Modules	10 HS 001 – Professional Ethics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Enable the students with an understanding of the ethics and moral values that form the basis of engineering profession
2	Comprehend the basic moral theories about right action that are used for solving ethical problems
3	Explicate the comparison of various standard experiments
4	Realize the various roles of codes ,codes of ethics for engineers and learn the space shuttle challenger case study
5	Elucidate the issues regarding the safety and engineer and designing for safety
6	Identify the risk benefit analysis for moderating risks ,different accidents and study the issues and reasons for Three mile Island disaster
7	Recognize the professional rights and responsibilities, issues of conflicts of interest and learn the importance of confidentiality and collective bargaining
8	Explicate issues regarding the acceptance of Gifts/Bribes , Occupational crimes and make an awareness about whistle blowing
9	Perform assignment on the topic Globalization ,Cross cultural issues and learn the Bhopal gas tragedy
10	Acquire knowledge about weapons development, intellectual property rights(IPR) and various aspects of computer ethics

Modules	10 CS 611- Object Oriented Analysis and Design Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understand basic object oriented concepts.
2	Elucidate object oriented software development process.
3	Gain knowledge in object oriented methodologies.
4	Narrate the concept of patterns and frameworks.
5	Examine the needs of unified modeling language.
6	Construct various UML diagrams for software development.
7	Identify the Use Cases form the scenarios.
8	Describe how to identify and classify the classes based on classification approach.
9	Acquire knowledge in design axioms for building the classes.
10	Familiarize with object storage and interoperability

Modules	10 CS 612- C # and .Net Frame Work Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Know the basic concepts of C#.
2	Apply the different dimensions of C# with looping and arrays
3	Understand the object oriented concepts in C#
4	Demonstrate the specific features of C# like delegates, events and exceptions
5	Understand The .NET Infrastructure And Its Components
6	Describe the concepts of Remoting and threads
7	Illustrate the concepts of web form fundamentals
8	Apply the knowledge of validation to the data entered in the web forms.
9	Interpret how to connect the application with relational databases.
10	Develop an application to access and display data from database.

Modules	10 CS 615 Theory of Computation Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Enable the students to acquire a full understanding and mentality of Automata Theory as the basis of all computer science languages design and understand the various forms of proof.
2	Understanding of the basic kinds of finite automata and their capabilities and enable the students to design finite automata and non-deterministic finite automata.
3	Ability to describe and transform regular expressions.
4	Ability to describe and transform regular languages and minimize finite automata.
5	Understanding of context-free grammar and grammars of context free languages.
6	Implement the abstract models of computation such as finite and push-down automata, and analyze their relative expressive power.
7	Apply the knowledge of properties of context-free languages.
8	Comprehend the concept of Turing machine and enable the students to describe languages using Turing Machines.
9	Gain the knowledge of undecidability problem.
10	Apply the knowledge of post's correspondence problem.

Modules	10 CS 616 - Software Engineering Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Describe about Water fall, Incremental, Spiral, Prototyping, and Object oriented models
2	Discuss about computer based system, verification & validation
3	Describe the hierarchy of system engineering
4	Demonstrate about requirements gathering & analysis for software development
5	Discover the concepts of data modeling, scenario based modeling, and behavior model
6	Practice the design process of software development
7	Discriminate the strategic approaches and issues for software testing
8	Describe the concepts of White box, Basis path, Black box and Control structure testing
9	Identify the emerging trends and tools in software engineering
10	Describe the process involved in Agile software development

Modules	10 CS 6P5 Mini Project Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Identify a problem in the domain of interest
2	Identify the area of application
3	Identify the possible solutions
4	Identify tools and techniques to implement the project
5	Prepare technical report

Modules	10 CS 6P2 - C # and .Net Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Apply the concept of Pass by Value, Pass by Refer and Method overloading.
2	Demonstrate Arrays and processing elements using for each loop.
3	Create Simple Classes for understanding objects and member functions
4	Apply the concept of Constructors, Constructor overloading and Copy constructor.
5	Experiment the concept of Inheritance.
6	Create Abstract class and Abstract methods.
7	Apply the concept of operator overloading, Interfaces and Exception Handling.
8	Construct Delegates and Multicast Delegates.
9	Develop a simple web based application using ASP.NET and Validation Controls.
10	Develop a simple web based application using ADO.NET.

Modules	10 CS 6P3 - Case Tools Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Exploring the concept of requirement analysis and applying for different applications
2	Analyze and identify modules for each application.
3	Build usecase diagram for a given application.
4	Construct class diagram for a given application
5	Create sequence and collaboration diagram for a given problem.
6	Construct state and activity diagram for a given application.
7	Develop component diagram for a given application.
8	Generate link between application and component.
9	Create code using rational rose tool.
10	Test the application using tool.

Modules	10 TP 0P4- Career Competency Development IV Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate the ability in solving the problems
2	Analyse and conclude the problem according to the given information
3	Solve the problem with appropriate programming languages
4	Analyse their capabilities in team work
5	Express their in-depth technical knowledge and interpersonal skills

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Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 HS 002	TOTAL QUALITY MANAGEMENT	3	0	0	3	50	50	100

Objective(s)	Understanding the Total Quality Management concept and principles and the various tools available to achieve Total Quality Management, Understanding the statistical approach for quality control, creating awareness about the ISO and QS certification process and its need for the industries.

1	INTRODUCTION	Total Hrs	9

Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Quality Council, Quality Statements, Deming Philosophy, Barriers to TQM Implementation.

2	TQM PRINCIPLES	Total Hrs	9

Customer satisfaction, Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement, Juran Trilogy, PDSA Cycle, 5S, Kaizen, Supplier Partnership, Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures-Basic Concepts, Strategy.

3	STATISTICAL PROCESS CONTROL (SPC)	Total Hrs	9

The tools of quality, Statistical Fundamentals, Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New Management tools.

4	TQM TOOLS	Total Hrs	9

Benchmarking, Reasons to Benchmark, Benchmarking Process, Quality Circle, Quality Function Deployment (QFD). House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM), Concept, Improvement Needs, FMEA–Stages, Types.

5	QUALITY SYSTEMS	Total Hrs	9

Need for ISO 9000 Quality Systems, ISO 9001:2008 ISO 14000 Quality Systems, Elements Concepts, Implementation, Documentation, Quality Auditing, Requirements and Benefits, Non Conformance report, Case Studies on Educational System.

Total hours to be taught	45

Text book (s) :

1	Dale H.Besterfiled, et al., “Total Quality Management”, Pearson Education Asia, 1999. (Indian reprint 2002).

Reference(s) :

1	James R.Evans & William M.Lidsay, “The Management and Control of Quality”, (5th Edition), South-Western (Thomson Learning), 2002.
2	Feigenbaum.A.V. “Total Quality Management”, McGraw Hill, 1991.
3	Jayakumar.V, Total Quality Management”, Lakshmi Publications, 2006.
4	Suburaj, Ramasamy “Total Quality Management”, Tata McGraw Hill, 2005.

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Semester VII								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT 001	MOBILE COMPUTING (CS, IT)	3	0	0	3	50	50	100
Objective(s)	To learn the basics of Wireless voice and data communications technologies. To build working knowledge on various telephone and satellite networks. To study the working principles of wireless LAN and its standards. To build knowledge on various Mobile Computing Algorithms. To build skills in working with Wireless Application Protocols to develop mobile content applications.							

1	WIRELESS COMMUNICATION FUNDAMENTALS	Total Hrs	9
Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks			
2	TELECOMMUNICATION NETWORKS	Total Hrs	11
Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 –Satellite Systems - Broadcast Systems – DAB - DVB.			
3	WIRELESS LAN	Total Hrs	9
Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 802.11b standards – HIPERLAN – Blue Tooth.			
4	MOBILE NETWORK LAYER	Total Hrs	9
Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR –Least Interference Routing-Hierarchical-Geographic Position Assisted Ad Hoc Routing .			
5	TRANSPORT AND APPLICATION LAYERS	Total Hrs	7
Traditional TCP – Classical TCP improvements – WAP- Case study – Android			
Total hours to be taught			45

Text book (s) :	
1	Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2008.
Reference(s):	
1	William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002.
2	Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, PHI/Pearson Education, 2003.
3	Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, New York, 2003.
4	Hazysztof Wesolowshi, “Mobile Communication Systems”, John Wiley and Sons Ltd, 2002.

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Semester VII								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 711	OPEN SOURCE SYSTEM	3	1	0	4	50	50	100
Objective(s)	Gaining Knowledge in the concept of Open Source System, Open Source Operating System, Open Source Database: MYSQL and PHP.							

1	INTRODUCTION	Total Hrs	12
Introduction to Open sources- Need of Open Sources – Advantages of Open Sources- Application of Open Sources.			
2	OPEN SOURCE OPERATING SYSTEM	Total Hrs	12
Open Source Operating system: LINUX: Introduction – General Overview –The Linux Shell and File structure: The shell – The shell scripts and programming – Shell configuration – Linux files ,Directories and Archives			
3	OPEN SOURCE DATABASE: MYSQL	Total Hrs	12
MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary- Using sequences			
4	BASICS OF PHP	Total Hrs	12
PHP: Introduction – variables- constants –data types – operators – Statements – Functions.			
5	OBJECT ORIENTED CONCEPT OF PHP	Total Hrs	12
OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP Connectivity			
Total hours to be taught			60

Reference(s):

1	"The Complete Reference Linux", Sixth Edition 2010 by Richard Petersen, Tata McGraw Hill Edition
2	Paul Dubois, "MySQL cook book", O'reilly publication, October 2002.
3	Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4	http://opensource.org/osd
5	Rasmus Lerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2002
6	Vikram Vaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw- Hill Publishing Company Limited, Indian Reprint 2009.

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Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 712	CRYPTOGRAPHY AND NETWORK SECURITY	3	0	0	3	50	50	100
Objective(s)	Knowing the methods of conventional encryption, understanding the concepts of public key encryption and number theory , understanding authentication and Hash functions, knowing the network security tools and applications and understanding the system level security used.							

1	INTRODUCTION	Total Hrs	10

OSI Security Architecture - Classical Encryption techniques – Cipher Principles – Data Encryption Standard – Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES – AES Cipher – Triple DES.

2	PUBLIC KEY CRYPTOGRAPHY	Total Hrs	10

Key Management - Diffie-Hellman key Exchange – Elliptic Curve Arithmetic and Cryptography - Introduction to Number Theory – Traffic Confidentiality – Key Distribution - Public Key Cryptography and RSA.

3	AUTHENTICATION AND HASH FUNCTION	Total Hrs	9

Authentication requirements – Authentication functions – Message Authentication Codes – Cryptographic Hash Functions - Secure Hash Algorithm – MAC based on Hash function: HMAC - Digital Signatures – Digital Signature Standard

4	NETWORK SECURITY	Total Hrs	8

Kerberos – X.509 Certificates – Electronic Mail Security – Pretty Good Privacy – S/MIME - IP Security – Transport Level Security - Web Security Considerations – Secure Socket Layer and Transport layer Security - Transport layer Security.

5	SYSTEM LEVEL SECURITY	Total Hrs	8

Intruders - Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Distributed Denial of service attacks – Firewalls – Types – Firewall Location and Configurations.

Total hours to be taught	45

Text book (s) :

1	William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Fifth Edition, 2012.

Reference(s):

1	Behrouz A. Forouzen, Dabdeep Mukhopadhya, “Cryptography and Network Security”, Tata McGraw-Hill, 201
2	Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, Second Edition, 2008.
3	V.K.Pachghare, “Cryptography and Information Security”, PHI Publications, 2011.
4	William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of Ind Fourth Edition, 2008.

K.S.Rangasamy College of Technology - Autonomous Regulation									R 2010
Department	Computer Science and Engineering			Programme Code & Name			CS: B.E. Computer Science and Engineering		
Semester VII									
Course Code	Course Name	Hours/Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
10 CS 713	PRINCIPLES OF COMPILER DESIGN	3	1	0	4	50	50	100	
Objective(s)	Enable the students to learn the phases of the compilation process. Develop an awareness of the function, design of a languages and grammars for modern compilers. Exercise the execution of lexical analysis, parsing techniques, intermediate code generation, run time environment, code optimization and code generation that helps to understand the importance of appropriate techniques.								

