Curriculum & Syllabus

of

B.E. Computer Science and Engineering

(For the batch admitted in 2010-11 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								
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 CS 101	Technical English	3	0	0	3	50	50	100
10 CS 102	Engineering Mathematics I	3	1	0	4	50	50	100
10 CS 103	Physics of Materials (CS, EC, EE, EI, IT)	3	0	0	3	50	50	100
10 CS 104	Engineering Chemistry (CS, EC, EE, EI, IT)	3	0	0	3	50	50	100
10 CS 105	Engineering Graphics (CS, EC, EE, EI, IT)	2	0	3	4	50	50	100
10 CS 106	Basics of Civil and Mechanical Engineering (CS, EC, EE, EI, IT)	4	0	0	3	50	50	100
	PRACTICAL							
10 CS 107	Engineering Chemistry Laboratory (CS, EC, EE, EI, IT)	0	0	3	2	50	50	100
10 CS 108	Engineering Practices Laboratory (CS, EC, EE, EI, IT)	0	0	3	2	50	50	100
	Total	18	1	9	24			800
Semester II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
	THEORY							
10 CS 201	Communication Skills	3	0	0	3	50	50	100
10 CS 202	Engineering Mathematics II	3	1	0	4	50	50	100
10 CS 203	Environmental Engineering (CS, EC, EE, EI, IT)	3	0	0	3	50	50	100
10 CS 204	Engineering Physics (CS, EC, EE, EI, IT)	3	0	0	3	50	50	100
10 CS 205	Basics of Engineering Mechanics (CS, EC, EE, EI, IT)	3	1	0	4	50	50	100
10 CS 206	Fundamentals of Programming (CS, EC, EE, EI, IT)	3	1	0	3	50	50	100
	PRACTICAL							
10 CS 207	Engineering Physics Laboratory (CS, EC, EE, EI, IT)	0	0	3	2	50	50	100
10 CS 208	Fundamentals of Programming Laboratory (CS, EC, EE, EI, IT)	0	0	3	2	50	50	100
	Total	18	3	6	24			800

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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
	THEORY							
10 CS 301	Engineering Mathematics III	3	1	0	4	50	50	100
10 CS 302	Digital Principles and System Design (CS, EC, IT)	3	0	0	3	50	50	100
10 CS 303	Electronic Devices and Circuits (CS, IT)	3	0	0	3	50	50	100
10 CS 304	Basics of Electrical Engineering (CS, IT)	3	0	0	3	50	50	100
10 CS 305	Data Structures Using C (CS, EE, EI, IT)	3	0	0	3	50	50	100
10 CS 306	Object Oriented Programming and C++	3	0	0	3	50	50	100
	PRACTICAL							
10 CS 307	Data Structures using C Laboratory (CS, EE, EI, IT)	0	0	3	2	50	50	100
10 CS 308	Object Oriented Programming and C++ Laboratory	0	0	3	2	50	50	100
10 CS 309	Electronic Circuits and Digital Laboratory (CS, IT)	0	0	3	2	50	50	100
10 CS 310	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 CS 401	Discrete Mathematics	3	1	0	4	50	50	100
10 CS 402	Microprocessors and Microcontrollers (CS, EC, IT)	3	0	0	3	50	50	100
10 CS 403	Computer Architecture	3	0	0	3	50	50	100
10 CS 404	Java Programming	3	0	0	3	50	50	100
10 CS 405	Design and Analysis of Algorithm (CS, IT)	3	0	0	3	50	50	100
10 CS 406	Operating Systems	3	0	0	3	50	50	100
	PRACTICAL							
10 CS 407	Microprocessors and Microcontrollers Laboratory (CS, EC, IT)	0	0	3	2	50	50	100
10 CS 408	Java Programming Laboratory	0	0	3	2	50	50	100
10 CS 409	Operating Systems Laboratory	0	0	3	2	50	50	100
10 CS 410	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 CS 501	Probability and Queuing Theory	3	1	0	4	50	50	100
10 CS 502	System Software	3	0	0	3	50	50	100
10 CS 503	Data Communication and Networks	3	0	0	3	50	50	100
10 CS 504	Web Technology	3	0	0	3	50	50	100
10 CS 505	Graphics and Multimedia System	3	0	0	3	50	50	100
10 CS 506	Database Management Systems (CS, IT)	3	1	0	4	50	50	100
	PRACTICAL							
10 CS 507	Database Management Systems Laboratory	0	0	3	2	50	50	100
10 CS 508	Web Technology Laboratory	0	0	3	2	50	50	100
10 CS 509	Graphics and Multimedia System Laboratory	0	0	3	2	50	50	100
10 CS 510	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	1	0	4	50	50	100
10 CS 612	C # and .Net Frame Work	3	1	0	4	50	50	100
10 CS 613	Visual Programming	3	0	0	3	50	50	100
10 CS 614	Software Engineering	3	0	0	3	50	50	100
10 CS E1*	Elective I	3	0	0	3	50	50	100
	PRACTICAL							
10 CS 6P1	Visual Programming Laboratory	0	0	3	2	50	50	100
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 TP 0P4	Career Competency Development IV	0	0	2	0	100	00	100
	Total	18	2	11	26	1000		

