


	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	M.E.	Programme Code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING		Semester	I	
CURRICULUM (Applicable to the students admitted in the academic year 2013-2014)					



Course Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
THEORY								
P13MA101	Applied probability and statistics	3	1	0	4	50	50	100
P13CS101	Advanced Computer Architecture	3	0	0	3	50	50	100
P13CS102	Ad-hoc and Wireless Sensor Networks	3	0	0	3	50	50	100
P13CS103	Advanced Data Structures and Algorithms	3	0	0	3	50	50	100
P13CS104	Object Oriented Software Engineering	3	0	0	3	50	50	100
PRACTICAL								
P13CS105	Wireless Networks Lab	0	0	3	2	50	50	100
P13CS106	Data Structures Lab	0	0	3	2	50	50	100
Total Credits					20	350	350	700

CA - Continuous Assessment, ESE - End Semester Examination

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Programme	M.E.	Programme Code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING		Semester	II	
CURRICULUM (Applicable to the students admitted in the academic year 2013-2014)					



Course Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
THEORY								
P13CS207	Advanced Database Technology	3	0	0	3	50	50	100
P13CS208	Open Source Systems	3	0	0	3	50	50	100
P13CS209	Component based Technology	3	0	0	3	50	50	100
P13CS210	Advanced Operating Systems	3	0	0	3	50	50	100
P13CS211	Soft Computing	3	0	0	3	50	50	100
	Elective-I	3	0	0	3	50	50	100
PRACTICAL								
P13CS212	Open Source Systems Lab	0	0	3	2	50	50	100
P13CS213	Component Technology Lab	0	0	3	2	50	50	100
Total Credits					22	400	400	800

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Programme	M.E.	Programme Code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING		Semester	III	
CURRICULUM (Applicable to the students admitted in the academic year 2013-2014)					

Course Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
THEORY								
	Elective-II	3	0	0	3	50	50	100
	Elective-III	3	0	0	3	50	50	100
	Elective-IV	3	0	0	3	50	50	100
PRACTICAL								
P13CS314	Project Phase – I	0	0	12	6	50	50	100
Total Credits					15	200	200	400



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Programme	M.E.	Programme Code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING		Semester	IV	
CURRICULUM (Applicable to the students admitted in the academic year 2013-2014)					

Course Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
PRACTICAL								
P13CS415	Project Phase – II	0	0	24	12	50	50	100
Total Credits					12	50	50	100



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Cumulative Course Credits: **69**

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Department	COMPUTER SCIENCE AND ENGINEERING		Semester		-
CURRICULUM (Applicable to the students admitted in the academic year 2013-2014)					

LIST OF ELECTIVES								
Course Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CSE01	Mobile Computing	3	0	0	3	50	50	100
P13CSE02	Grid Computing	3	0	0	3	50	50	100
P13CSE03	Distributed Computing	3	0	0	3	50	50	100
P13CSE04	Agent Based Intelligent Systems	3	0	0	3	50	50	100
P13CSE05	Digital Image Processing	3	0	0	3	50	50	100
P13CSE06	Computer Network and Management	3	0	0	3	50	50	100
P13CSE07	XML and Web Services	3	0	0	3	50	50	100
P13CSE08	Computer Architecture and Parallel Processing	3	0	0	3	50	50	100
P13CSE09	Bio Informatics Computing	3	0	0	3	50	50	100
P13CSE10	Embedded System	3	0	0	3	50	50	100
P13CSE11	Multimedia Technology	3	0	0	3	50	50	100
P13CSE12	Software Testing and Quality Assurance	3	0	0	3	50	50	100
P13CSE13	Software Project Management	3	0	0	3	50	50	100
P13CSE14	Information Security	3	0	0	3	50	50	100
P13CSE15	Visual Programming	3	0	0	3	50	50	100



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Programme	M.E./ M.Tech.	Programme code		Regulation	2013
Department	Common to CSE and IT			Semester	I