1	COMPILER AND LEXICAL ANALYSIS	Total Hrs	12
Introduction to Compilers – Structure of a Compiler – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – Finite Automata – Regular Expressions to Automata.			
2	SYNTAX ANALYSIS	Total Hrs	12
Role of the Parser – Context-Free Grammars – Writing a Grammars – Top Down Parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up Parsing – Shift Reduce Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.			
3	INTERMEDIATE CODE GENERATION	Total Hrs	12
Intermediate languages – Three-Address Code – Types and Declarations – Translation of Expressions – Rules for Type Checking and Type Conversions – Control Flow – Backpatching – Switch Statements – Procedures.			
4	CODE GENERATION	Total Hrs	12
Issues in the Design of a Code Generator – Target Language – Addresses in the Target Code – Basic Blocks and Flow Graphs – Optimization of Basic Blocks – A Simple Code Generator – Peephole Optimization.			
5	CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS	Total Hrs	12
Code Optimization – Principal Sources of Optimization – Introduction to Data Flow Analysis – Run Time Environments – Storage Organization – Stack Allocation of Space – Access to Non-Local Data on the Stack.			
Total hours to be taught			60

Text book (s) :

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, “Compilers Principles, Techniques and Tools”, Second Edition, Pearson Education, 2011.

Reference(s):

1. Allen I. Holub, “Compiler Design in C”, Prentice Hall of India, 2003.
2. C. N. Fischer and R. J. LeBlanc, “Crafting a Compiler with C”, Benjamin Cummings, 2003.
3. J.P. Bennet, “Introduction to Compiler Techniques”, Second Edition, Tata McGraw-Hill, 2003.
4. Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001.
5. Kenneth C. Louden, “Compiler Construction: Principles and Practice”, Thompson Learning, 2003.

<table>
<tr><td colspan="7">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td>R 2010</td></tr>
<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="2">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="8">Semester VII</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="2">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS 7P1</td><td colspan="2">COMPILER DESIGN LABORATORY</td><td>0</td><td>0</td><td>3</td><td>2</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Enable the students to learn conversion of high level to machine code. Understanding the design and implementation of different phases of a compiler.</td></tr>
<tr><td colspan="8">List of Experiments</td></tr>
<tr><td colspan="8">1. Lexical analyzer
2. Syntax analyzer
3. Validate string for the given regular expression
4. NFA using regular expression
5. Top down parsing
6. Shift reduce parsing
7. Simple LR parsing
8. Three address Code generator
9. Code optimization
10. DAG creation</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td>45</td></tr>
</table>

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Semester VII								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 7P2	OPEN SOURCE SYSTEM LABORATORY	0	0	3	2	50	50	100
Objective(s)	Providing knowledge in Open Source Programming. Understanding the concepts of Linux, MYSQL, and PHP.							

List of experiments

1. Write and Execute essential Shell Scripting Commands in Linux and write a Script to print user information who currently login with current date & time.

2. Connecting the MYSQL database and perform the following
   a. Creating and Deleting Database.
   b. Creating a Table.
   c. Examining the Results.
   d. Inserting / Retrieving Data into / from Tables.
3.
   a. Selecting Specific Rows and Columns.
   b. Deleting and Updating Rows.
   c. Loading a Database from a File.

4. PHP program that displays a welcome message

5. PHP program to implement Simple data storage, operators and Functions.

6. PHP script implements string handling functions.

7. PHP program to compare the strings "apple", "orange", "banana" between them and displays the comparison result.

8. PHP Script that implements the database connectivity.

9. PHP scripts that implement the following file handling operations
   i. Reading data from the file
   ii. Writing data to the file
   iii. Printing all the records.

10. Write a PHP script to add the Rollno, name, six subjects' marks into Mark table in MySQL and display the average and result.

Total hours to be taught	45

<table>
<tr><td colspan="5">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="3">R 2010</td></tr>
<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="3">CS : B.E. Computer Science and Engineering</td></tr>
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<tr><td rowspan="2">Course Code</td><td rowspan="2">Course Name</td><td colspan="3">Hours / Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS 7P3</td><td>PROJECT WORK – PHASE I</td><td>0</td><td>0</td><td>4</td><td>2</td><td>100</td><td>00</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="7">Imparting the practical knowledge to the students and also to make them to carry out the technical procedures in their project work. To provide an exposure to the students to refer, read and review the research articles, journals and conference proceedings rele4vant to their project work and placing this as their beginning stage for their final presentation.</td></tr>
<tr><td>Methodology</td><td colspan="7">Three reviews have to be conducted by the committee of minimum of three members one of which should be the guide
Problem should be selected
Students have to collect about 20 papers related to their work
Reports has to be prepared by the students as per the format in Annexure – 1
Preliminary implementation can be done if possible
Internal evaluation has to be done for 100 Marks</td></tr>
<tr><td colspan="7">Total hours</td><td>60</td></tr>
</table>

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Semester VII									
Course Code	Course Name	Hours/Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
10 TP 0P5	Career Competency Development V	0	0	2	0	100	00	100	
Objective(s)	To enhance employability skills and to develop career competency								

Unit – 1	Written and Oral Communication	Hrs
Self Introduction – GD – HR Interview Skills – Corporate Profile Review Practices on Company Based Questions and Competitive Exams Materials: Instructor Manual		6
Unit – 2	Verbal & Logical Reasoning	6
Practices on Company Based Questions and Competitive Exams Materials: Instructor Manual		
Unit – 3	Quantitative Aptitude	6
Practices on Company Based Questions and Competitive Exams Materials: Instructor Manual		
Unit – 4	Data Interpretation and Analysis	6
Practices on Company Based Questions and Competitive Exams Materials: Instructor Manual		
Unit – 5	Programming & Technical Skills – Part 3	6
Data Structure - Arrays – Linked List – Stack – Queues – Tree – Graph Practices on Algorithms and Objective Type Questions Materials: Instructor Manual		
	Total	30

Evaluation Criteria

S.No.	Particular	Test Portion	Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2,3, 4 & 5 (External Evaluation)	60
2	Evaluation 2 - Oral Communication	GD and HR Interview (External Evaluation by English, MBA Dept.)	20
3	Evaluation 3 – Technical Interview	Internal Evaluation by the Dept. – 3 Core Subjects	20
		Total	100

Reference Books

1. Aggarwal, R.S. “A Modern Approach to Verbal and Non-verbal Reasoning”, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2. Abhijit Guha, “Quantitative Aptitude”, TMH, 3rd edition
3. Objective Instant Arithmetic by M.B. Lal & GoswamiUpkar Publications.
4. Word Power Made Easy by Norman Lewis W.R. GOYAL PUBlications

Note:

- Instructor can cover the syllabus by Class room activities and Assignments(5 Assignments/week)
- Instructor Manual has Class work questions, Assignment questions and Rough work pages
- Each Assignment has 20 questions for Unit 1,2,3,4 & 5 and Unit 5 and 5 questions from Unit 5(Algorithms) & Unit 1(Oral Communication)
- Evaluation has to be conducted as like Lab Examination.

VII Semester - Course Outcomes

Modules	10 HS 002– Total Quality Management Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Elucidate the Concept of quality and Dimensions of quality, Planning and quality costs analysis Techniques
2	Comprehend the Basic Concept, Principles of TQM and Barriers to TQM Implementation
3	Discuss the Concepts of Customer satisfaction, Perception, Complaints, Service Quality and Retention
4	Implement the Performance Appraisal and Benefits
5	Gain knowledge in the Measures of central Tendency and Dispersion
6	Implement the Control Charts for variables and attributes and new management tools
7	Analyze the concept of Benchmarking, Process, Reasons to Benchmark
8	Gain the knowledge of Total Productive Maintenance, Improvement Needs and Stages of FMEA
9	Narrate the concept of Quality Systems, elements, implementation and documentation
10	Comprehend the Basic Concept of quality Auditing, Requirements, Benefits and Non conformance report

Modules	10 IT 001 - Mobile Computing Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Gain Knowledge in basics of radio transmission.
2	Identify the reason for need of special MAC in wireless network.
3	Describe second generation digital cellular network and its architecture.
4	Recognize the role of unidirectional broadcast systems within mobile communication scenario.
5	Observe various WLAN products , its system and protocol architecture
6	Examine the basics and various phases of HIPERLAN 1and bluetooth
7	Identify the requirements of Mobile IP for Ipv4 and Ipv6.
8	Gain knowledge on various types of routing protocols.
9	Acquire the knowledge of TCP for mobility
10	Obtain the knowledge of WAP and its components and architecture

Modules	10 CS 711 - Open Source System Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understand the basic concepts of Open source
2	Identify the applications of Open source
3	Describe the Linux file structure and shell structure.
4	Understand the shell scripts and programming
5	Expressthe fundamental knowledge about MySql database
6	Discuss the MySql record selection technology and administration.
7	Describe the basic terminologies of PHP
8	Extend the knowledge of operators and functions of PHP
9	Apply the knowledge of object oriented concepts in PHP
10	Apply the knowledge about the PHP and SQL database connectivity

Modules	10 CS 712 - Cryptography and Network Security Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understand the OSI (open system interconnection) architecture framework for defining security attacks and various data encryption standards.
2	Realize the knowledge about Block Cipher design principles, Advanced Encryption Standard, and reliable transfer of keys between two users.
3	Recognize with Elliptic curve architecture which helps to learn the drawbacks over RSA algorithm.
4	Analyze the knowledge about the confidentiality factors and symmetric encryption techniques.
5	Realize the study of ensuring the right user from accessing a particular system and to discover about a function that used to produce an authenticator.
6	Know the authentication and confidentiality hash function and to expel the third party penetration in a mail transfer between two parties
7	Realize the authentication application and about Electronic mail security
8	Understand about the various IP security and Web security principles
9	Identify the behaviors of intruders, authorized users and principles of password management
10	Identify various kinds of virus and threats and learn about the firewall principles and techniques

Modules	10 CS 713 - Principles of Compiler Design Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize the various phases of compiler and its functions
2	Examine the grammar for the generated tokens and solving finite automata for a input string
3	Solve the left and right most derivation
4	Comprehend the top down parsing techniques
5	Infer the processing of bottom up parsing
6	Examine about the intermediate code representation
7	Interpret the concept of statement and expression
8	Analyze the function preserving and structure preserving transformation
9	Summarize about various storage strategies, basic blocks and flow graphs
10	Investigate the issues in the design of code generator and target machine

Modules	10 CS 7P1 - Compiler Design Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Review the concept of lexical analyzer to tokenize the given input program
2	Interpret the syntax of any programming language using syntax analyzer
3	Determine whether the string for the given regular expression is valid or not
4	Design a finite automata to compute a NFA using regular expression
5	Implement the top down parser for the given grammar
6	Execute the shift reduce parser
7	Implement a simple LR parsing algorithm
8	Develop the three address code for intermediate representation
9	Execute a code optimization for intermediate representation
10	Examine the DAG creation for postfix expression

Modules	10 CS 7P2 - Open Source System Laboratory Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Demonstrate the concept of shell scripting concepts in linux
2	Interpret the concepts of MySql
3	Experiment the Record selection technology in MySql
4	Demonstrate the basic concept in PHP
5	Develop the simple PHP application using operators and Functions.
6	Demonstrate the string handling functions in PHP
7	Compare the strings between them and displays the comparison result
8	Demonstrate the MySql database connectivity in PHP
9	Express the concepts of file handling functions in PHP
10	Create a webpage using PHP.

Modules	10 CS 7P3 - Project Work - Phase I Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Identify a problem in the domain of interest
2	Perform literature survey and identify the existing issues
3	Identify the possible solutions
4	Identify tools and techniques to implement the project
5	Prepare technical report

Modules	10 TP 0P5- Career Competency Development V Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Predict and analyse the aptitude and logical skills
2	Review their verbal ability and written ability
3	Assess their capabilities among the team members
4	Prepare for an interview process
5	Identify the key elements of decision-making in the context of career planning

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Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 HS 003	PRINCIPLES OF MANAGEMENT	3	0	0	3	50	50	100
Objective(s)	Improving the Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge in international aspect of management.							

1.	HISTORICAL DEVELOPMENT	Total Hrs	9
Definition of Management – Science or Art – Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organisation.			
2.	PLANNING	Total Hrs	9
Nature & Purpose – Types of Plans – Steps involved in Planning – Objectives – Setting Objectives – process of Management by Objectives – Strategies, Policies & Planning Premises – Forecasting – Decision making.			
3.	ORGANISING	Total Hrs	9
Nature and purpose – Formal and informal organization – Organization Chart – Structure and Process – Departmentation by difference strategies – Line and Staff authority – Benefits and limitations – De-Centralization and Delegation of Authority – Staffing – Selection process – Techniques – HRD – Managerial Effectiveness.			
4.	DIRECTING	Total Hrs	9
Scope – Human Factors – Leadership – Types of Leadership – Motivation – Hierarchy of needs – Motivation Theories – Motivational Techniques – Job Enrichment – Communication – process of Communication – Barriers and Breakdown – Effective Communication – Electronic media in Communication.			
5.	CONTROLLING	Total Hrs	9
System and process of Controlling – Requirements for effective control – the Budget as Control Technique – Information Technology in Controlling – Use of computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management.			
Total hours to be taught			45

Text book (s):

1.	Harold Kooritz & Heinz Weihrich, “Essentials of Management”, Tata McGraw-Hill, 1998.
2.	Joseph L Massie, “Essentials of Management”, Prentice Hall of India, (Pearson) Fourth Edition, 2003.