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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
	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 CS E21	XML and Web Services	3	0	0	3	50	50	100
10 CS E22	Cloud Computing (CS, IT)	3	0	0	3	50	50	100
10 CS E23	Embedded System Design	3	0	0	3	50	50	100
10 CS E24	Multimedia Computing	3	0	0	3	50	50	100
10 CS E25	Mobile Ad-hoc Networks	3	0	0	3	50	50	100
10 CS E26	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 E34	Trust Computing	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 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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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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<tr><td colspan="9">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="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 711</td><td colspan="2">OPEN SOURCE SYSTEM</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="8">Gaining Knowledge in the concept of Open Source System, Open Source Operating System, Open Source Database: MYSQL and PHP.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">Introduction to Open sources- Need of Open Sources – Advantages of Open Sources- Application of Open Sources.</td></tr>
<tr><td>2</td><td colspan="5">OPEN SOURCE OPERATING SYSTEM</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">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</td></tr>
<tr><td>3</td><td colspan="5">OPEN SOURCE DATABASE: MYSQL</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">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</td></tr>
<tr><td>4</td><td colspan="5">BASICS OF PHP</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">PHP: Introduction – variables- constants –data types – operators – Statements – Functions.</td></tr>
<tr><td>5</td><td colspan="5">OBJECT ORIENTED CONCEPT OF PHP</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP Connectivity</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="2">60</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">“The Complete Reference Linux“, Sixth Edition 2010 by Richard Petersen, Tata McGraw Hill Edition</td></tr>
<tr><td>2</td><td colspan="8">Paul Dubois, “MySQL cook book”, O’reilly publication, October 2002.</td></tr>
<tr><td>3</td><td colspan="8">Steven Holzner, “PHP: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.</td></tr>
<tr><td>4</td><td colspan="8">http://opensource.org/osd</td></tr>
<tr><td>5</td><td colspan="8">Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’Reilly, 2002</td></tr>
<tr><td>6</td><td colspan="8">Vikram Vaswani, “MYSQL: The Complete Reference”, 2nd Edition, Tata McGraw- Hill Publishing Company Limited, Indian Reprint 2009.</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="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 712</td><td colspan="2">CRYPTOGRAPHY AND NETWORK SECURITY</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">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.</td></tr>
<tr><td>1</td><td colspan="6">INTRODUCTION</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td>2</td><td colspan="6">PUBLIC KEY CRYPTOGRAPHY</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="9">Key Management - Diffie-Hellman key Exchange – Elliptic Curve Arithmetic and Cryptography - Introduction to Number Theory – Traffic Confidentiality – Key Distribution - Public Key Cryptography and RSA.</td></tr>
<tr><td>3</td><td colspan="6">AUTHENTICATION AND HASH FUNCTION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>4</td><td colspan="6">NETWORK SECURITY</td><td colspan="2">Total Hrs</td><td>8</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td>5</td><td colspan="6">SYSTEM LEVEL SECURITY</td><td colspan="2">Total Hrs</td><td>8</td></tr>
<tr><td colspan="9">Intruders - Intrusion detection – password management – Viruses and related Threats – Virus Counter measures –Distributed Denial of service attacks – Firewalls – Types – Firewall Location and Configurations.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Fifth Edition, 2012.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Behrouz A. Forouzen, Dabdeep Mukhopadhya, “Cryptography and Network Security”, Tata McGraw-H 2012.</td></tr>
<tr><td>2</td><td colspan="8">Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, Second Edition, 2008.</td></tr>
<tr><td>3</td><td colspan="8">V.K.Pachghare, “Cryptography and Information Security”, PHI Publications, 2011.</td></tr>
<tr><td>4</td><td colspan="8">William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of Ind Fourth Edition, 2008.</td></tr>
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<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="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 colspan="2">10 CS 713</td><td>PRINCIPLES OF COMPILER DESIGN</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">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.</td></tr>
<tr><td>1</td><td colspan="6">COMPILER AND LEXICAL ANALYSIS</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td>2</td><td colspan="6">SYNTAX ANALYSIS</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td>3</td><td colspan="6">INTERMEDIATE CODE GENERATION</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">Intermediate languages – Three-Address Code – Types and Declarations – Translation of Expressions – Rules for Type Checking and Type Conversions – Control Flow – Backpatching – Switch Statements – Procedures.</td></tr>
<tr><td>4</td><td colspan="6">CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td>5</td><td colspan="6">CODE GENERATION</td><td colspan="2">Total Hrs</td><td>12</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>60</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1.</td><td colspan="8">Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, “Compilers Principles, Techniques and Tools”, Second Edition, Pearson Education, 2011.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1.</td><td colspan="8">Allen I. Holub, “Compiler Design in C”, Prentice Hall of India, 2003.</td></tr>
<tr><td>2.</td><td colspan="8">C. N. Fischer and R. J. LeBlanc, “Crafting a Compiler with C”, Benjamin Cummings, 2003.</td></tr>
<tr><td>3.</td><td colspan="8">J.P. Bennet, “Introduction to Compiler Techniques”, Second Edition, Tata McGraw-Hill, 2003.</td></tr>
<tr><td>4.</td><td colspan="8">Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001.</td></tr>
<tr><td>5.</td><td colspan="8">Kenneth C. Louden, “Compiler Construction: Principles and Practice”, Thompson Learning, 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 VII								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS 7P1	COMPILER DESIGN LABORATORY	0	0	3	2	50	50	100
Objective(s)	Enable the students to learn conversion of high level to machine code. Understanding the design and implementation of different phases of a compiler.							