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13MA101	Applied Probability and Statistics	3	1	0	4	50	50	100

Objective	<ul style="list-style-type: none"> To introduce the basic concepts of One Dimensional and Two Dimensional random variables To provide information about Estimation theory, Correlation, Regression and Testing of hypothesis. To enable the students to use the concepts of multivariate normal distribution and principle components Analysis. 			
Unit - I	ONE DIMENSIONAL RANDOM VARIABLES	Periods	9+3	
Random Variables- Probability Function-Moments-Moment Generating Function & their Properties- Binomial , Poisson , Geometric , Uniform, Exponential and Normal Distributions.				
Unit - II	TWO DIMENSIONAL RANDOM VARIABLES	Periods	9+3	
Joint distributions-Marginal and Conditional distributions-Functions of two dimensional random variables - Regression Curve-Correlation.				
Unit - III	ESTIMATION THEORY	Periods	9+3	
Un biased Estimators- Method of Moments-Maximum Likelihood Estimation- Curve fitting by Principle of Least Squares-Regression lines.				
Unit - IV	TESTING OF HYPOTHESIS	Periods	9+3	
Sampling distributions-Type I and II errors-Tests based on Normal, t, chi-square and F distributions for testing of mean, variance and proportions-Tests for Independence of Attributes and Goodness of fit.				
Unit - V	MULTIVARIATE ANALYSIS	Periods	9+3	
Random Vectors and matrices-Mean vectors and Covariance matrices-Multivariate Normal density and its properties-Principal components Population Principal Components-Principal Components from Standardized variables.				
			Total Periods	60



REFERENCES:	
1.	Jay L. Devore, "Probability and Statistics for Engineering and the Sciences", Eighth Edition, Cengage Learning, 2011.
2.	Richard Johnson, "Miller & Freund's Probability and Statistics for Engineer", Seventh Edition, Prentice-Hall ,2007
3.	Richard A. Johnson and Dean W. Wichern , "Applied Multivariate Statistical Analysis ",Fifth Edition Pearson Education Asia,2002.
4.	Gupta S.C. and Kapoor V.K., "Fundamentals of Mathematical Statistics", Third Edition, Sultan and Sons, 2001.
5.	Dallas E Johnson , "Applied Multivariate Methods for Data Analysis", Thomson and Duxbury Press, 1998.

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS101	Advanced Computer Architecture	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the concept of Architecture and Internal Parts of Computers To understand the Pipelining Concepts and Instruction Level Parallelism 						
Unit - I	FUNDAMENTALS OF COMPUTER DESIGN				Periods	9	
Introduction-Measuring, reporting and summarizing performance-Quantitative principles of computer design-Instruction Set Principles-Introduction-Classifying ISA-Types and size of operands-Pipelining-Introduction-Hazards-Implementation-Multicycle operations.							
Unit - II	INSTRUCTION LEVEL PARALLELISM				Periods	9	
Instruction Level Parallelism-Concepts, Challenges-Basic Compiler Techniques for exposing ILP-Reducing branch cost with prediction-Overcoming data hazards with dynamic scheduling-Examples and algorithms-Hardware based speculation.							
Unit - III	INSTRUCTION LEVEL PARALLELISM WITH HARDWARE AND SOFTWARE APPROACHES				Periods	9	
Exploiting ILP with multiple Issues and static scheduling, dynamic scheduling-Advanced technique for instruction delivery and speculation-Limitations of ILP-Hardware Vs Software Speculation-Multithreading using ILP-Exploit thread level parallelism.							
Unit - IV	MULTIPROCESSORS AND THREAD LEVEL PARALLELISM				Periods	9	
Introduction-Symmetric Shared Memory- Architecture, Performance-Distributed Shared memory-Directory based coherence-Synchronization-Basic-Models of memory consistency-Sun T1 Multiprocessor.							
Unit - V	MEMORY HIERARCHY AND STORAGE DEVICES				Periods	9	
Introduction-Optimization of cache performance-Memory technology and optimizations-Protection-Virtual Memory and Machine-Storage Systems-Introduction-Advanced topics in disk storage-I/O performance, reliability, measures and benchmarks.							
Total Periods						45	