Reference(s):

1.	Tripathy PC And Reddy PN, “Principles of Management”, Tata McGraw Hill, 1999.
2.	Decenzo David, Robbin Stephen A, “Personnel and Human Reasons Management”, Prentice Hall of India, 1996.
3.	JAF Stomer, Freeman R. E and Daniel R “Gilbert Management”, Pearson Education, Sixth Edition, 2004.
4.	Fraidoon Mazda, “Engineering Management”, Addison Wesley, 2000.
5.	Prasad L.M, “Principles of Management”, Sultan Chand & Sons Ltd, 2003.

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Semester VIII								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 811	SOFTWARE TESTING	3	0	0	3	50	50	100
Objective(s)	To explain the basics of software testing. To highlight the strategies for software testing. To stress the need and conduct of testing levels. To identify the issues in testing management. To bring out the ways and means of controlling and monitoring testing activity							

1	INTRODUCTION TO TESTING	Total Hrs	8
Software Testing – Definition of Software Testing – Objective and limits of testing – Testing Strategy – Roles and Responsibilities of a Software Tester in Organizations – Independent Verification and Validation			
2	SOFTWARE TESTING REQUIREMENTS	Total Hrs	10
Software Testing Requirements - Analyzing the requirements -Classifying the Functional and Non Functional Requirements. Software Testing Review Process - Objective of Software Testing Review - Types of Reviews - Peer Review, Walkthrough, Inspection - Checklists of Review Process - Review Log			
3	TESTING TECHNIQUES	Total Hrs	9
White box testing techniques – Static and Dynamic Testing – Statement Coverage – Decision Coverage – Basic Path Testing – Control Flow Graph Coverage – Branch Coverage – Conditional Coverage – McCabe's Cyclomatic Complexity – Mutation Testing. Black Box Test Techniques – Boundary Value Analysis – Equivalent Class Partition – Error Guessing – Decision Table – State Transition Table – Pair Wise Testing – Use Case Testing.			
4	TESTING TYPES	Total Hrs	9
Unit Testing, Smoke Testing, Functional Testing and its types – Integration, System Testing, User Acceptance Testing (Alpha & Beta)- Non Functional Testing and its types – Performance Testing (Load, Volume, Stress) – Recovery Testing, Browser Compatibility Testing – Security Testing – Scalability Testing – Usability Testing – Ad Hoc Testing – Internationalization Testing – Configuration Testing - DataWare House Testing and Business Intelligence Testing – Mobile Testing			
5	TEST CASE DESIGN	Total Hrs	9
Definition of Test Case - Standard, Guidelines and Naming Conventions for Test Case Design – Characteristics of Good Test Cases and its templates – Creation of Test Case – Requirement Coverage –Traceability Matrix – Test Case Review Process – Test Execution – Test Log - Reporting of Test Execution – Risk Based Testing Approach – Definition of Risk - Importance of RBT – Classifying the Test Cases using RBT approach			
Total hours to be taught			45

Text book :

1	S.Subashni, N.Sathees Kumar, Dr.B.G.Geetha, Dr.G.Singaravel, "Software Testing", Umayam Publications , 1st edition ,2013.

Reference (s) :

1	Marnie L.Hutchson, "Software Testing Fundamentals Methods and Metrics",Wiley,2003 edition
2	Glenford J.Myess,"The Art of testing", Wiley, 2003 edition.
3	Mauro pezze,Michal young, "Software Testing and Analysis: Process, Principles, and Techniques",Wiley,2008 edition
4	Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, New Delhi, 1995
5	Elfriede Dustin, "Effective Software Testing", Pearson Education, New Delhi, 2003
6	Renu Rajani and Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw-Hill, New Delhi, 2003

<table>
<tr><td colspan="8">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td>R 2010</td></tr>
<tr><td>Department</td><td colspan="3">Computer Science and Engineering</td><td colspan="2">Programme code & Name</td><td colspan="3">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="9">Semester VIII</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="2">Course Name</td><td colspan="3">Hours/Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS 8P1</td><td colspan="2">PROJECT WORK – PHASE II</td><td>0</td><td>0</td><td>16</td><td>8</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">Enabling and strengthening the students to carry out the project on their own and to implement their innovative ideas to forefront the risk issues and to retrieve the hazards by adopting suitable assessment methodologies and stating it to global.</td></tr>
<tr><td>Methodology</td><td colspan="8">Three reviews have to be conducted by the committee of minimum of three members one of which should be the guide
Each review has to be evaluated for 100 Marks
Attendance is compulsory for all reviews. If a student fails to attend review for some valid reason, one or more chance may be given
They should publish the paper preferably in the journals / conference
Final review will be done by the committee that consists of minimum of three members one of which should be the guide (If possible include one external expert examiner with in the college)
The Report should be submitted by the students around at the end of April.</td></tr>
<tr><td colspan="8">Total hours</td><td>240</td></tr>
</table>

VIII Semester Course Outcome

Modules	10 HS 003 - Principles of Management Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Explore the basic concepts of management, and to learn the contributions and functions, types of business organization.
2	Gain knowledge about the various types of planning, setting objectives and forecasting.
3	Distinguish formal and informal organization, and gain knowledge on various types of organization chart, its structure and process.
4	Analyze comparatively the selection process and leadership.
5	Gain the knowledge on the various types of leadership.
6	Evaluate the motivation theories and motivational techniques.
7	Explore the importance of communication, process, barriers, breakdown of communication and importance of electronic media in communication.
8	Identify the different processes of controlling and concept budgeting.
9	Make a good productivity.
10	Comprehend the global environment, Gaining knowledge about the international management and global theory of management.

Modules	10 CS 811 - Software Testing Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Know the basic concepts of software testing
2	Justify about computer based system, verification & validation
3	Analyze the functional requirements of the system
4	Interpret the use of conducting the review
5	Implement internal and external views of software testing
6	Determine the need for White box, Basis path, Black box and Control structure testing
7	Classify different strategic approaches and types in software testing
8	Describe the concepts of data warehouse testing and Mobile testing
9	Implement the guidelines to generate test cases
10	Explore about Risk Based Testing Approach in test cases

Modules	10 CS 8P1 - Project Work - Phase II Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Design modules of the project.
2	Integrate the modules and arrive the final output.
3	Investigate the results with available solutions.
4	Demonstrate the outcome of the project and verify.
5	Prepare technical report

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Department	Computer Science and Engineering		Program code & Name		CS : B.E. Computer Science and Engineering			
Elective I								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E11	DATA MINING	3	0	0	3	50	50	100
Objective(s)	This subject introduces basic concepts, tasks, methods, and techniques in data mining. The emphasis is on various data mining problems and their solutions. Students will develop an understanding of the data mining process and issues, learn various techniques for data mining, and apply the techniques in solving data mining problems using data mining tools and systems.							
1	INTRODUCTION TO DATA MINING				Total Hrs	9		
Motivation and importance - What is Data Mining - Relational Databases - Data Warehouses - Transactional Databases - Advanced Database Systems - Data Mining Functionalities - Interestingness of a pattern Classification of Data Mining Systems - Major issues in Data Mining.								
2	DATA WAREHOUSE AND OLAP TECHNOLOGY FOR DATA MINING				Total Hrs	9		
What is a Data Warehouse - Multi-Dimensional Data Model - Data Warehouse Architecture – Data Warehouse Implementation - Development of Data Cube Technology - Data Warehousing to Data Mining.								
3	DATA PREPROCESSING				Total Hrs	9		
Why Pre-process the Data? - Data Cleaning - Data Integration and Transformation Data Reduction - Discretization and Concept Hierarchy Generation - Data Mining Primitives: Mining Association rule in large Databases - Association Rule Mining - Mining Single-dimensional Boolean Association rules from Transactional Databases - Mining Multi-dimensional Association rules from relational databases & Data Warehouses.								
4	CLASSIFICATION AND PREDICTION				Total Hrs	9		
Concepts and Issues regarding Classification and Prediction - Classification by Decision Tree Induction – Bayesian Classification - Classification by Back-propagation - Classification Based on Concepts from Association Rule Mining.								
5	CLUSTER ANALYSIS				Total Hrs	9		
What is Cluster Analysis? - Types of Data in Cluster Analysis - A Categorization of Major clustering methods - partitioning methods - Hierarchial methods - Density-Based Methods: DBSCAN - Grid-based Method: STING - Model-based Clustering Method: Statistical approach - Outlier analysis								
Total hours to be taught						45		
Text book (s) :								
1	Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Morgan Kaufman Publications.							
Reference(s):								
1	Adriaan, “Introduction to Data Mining”, Addison Wesley Publication							
2	A.K.Pujari, “Data Mining Techniques”, University Press							

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Elective I								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E12	ADVANCED COMPUTER ARCHITECTURE	3	0	0	3	50	50	100
Objective(s)	Studying the ISA design, instruction pipelining and performance related issues, doing a detailed study of ILP with dynamic Approaches, doing a detailed study of ILP with software approaches, studying the different multiprocessor architectures and related issues, studying the Memory and I/O systems and their performance issues.							
1	INTRODUCTION				Total Hrs	9		
Fundamentals of Computer Design – Measuring and reporting performance – Quantitative principles of computer design. Instruction set principles – Classifying ISA – Design issues. Pipelining – Basic concepts – Hazards – Implementation – Multicycle operations.								
2	INSTRUCTION LEVEL PARALLELISM WITH DYNAMIC APPROACHES				Total Hrs	9		
Concepts – Dynamic Scheduling – Dynamic hardware prediction – Multiple issues – Hardware based speculation – Limitations of ILP.								
3	INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROACHES				Total Hrs	9		
Compiler techniques for exposing ILP – Static branch prediction – VLIW – Advanced compiler support – Hardware support for exposing more parallelism – Hardware versus software speculation mechanisms.								
4	MEMORY AND I/O				Total Hrs	9		
Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time – Main memory and performance – Memory technology. Types of storage devices – Buses – RAID – Reliability, availability and dependability – I/O performance measures – Designing an I/O system.								
5	MULTIPROCESSORS AND THREAD LEVEL PARALLELISM				Total Hrs	9		
Symmetric and distributed shared memory architectures – Performance issues – Synchronization – Models of memory consistency – Multithreading.								
Total hours to be taught						45		
Text book (s) :								
1	John L. Hennessey and David A. Patterson,"Computer Architecture: A Quantitative Approach", Morgan Kaufmann, 2003, Third Edition.							
Reference(s):								
1	D.Sima, T.Fountain and P.Kacsuk, "Advanced Computer Architectures: A Design Space Approach", Addison Wesley, 2000.							
2	Kai Hwang and Zhi.Wei Xu, "Scalable Parallel Computing", Tata McGraw-Hill, New Delhi, 2003							

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Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Elective I								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E13	USER INTERFACE DESIGN	3	0	0	3	50	50	100
Objective(s)	Studying the concept of menus, windows, interfaces, about business functions, characteristics and components of windows, various controls for the windows, various problems in windows design with color, text, graphics and testing methods							
1	HUMAN COMPUTER INTERFACE				Total Hrs	9		
Introduction-Importance-Human-Computer interface-characteristics of graphics interface-Direct manipulation graphical system - web user interface-popularity-characteristic & principles.								
2	USER INTERFACE DESIGN PROCESS				Total Hrs	9		
User interface design process- obstacles-usability-human characteristics in design - Human interaction speed-business functions-requirement analysis-Direct-Indirect methods-basic business functions-Design standards-system timings-Human consideration in screen design.								
3	DESIGNING OF MENUS AND WINDOWS				Total Hrs	9		
Menus: Structures of menus - functions of menus-contents of menu-formatting -phrasing the menu - selecting menu choice-navigating menus-graphical menus. Windows: Characteristics-components-presentation styles-types-managements-organizations - Operations - web systems.								
4	DESIGNING OF CONTROLS				Total Hrs	9		
Device-based controls: characteristics-selecting the proper device based controls. Screen -based controls: operate control - text boxes-selection control-combination control-custom control-presentation control.								
5	DESIGNING OF WEB PAGES				Total Hrs	9		
Text for web pages - effective feedback-guidance & assistance-Internationalization-accesssibility-Icons-Image-Multimedia -coloring. Windows layout-test: prototypes - kinds of tests – retest. Usability of Web Sites and Case Study of e-commerce sites.								
Total hours to be taught						45		
Text book (s) :								
1	Wilbert. O. Galitz, “The Essential Guide to User Interface Design”, John Wiley& Sons, 2001.							
Reference(s):								
1	Ben Sheiderman, “Design the User Interface”, Pearson Education, 1998.							
2	Jacob Nielsen, “Usability Engineering ", Academic Press, 1993.							
3	Alan Cooper, “The Essential of User Interface Design”, Wiley – Dream Tech Ltd., 2002.							