List of Experiments

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

Content beyond the syllabus:

1. Parser Generator Yacc.
2. Leading and Trailing edge

Total hours to be taught	45

K.S.Rangasamy College of Technology - Autonomous Regulation								R 2010
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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="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">Semester VII</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 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="8">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="8">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="8">Total hours</td><td>60</td></tr>
</table>

K.S.Rangasamy College of Technology - Autonomous Regulation						R 2010			
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Semester VII									
Course Code	Course Name	Hours/Week				Credit	Maximum Marks		
10 TP 0P5	CAREER COMPETENCY DEVELOPMENT V	L	T	P		C	CA	ES	Total
		0	0	2		0	100	00	100
Objective(s)	Improving the skill level of students , making the students competent with facing Interviews and attending competitive exams thereby enhancing the employability of students								

1	Company type written test in Aptitude, Written Communication Skills	1
Company based questions – Questions from Aptitude, Written Communication and Comprehension. Evaluation I Written Test		6 2
2	Company type written test in Verbal and Non-verbal Reasoning Skills	2
Company based Questions – Questions from Verbal and Non-verbal reasoning. Evaluation II Written Test		6 2
3	Programming Skills	3
Company based questions from C language, Data structures and Object Oriented Programming. Evaluation III Written Test		6 2
4	Interview Skills (Association Session)	4
Technical Interview – Questions from core subjects HR Interview – Flexibility, Achievement orientation, Decisiveness Evaluation IV – Technical & HR Interview.		6
	Total	30

Reference(s):

1	R.S.Aggarwal , "Quantitative Aptitude", S.Chand & Company Ltd., New Delhi, Reprint 2007 (Twice) (Unit – I)
2	CCD Guide by English Department of KSRCT, 2008 (Unit – I)
3	R.S.Aggarwal , "A Modern Approach to verbal & Non–verbal Reasoning", S.Chand & Company Ltd, New Delhi, 2008, (Unit – II)
4	Yashavant Kanetkar, " Let us 'C' ", BPB Publications, New Delhi, 2002 (Unit – III)
5	Herbert Schildt , "The Complete Reference C++" Tata MacGraw Hill, 2003 (Unit – III)
6	Mark Allen Weiss , "Data Structures and Algorithm Analysis in C", Pearson Education 2002. (Unit – III)
7	Company question papers (Unit I – III)
8	HR Interview Guide by Training Cell (Unit IV)

EVALUATION CRITERIA

S.No.	Particular	Test Portion	Marks
1	Evaluation I Written Test	Unit I- Aptitude – 50 OQs, Written Communication & Comprehension – 50 OQs,	25
2	Evaluation II Written Test	Unit II – Verbal Reasoning – 50 OQs, Non-verbal Reasoning – 50OQs	25
3	Evaluation III Written Test	Unit III – C Language -50OQs, Data Structures -25 OQs, OPs- 25 OQs	20
4	Evaluation IV Technical & HR Interview	Unit IV - Technical Interview – 6 questions (each question 2.5 marks) HR interview – Flexibility (5 Marks), Achievement orientation (5 Marks), Decisiveness (5 Marks)	15 15
P–Presentation C–Content OQ–Objective type question T–Total			T = 100

Note :
1. Question paper and keys will be supplied by the training cell for written test for Evaluation I, II & III
2. Respective Departments will conduct Evaluation I, II, III & IV, correct and submit the marks obtained by the students to the Training Cell.
3. All training & Evaluation tests will be conducted on odd Saturdays, Session of 2 periods in FN & Session of 2 periods in AN & Association Session.
4. 60 Interview type questions, 10 questions from each of 6 subjects of VIth Semester are to be prepared. 1 question from each subject at random to be asked carrying 2½ marks each (6 x 2½ = 15 marks) for Technical Interview. Each section is divided into 3 groups of 22 each.

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 VIII									
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.								

K.S.Rangasamy College of Technology Autonomous Regulation								R 2010
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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	Dr.B.G.Geetha, S.Subashni, Dr.G.Singaravel, N.Sathees Kumar, "Software Testing", Cengage Learning India Private Limited, 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							