REFERENCES:	
1.	John L. Hennessey and David A. Patterson, “Computer Architecture – A quantitative approach”, Fourth Edition, Morgan Kaufmann / Elsevier ,2007.
2.	John P. Hayes, “Computer Architecture and Organization “, Third edition, McGraw-Hill, 1998.
FURTHER READINGS:	
1.	William Stallings, “Computer Organization and Architecture – Designing for Performance”, Seventh Edition, Pearson Education, 2006.
2.	David E. Culler, Jaswinder Pal Singh, “Parallel Computing Architecture: A hardware/ software approach” , Morgan Kaufmann / Elsevier, 1997.

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Department	COMPUTER SCIENCE AND ENGINEERING			Semester	I

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CS102	Ad-hoc and Wireless Sensor Networks	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To introduce and study established and emerging areas of Wireless Networks. To develop a comprehensive understanding of Wireless network protocols. 		
Unit – I	AD-HOC MAC	Periods	9
Introduction – Issues in Ad-Hoc Wireless Networks. MAC Protocols – Issues, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.			
Unit – II	AD-HOC NETWORK ROUTING & TCP	Periods	9
Issues – Classifications of routing protocols – Hierarchical and Power aware. Multicast routing – Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc –Feedback based, TCP with explicit link, TCP-BuS, Ad Hoc TCP, and Split TCP.			
Unit – III	WSN –MAC	Periods	9
Introduction – Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols –self-organizing, Hybrid TDMA/FDMA and CSMA based MAC			
Unit – IV	WSN ROUTING, LOCALIZATION & QOS	Periods	9
Issues in WSN routing – OLSR, AODV. Localization – Indoor and Sensor Network Localization. QoS in WSN.			
Unit – V	MESH NETWORK	Periods	9
Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture –Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness– Heterogeneous Mesh Networks – Vehicular Mesh Networks			
Total Periods			45



REFERENCES:	
1.	C.Siva Ram Murthy and B.Smanoj, “ Ad Hoc Wireless Networks – Architectures and Protocols”, First Edition, Pearson Education, 2004.
2.	Feng Zhao and Leonidas Guibas, “Wireless Sensor Networks”, First Edition , Morgan Kaufman Publishers, 2004.
3.	C.K.Toth, “Ad Hoc Mobile Wireless Networks”, Pearson Education, 2002.
4.	Thomas Krag and Sebastin Buettrich, “Wireless Mesh Networking”, O’Reilly Publishers, 2007.

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Programme	M.E./ M.Tech.	Programme code		Regulation	2013
Department	Common to CSE and IT				I

Course code	Course name	Periods per week			Credit C	Maximum Marks		
		L	T	P		CA	ESE	Total
P13CS103	Advanced Data Structures and Algorithms	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the concept of Basic Data Structures and Advanced Trees and Heaps To master the design and Applications of an Algorithm Design Methods 		
Unit - I	COMPLEXITY ANALYSIS AND ELEMENTARY DATA STRUCTURES	Periods	9
Algorithm Specification-Performance Analysis-Randomized Algorithm-Stacks –Queues-Trees			
Unit - II	ADVANCED HEAP STRUCTURES	Periods	9
Min Max Heaps-Binomial Heaps- Fibonacci Heaps-Symmetric Min Max Heaps-Interval Heaps-Pairing Heaps			
Unit - III	TREES	Periods	9
Binary Search Trees-AVL Trees-Red-Black Trees-Selection Trees-Forests-Threaded Binary Tree-Splay Tree-B Tree-B+ Trees.			
Unit - IV	GREEDY AND DIVIDE AND CONQUER	Periods	9
Quick Sort-Strassen’s Matrix Multiplication- Convex Hull-Tree Vertex Splitting-Job Sequencing with Deadlines-Optimal Storage on Tapes.			
Unit - V	DYNAMIC PROGRAMMING AND BACK TRACKING	Periods	9
Multistage Graphs- 0/1 Knapsack using dynamic programming-Flow shop scheduling-8 Queen problem-Graph Coloring- Knapsack using Backtracking.			
Total Periods			45