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Elective I

Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E14	PATTERN RECOGNITION TECHNIQUES	3	0	0	3	50	50	100
Objective(s)	Learning the basics of Pattern Classifier, learning Feature extraction, Classification and Recognition techniques, learning recent advances in pattern classification.							

1	PATTERN RECOGNITION OVERVIEW	Total Hrs	9
Pattern recognition, Classification and Description—Patterns and feature Extraction with Examples—Training and Learning in PR systems—Pattern recognition Approaches			
2	STATISTICAL PATTERN RECOGNITION	Total Hrs	9
Introduction to statistical Pattern Recognition—supervised Learning using Parametric and Non Parametric Approaches			
3	DISCRIMINANT FUNCTIONS AND UNSUPERVISED LEARNING AND CLUSTERING	Total Hrs	9
Introduction—Discrete and binary Classification problems—Techniques to directly Obtain linear Classifiers -- Formulation of Unsupervised Learning Problems—Clustering for unsupervised learning and classification			
4	SYNTACTIC PATTERN RECOGNITION	Total Hrs	9
Overview of Syntactic Pattern Recognition—Syntactic recognition via parsing and other grammars–Graphical Approaches to syntactic pattern recognition—Learning via grammatical inference			
5	NEURAL PATTERN RECOGNITION	Total Hrs	9
Introduction to Neural networks—Feedforward Networks and training by Back Propagation—Content Addressable Memory Approaches and Unsupervised Learning in Neural PR.			
Total hours to be taught			45

Text book (s) :

1	Robert Schalkoff, “pattern Recognition: statistical, structural and neural approaches, John wiley & sons, Inc, 1992.

Reference(s) :

1	Earl Gose, Richard johnsonbaugh, Steve Jost, Pattern Recognition and Image Analysis, Prentice Hall of India,.Pvt Ltd, new Delhi.
2	R.O.Duda, P.E.Hart & D.G Stork, Pattern Classification 2nd Edition, J.Wiley Inc 2001.

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Elective I								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E15	INFORMATION STORAGE AND MANAGEMENT	3	0	0	3	50	50	100
Objective(s)	Evaluating storage architecture; understand logical and physical components of a storage infrastructure including storage subsystems, describing storage networking technologies such as FC – SAN, NAS, IP – SAN and data archival solution – CAS, identifying difference storage virtualization technologies and their benefits, understanding business continuity solutions including, backup and recovery technologies, and Local and remote replication solutions.							

1	STORAGE SYSTEMS	Total Hrs	9

Introduction to Information Storage and Management: Information storage – Evolution of storage technology and architecture – Data center Infrastructure - Key challenges in managing information – Information life cycle.
Storage System Environment: Components of a the Host. RAID – implementation of RAID – RAID array components – RAID levels – RAID Comparison - Host spares. Intelligent storage System – Components – intelligent storage array.

2	STORAGE NETWORKING TECHNOLOGIES	Total Hrs	9

Direct – Attached storage and introduction to SCSI: Type of DAS – DAS benefits and limitations Disk Drive Interfaces – Introduction to Parallel SCSI – SCSI command model.
Storage Area Networks – Fiber channel – SAN evolution - SAN components – FC Connectivity – Fiber channel ports – Fiber Channel Architecture - Zoning – Fiber Channel login types – FC Topologies. Benefits of NAS – NAS file I/O – Components of NAS – NAS implementation – NAS file sharing protocols – NAS I/O operations.

3	ADVANCED STORAGE NETWORKING AND VIRTUALIZATION	Total Hrs	9

iSCSI – FCIP – Fixed content and archives – Types of archives – features and benefits of CAS – CAS architecture – Objects storage and retrieval in CAS – CAS Examples
Storage Virtualization: Forms of Virtualization - SNIA Storage virtualization taxonomy – storage virtualization configurations – storage virtualization challenges – Types of storage virtualization

4	BUSINESS CONTINUITY	Total Hrs	9

Introduction to Business continuity: Information availability – BC terminology – BC planning life cycle – Failure analysis – Business impact analysis – BC technology solutions – concept in practice
Backup and Recovery: Backup purpose – considerations – granularity – recovery considerations – backup technologies – concepts in practice

5	REPLICATION	Total Hrs	9

Local replication: Source and target – uses of local replicas – data consistency – local replication technologies – restore and restart considerations – creating multiple replicas – management interfaces – concepts in practice - Remote replications – modes of remote replication technologies – network infrastructure – concepts in practice

Total hours to be taught	45

Text book (s) :

1	EMC Corporation, Information Storage and Management, Wiley India,2010, ISBN:978-81-265-2147-0.

Reference(s) :

1	Robert Spalding storage Networks: The Complete Reference, Tata McGraw Hill, Osborne, 2003.
2	Marc Farley, Building Storage Networks, Tata McGraw Hill, Osborne, 2001.
3	Meeta Gupta, storage Area Networks Fundamentals, Pearson Education Limited, 2002.
4	Dr. Arun Kumar R, Easy Oracle Automation – Oracle 10g, Automatic Storage, Memory and Diagnostic Feartures, 2004, ISBN 0-9745993-6-0.

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Elective I								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E16	DISTRIBUTED COMPUTING	3	0	0	3	50	50	100
Objective(s)	Learning the basics of Distributed Systems, Client Server model and algorithms based on Distributed deadlock, enhancing the knowledge on File Replication and Distributed Operating Systems.							
1	INTRODUCTION				Total Hrs	9		
Characterization of Distributed Systems - Examples - Resource Sharing and the Web - Challenges - System Models - Architectural and Fundamental Models - Networking and Internetworking - Types of Networks - Network Principles - Internet Protocols - Case Studies.								
2	PROCESSES AND DISTRIBUTED OBJECTS				Total Hrs	9		
Interprocess Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication - Case Study - Distributed Objects and Remote Invocation - Communication Between Distributed Objects - Remote Procedure Call - Events and Notifications - Java RMI - Case Study.								
3	OPERATING SYSTEM ISSUES – I				Total Hrs	9		
The OS Layer - Protection - Processes and Threads - Communication and Invocation – OS Architecture - Security - Overview - Cryptographic Algorithms - Digital Signatures - Cryptography Pragmatics - Case Studies - Distributed File Systems - File Service Architecture - Sun Network File System - The Andrew File System .								
4	OPERATING SYSTEM ISSUES – II				Total Hrs	9		
Name Services -Domain Name System - Directory and Discovery Services - Global Name Service - X.500 Directory Service - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States - Distributed Debugging - Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.								
5	DISTRIBUTED TRANSACTION PROCESSING				Total Hrs	9		
Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols - Concurrency Control in Distributed Transactions - Distributed Deadlocks - Transaction Recovery - Overview of Replication And Distributed Multimedia Systems.								
Total hours to be taught						45		
Text book (s) :								
1	George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems Concepts and Design, Pearson Education, 3rd Edition, 2002.							
2	Sape Mullender, Distributed Systems, Addison Wesley, 2nd Edition, 1993.							
Reference(s):								
1	Andrew S Tanenbaum , Maartenvan Steen,Distibuted Systems –Principles and Pardigms,Pearson Education, 2002.							
2	Mugesh Singhal,Niranjan G Shivaratri,Advanced Concepts in Operating Systems,Tata McGraw Hill Edition, 2001.							

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Elective II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 IT E21	CLOUD COMPUTING (CS, IT)	3	0	0	3	50	50	100
Objective(s)	Be able to understand what the current challenges are in cloud computing and be able to understand how to design and implement cloud-based applications.							
1	INTRODUCTION				Total Hrs	8		
Cloud computing basics: Defining Cloud computing –Cloud Types - Characteristics of Cloud computing – Assessing the role of Open Standards - Measuring the cloud's value - Cloud Architecture: Exploring the cloud computing stack.								
2	CLOUD SERVICES AND APPLICATIONS				Total Hrs	10		
Understanding Services and Applications by Type: Defining Infrastructure as a service- Defining Platform as a Service- Defining software as a Service – Defining Identity as a Service, Understanding Abstraction and virtualization: Virtualization Technologies – Load Balancing and virtualization-Understanding Hypervisors- Machine Imaging – Porting applications								
3	CLOUD PLATFORMS				Total Hrs	9		
Platform as a Service: PaaS Applications Frameworks – Using Amazon Web Services: Amazon Web service components and Services – Working with Elastic Compute Cloud (EC2) – Working with Amazon Storage systems- Understanding Amazon Database Services								
4	CLOUD SECURITY				Total Hrs	9		
Microsoft Cloud Services: Exploring Microsoft Cloud services – Windows Azure Platform, Cloud Security: Securing the cloud – Securing Data –Establishing Identity and Presence								
5	SERVICE ORIENTED ARCHITECTURE AND CLOUD STORAGE				Total Hrs	9		
Service Oriented Architecture: Introducing service Oriented Architecture - SOA Communications –Managing and Monitoring SOA. Cloud storage: Provisioning Cloud Storage- Exploring Cloud Backup Solutions.								
Total hours to be taught						45		
Text book :								
1	Barrie Sosinsky, "Cloud Computing Bible". Wiley Publishing, 2011.							
Reference (s) :								
1	Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs". Emereo Pty Limited, 2008.							
2	George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud". [First Edition]Publisher - Orelly's, 2009							

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Elective II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E21	XML AND WEB SERVICES	3	0	0	3	50	50	100

Objective(s)	The basic aim of this subject is to provide students with insight into XML Web Services, various key technologies for web services, protocol architecture of XML services and also explains how the web services can be developed using XML and also describes various security issues in the XML document.

1	XML BASICS, SOAP INTRODUCTION	Total Hrs	9
Role Of XML – XML and the Web – XML Language Basics – SOAP – Web Services – Revolutions of Xml – Service Oriented Architecture (SOA).			
2	DTD, SCHEMA AND NAMESPACES	Total Hrs	9
XML-Namespaces – Structuring With Schemas and DTD – Presentation Techniques – Transformation - XML Infrastructure.			
3	SOAP- RPC	Total Hrs	9
Overview Of SOAP-HTTP – XML – RPC – SOAP: Protocol-Message Structure – Intermediaries – Actors –Design Patterns and Faults – SOAP with Attachments.			
4	ARCHITECTURE	Total Hrs	9
Overview – Architecture – Key Technologies – UDDI – WSDL – ebXML – SOAP and Web services in E-Com – Overview of .NET And J2EE – Creating ASP.NET Web Services.			
5	SECURITIES ISSUES	Total Hrs	9
Security Overview – Canonicalization – XML Security Frame Work – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents – XML in Practice.			
Total hours to be taught			45

Text book (s) :

1	Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

Reference(s) :

1	Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, “Developing Java Web Services”, Wiley Publishing Inc., 2004.
2	Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services”, Pearson Education, 2004.
3	McGovern, et al., “Java Web Services Architecture”, Morgan Kaufmann Publishers, 2005.

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Elective II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E22	EMBEDDED SYSTEM DESIGN	3	0	0	3	50	50	100
Objective(s)	Learning basic Concepts of Embedded System, Advanced Microcontroller, Real-Time operating system, and design process of Embedded system.							