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<tr><td colspan="8">Semester VIII</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 8P1</td><td>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="7">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="7">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="7">Total hours</td><td>240</td></tr>
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<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 E11</td><td colspan="2">DATA MINING</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">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.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION TO DATA MINING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>2</td><td colspan="5">DATA WAREHOUSE AND OLAP TECHNOLOGY FOR DATA MINING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>3</td><td colspan="5">DATA PREPROCESSING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>4</td><td colspan="5">CLASSIFICATION AND PREDICTION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>5</td><td colspan="5">CLUSTER ANALYSIS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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</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">Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Morgan Kaufman Publications.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Adriaan, “Introduction to Data Mining”, Addison Wesley Publication</td></tr>
<tr><td>2</td><td colspan="8">A.K.Pujari, “Data Mining Techniques”, University Press</td></tr>
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<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 E12</td><td colspan="2">ADVANCED COMPUTER ARCHITECTURE</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">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.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>2</td><td colspan="5">INSTRUCTION LEVEL PARALLELISM WITH DYNAMIC APPROACHES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Concepts – Dynamic Scheduling – Dynamic hardware prediction – Multiple issues – Hardware based speculation – Limitations of ILP.</td></tr>
<tr><td>3</td><td colspan="5">INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROACHES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Compiler techniques for exposing ILP – Static branch prediction – VLIW – Advanced compiler support – Hardware support for exposing more parallelism – Hardware versus software speculation mechanisms.</td></tr>
<tr><td>4</td><td colspan="5">MEMORY AND I/O</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>5</td><td colspan="5">MULTIPROCESSORS AND THREAD LEVEL PARALLELISM</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Symmetric and distributed shared memory architectures – Performance issues – Synchronization – Models of memory consistency – Multithreading.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">John L. Hennessey and David A. Patterson,”Computer Architecture: A Quantitative Approach”, Morgan Kaufmann, 2003, Third Edition.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">D.Sima, T.Fountain and P.Kacsuk, ”Advanced Computer Architectures: A Design Space Approach”, Addison Wesley, 2000.</td></tr>
<tr><td>2</td><td colspan="8">Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003</td></tr>
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<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 E13</td><td>USER INTERFACE DESIGN</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">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</td></tr>
<tr><td>1</td><td colspan="5">HUMAN COMPUTER INTERFACE</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Introduction-Importance-Human-Computer interface-characteristics of graphics interface-Direct manipulation graphical system - web user interface-popularity-characteristic & principles.</td></tr>
<tr><td>2</td><td colspan="5">USER INTERFACE DESIGN PROCESS</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>3</td><td colspan="5">DESIGNING OF MENUS AND WINDOWS</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>4</td><td colspan="5">DESIGNING OF CONTROLS</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>5</td><td colspan="5">DESIGNING OF WEB PAGES</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</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">Wilbert. O. Galitz, “The Essential Guide to User Interface Design”, John Wiley& Sons, 2001.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Ben Sheiderman, “Design the User Interface”, Pearson Education, 1998.</td></tr>
<tr><td>2</td><td colspan="8">Jacob Nielsen, “Usability Engineering ", Academic Press, 1993.</td></tr>
<tr><td>3</td><td colspan="8">Alan Cooper, “The Essential of User Interface Design”, Wiley – Dream Tech Ltd., 2002.</td></tr>
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<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 E14</td><td>PATTERN RECOGNITION TECHNIQUES</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">Learning the basics of Pattern Classifier, learning Feature extraction, Classification and Recognition techniques, learning recent advances in pattern classification.</td></tr>
<tr><td>1</td><td colspan="5">PATTERN RECOGNITION OVERVIEW</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="8">Pattern recognition, Classification and Description—Patterns and feature Extraction with Examples—Training and Learning in PR systems—Pattern recognition Approaches</td></tr>
<tr><td>2</td><td colspan="5">STATISTICAL PATTERN RECOGNITION</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="8">Introduction to statistical Pattern Recognition—supervised Learning using Parametric and Non Parametric Approaches</td></tr>
<tr><td>3</td><td colspan="5">DISCRIMINANT FUNCTIONS AND UNSUPERVISED LEARNING AND CLUSTERING</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="8">Introduction—Discrete and binary Classification problems—Techniques to directly Obtain linear Classifiers -- Formulation of Unsupervised Learning Problems—Clustering for unsupervised learning and classification</td></tr>