REFERENCES:	
1.	Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, “Computer Algorithms/ C++”, Second Edition, Universities Press,1999.
2.	Ellis Horowitz, Sartaj Sahni, Dinesh Mehta,” Fundamentals of Data Structures in C++”, Second Edition, Universities Press,1999..
FURTHER READINGS:	
1.	G. Brassard and P. Bratley, “Algorithmics: Theory and Practice”, Printice –Hall, 1988.
2.	Thomas H. Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein, “Introduction to Algorithms”, Second Edition, PHI,2003.

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS104	Object Oriented Software Engineering	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the concept of analysis and design of object -oriented software engineering To develop the skills and understanding the requirements to design and implement object oriented applications. 						
Unit - I	INTRODUCTION				Periods	9	
Introduction to Software Engineering Concepts – Development Activities – Managing Software Development –Modeling with UML – Project Organization and Communication.							
Unit - II	ANALYSIS				Periods	9	
Requirements Elicitation – Concepts – Activities – Management – Analysis concepts							
Unit - III	SYSTEM DESIGN				Periods	9	
Decomposing the system – Overview of System Design – System Design Concepts – System Design Activities – Addressing Design Goals – Managing System Design							
Unit - IV	OBJECT DESIGN AND IMPLEMENTATION ISSUES				Periods	9	
Reusing Pattern Solutions – Specifying Interfaces – Mapping Models to Code – Testing							
Unit - V	MANAGING CHANGE				Periods	9	
Rationale Management – Configuration Management – Project Management – Software Life Cycle							
Total Periods						45	

REFERENCES:	
1.	Bernd Bruegge, Alan H Dutoit, “Object-Oriented Software Engineering”, Second Edition, Pearson Education, 2004.
FURTHER READINGS:	
1.	Craig Larman, “Applying UML and Patterns”, Third Edition, Pearson Education, 2005.
2.	Stephen Schach, “Software Engineering” Seventh Edition, McGraw-Hill, 2007.



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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS105	Wireless Networks Lab	0	0	3	2	50	50	100

LIST OF EXPERIMENTS



1. Simulate a LAN with 802.3 MAC consisting of TCP and UDP Traffic using NS2.
2. Performance evaluation of different routing protocols in wired network environment using NS2
3. Simulate wireless Ad hoc networks with static nodes and study the performance using NS2
4. Simulate and analyze the performance of Adhoc network with Dynamic Nodes using NS2
5. Simulate WSN in NS2 and analyze the energy model of nodes.
6. Performance evaluation of different ad-hoc wireless routing protocols (DSDV, DSR, AODV) using NS2.
7. Simulate hierarchal structure of WSN in NS2
8. Mini project

TOTAL: 45 PERIODS

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CS106	Data Structures Lab	0	0	3	2	50	50	100



LIST OF EXPERIMENTS
<ol style="list-style-type: none"> 1. Implementation of Min Heap Structures 2. Implementation of Deaps. 3. Implementation of Leftist Heap 4. Implementation of AVL Tree 5. Implementation of B-Tree 6. Implementation of Tries 7. Implementation of Quick Sort 8. Implementation of Convex hull 9. Implementation of 0/1 Knapsack using Dynamic Programming 10. Implementation of Graph coloring using backtracking.
TOTAL: 45 PERIODS