1	INTRODUCTION	Total Hrs	7
Features of Embedded Systems – Design Metrics – Embedded Systems Design Flow.			
2	ARM: AN ADVANCED MICROCONTROLLER	Total Hrs	11
ARM Microcontroller : ARM Pipeline – Instruction Set Architecture(ISA) –THUMB Instructions – Exception in ARM – Other target architectures: Digital Signal Processors – Field Programmable Gate Array (FPGA) –Interfacing: Serial Peripheral Interface (SPI) – Inter – Integrated Circuit (IIC, I^2C) – RS-232C – RS-422 – RS-485 – Universal Serial Bus (USB) – Infrared Communications (IrDA) – Controller Area Network (CAN) – Bluetooth.			
3	REAL – TIME OPERATING SYSTEM	Total Hrs	9
Types of Real-time Tasks –Task Periodicity – Task Sceduling – Classfication of Scheduling Algorthms – Clock Driven Scheduling – Event Driven Scheduling –Resource Sharing – Other Features of RTOS – Commerical RTOSs –Specification Techniques: Introduction StateChart – Specification and Description Language (SDL) – Petri Nets – Unified Modelling language (UML)			
4	HARDWARE – SOFTWARE COSIMULATION	Total Hrs	9
Cosimulation Approaches – A Typical Cosimulation Environment –Hardware-Software Partitioning: Partitioning Using Integer Programming – Extended Kernighan-Lin Heuristic – Partitioning Using Genetic Algorithm – Partitioning Using Particle Swarm Optimization (PSO) – Extended partitioning Problem - Power Aware Partitioning on Reconfigurable Hardware.			
5	FUNCTIONAL PARTITIONING AND OPTAMIZATION	Total Hrs	9
Functional Partitioning – High-level Optimizations – Low power Embedded system design: Sources of Power Dissipation –Power Reduction Techniques – System Level power Management.			
Total hours to be taught			45

Text book (s) :

1	Santanu Chattopadhyay , “Embedded System Design” , PHI Learning Pl New Delhi-110001, 2010.

Reference(s) :

1	**Gajski,** D.D**., Abdi,** S**., Gerstlauer,** A.**, Schirner,** G**.** “Embedded System design “, Springer, 2009
2	Michael Barr and Anthony Massa “Programming Embedded Systems With C and GNU Development Tools”, 2nd Edition, Orally publications

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Elective II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E23	MULTIMEDIA COMPUTING	3	0	0	3	50	50	100
Objective(s)	Learning Concepts of Multimedia Tools, Multimedia Operating Systems, Multimedia Communication Systems, Data Compression and Multimedia Applications							
1	INTRODUCTION TO MULTIMEDIA				Total Hrs	10		
Elements of multimedia system – Need and aspects of multimedia - Information units. Sound - Audio file formats – MIDI – Images - Computer Image Processing - Principles of animation - Animation techniques - Creating animated scenes – Video - Basic concepts - Video Capture - Recording format - Storage for multimedia - CD Technologies - Multimedia Workstations								
2	MULTIMEDIA TOOLS				Total Hrs	8		
Basic tools - Image-editing tool - Painting and drawing tools –Sound editing programs - Video formats - Linking multimedia objects – OLE -presentation tools - authoring tools.								
3	MULTIMEDIA OPERATING SYSTEMS				Total Hrs	9		
Introduction - Real Time - Resource Management - Process Management - File Systems - Database Systems - Multimedia Database Management System - Characteristics of an MDBMS - Data Analysis - Data Structure - Operations on Data - Integration in a Database Model								
4	MULTIMEDIA COMMUNICATION SYSTEMS				Total Hrs	9		
Application Subsystem - Transport Subsystem – Synchronization - Introduction - Notion of Synchronization - Presentation Requirements - A Reference Model for Multimedia Synchronization - Synchronization in distributed environment.								
5	DATA COMPRESSION AND MULTIMEDIA APPLICATIONS				Total Hrs	9		
Source entropy and hybrid coding – JPEG – MPEG - H.261 - DVI. Video conferencing - Tele conferencing – Tele services – messaging services – retrieval services – Tele action services.								
Total hours to be taught						45		
Text book (s) :								
1	Ralf Steinmetz, Klara Nahrstedt, "Multimedia: Computing, Communications and Applications", Pearson Education Asia, New Delhi, 2002.							
Reference(s):								
1	Tay Vaughan, “Multimedia: Making it work”, sixth edition, Tata McGraw Hill, New Delhi, 2002.							
2	Fred Halsall, “Multimedia Communication, Application Networks, Protocols and Standard”, fourth edition, Addison Wesley, New Delhi, 2001.							
3	John F.Koegal Buford, “Multimedia Systems”, Pearson Educational Asia, New Delhi, 2001.							
4	Ron, Goldberg, "Multimedia Producer's Bible", fifth edition, Comdex Computer Publishing, New Delhi, 1996.							

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Elective II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E24	MOBILE AD-HOC NETWORKS	3	0	0	3	50	50	100
Objective(s)	Learning about MAC and ad hoc routing protocols and study in detail the transport layer and security protocols for ad hoc network, Quality of service issues and to learn about wireless sensor network							
1	INTRODUCTION				Total Hrs	9		
Introduction- Issues – Ad hoc wireless Internet- MAC protocols for ad hoc wireless networks - Classification of MAC protocols - Contention-Based protocols - Contention-Based protocols with Reservation Mechanisms - D-PRMA – CATA– HRMA - SRMA/PA - Contention-Based protocols with Scheduling Mechanisms.								
2	AD HOC ROUTING PROTOCOLS				Total Hrs	9		
Introduction - Classifications of Routing Protocols - Table-Driven Routing Protocols – On-Demand Routing Protocols -DSR - AODV - TORA – LAR – ABR – Hybrid Routing Protocols.								
3	TRANSPORT LAYER AND SECURITY PROTOCOLS FOR AD HOC WIRELESS NETWORKS				Total Hrs	9		
Classification of Transport Layer Solutions - TCP Over Ad Hoc Wireless Networks - Security in Ad Hoc Wireless Networks - Network Security Requirements - Network Security Attacks - Key Management - Secure Routing in Ad Hoc Wireless Networks.								
4	QUALITY OF SERVICE IN AD HOC WIRELESS NETWORKS				Total Hrs	9		
Introduction – Issues - Classifications of QoS Solutions - MAC Layer Solutions - Network Layer Solutions – QoS Routing Protocols – Ticket-Based QoS Routing Protocol - PLBQR – TDR - QoS Frameworks for Ad Hoc Wireless Networks.								
5	WIRELESS SENSOR NETWORKS				Total Hrs	9		
Introduction – Sensor Network Architecture – Data Dissemination- Data Gathering – MAC Protocols for Sensor Networks – Location Discovery – Quality of a Sensor Network.								
Total hours to be taught						45		
Text book (s) :								
1	C. Siva Ram Murthy and B.S. Manoj “Ad Hoc Wireless Networks: Architectures and Protocols”, Pearson Education 2004,Reprint 2012.							
Reference(s) :								
1	S. Rajasekaran, G.A. Vijayalakshmi Pai “Neural Networks, Fuzzy Logic, and Genetic Algorithms “, Prentice Hall PTR, 2005.							
2	C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR, 20010. Charles E. Perkins, Ad Hoc Networking, Addison Wesley, 2000.							

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Elective II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E25	SOFTWARE FORENSICS	3	0	0	3	50	50	100
Objective(s)	Learning basic concept of software forensics and studying Player-Hackers, Crackers, Phreaks, and other Doodz, Avanced tools, Law and Ethics-Software forensics in court, Computer Virus and Malware Concepts and Background, Programming Cultures and Indicators, Stylistic Analysis and Linguistic Forensics, Nalysauthorship AIS.							
1	INTRODUCTION TO SOFTWARE FORENSICS, SOFTWARE CODE AND ANALYSIS TOOLS				Total Hrs	9		
Motivations and Rationales - General Characteristics - Black hat Products - Other Products - Summary - The Programming Process Digital Forensic Definitions - Software Forensics - Objectives and Objects of Software Forensics - Identity - Other Object of Study - Software Forensic Tools -The Process - The Products - Finally, Already, the Tools - Software Forensic Technologies and Practices - Content Analysis - Legal Considerations - Presentation in Court – Summary.								
2	THE PLAYER-HACKERS, CRACKERS, PHREAKS, AND OTHER DOODZ				Total Hrs	9		
Terminology -Types of Black hats -The Products -The Resulting Objects -The Analytical Tools -Forensic Tools – Summary.								
3	ADVANCED TOOLS, LAW AND ETHICS-SOFTWARE FORENSICS IN COURT				Total Hrs	9		
Decompilation -Desquirr -Dcc Boomerang -Plagiarism -JPlag -YAP -Other Approaches -summary -Legal Systems - Differences Within Common Law -Jurisdiction -Evidence -Types of Evidence - Rules of Evidence -Providing Expert Testimony -Ethics -Disclosure - Blackhat motivations as a Defense – Summary.								
4	COMPUTER VIRUS AND MALWARE CONCEPTS AND BACKGROUND, PROGRAMMING CULTURES AND INDICATORS				Total Hrs	9		
History of Computer viruses and Worms -Malware Definition and Structure -Virus Structure -Trojan structure -Logic Bomb Structure -Remote Access Trojan (RAT) Structure -Distributed Denial of Service (DDoS) Structure Detection and Antidetection Techniques -Detection Technologies -tealth and Antidetection Measures -Summary -User Interface -Cultural Features and “Help” -Functions -Programming Style -Program structure -Programmer Skill and Objectives - Developmental Strictures -Technological Change –Summary.								
5	STYLISTIC ANALYSIS AND LINGUISTIC FORENSICS, NALYSAUTHORSHIP AIS				Total Hrs	9		
Biblical Criticism -Shakespeare and Other Literature -Individual Identification and Authentication -Content Analysis Noncontent Analysis -The Content/Noncontent Debate -Noncontent Metrics as Evidence of Authorship -Additional Indicators - Summary -Problems - Plagiarism Detection Versus Authorship Analysis -How Can It Work? - Source Code Indicators - More General Indicators - Is It Reliable? – Summary.								
Total hours to be taught						45		
Text book (s) :								
1	Robert M.Slade ,”Software forensics” , Tata McGraw – Hill Publishing Company Limited, New Delhi,2005.							
Reference(s) :								
1	Bill Nelson, Amelia Phillips, Christopher Steuart, “Guide to computer forensics and investigations”, Cengage Learning, 2010							
2	Bill Nelson, Amelia Phillips, Frank Enfinger, Chris Stewart ,” Computer Forensics and Investigations”,2004							

K.S.Rangasamy College of Technology Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme code & Name		CS: B.E. Computer Science and Engineering			
Elective III								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E31	DECISION SUPPORT SYSTEMS AND INTELLIGENT SYSTEMS	3	0	0	3	50	50	100
Objective(s)	Learning development of support system, methods, intelligent decision system development							

1	INTRODUCTION	Total Hrs	9

Decision making, Systems, Modeling, and support – Introduction and Definition – Systems – Models – Modeling process – Decision making: The intelligence phase – The design phase - The choice phase – Evaluation: The implementation phase –Alternative Decision Making-Design Support System concepts, Methodologies and Technologies: DSS characteristics & capabilities - Concepts of Decision Support System - DBMS subsystem - Model Management Subsystem - User-interface subsystem - Knowledge Based Management Subsystem - Decision Support System User - Decision Support System Hardware - Decision Support System Classifications.

2	DECISION SUPPORT SYSTEM MODELING & BUSINESS INTELLIGENCE	Total Hrs	9

Modeling and Analysis- Management Support System Modeling - Static & Dynamic Models - Certainty, Uncertainty Risk - Decision Analysis with Decision Tables and Trees - Problem – solving search methods -Data warehousing - Business analysis and visualization - Data, Tent and Web mining. .

3	KNOWLEDGE MANAGEMENT	Total Hrs	9

Introduction – Organization – learning & Transformation – Knowledge Management activities – Approaches to Knowledge Management – Information Technology in Knowledge Management – Knowledge Management System Implementation – Role of people in Knowledge Management - Ensuring the success of Knowledge Management

4	INTELLIGENT SYSTEM DEVELOPMENT	Total Hrs	9

Artificial intelligence and Expert System – Machine learning techniques – Case Based Reasoning (CBR) – Generic Algorithm fundamentals – fuzzy logic fundamentals -Natural language processing – Voice Technologies web-base Intelligent System – Intelligent Agent's – Semantic Web.

5	IMPLEMENTING INTELLIGENT DECISION SUPPORT SYSTEMS	Total Hrs	9

Types of support System landscape and Management Model Support System application Development – Development option for Management Model Support System application – Prototyping – Criteria for selecting Management Model Support System - development Approach connecting to database – Risk to Web series – user developed management support – System Integration – Types of Management Model Support System Support System and knowledge Management – System Integration – Types of Management Model Support System integration – Integration with enterprise system and knowledge management.

Total hours to be taught	45

Text Book(s) :

1	Efrain Turban, Jay E.Aronson, Teng-Peng Liang, Ramesh Sharada "Decision Support Systems and Intelligent Systems" 8th Edition, Pearson Education, 2007.