<tr><td>4</td><td colspan="5">SYNTACTIC PATTERN RECOGNITION</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="8">Overview of Syntactic Pattern Recognition—Syntactic recognition via parsing and other grammars–Graphical Approaches to syntactic pattern recognition—Learning via grammatical inference</td></tr>
<tr><td>5</td><td colspan="5">NEURAL PATTERN RECOGNITION</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="8">Introduction to Neural networks—Feedforward Networks and training by Back Propagation—Content Addressable Memory Approaches and Unsupervised Learning in Neural PR.</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">Robert Schalkoff, “pattern Recognition: statistical, structural and neural approaches, John wiley & sons, Inc, 1992.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Earl Gose, Richard johnsonbaugh, Steve Jost, Pattern Recognition and Image Analysis, Prentice Hall of India,.Pvt Ltd, new Delhi.</td></tr>
<tr><td>2</td><td colspan="8">R.O.Duda, P.E.Hart & D.G Stork, Pattern Classification 2nd Edition, J.Wiley Inc 2001.</td></tr>
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<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 E15</td><td colspan="2">INFORMATION STORAGE AND MANAGEMENT</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">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.</td></tr>
<tr><td>1</td><td colspan="5">STORAGE SYSTEMS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>2</td><td colspan="5">STORAGE NETWORKING TECHNOLOGIES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>3</td><td colspan="5">ADVANCED STORAGE NETWORKING AND VIRTUALIZATION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>4</td><td colspan="5">BUSINESS CONTINUITY</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>5</td><td colspan="5">REPLICATION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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</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">EMC Corporation, Information Storage and Management, Wiley India,2010, ISBN:978-81-265-2147-0.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Robert Spalding storage Networks: The Complete Reference, Tata McGraw Hill, Osborne, 2003.</td></tr>
<tr><td>2</td><td colspan="8">Marc Farley, Building Storage Networks, Tata McGraw Hill, Osborne, 2001.</td></tr>
<tr><td>3</td><td colspan="8">Meeta Gupta, storage Area Networks Fundamentals, Pearson Education Limited, 2002.</td></tr>
<tr><td>4</td><td colspan="8">Dr. Arun Kumar R, Easy Oracle Automation – Oracle 10g, Automatic Storage, Memory and Diagnostic Feartures, 2004, ISBN 0-9745993-6-0.</td></tr>
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<tr><td colspan="2">10 CS E16</td><td colspan="2">DISTRIBUTED COMPUTING</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">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.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>2</td><td colspan="5">PROCESSES AND DISTRIBUTED OBJECTS</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>3</td><td colspan="5">OPERATING SYSTEM ISSUES – I</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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 .</td></tr>
<tr><td>4</td><td colspan="5">OPERATING SYSTEM ISSUES – II</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>5</td><td colspan="5">DISTRIBUTED TRANSACTION PROCESSING</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</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">George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems Concepts and Design, Pearson Education, 3rd Edition, 2002.</td></tr>
<tr><td>2</td><td colspan="8">Sape Mullender, Distributed Systems, Addison Wesley, 2nd Edition, 1993.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Andrew S Tanenbaum , Maartenvan Steen,Distibuted Systems –Principles and Pardigms,Pearson Education, 2002.</td></tr>
<tr><td>2</td><td colspan="8">Mugesh Singhal,Niranjan G Shivaratri,Advanced Concepts in Operating Systems,Tata McGraw Hill Edition, 2001.</td></tr>
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<tr><td colspan="2">10 CS E21</td><td colspan="2">XML AND WEB SERVICES</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">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.</td></tr>
<tr><td>1</td><td colspan="5">XML BASICS, SOAP INTRODUCTION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Role Of XML – XML and the Web – XML Language Basics – SOAP – Web Services – Revolutions of Xml – Service Oriented Architecture (SOA).</td></tr>
<tr><td>2</td><td colspan="5">DTD, SCHEMA AND NAMESPACES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">XML-Namespaces – Structuring With Schemas and DTD – Presentation Techniques – Transformation - XML Infrastructure.</td></tr>
<tr><td>3</td><td colspan="5">SOAP- RPC</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Overview Of SOAP-HTTP – XML – RPC – SOAP: Protocol-Message Structure – Intermediaries – Actors – Design Patterns and Faults – SOAP with Attachments.</td></tr>
<tr><td>4</td><td colspan="5">ARCHITECTURE</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Overview – Architecture – Key Technologies – UDDI – WSDL – ebXML – SOAP and Web services in E-Com – Overview of .NET And J2EE – Creating ASP.NET Web Services.</td></tr>
<tr><td>5</td><td colspan="5">SECURITIES ISSUES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Security Overview – Canonicalization – XML Security Frame Work – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines for Signing XML Documents – XML in Practice.</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">Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.</td></tr>
<tr><td colspan="8">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="7">Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, “Developing Java Web Services”, Wiley Publishing Inc., 2004.</td></tr>
<tr><td>2</td><td colspan="7">Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services”, Pearson Education, 2004.</td></tr>
<tr><td>3</td><td colspan="7">McGovern, et al., “Java Web Services Architecture”, Morgan Kaufmann Publishers, 2005.</td></tr>
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<tr><td colspan="2">10 CS E22</td><td>CLOUD COMPUTING (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="7">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.</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">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.</td></tr>