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS207	Advanced Database Technology	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To study about the parallel database, distributed database, multimedia database, XML database and Mobile database with its architecture and requirements. To have developed skills in advanced conceptual modeling and database design. 						
Unit - I	DATABASE CONCEPTS				Periods	9	
Introduction – Overview of file systems and database systems-Software architecture of a typical DBMS - Data Models - ER diagrams - Introduction to Relational Model-Relational Algebra - Normalization Techniques.							
Unit - II	PARALLEL AND DISTRIBUTED DATABASES				Periods	9	
Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture-							
Unit - III	XML DATABASES				Periods	9	
XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining							
Unit - IV	MOBILE DATABASES				Periods	9	
Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes							
Unit - V	MULTIMEDIA DATABASES				Periods	9	
Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases – Audio Databases – Multimedia Database Design.							
Total Periods						45	



REFERENCES:	
1.	Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fifth Edition, McGraw Hill, 2006.
2.	V.S.Subramanian, “Principles of Multimedia Database Systems”, Harcourt India Pvt Ltd., 2001.
3.	Vijay Kumar, “Mobile Database Systems”, John Wiley & Sons, 2006.
4.	R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
FURTHER READINGS:	
1.	Thomas Cannolly and Carolyn Begg, “ Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.
2.	C.J.Date, A.Kannan and S.Swamynathan,”An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS208	Open Source Systems	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To introduce the concept of open source system with Linux operating system. To provide adequate knowledge about MySQL, the open source database and open source programming languages PHP, Python, Perl. To provide the adequate knowledge about open source tools and techniques. 							
Unit - I	OPEN SOURCE OPERATING SYSTEM				Periods	9		
Introduction to Open sources – Need of Open Sources – Advantages of Open Sources–Application of Open Sources. Open source operating systems: LINUX: Introduction –General Overview – Kernel Mode and user mode – Process – Advanced Concepts –Scheduling – Personalities – Cloning – Signals – Development with Linux.								
Unit - II	OPEN SOURCE DATABASE				Periods	9		
MySQL: Introduction – Setting up account – Starting, terminating and writing your ownSQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata –Using sequences – MySQL and Web.								
Unit - III	PHP				Periods	9		
Essential PHP-Operators and Flow control-Strings and Arrays-Creating functions-Reading data in web pages-PHP Browser-Handling Power-Object Oriented Programming-Advanced OOP-File Handling-Working with databases-Security								
Unit - IV	PYTHON AND PERL				Periods	9		
Python: Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP. Perl: Variables and Data –Statements and Control structures – Subroutines, Packages, and Modules- Working with Files.								
Unit - V	GUI PROGRAMMING				Periods	9		
Creating Dialogs: Rapid Dialog Design–Shape Changing Dialog–Dynamic Dialog–Build-in Dialog Class. Creating Main Windows: Creating Menus –Toolbars–Setting up Status Bar. Layout Management – Event Processing – Input and Output –Databases – Networking.								
Total Periods						45		



REFERENCES:	
1.	Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications, 2003
2.	Steve Suchring, “MySQL Bible”, John Wiley, 2002.
3.	Steven Holzner, “PHP: The Complete Reference”, Second Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4.	Wesley J. Chun, “Core Python Programming”, Prentice Hall, 2001
5.	Martin C. Brown, “Perl: The Complete Reference”, Second Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
6.	Jasmin Blanchette, Mark Summerfield, “C++ GUI Programming with Qt4” Second Edition, Prentice Hall, 2008

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS209	Component Based Technology	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To explore different software components and their application. Introduces in depth JAVA, CORBA and .Net Components Deals with Fundamental properties of components, technology and architecture and middleware. 				
Unit - I	INTRODUCTION	Periods	9		
Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware.					
Unit - II	JAVA COMPONENT TECHNOLOGIES	Periods	9		
Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP.					
Unit - III	CORBA TECHNOLOGIES	Periods	9		
Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture.					
Unit - IV	COM AND .NET TECHNOLOGIES	Periods	9		
COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – app domains – contexts – reflection – remoting.					
Unit - V	COMPONENT FRAMEWORKS AND DEVELOPMENT	Periods	9		
Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools.					
Total Periods				45	