Reference(s):

1	Ganesh Natarajan, Sandhya Shekhar, "Knowledge management – Enabling Business Growth", Tata McGraw-Hill, 2002.
2	George M.Marakas, "Decision Support System", Prentice Hall, India, 2003.
3	Efrem A.Mallach, "Decision Support and Data Warehouse Systems", Tata McGraw-Hill, 2002.

K.S.Rangasamy College of Technology Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme code & Name			CS : B.E. Computer Science and Engineering		
Elective III								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E32	ARTIFICIAL INTELLIGENCE	3	0	0	3	50	50	100
Objective(s)	Understanding the genesis of Artificial Intelligence. Studying the applications of Artificial Intelligence.							

1	INTRODUCTION	Total Hrs	9
Basic definitions, History, Intelligent agents, Agents and environments, Structure of agents.			
2	PROBLEM SOLVING AGENTS	Total Hrs	9
Searching for solutions: Uninformed search strategies – Informed search strategies, Online search agents and unknown environments, Constraint satisfaction problems.			
3	KNOWLEDGE BASED AGENTS	Total Hrs	9
Knowledge representation, Logic, Proposition, Inference, First order logic, Inference in FOL, Algorithms, Knowledge representation issues.			
4	PLANNING AND PROBABILISTIC AGENTS	Total Hrs	9
The planning problem, Partial order planning, Conditional planning, Multi agent planning, Uncertainty and probabilistic reasoning.			
5	LEARNING AGENTS AND APPLICATIONS	Total Hrs	9
Learning from observations, Learning decision trees, Statistical learning methods, Instance based learning, Neural network techniques for learning. Applications - Artificial intelligence in medicine, Industrial automation, FMS and Robotics, Management and business intelligence.			
Total hours to be taught			45

Text book (s) :

1	Stuart Russel, Peter Norvig, “Artificial Intelligence – A Modern Approach”, Second Edition, Pearson Education, New Delhi, 2008.

Reference(s):

1	Mishra R B., “Artificial Intelligence”, PHI Learning Pvt Ltd, New Delhi, 2011.
2	Padhy N. P., “Artificial Intelligence and Intelligent Systems”, Oxford University Press, New Delhi, 2005.
3	Nils J Nilsson, “Artificial Intelligence – A New Synthesis”, Morgan Kaufmann, New Delhi, 2007
4	George F Luger, “Artificial Intelligence – Structures and Strategies for Complex Problem Solving”, Pearson Education, New Delhi, 2004.
5	Dan W Patterson, “Introduction to Artificial Intelligence and Expert Systems”, PHI Learning Pvt. Ltd., New Delhi, 2010.

K.S.Rangasamy College of Technology Autonomous Regulation			R 2010
Department	Computer Science and Engineering	Programme code & Name	CS : B.E. Computer Science and Engineering

Elective III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E33	OBJECT ORIENTED PROGRAMMING IN PYTHON	3	0	0	3	50	50	100
Objective(s)	Gaining knowledge in Object Oriented Programming paradigm with python, studying about objects, inheritance, polymorphism, data structures, exception handling, files, strings and testing of open source language python.							

1	OBJECT-ORIENTED DESIGN	Total Hrs	9
What is Object-oriented? - Objects and classes- Specifying attributes and behaviors- Hiding details and creating the public interface- Composition and inheritance- Inheritance			
2	OBJECTS IN PYTHON	Total Hrs	9
Creating Python classes - Modules and packages - Organizing the modules- Absolute imports- Relative imports			
3	INHERITANCE AND POLYMORPHISM	Total Hrs	9
Extending built-ins- Overriding and super- Multiple inheritance- Polymorphism			
4	PYTHON DATA STRUCTURES AND EXCEPTION HANDLING	Total Hrs	9
Empty objects- Tuples and named tuples- Dictionaries- Lists- Sets - Raising exceptions- What happens when an exception occurs?- Handling exceptions- Exception hierarchy- Defining our own exceptions- Exceptions aren't exceptional			
5	FILES, STRINGS AND TESTING OBJECT-ORIENTED PROGRAMS	Total Hrs	9
String manipulation-String formatting- File IO -Why test?-Unit testing-testing with py.test- How much testing is enough?			
Total hours to be taught			45

Text book (s) :

1	Dusty Phillips “Python 3 Object Oriented Programming “ 2010 Packt Publishing

Reference(s):

1	James Payne “Beginning Python using Python 2.6 and Python 3.1” 2010 Willey India Pvt Ltd
2	Wesley J. Chun, “Core Phython Programming”, Prentice Hall, 2001

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Elective III								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E37	MOBILE APPLICATION DEVELOPMENT	3	0	0	3	50	50	100
Objective(s)	• Understand system requirements for mobile applications • Generate suitable design using specific mobile development frameworks • Generate mobile application design • Implement the design using specific mobile development frameworks • Deploy the mobile applications in marketplace for distribution							
1	INTRODUCTION				Total Hrs	5		
Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications								
2	BASIC DESIGN				Total Hrs	8		
Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.								
3	ADVANCED DESIGN				Total Hrs	8		
Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.								
4	TECHNOLOGY I – ANDROID				Total Hrs	12		
Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.								
5	TECHNOLOGY II–IOS				Total Hrs	12		
Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.								
Total hours to be taught						45		
Text book (s) :								
1								
Reference(s) :								
1	http://developer.android.com/develop/index.html							
2	Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox,							
3	.Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech,							
4	James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012							
5	David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS 6Development: Exploring the iOS SDK”, Apress, 2013.55							

<table>
<tr><td colspan="6">K.S.Rangasamy College of Technology - Autonomous Regulation</td><td colspan="3">R 2010</td></tr>
<tr><td>Department</td><td colspan="2">Computer Science and Engineering</td><td colspan="2">Programme Code & Name</td><td colspan="3">CS : B.E. Computer Science and Engineering</td></tr>
<tr><td colspan="9">Elective III</td></tr>
<tr><td rowspan="2">Course Code</td><td colspan="2" rowspan="2">Course Name</td><td colspan="3">Hours / Week</td><td>Credit</td><td colspan="3">Maximum Marks</td></tr>
<tr><td>L</td><td>T</td><td>P</td><td>C</td><td>CA</td><td>ES</td><td>Total</td></tr>
<tr><td>10 CS E35</td><td colspan="2">SECURITY ISSUES IN AD-HOC NETWORKS</td><td>3</td><td>0</td><td>0</td><td>3</td><td>50</td><td>50</td><td>100</td></tr>
<tr><td>Objective(s)</td><td colspan="8">Learning basic Security concepts, and Secure Routing Secure Routing, Protocols, Data Communication in Adhoc networks Detection and Preventions of Attacks</td></tr>
<tr><td>1</td><td colspan="5">BASIC SECURITY CONCEPTS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Introduction and Basic Security Concepts - Threats, Attacks and Vulnerabilities in Ad hoc Networks – Basic Security Concepts – Cryptographic Primitives – Modes of operation – Miscellaneous Properties, Key Management – Symmetric and Asymmetric based approaches</td></tr>
<tr><td>2</td><td colspan="5">SECURE ROUTING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Distance vector and Link-state routing – Ad-hoc On-demand Distance Vector – Secure AODV,Authenticated Routing for Ad Hoc Networks, Security Aware Ad Hoc Routing Dynamic Source Routing Protocol – Secure Routing Protocol – Ariadne – Endair – A provably secure routing protocol, Secure – AODV implementation and performance tuning – Secure Neighbourhood discovery in MANETs.</td></tr>
<tr><td>3</td><td colspan="5">ROUTING PROTOCOLS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Destination Sequenced Distance Vector Routing Protocol – Secure Efficient Distance Vector Routing (SEAD) – SuperSEAD – S-DSDV, Optimized Link State Routing – Secure extensions – Secure Link-state routing. Anonymous routing protocols and Generic attacks against routing,Reputation Based Systems, Credit Based Systems,. Limitations of these systems</td></tr>
<tr><td>4</td><td colspan="5">HYBRID SOLUTIONS,SMT,SSP</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Game theory solutions – Limitations - Hybrid Solutions to security. Other proposed schemes in security. Secure Data Communication in Mobile Ad hoc Networks. SMT and SSP protocols</td></tr>
<tr><td>5</td><td colspan="5">DETECTION AND PREVENTION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Key Challenges of Military Tactical Networking – Worm hole attack detection and prevention in ad hoc networks. Sybil attacks – Detection and prevention – Existing solutions for other wellknown attacks.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="2">45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Farooq Anjum, Petros Mouchtaris “Security for Wireless Ad hoc Networks”, Wiley Publications, 2007.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">George Aggelou “Mobile Ad Hoc Networks”, McGrawHill, 2004</td></tr>
<tr><td>2</td><td colspan="8">Younghwan Yoo And Dharma P. Agrawal Why Does It Pay To Be Selfish In A Manet, IEEE Wireless Communications, December 2006</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering	Programme Code & Name			CS : B.E. Computer Science and Engineering			
Elective III								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E36	SERVICE ORIENTED ARCHITECTURE	3	0	0	3	50	50	100
Objective(s)	Learning about basic fundamentals of SOA, Learning about message exchange patterns, learning about service oriented architecture, learning about SOA delivery strategies and WSDL							
1	SOA INTRODUCTION				Total Hrs	9		
Fundamental SOA-Common characteristics of contemporary SOA- Common-misperceptions about SOA-Common tangible benefits of SOA- Common pitfalls of adopting SOA - An SOA timeline (from XML to Web services to SOA)- The continuing evolution of SOA (standards organizations and contributing vendors)- The roots of SOA(comparing SOA to past architectures) - The Web services framework- Services (as Web services)-Service descriptions (with WSDL)-Messaging (with SOAP).								
2	MESSAGE AND METADATA EXCHANGE				Total Hrs	9		
Message exchange patterns- Serviceactivity-coordination-Atomic transactions- Business activities-Orchestration-Choreography - Addressing- Reliable messaging- Correlation-Policies- Metadata exchange-Security- Notification and eventing.								
3	SOA ARCHITECTURE				Total Hrs	9		
Principles of Service-Orientation-Service-orientation and the enterprise- Anatomy of a service-oriented architecture- Common principles of service-orientation-How service-orientation principles inter-relate-Section-Service-orientation and object-orientation-Native Web service support for service-orientation principles. - Service Layers –Service orientationand contemporary SOA- Service layer abstraction-application service layer-Business service layer- Orchestration service layer-Agnostic services- Service layer configuration scenarios.								
4	SOA DELIVERY STRATEGIES, SERVICE MODELING				Total Hrs	9		
SOA Delivery Strategies- SOA delivery lifecycle - phases- The top-down strategy- The bottom-up strategy- The agile strategy - Introduction to service-oriented analysis- Benefits of a business-centric SOA- Deriving business services - Service modeling (a step-by-step process)-Service modeling guidelines- Classifying service model logic- Contrasting service modeling approaches (an example).								
5	SOA DESIGN				Total Hrs	9		
Introduction to service-oriented design- WSDL-related - XML Schema language basics- WSDL language basics-SOAP language basics- Service interface - design tools - Steps to composing SOA Considerations for choosing service layers and SOA standards, positioning of cores and SOA - extensions - Overview-Service design of business service, application service, taks centric service and guidelines - WS-BPEL language basics-WSC oordination overview- Service-oriented business process design (a step-by-step process).								
Total hours to be taught						45		
Text book (s) :								
1	Thomas Erl ," Service-Oriented Architecture: Concepts, Technology & Design", Pearson Education Pte Ltd 2008.							
Reference(s) :								
1	Thomas Erl,"SOA Principles Of Service Design"Pearson Exclusives 2007.							
2	Tomas Erl and Grady Booch,"SOA Design Patterns"Printice Hall 2008							

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Department	Computer Science and Engineering		Programme code & Name		CS : B.E. Computer Science and Engineering			
Elective IV								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E41	PARALLEL COMPUTING	3	0	0	3	50	50	100
Objective(s)	Studying the scalability and clustering issues and the technology necessary for them, understanding the technologies enabling parallel computing, studying the different types of interconnection networks, studying the different parallel programming models, studying the software support needed for shared memory programming.							
1	SCALABILITY AND CLUSTERING				Total Hrs	9		
Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.								
2	ENABLING TECHNOLOGIES				Total Hrs	9		
System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding.								
3	SYSTEM INTERCONNECTS				Total Hrs	9		
Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.								
4	PARALLEL PROGRAMMING				Total Hrs	9		
Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.								
5	MESSAGE PASSING PROGRAMMING				Total Hrs	9		
Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.								
Total hours to be taught						45		
Text book (s) :								
1	Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003.							
Reference(s):								
1	David E. Culler & Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, 1999.							
2	Michael J. Quinn, “Parallel Programming in C with MPI & OpenMP”, Tata McGraw-Hill, New Delhi, 2003							
3	Kai Hwang, “Advanced Computer Architecture” Tata McGraw-Hill, New Delhi, 2003.							