<tr><td>2</td><td colspan="5">CLOUD SERVICES AND APPLICATIONS</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="9">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</td></tr>
<tr><td>3</td><td colspan="5">CLOUD PLATFORMS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>4</td><td colspan="5">CLOUD SECURITY</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Microsoft Cloud Services: Exploring Microsoft Cloud services – Windows Azure Platform,
Cloud Security: Securing the cloud – Securing Data –Establishing Identity and Presence</td></tr>
<tr><td>5</td><td colspan="5">SERVICE ORIENTED ARCHITECTURE AND CLOUD STORAGE</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Service Oriented Architecture: Introducing service Oriented Architecture - SOA Communications –Managing and Monitoring SOA. Cloud storage: Provisioning Cloud Storage- Exploring Cloud Backup Solutions.</td></tr>
<tr><td colspan="7">Total hours to be taught</td><td colspan="2">45</td></tr>
<tr><td colspan="9">Text book :</td></tr>
<tr><td>1</td><td colspan="8">Barrie Sosinsky, “Cloud Computing Bible”. Wiley Publishing, 2011.</td></tr>
<tr><td colspan="9">Reference (s) :</td></tr>
<tr><td>1</td><td colspan="8">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.</td></tr>
<tr><td>2</td><td colspan="8">George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud”. [First Edition]Publisher - Orelly’s, 2009</td></tr>
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<tr><td>10 CS E23</td><td colspan="2">EMBEDDED SYSTEM DESIGN</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 Concepts of Embedded System, Advanced Microcontroller, Real-Time operating system, and design process of Embedded system.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION</td><td>Total Hrs</td><td colspan="2">7</td></tr>
<tr><td colspan="9">Features of Embedded Systems – Design Metrics – Embedded Systems Design Flow.</td></tr>
<tr><td>2</td><td colspan="5">ARM: AN ADVANCED MICROCONTROLLER</td><td>Total Hrs</td><td colspan="2">11</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td>3</td><td colspan="5">REAL – TIME OPERATING SYSTEM</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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)</td></tr>
<tr><td>4</td><td colspan="5">HARDWARE – SOFTWARE COSIMULATION</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>5</td><td colspan="5">FUNCTIONAL PARTITIONING AND OPTAMIZATION</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Functional Partitioning – High-level Optimizations – Low power Embedded system design: Sources of Power Dissipation –Power Reduction Techniques – System Level power Management.</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">Santanu Chattopadhyay , “Embedded System Design” , PHI Learning Pl New Delhi-110001, 2010.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Gajski, D.D., Abdi, S., Gerstlauer, A., Schirner, G. “Embedded System design “, Springer, 2009</td></tr>
<tr><td>2</td><td colspan="8">Michael Barr and Anthony Massa “Programming Embedded Systems With C and GNU Development Tools”, 2nd Edition, Orally publications</td></tr>
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<tr><td colspan="2">10 CS E24</td><td colspan="2">MULTIMEDIA COMPUTING</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">Learning Concepts of Multimedia Tools, Multimedia Operating Systems, Multimedia Communication Systems, Data Compression and Multimedia Applications</td></tr>
<tr><td>1</td><td colspan="6">INTRODUCTION TO MULTIMEDIA</td><td>Total Hrs</td><td>10</td></tr>
<tr><td colspan="8">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 animate scenes – Video - Basic concepts - Video Capture - Recording format - Storage for multimedia - CD Technologies Multimedia Workstations</td></tr>
<tr><td>2</td><td colspan="6">MULTIMEDIA TOOLS</td><td>Total Hrs</td><td>8</td></tr>
<tr><td colspan="8">Basic tools - Image-editing tool - Painting and drawing tools –Sound editing programs - Video formats - Linking multimedia objects – OLE -presentation tools - authoring tools.</td></tr>
<tr><td>3</td><td colspan="6">MULTIMEDIA OPERATING SYSTEMS</td><td>Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">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</td></tr>
<tr><td>4</td><td colspan="6">MULTIMEDIA COMMUNICATION SYSTEMS</td><td>Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Application Subsystem - Transport Subsystem – Synchronization - Introduction - Notion of Synchronization - Presentation Requirements - A Reference Model for Multimedia Synchronization - Synchronization in distributed environment.</td></tr>
<tr><td>5</td><td colspan="6">DATA COMPRESSION AND MULTIMEDIA APPLICATIONS</td><td>Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Source entropy and hybrid coding – JPEG – MPEG - H.261 - DVI. Video conferencing - Tele conferencing – Tele services – messaging services – retrieval services – Tele action services.</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">Ralf Steinmetz, Klara Nahrstedt, "Multimedia: Computing, Communications and Applications", Pearson Education Asia, New Delhi, 2002.</td></tr>
<tr><td colspan="8">Reference(s):</td></tr>
<tr><td>1</td><td colspan="7">Tay Vaughan, “Multimedia: Making it work”, sixth edition, Tata McGraw Hill, New Delhi, 2002.</td></tr>
<tr><td>2</td><td colspan="7">Fred Halsall, “Multimedia Communication, Application Networks, Protocols and Standard”, fourth edition, Addison Wesley, New Delhi, 2001.</td></tr>
<tr><td>3</td><td colspan="7">John F.Koegal Buford, “Multimedia Systems”, Pearson Educational Asia, New Delhi, 2001.</td></tr>
<tr><td>4</td><td colspan="7">Ron, Goldberg, "Multimedia Producer’s Bible", fifth edition, Comdex Computer Publishing, New Delhi, 1996.</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			
Elective II								
Course Code	Course Name	Hours / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
10 CS E25	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 E26	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							