REFERENCES:	
1.	Clemens Szyperski “Component Software: Beyond Object-Oriented Programming”, Pearson Education publishers, 2003.
FURTHER READINGS:	
1.	Ed Roman, “Enterprise Java Beans”, Third Edition, Wiley, 2004.
2.	Freeze, “Visual Basic Development Guide for COM & COM+”, BPB Publication, 2001.
3.	Mowbray, “Inside CORBA”, Pearson Education, 2003.
4.	G. Sudha Sadasivam, “Component Based Technology”, Wiley India, 2008.
5.	Hortsamann, Cornell, “CORE JAVA Vol-II” Sun Press, 2002.

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS210	Advanced Operating Systems	3	0	0	3	50	50	100



Objective	<ul style="list-style-type: none"> To introduce Operating System Concepts with emphasis on foundations & design principles. To understand the principles and concepts that are used as a basis of modern operating system kernels. 						
Unit - I	INTRODUCTION					Periods	9
Overview - Functions of an Operating System – Design Approaches – Types of Advanced Operating System - Synchronization Mechanisms – Concept of a Process, Concurrent Processes – The Critical Section Problem, Other Synchronization Problems – Language Mechanisms for Synchronization – Axiomatic Verification of Parallel Programs - Process Deadlocks - Preliminaries – Models of Deadlocks, Resources, System State – Necessary and Sufficient conditions for a Deadlock – Systems with Single-Unit Requests, Consumable Resources, Reusable Resources.							
Unit - II	DISTRIBUTED OPERATING SYSTEMS					Periods	9
Introduction – Issues – Communication Primitives – Inherent Limitations - Lamport’s Logical Clock; Vector Clock; Causal Ordering; Global State; Cuts; Termination Detection. Distributed Mutual Exclusion – Non-Token Based Algorithms – Lamport’s Algorithm - Token-Based Algorithms – Suzuki-Kasami’s Broadcast Algorithm – Distributed Deadlock Detection – Issues – Centralized Deadlock-Detection Algorithms - Distributed Deadlock-Detection Algorithms. Agreement Protocols – Classification - Solutions – Applications.							
Unit - III	DISTRIBUTED RESOURCE MANAGEMENT					Periods	9
Distributed File systems – Architecture – Mechanisms – Design Issues – Distributed Shared Memory – Architecture – Algorithm – Protocols - Design Issues. Distributed Scheduling – Issues – Components – Algorithms.							
Unit - IV	FAILURE RECOVERY AND FAULT TOLERANCE					Periods	9
Basic Concepts-Classification of Failures – Basic Approaches to Recovery; Recovery in Concurrent System; Synchronous and Asynchronous Check pointing and Recovery; Check pointing in Distributed Database Systems; Fault Tolerance; Issues - Two-phase and Non- blocking Commit Protocols; Voting Protocols; Dynamic Voting Protocols;							
Unit - V	MULTIPROCESSOR AND DATABASE OPERATING SYSTEMS					Periods	9
Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory Management – Reliability / Fault Tolerance; Database Operating Systems – Introduction – Concurrency Control – Distributed Database Systems – Concurrency Control Algorithms.							
Total Periods							45

REFERENCES:

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|----|---|
| 1. | Mukesh Singhal and N. G. Shivaratri, "Advanced Concepts in Operating Systems", McGraw-Hill, 2000. |
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FURTHER READINGS:



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|----|---|
| 2. | Abraham Silberschatz, Peter B. Galvin, G. Gagne, "Operating System Concepts", Sixth Edition, Addison Wesley Publishing Co., 2003. |
| 3. | Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001. |

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	II

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS211	Soft Computing	3	0	0	3	50	50	100