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Elective IV								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E42	TEXT MINING	3	0	0	3	50	50	100
Objective(s)	Understanding the concepts of text mining and applications along with programming, Exploring Text, Markov Models and POS Tagging, Searching the Web, knowing Text Categorization							
1	INTRODUCTION, TEXT MINE INSTALLATION, MATHEMATICS BACKGROUND				Total Hrs	9		
Origins of Text Mining - Information Retrieval- Natural Language Processing Understanding Text- Polysemi Synonymy- Applications- Business- Medicine and Law- Society-Information Visualization-An Architecture for Text Mining Applications -Text Mining Functions- A Layered Model-Software- Usage - Probability-Least Squares Method- Entropy-Related-Event Probabilities-Bayer's Rule-Probability Distributions-Binomial Distribution-Poisson Distribution- Normal Distribution-Sampling Distributions-T-Distribution Estimation-Expectation Maximization Algorithm-Hypothesis Testing-Chi-Square Test- Matrices Singular value Decomposition.								
2	EXPLORING TEXT, MARKOV MODELS AND POS TAGGING				Total Hrs	9		
Words-Token Assembly- Word Stems-Base Words-Word and Meaning Relationships- Patterns in Words and Letters- Word Statistics-Zipf's Law-Sentences-Indexing Document Text- Frequency-Based- Stop words Inverse Document Frequency-Latent Semantic Indexing. hidden Markov Models-Observation Probability- State Sequence-Parameter Estimation-POS Taggers-HMM Taggers-Rule – Based Taggers-Building a Tagger-Word Sense Disambiguation-A Implementation of a WSD- Evaluation of WSDs.								
3	INFORMATION EXTRACTION, SEARCH ENGINES				Total Hrs	9		
IE Applications-Entity Extraction-HMMs for Entity Extraction -Implementation of an Entity Extractor Systems-Festus- Rapier-Phrase Extraction -Early Search Engines-Medline –Dialog- Indexing Text for Search- An Implementation in Text Mine Google Index-Indexing Multimedia-Queries-Boolean Queries- Multimedia Queries-Relevance Feedback-Searching an Index- Searching in Text Mine-Google Search-Evaluation-Ranking Algorithms Link Structure of Web Pages-Viewing Search Results.								
4	SEARCHING THE WEB				Total Hrs	9		
Web Structure-Search Engine Coverage- Web Directories-A Distributed Search- Web Communities-The Hidden Web-Crawlers- Web Search Engine Crawlers-Focused Crawlers-Text Mine Crawler Crawl Visualization--Clustering Documents-Cluster Organization Cluster –Parameters- Cluster – Based Search- Searching with a Taxonomy- Similarity Measures-Linking Methods Clustering Methods-K-Means-Simulated Annealing-Genetic Algorithms- Scatter\Gather-Visual Tools for Clusters-Cluster Evaluation.								
5	TEXT CATEGORIZATION				Total Hrs	9		
Categorization Problem- Filtering Email-A Bayesian Email Filter-Features of Spam-Requirements for a Spam Detector-An Email Archive-Email Categorization -Email Monitor-Personal Email Network-Chain EmaiCategorization Methods-Rocchio's Algorithm-Perceptions-Decision Trees-Nearest Neighbor-Support Vector Machines-Summarization-Training a Summarizer-Sentence Selection-News Articles- Email Threads-Web Pages-A Cluster-Based Summarizer-Implementation of a Summarizer-Evaluation of Summaries-Information Monitor-Event Detection-Event Tracking- Monitoring the News- Sentiment Analysis.								
Total hours to be taught						45		
Text book (s) :								
1	Manu Konchady, "Text Mining Application Programming ", India edition, Cengage Leaning, 2006.							
Reference(s) :								
1	Michael W. Berry, Jacob Kogan, quot,"Text Mining: Applications and Theory", Wiley, 2010.							
2	Louise Francis and Matt Flynn, "Text Mining Handbook". Spring, 2010.							

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme code & Name		CS: B.E. Computer Science and Engineering			
Elective IV								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E43	SEMANTIC WEB	3	0	0	3	50	50	100
Objective(s)	Introducing basic concepts, tasks, methods, and techniques in semantic web, understanding of the semantic web process and issues.							
1	INTRODUCTION				Total Hrs	8		
History – Semantic Web Layers –Semantic Web technologies – Semantics in Semantic Web – XML**:** Structuring – Namespaces – Addressing – Querying – Processing								
2	RDF				Total Hrs	10		
RDF and Semantic Web – Basic Ideas - RDF Specification – RDF Syntax: XML and Non- XML - RDF elements – RDF relationship: Reification, Container, and collaboration – RDF Schema –Editing, Parsing, and Browsing RDF/XML-RQL-RDQL								
3	ONTOLOGY				Total Hrs	10		
Why Ontology – Ontology movement – OWL – OWL Specification - OWL Elements –OWL constructs: Simple and Complex – Ontology Engineering : Introduction –Constructing ontologies – Reusing ontologies – On-To-Knowledge Semantic Web architecture								
4	LOGIC AND INFERENCE				Total Hrs	9		
Logic – Description Logics - Rules – Monotonic Rules: Syntax, Semantics and examples – Non- onotonic Rules – Motivation, Syntax, and Examples – Rule Markup in XML: Monotonic Rules, and Non-Monotonic Rules								
5	APPLICATIONS OF SEMANTIC WEB TECHNOLOGIES				Total Hrs	8		
RDF Uses: Commercial and Non-Commercial use – Sample Ontology – e-Learning –Web Services – Web mining – Horizontal information – Data Integration – Future of Semantic Web								
Total hours to be taught						45		
Text book (s) :								
1	Grigorous Antoniou and Van Hermelen - “A Semantic Web Primer”-The MIT Press –2004							
2	Spinning the Semantic Web: Bringing the world wide web to its full potential – The MIT Press – 2004							
Reference(s):								
1	Shelley Powers – “Practical RDF” – O’reilly publishers – First Indian Reprint :2003							

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Elective IV								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E44	AGILE SOFTWARE METHODOLGY	3	0	0	3	50	50	100
Objective(s)	L earning about basic concepts and methodologies of agile							

1	INTRODUCTION	Total Hrs	9
A cooperative Game of Invention and Communication - Software and poetry, Software and Games - Software and Rock Climbing - A Game of Invention and Communication – Software and Engineering - Software and model Building			
2	OPEN SOURCE DEVELOPMENT	Total Hrs	9
A second look at the cooperative Game - Programmers as communications specialists –Sufficiency for the primary goal – Sufficiency in the residue - Open source development			
3	CHARACTERISTIC FUNCTION	Total Hrs	9
THEM's Funky people - The quest for a characteristic function - Elements of Funkiness - Inescapable Diversity – The place of technology, Overcoming Failure modes - Making Mistakes -Inventing Rather than Researching - Countering with Discipline and Tolerance, Drawing on Success Modes –Good at looking around- People Learn- Contributing and Taking Initiative -Combining Success Modes – Heroes as ordinary people			
4	COOPERATING TEAMS, OSMOTIC COMMUNICTION	Total Hrs	9
Communicating, cooperating Teams - Convection currents of Information - Delays and lost opportunity costs - Erg seconds - Osmotic communication – Drafts - Information Radiators –Applying the theory of Hot Air, Jumping Communication Gaps- Modalities in communication –The impact of removing Modalities – Making use of Modalities			
5	DESIGN METHODOLOGY AND DESIGN PRINCIPLES	Total Hrs	9
Methodologies - Methodology concepts – Structural terms - Scope, Methodology Design Principles – Seven Principles, XP under Glass –Dissecting XP – Adjusting XP, Agile and Self Adapting - Agile - Sweet Spots –The Trouble with Virtual Teams, Agile models.			
Total hours to be taught			45

Text book (s) :	
1	Alistair Cockburn, "Agile Software Development - The Agile Software Development Series", Addison Wesley, 2002.
Reference(s) :	
1	Mike Cohn, "Succeeding with agile software development using scrum" Kindle Edition, 2009.
2	Scott Ambler, " Agile Modeling: Effective Practices for extreme programming and Unified Process", Kindle Edition, 2002.
3	Ken Schwaber, Mike Beedle, "Agile Software Development with Scrum", 2001

K.S.Rangasamy College of Technology Autonomous Regulation			R 2010
Department	Computer Science and Engineering	Programme code & Name	CS : B.E. Computer Science and Engineering

Elective IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E45	SOFTWARE QUALITY ASSURANCE	3	0	0	3	50	50	100
Objective(s)	Knowing about the accuracy of the software quality assurance process, learning about various testing strategy to assure the quality.							

1	FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE	Total Hrs	9
The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management.			
2	MANAGING SOFTWARE QUALITY	Total Hrs	9
Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management.			
3	SOFTWARE QUALITY ASSURANCE METRICS	Total Hrs	9
Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis			
4	SOFTWARE QUALITY PROGRAM	Total Hrs	9
Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.			
5	SOFTWARE QUALITY ASSURANCE STANDARDIZATION	Total Hrs	9
Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM.			
Total hours to be taught			45

Text book (s) :

1	Mordechai Ben-Menachem / Garry S Marliss, "Software Quality", Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V)
2	Watts S Humphrey, "Managing the Software Process", Pearson Education Inc.(UNIT I and II).

Reference(s):

1	Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition, Artech House Publishers 2007
2	Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
Department	Computer Science and Engineering		Programme Code & Name		CS : B.E. Computer Science and Engineering			
Elective IV								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E46	WIRELESS SENSOR NETWORKS	3	0	0	3	50	50	100
Objective(s)	Learning sensor Networks, Models, Network Sensor, sensor tasking and Control, Sensor network databases, sensor network platforms and tools.							

1	INTRODUCTION TO SENSOR NETWORKS	Total Hrs	9

Unique Constraints and Challenges – Advantages of Sensor networks – Sensor network applications – Collaborative processing – Key definition of sensor networks – A tracking scenario – problem formulation – Distribution representation and inference of states – Tracking multiple objects – Sensor models – Reference compression and metrics.

2	NETWORK SENSOR	Total Hrs	9

Key assumptions – Medium access control – General Issues – geographic Energy aware routing – Attribute based routing

3	INFRASTRUCTURE ESTABLISHMENT, SENSOR TASKING AND CONTROL	Total Hrs	9

Topology control – Clustering – Time Synchronization – Localization and localization services - Task driven sensing Roles of Sensor nodes and Utilizes – Information based sensor tasking – Joint routing and Information Aggregation.

4	SENSOR NETWORK DATA BASES	Total Hrs	9

Sensor Data base challenges – Querying the Physical Environment – Query Interfaces – High level Data Base organization – In Network aggregation – Data Centric storage – Data indices and Range queries – Distributed hierarchical aggregation – temporal Data

5	SENSOR NETWORK PLATFORMS AND TOOLS	Total Hrs	9

Sensor node hardware – sensor network programming challenges – node level software plat form – node level simulators – Programming beyond individual modes state – centric programming –Emerging applications of wireless sensor networks.

Total hours to be taught	45

Text book (s) :

1	Fenz Zhan.Leonidas Guibas “Wireless Sensor Networks “– An information processing approach. Elsevir Inc – 2004. ISBN 1-55860-914-8.