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<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>
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<tr><td rowspan="2">Course Code</td><td rowspan="2" colspan="3">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 E31</td><td colspan="3">DECISION SUPPORT SYSTEMS AND INTELLIGENT 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>Objective(s)</td><td colspan="8">Learning development of support system, methods, intelligent decision system development</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>2</td><td colspan="5">DECISION SUPPORT SYSTEM MODELING & BUSINESS INTELLIGENCE</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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. .</td></tr>
<tr><td>3</td><td colspan="5">KNOWLEDGE MANAGEMENT</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>4</td><td colspan="5">INTELLIGENT SYSTEM DEVELOPMENT</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>5</td><td colspan="5">IMPLEMENTING INTELLIGENT DECISION SUPPORT SYSTEMS</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</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">Efrain Turban, Jay E.Aronson, Teng-Peng Liang, Ramesh Sharada “Decision Support Systems and Intelligent Systems” 8th Edition, Pearson Education, 2007.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Ganesh Natarajan, Sandhya Shekhar, “Knowledge management – Enabling Business Growth”, Tata McGraw-Hill, 2002.</td></tr>
<tr><td>2</td><td colspan="8">George M.Marakas, “Decision Support System”, Prentice Hall, India, 2003.</td></tr>
<tr><td>3</td><td colspan="8">Efrem A.Mallach, “Decision Support and Data Warehouse Systems”, Tata McGraw-Hill, 2002.</td></tr>
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<tr><td colspan="2">10 CS E32</td><td colspan="2">ARTIFICIAL INTELLIGENCE</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 genesis of Artificial Intelligence. Studying the applications of Artificial Intelligence.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Basic definitions, History, Intelligent agents, Agents and environments, Structure of agents.</td></tr>
<tr><td>2</td><td colspan="5">PROBLEM SOLVING AGENTS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Searching for solutions: Uninformed search strategies – Informed search strategies, Online search agents and unknown environments, Constraint satisfaction problems.</td></tr>
<tr><td>3</td><td colspan="5">KNOWLEDGE BASED AGENTS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Knowledge representation, Logic, Proposition, Inference, First order logic, Inference in FOL, Algorithms, Knowledge representation issues.</td></tr>
<tr><td>4</td><td colspan="5">PLANNING AND PROBABILISTIC AGENTS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">The planning problem, Partial order planning, Conditional planning, Multi agent planning, Uncertainty and probabilistic reasoning.</td></tr>
<tr><td>5</td><td colspan="5">LEARNING AGENTS AND APPLICATIONS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Stuart Russel, Peter Norvig, “Artificial Intelligence – A Modern Approach”, Second Edition, Pearson Education, New Delhi, 2008.</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Mishra R B., “Artificial Intelligence”, PHI Learning Pvt Ltd, New Delhi, 2011.</td></tr>
<tr><td>2</td><td colspan="8">Padhy N. P., “Artificial Intelligence and Intelligent Systems”, Oxford University Press, New Delhi, 2005.</td></tr>
<tr><td>3</td><td colspan="8">Nils J Nilsson, “Artificial Intelligence – A New Synthesis”, Morgan Kaufmann, New Delhi, 2007</td></tr>
<tr><td>4</td><td colspan="8">George F Luger, “Artificial Intelligence – Structures and Strategies for Complex Problem Solving”, Pearson Education, New Delhi, 2004.</td></tr>
<tr><td>5</td><td colspan="8">Dan W Patterson, “Introduction to Artificial Intelligence and Expert Systems”, PHI Learning Pvt. Ltd., New Delhi, 2010.</td></tr>
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<tr><td colspan="2">10 CS E33</td><td colspan="2">OBJECT ORIENTED PROGRAMMING IN PYTHON</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">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.</td></tr>
<tr><td>1</td><td colspan="5">OBJECT-ORIENTED DESIGN</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">What is Object-oriented? - Objects and classes- Specifying attributes and behaviors- Hiding details and creating the public interface- Composition and inheritance- Inheritance</td></tr>
<tr><td>2</td><td colspan="5">OBJECTS IN PYTHON</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Creating Python classes - Modules and packages - Organizing the modules- Absolute imports- Relative imports</td></tr>
<tr><td>3</td><td colspan="5">INHERITANCE AND POLYMORPHISM</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Extending built-ins- Overriding and super- Multiple inheritance- Polymorphism</td></tr>
<tr><td>4</td><td colspan="5">PYTHON DATA STRUCTURES AND EXCEPTION HANDLING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>5</td><td colspan="5">FILES, STRINGS AND TESTING OBJECT-ORIENTED PROGRAMS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">String manipulation-String formatting- File IO -Why test?-Unit testing-testing with py.test- How much testing is enough?</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Dusty Phillips "Python 3 Object Oriented Programming " 2010 Packt Publishing</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">James Payne "Beginning Python using Python 2.6 and Python 3.1" 2010 Willey India Pvt Ltd</td></tr>
<tr><td>2</td><td colspan="8">Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2001</td></tr>
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<tr><td colspan="2">10 CS E34</td><td colspan="2">TRUST COMPUTING</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">Learning logics of programming , trust management approaches, Distributed trust model, design and its management in ad-hoc networks</td></tr>
<tr><td>1</td><td colspan="5">LOGIC PROGRAMMING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Introduction - Basics of logic and logic programming – definite logic programs – SLD resolution principle</td></tr>
<tr><td>2</td><td colspan="5">TRUST MANAGEMENT APPROACHES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Overview of trust management approach - Distributed authorization – trust management approach – characteristics – Public Key Certificates –Existing Public key infrastructures – X.509 and PGP.</td></tr>
<tr><td>3</td><td colspan="5">TRUAST MANAGEMNET LANGUAGES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Early trust management languages and approaches - PolicyMaker – KeyNote – SPKI(Simple Public Key Infrastructure) – Simple Distributed Security Infrastructure (SDSI) – Datalog based trust management languages – other closely related logic based security languages.</td></tr>
<tr><td>4</td><td colspan="5">DISTRIBUTED TRUST MODEL & DESIGN</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Decentralized trust management - Distributed credential chain discovery in trust management – Design of a role based trust management framework.- Distributed trust model</td></tr>
<tr><td>5</td><td colspan="5">TRUST MODELING AND MANAGEMENT IN AD HOC NETWORKS</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="9">Related Work on Trust Modeling and Management in Ad hoc Networks Distributed Trust Model – Trust Evaluation and Metrics in Mobile Ad hoc Network – Establishing Trust in Pure Ad hoc Networks – Incorporating trust and reputation in DSR for dependable routing – Performance Comparison of Trust-Based reactive routing protocols – Trust Management vulnerabilities in distributed networks.</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">Krzysztof R. Apt. Logic Programming. Handbook of theoretical computer science,Elsevier 1990.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Matt Blaze, Joan Feigenbaum, and Jack Lacy. Decentralized Trust Management. In Oakland, 1996.</td></tr>
<tr><td>2</td><td colspan="8">M. Blaze, J. Feigenbaum, J. Ioannidis, and A. Keromytis. The KeyNote Trust-Management System Version 2. Network Working Group RFC 2704, September 1999.</td></tr>
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<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>
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<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">Elective III</td></tr>
<tr><td colspan="2" 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 colspan="2">10 CS E36</td><td colspan="2">SERVICE ORIENTED ARCHITECTURE</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">Learning about basic fundamentals of SOA, Learning about message exchange patterns, learning about service oriented architecture, learning about SOA delivery strategies and WSDL</td></tr>
<tr><td>1</td><td colspan="5">SOA INTRODUCTION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">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).</td></tr>
<tr><td>2</td><td colspan="5">MESSAGE AND METADATA EXCHANGE</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">Message exchange patterns- Serviceactivity-coordination-Atomic transactions- Business activities-Orchestration-Choreography - Addressing- Reliable messaging- Correlation-Policies- Metadata exchange-Security- Notification and eventing.</td></tr>
<tr><td>3</td><td colspan="5">SOA ARCHITECTURE</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">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.</td></tr>
<tr><td>4</td><td colspan="5">SOA DELIVERY STRATEGIES, SERVICE MODELING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">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).</td></tr>
<tr><td>5</td><td colspan="5">SOA DESIGN</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="8">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).</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">Thomas Erl ," Service-Oriented Architecture: Concepts, Technology & Design", Pearson Education Pte Ltd 2008.</td></tr>
<tr><td colspan="8">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="7">Thomas Erl,"SOA Principles Of Service Design"Pearson Exclusives 2007.</td></tr>
<tr><td>2</td><td colspan="7">Tomas Erl and Grady Booch,"SOA Design Patterns"Printice Hall 2008</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		
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.							