Objective	<ul style="list-style-type: none"> To study about the soft computing and neural networks. To design generic algorithm with suitable examples and fuzzy logics. To have developed skills in neuro fuzzy modeling and generic algorithms. 						
Unit - I	INTRODUCTION				Periods	9	
Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics							
Unit - II	NEURAL NETWORKS				Periods	9	
Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks –Supervised Learning Neural Networks – Radial Basis Function Networks – Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures –Advances in Neural networks							
Unit - III	FUZZY LOGIC				Periods	9	
Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rule based system – Fuzzy Decision Making – Applications of fuzzy logic							
Unit - IV	NEURO-FUZZY MODELING				Periods	9	
Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro -Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification –Neuro-Fuzzy Control – Case studies							
Unit - V	GENETIC ALGORITHMS				Periods	9	
Introduction to Genetic Algorithms (GA) – Terminologies and operators of GA – Classification of GA – GA for Optimization problem - Applications of GA							
Total Periods						45	

REFERENCES:	
1.	Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”,Prentice-Hall of India, 2003.
2.	S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to Fuzzy Logic using MATLAB”, Springer, 2007.
3.	S.N.Sivanandam · S.N.Deepa, “ Introduction to Genetic Algorithms”, Springer, 2007.
FURTHER READINGS:	
1.	Mitchell Melanie, “An Introduction to Genetic Algorithm”, Prentice Hall, 1998.
2.	David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley, 1997.
3.	George J. Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic-Theory and Applications”, Prentice Hall, 1995.
4.	James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Edn., 2003.

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	II



Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS212	Open Source Systems Lab	0	0	3	2	50	50	100

LIST OF EXPERIMENTS
<ol style="list-style-type: none"> 1. Configuring Linux Environment, MySQL and APACHE server. 2. XML and databases 3. PHP with Database connectivity (Retrieving and uploading data, dynamic internet applications) 4. PYTHON programming 5. Perl script and CGI with Database connectivity 6. GUI Programming 7. Mini Project
TOTAL: 45 PERIODS

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	II

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CS213	Component Technology Lab	0	0	3	2	50	50	100



LIST OF EXPERIMENTS
<ol style="list-style-type: none"> 1. Create a distributed application to download various files from various servers using RMI 2. Create a Java Bean to draw various graphical shapes and display it using or without using BDK 3. Develop an Enterprise Java Bean for Banking operations 4. Develop an Enterprise Java Bean for Library operations 5. Create an Active-X control for File operations 6. Develop a component for converting the currency values using COM / .NET 7. Develop a component for encryption and decryption using COM / .NET 8. Develop a component for retrieving information from message box using DCOM / .NET 9. Develop a middleware component for retrieving Stock Market Exchange information using CORBA 10. Develop a middleware component for retrieving Weather Forecast information using CORBA
TOTAL: 45 PERIODS

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Department	COMPUTER SCIENCE AND ENGINEERING		Semester	-	

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CSE01	Mobile Computing	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the emerging mobile computing ideas and best practices. To learn the basics of wireless voice and data communication technologies. To study the working principles of wireless LAN and its standards To describe various mobile network architecture. 						
Unit - I	WIRELESS COMMUNICATION FUNDAMENTALS				Periods	9	
Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA.							
Unit - II	WIRELESS NETWORKS				Periods	9	
Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services – Network – HiperLAN – Bluetooth – Wi-Fi – WiMAX.							
Unit - III	MOBILE NETWORKS				Periods	9	
Cellular Wireless Networks – GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS.							
Unit - IV	ROUTING				Periods	9	
Mobile IP – DHCP – AdHoc – Proactive and Reactive Routing Protocols – Multicast Routing - Tunneling and encapsulation – IP-in-IP Encapsulation – Minimal encapsulation – Generic Routing Encapsulation – Reverse Tunneling – Alternative matrix.							
Unit - V	TRANSPORT AND APPLICATION LAYERS				Periods	9	
Mobile TCP – WAP – Architecture – WWW Programming Model – WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WML Scripts.							
Total Periods						45	



REFERENCES:	
1.	Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.
2.	Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education, 2003
3.	William Stallings, “Wireless Communications and Networks”, Pearson Education, 2002.
FURTHER READINGS:	
1.	Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, First Edition, Pearson Education, 2003.
2.	Agrawal and Zeng, ”Introduction to Wirless and Mobile Systems”, First Edition, Cole Thomson Learning, 2002.