Reference(s) :

1	Edger H.Dr.Calleway Edger .H auerbach Publication “Wireless Sensor Networks – Architecture and Protocols “. Auerbach Publications (August 26,2003) ISBN 0849318238
2	P.Papadomitratos *et al*., Secure Neighbourhood Discovery; A fundamental element for Mobile Ad hoc Networks, IEEE Communications Magazine, February 2008

Electives - Course Outcomes (COs)

Modules	10 CS E11- Data Mining Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Elucidate the basic concept of Data Mining
2	Discuss the issues related to data mining
3	Explore about multidimensional model
4	Expected to understand about cube operations
5	Narrate the steps of data preprocessing
6	Enumerate about multidimensional association rules
7	Discuss different classification techniques
8	State association rule mining and its applications
9	Outline different clustering techniques
10	Describe about outlier analysis and its applications

Modules	10 CS E12 - Advanced Computer Architecture Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Comprehend the fundamental concepts of computer design
2	Describe about the concepts of Instruction set, pipelining and hazards
3	Acquire the knowledge Dynamic Scheduling and Dynamic hardware prediction
4	Obtain knowledge about Hardware based speculation and Limitations of ILP.
5	Implement ILP with software approaches
6	Formalize static branch prediction and VLIW
7	Characterize cache memory and main memory organization
8	Differentiate different types of storage devices and RAID
9	Apply the concepts of shared and distributed memory architectures
10	Describe Synchronization and Multithreading

Modules	10 CS E13 - User Interface Design Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understand the human-computer interface and its characteristics
2	Identify the characteristics of web user interface
3	Analyze the user interface design process and its usability
4	Develop the requirement analysis and human considerations in screen design
5	Create the process for designing of menus
6	Understand the steps involved in designing of windows
7	Identify the device based controls and its characteristics
8	Analyze the screen based controls and its characteristics
9	Develop steps for designing of web pages
10	Understand the designing of windows layout

Modules	10 CS E14 - Pattern Recognition Techniques Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Know the basis pattern recognition and feature extraction concepts
2	Interpret the pattern recognition approaches in various applications
3	Implement the fundamental concept of statistical pattern recognition
4	Demonstrate the supervised learning methods using parametric and non parametric approaches
5	Recognize the binary classification problems and to obtain linear classifiers
6	Implement the concept of clustering for unsupervised learning
7	Employ the parsing and grammar concept using Syntactic pattern recognition
8	Develop the graphical and learning approaches for syntactic pattern recognition
9	Illustrate the concept of neural networks trained by back propagation techniques
10	Create the memory approaches and to observe unsupervised learning neural pattern recognition

Modules	10 CS E15 - Information Storage and Management Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understand the origin of storage systems and observe the information life cycle
2	Interpret the various storage resources for storing the information
3	Classify the connectivity between the storage devices and servers
4	Recognize the connection between the storage host and bridging device over IP using iSCSI
5	Understand the concepts of object based system in content addressed storage
6	Analyse the technique of masking or abstracting physical resources
7	Recognize the business continuity process for mitigating impact of planned and unplanned downtime
8	Recognize the back technology to restore the data in the event of data loss
9	Analyse the concept of local replication technologies
10	Analyze the uses of remote replication technologies

Modules	10 CS E16 - Distributed Computing Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Observe the characterization and challenges in Distributed Systems.
2	Analyze various models of distributed systems and compare the types of Networks.
3	Identify the purpose of Marshalling and Un-marshalling
4	Recognize the purpose of inter process communication with the help of RMI.
5	Compare Process and threads with its features.
6	Appraise the techniques to provide security with the help of various cryptographic algorithms
7	Identify the purpose of Domain Name Service.
8	Acquire the needs of Logical clocks and observe the features of Mutual exclusion
9	Acquire the concept of Locks and compare flat and nested transactions
10	Observe ACID properties in concurrency control in distributed transactions

Modules	10 IT E21- Cloud Computing Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Know the Characteristics of Cloud computing and its types
2	Understand the Architecture of Cloud Computing and assessing the role of open standards
3	Illustrate the Cloud service models and Cloud Deployment Models
4	Apply knowledge of Abstraction, and Virtualization Technologies using hypervisors
5	Develop an application using Paas Application frameworks
6	Demonstrate how to use Amazon Web Services(EC2) and Storage Systems to deploy the applications in the cloud environment
7	Explore the Microsoft Cloud services- windows Azure Platform
8	Reveal the major security and privacy problems in the Cloud with security mechanisms
9	Understand the purpose of Service Oriented Architecture(SOA)
10	Demonstrate to work with Cloud-Based storage

Modules	10 CS E21 - XML and Web Services Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Gain the Knowledge in basics of xml language
2	Acquire the knowledge of web services and identify the ways in which they can benefit organizations.
3	Describe the basics of XML schemas and namespaces.
4	Analyze xml presentation, transformation and infrastructure techniques.
5	Explain the concept and usage of SOAP protocol.
6	Obtain the knowledge of Soap message structure.
7	Observe the concept of web services architecture.
8	Understand xml key technology.
9	Gain knowledge in fundamental xml security elements.
10	Recognize xml security framework.

Modules	10 CS E22 - Embedded System Design Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Identify the features of embedded systems
2	Analyze the process of embedded system design
3	Comprehend the design of ARM Microcontroller
4	Justify infrared and Bluetooth communication
5	Analyze the design of real time operating system
6	Identify various specification techniques
7	understand the hardware-software co simulation approaches and environment
8	Develop the hardware-software partitioning techniques
9	Implement functional partitioning in embedded system
10	Develop optimization techniques and low power embedded system design

Modules	10 CS E23 - Multimedia Computing Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Examine Different elements of Multimedia system and parameters involved in multimedia application
2	Observe Different storage media for multimedia
3	Comprehend Multimedia editing tools for audio, video and image
4	Analyze Linking multimedia objects
5	Outline Real-time, process and resource management
6	Examine different Database management system for multimedia
7	Predict Multimedia communication subsystems
8	Generate Multimedia synchronization reference model
9	Compare Different data compression techniques
10	Gain knowledge about Multimedia applications

Modules	10 CS E24 – Mobile Ad-Hoc Networks Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Comprehend the basics of Mobile ad-hoc networks and its Issues
2	Secure the knowledge of Content Based Protocols with the different Mechanisms
3	Acquire knowledge of the classifications and features of different Ad Hoc Routing Protocols
4	Acquire knowledge of the different transport layer solutions
5	Gain the knowledge of different transport layer protocols in Mobile Ad-Hoc Networks
6	Gain the knowledge of the Security aspects of Ad Hoc Wireless Networks
7	Secure the knowledge of the security protocols in Mobile Ad-Hoc Networks
8	Acquire knowledge of different QoS protocols in Mobile Ad-Hoc Networks
9	Comprehend the basic concept of wireless Sensor Networks
10	Acquire knowledge of the Issues in the wireless Sensor Networks and their solutions

Modules	10 CS E25 - Software Forensics Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Realize basics of Software Forensics
2	Acquire knowledge on the Software Forensics technologies and practices
3	Comprehend the knowledge on players
4	Realize the various basic software forensics tools
5	Attain knowledge on advanced tools
6	Comprehend the law and ethics of forensics
7	Identify various computer viruses and malware
8	Attain knowledge on programming cultures
9	Perform stylistic analysis and linguistic forensics
10	Comprehend the plagiarism and authorship analysis

Modules	10 CS E31 - Decision Support Systems and Intelligent Systems Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Know the concepts of different phases of decision making and evaluation.
2	Understand the decision support system concepts and methodologies.
3	Describe the concept of decision support techniques.
4	Understand the concept of business analysis and visualizations.
5	Describe the approaches of knowledge management.
6	Discuss the success of knowledge management.
7	Understand the concepts of expert systems.
8	Apply the knowledge of machine learning techniques.
9	Discuss the ideas of Management Model Support System application.
10	Understand the knowledge management and enterprise system.

Modules	10 CS E32 - Artificial Intelligence Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Understand the concepts of intelligence agent.
2	Describe the ideas of structure of agents.
3	Know the performance of problem solving agents.
4	Interpret the knowledge of searching strategies.
5	Analyze the issues of knowledge representation.
6	Interpret the knowledge of logics, proposition and interface.
7	Understand the issues of planning problems.
8	Describe the Uncertainty and probabilistic reasoning.
9	Discuss about neural network techniques for learning.
10	Understand use the leaning agents for applications.

Modules	10 CS E33– Object Oriented Programming in Python Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Comprehend the concepts of Object Oriented Design and its characteristics
2	Create and Implement the objects in Python
3	Create and Implement the modules and packages in Python
4	Comprehend the concepts of Inheritance and polymorphism
5	Implement the concepts of Inheritance and Polymorphism in Python
6	Comprehend different data structures in Python and implement them
7	Comprehend different Exception handling techniques in Python and implement them
8	Comprehend the String manipulations in Python and implement them
9	Comprehend the I/O file operations in Python and implement them
10	Acquire the knowledge of testing in Python

Modules	10 CS E37 Mobile Application Development - Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Know the Introduction to mobile applications.
2	Understand the Basics of embedded systems design.
3	Understand the Designing applications with multimedia.
4	Understand the Design patterns for mobile applications.
5	Describe the Establishing the development environment
6	Describe the Integration with social media applications
7	Discuss the applications using Core Location
8	Interpret the Data persistence using Core Data and SQLite
9	Understand the Integrating calendar and address book with social media application
10	Discuss the UI implementation

Modules	10 CS E35 - Security Issues in Ad-Hoc Networks Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Gain the knowledge of basic security concepts and secure routing vulnerabilities in MANET
2	Understand the cryptographic basics and symmetric and asymmetric approaches
3	Acquire the knowledge of basic on demand routing protocol in MANET
4	Obtain a knowledge of secure routing protocols and its working principle
5	Acquire the knowledge of proactive routing protocols and its working principle
6	Obtain knowledge of secure proactive routing protocols and its working principle.
7	Gain a knowledge of game theory solutions and its limitations
8	Obtain a knowledge of hybrid solutions and other protocols
9	Gain the knowledge about the key challenges of Military tactical networking and various attacks
10	Analyze the existing solutions for other well known attacks

Modules	10 CS E36 - Service Oriented Architecture Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Recognize the fundamentals, characteristics, benefits and pitfalls of SOA
2	Investigate the use of webs services, service descriptions and messaging
3	Review the activity management and composition of SOA
4	Examining the methods of messaging, policies, metadata and security
5	Comprehend the principles of service-orientation for web service
6	Interpret the information about different service layers and compare them
7	Compare the concepts of different SOA delivery strategies
8	Infer about the service-oriented analysis and process
9	Interpret the importance service-oriented design, WSDL and SOAP
10	Contrast the concept of service design and business process design

Modules	10 CS E41- Parallel Computing Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Describe the evolution and parallel model of computer
2	Comprehend the fundamental parallel programming concepts and the issues related to them
3	Analyze the technologies enabling parallel computing
4	Justify the concepts of cache coherence and latency
5	Differentiate types of interconnection networks
6	Describe Multithreading and Synchronization
7	Characterize different parallel programming models
8	Demonstrate shared memory programming
9	Obtain knowledge about Message Passing Paradigm and Message Passing Interface
10	Determine the performance of Parallel Virtual Machine

Modules	10 CS E42 - Text Mining Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Acquiring the basic concept of natural language processing
2	Elucidate the concept of distribution technique and its applications
3	Enriching about meaning of the words
4	Expected to understand about Indexing techniques
5	Exploring the indexing of google search engine
6	Illustrate about ranking algorithms of google
7	Narrate about text mine crawlers
8	Elucidate about the similarity measure techniques in text
9	Discuss categorization problem related to text
10	Elucidate about various categorization methods

Modules	10 CS E43 - Semantic Web Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Gain knowledge in Semantic Web and its Technologies
2	Obtain the knowledge of the layering approach of semantic Web
3	Construct the RDF data model and defining the vocabularies used in RDF data model
4	Edit, Parse and Browse RDF / XML
5	Identify the requirements of Ontology and know the sublanguages
6	Describe the On-To-Knowledge Semantic Web Architecture
7	Write the Monotonic and Non monotonic Rules
8	Inferring new knowledge from existing knowledge
9	Realize the applications of semantic web technologies
10	Examine the future of semantic web

Modules	10 CS E44 - Agile Software and Methodology Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Comprehend the software poetry and games
2	Gain the knowledge of software and engineering, model building
3	Comprehend the programmers as communication specialists
4	Gain the knowledge of open source development
5	Implement the characteristic function
6	Realize the concept of countering with discipline and tolerance
7	Realize the concept of cooperating team
8	Observe the osmotic function
9	Design the agile methodology
10	Design the principles

Modules	10 CS E45 - Software Quality Assurance Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Practice the fundamentals of SQA
2	Describe the quality management and software configuration management
3	Express about managing software organization and quality
4	Discuss the defect prevention and quality assurance management
5	Apply the software quality and total quality management techniques
6	Extend the software quality matrices and Software Quality Metrics Analysis
7	Practice the software quality program concepts
8	Summarize the Software Quality Assurance Planning
9	Prepare the software standards and software quality system standards
10	Describe about Capability Maturity Model and the Role of SQA in Software Development Maturity

Modules	10 CS E46 - Wireless Sensor Networks Course Outcomes (COs)
	At the end of the course, the student will be able to
1	Realize basics of Sensor networks
2	Acquire knowledge on the Sensor models, compression and metrics
3	Comprehend the access control and its issues
4	Realize the various routing techniques
5	Establishing the various infrastructures
6	Comprehend the Sensor tasking and its control
7	Implement the sensor network database
8	Attain knowledge on the network aggregation
9	Develop the sensor network platform and simulators
10	Comprehend the sensor network applications