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<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 E42</td><td colspan="2">TEXT MINING</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">Understanding the concepts of text mining and applications along with programming, Exploring Text, Markov Models and POS Tagging, Searching the Web, knowing Text Categorization</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION, TEXT MINE INSTALLATION, MATHEMATICS BACKGROUND</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>2</td><td colspan="5">EXPLORING TEXT, MARKOV MODELS AND POS TAGGING</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>3</td><td colspan="5">INFORMATION EXTRACTION, SEARCH ENGINES</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>4</td><td colspan="5">SEARCHING THE WEB</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>5</td><td colspan="5">TEXT CATEGORIZATION</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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.</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">Manu Konchady, “Text Mining Application Programming “, India edition, Cengage Leaning, 2006.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Michael W. Berry, Jacob Kogan, quot,”Text Mining: Applications and Theory”, Wiley, 2010.</td></tr>
<tr><td>2</td><td colspan="8">Louise Francis and Matt Flynn, “Text Mining Handbook”. Spring, 2010.</td></tr>
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<tr><td colspan="2">10 CS E43</td><td>SEMANTIC WEB</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">Introducing basic concepts, tasks, methods, and techniques in semantic web, understanding of the semantic web process and issues.</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">History – Semantic Web Layers –Semantic Web technologies – Semantics in Semantic Web – XML: Structuring – Namespaces – Addressing – Querying – Processing</td></tr>
<tr><td>2</td><td colspan="5">RDF</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="9">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</td></tr>
<tr><td>3</td><td colspan="5">ONTOLOGY</td><td colspan="2">Total Hrs</td><td>10</td></tr>
<tr><td colspan="9">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</td></tr>
<tr><td>4</td><td colspan="5">LOGIC AND INFERENCE</td><td colspan="2">Total Hrs</td><td>9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>5</td><td colspan="5">APPLICATIONS OF SEMANTIC WEB TECHNOLOGIES</td><td colspan="2">Total Hrs</td><td>8</td></tr>
<tr><td colspan="9">RDF Uses: Commercial and Non-Commercial use – Sample Ontology – e-Learning –Web Services – Web mining – Horizontal information – Data Integration – Future of Semantic Web</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Grigorous Antoniou and Van Hermelen - “A Semantic Web Primer”-The MIT Press –2004</td></tr>
<tr><td>2</td><td colspan="8">Spinning the Semantic Web: Bringing the world wide web to its full potential – The MIT Press – 2004</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Shelley Powers – “Practical RDF” – O’reilly publishers – First Indian Reprint :2003</td></tr>
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<tr><td>10 CS E44</td><td colspan="2">AGILE SOFTWARE METHODOLGY</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">L earning about basic concepts and methodologies of agile</td></tr>
<tr><td>1</td><td colspan="6">INTRODUCTION</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>2</td><td colspan="6">OPEN SOURCE DEVELOPMENT</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">A second look at the cooperative Game - Programmers as communications specialists –Sufficiency for the primary goal – Sufficiency in the residue - Open source development</td></tr>
<tr><td>3</td><td colspan="6">CHARACTERISTIC FUNCTION</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>4</td><td colspan="6">COOPERATING TEAMS, OSMOTIC COMMUNICTION</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>5</td><td colspan="6">DESIGN METHODOLOGY AND DESIGN PRINCIPLES</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td colspan="8">Total hours to be taught</td><td>45</td></tr>
<tr><td colspan="9">Text book (s) :</td></tr>
<tr><td>1</td><td colspan="8">Alistair Cockburn, "Agile Software Development - The Agile Software Development Series", Addison Wesley, 2002.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Mike Cohn, "Succeeding with agile software development using scrum" Kindle Edition, 2009.</td></tr>
<tr><td>2</td><td colspan="8">Scott Ambler, " Agile Modeling: Effective Practices for extreme programming and Unified Process", Kindle Edition, 2002.</td></tr>
<tr><td>3</td><td colspan="8">Ken Schwaber, Mike Beedle, “Agile Software Development with Scrum", 2001</td></tr>
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<tr><td colspan="2">10 CS E45</td><td>SOFTWARE QUALITY ASSURANCE</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 about the accuracy of the software quality assurance process, learning about various testing strategy to assure the quality.</td></tr>
<tr><td>1</td><td colspan="4">FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management.</td></tr>
<tr><td>2</td><td colspan="4">MANAGING SOFTWARE QUALITY</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management.</td></tr>
<tr><td>3</td><td colspan="4">SOFTWARE QUALITY ASSURANCE METRICS</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis</td></tr>
<tr><td>4</td><td colspan="4">SOFTWARE QUALITY PROGRAM</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.</td></tr>
<tr><td>5</td><td colspan="4">SOFTWARE QUALITY ASSURANCE STANDARDIZATION</td><td colspan="2">Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</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">Mordechai Ben-Menachem / Garry S Marliss, “Software Quality”, Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V)</td></tr>
<tr><td>2</td><td colspan="8">Watts S Humphrey, “Managing the Software Process”, Pearson Education Inc.(UNIT I and II).</td></tr>
<tr><td colspan="9">Reference(s):</td></tr>
<tr><td>1</td><td colspan="8">Gordon G Schulmeyer, “Handbook of Software Quality Assurance”, Third Edition, Artech House Publishers 2007</td></tr>
<tr><td>2</td><td colspan="8">Nina S Godbole, “Software Quality Assurance: Principles and Practice”, Alpha Science International, Ltd, 2004</td></tr>
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<tr><td colspan="2">10 CS E46</td><td>WIRELESS SENSOR 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 colspan="2">Objective(s)</td><td colspan="7">Learning sensor Networks, Models, Network Sensor, sensor tasking and Control, Sensor network databases, sensor network platforms and tools.</td></tr>
<tr><td>1</td><td colspan="5">INTRODUCTION TO SENSOR NETWORKS</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>2</td><td colspan="5">NETWORK SENSOR</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="9">Key assumptions – Medium access control – General Issues – geographic Energy aware routing – Attribute based routing</td></tr>
<tr><td>3</td><td colspan="5">INFRASTRUCTURE ESTABLISHMENT, SENSOR TASKING AND CONTROL</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</td></tr>
<tr><td>4</td><td colspan="5">SENSOR NETWORK DATA BASES</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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</td></tr>
<tr><td>5</td><td colspan="5">SENSOR NETWORK PLATFORMS AND TOOLS</td><td>Total Hrs</td><td colspan="2">9</td></tr>
<tr><td colspan="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.</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">Fenz Zhan.Leonidas Guibas “Wireless Sensor Networks “– An information processing approach. Elsevir Inc – 2004. ISBN 1-55860-914-8.</td></tr>
<tr><td colspan="9">Reference(s) :</td></tr>
<tr><td>1</td><td colspan="8">Edger H.Dr.Calleway Edger .H auerbach Publication “Wireless Sensor Networks – Architecture and Protocols “. Auerbach Publications (August 26,2003) ISBN 0849318238</td></tr>
<tr><td>2</td><td colspan="8">P.Papadomitratos et al., Secure Neighbourhood Discovery; A fundamental element for Mobile Ad hoc Networks, IEEE Communications Magazine, February 2008</td></tr>
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