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Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CSE02	Grid Computing	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To get an overview about system infrastructure of grid. To learn about various grid monitoring related techniques. To learn about security issues and working of scheduling paradigms in grids. To learn about various available grid middle wares. 						
Unit - I	CONCEPTS AND ARCHITECTURE				Periods	9	
Introduction - Parallel and Distributed Computing - Cluster Computing - Grid Computing - Anatomy and Physiology of Grid - Review of Web Services – OGSA – WSRF.							
Unit - II	GRID MONITORING				Periods	9	
Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- Grid ICE – JAMM – MDS - Network Weather Service - R-GMA - Other Monitoring Systems - Ganglia and Grid Mon.							
Unit - III	GRID SECURITY AND RESOURCE MANAGEMENT				Periods	9	
Grid Security - A Brief Security Primer - PKI-X509 Certificates - Grid Security - Grid Scheduling and Resource Management - Scheduling Paradigms - Working principles of Scheduling - A Review of Condor, SGE, PBS and LSF - Grid Scheduling with QoS.							
Unit - IV	DATA MANAGEMENT AND GRID PORTALS				Periods	9	
Data Management- Categories and Origins of Structured Data - Data Management Challenges-Architectural Approaches - Collective Data Management Services - Federation Services - Grid Portals - First-Generation Grid Portals - Second-Generation Grid Portals.							
Unit - V	GRID MIDDLEWARE				Periods	9	
List of globally available Middlewares - Case Studies - Recent version of Globus Toolkit and gLite - Architecture, Components and Features.							
Total Periods						45	



REFERENCES:	
1.	Maozhen Li, Mark Baker, “The Grid Core Technologies”, John Wiley & Sons ,2005.
FURTHER READINGS:	
1.	Ian Foster & Carl Kesselman, “The Grid 2 – Blueprint for a New Computing Infrastructure “, Morgan Kaufman ,2004.
2.	Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education, 2004.
3.	Fran Berman,Geoffrey Fox, Anthony J.G.Hey, “Grid Computing: Making the Global Infrastructure a reality”, John Wiley and sons, 2003.

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CSE03	Distributed Computing	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the basic concepts and architecture of Distributed Environment, Distributed Operating Systems. To understand the concepts of Distributed Resource Management. To understand the concepts of fault tolerance systems. 		
Unit - I	COMMUNICATION IN DISTRIBUTED ENVIRONMENT	Periods	9
Introduction – Various Paradigms in Distributed Applications – Remote Procedure Call –Remote Object Invocation – Message-Oriented Communication – Unicasting, Multicasting and Broadcasting – Group Communication.			
Unit - II	DISTRIBUTED OPERATING SYSTEMS	Periods	9
Issues in Distributed Operating System – Threads in Distributed Systems – Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocols.			
Unit - III	DISTRIBUTED RESOURCE MANAGEMENT	Periods	9
Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models – Ivy – Munin – Distributed Scheduling – Distributed File Systems – Sun NFS.			
Unit - IV	FAULT TOLERANCE AND CONSENSUS	Periods	8
Introduction to Fault Tolerance – Distributed Commit Protocols – Byzantine Fault Tolerance –Impossibilities in Fault Tolerance.			
Unit - V	CASE STUDIES LAYERS	Periods	10
Distributed Object-Based System – CORBA – COM+ – Distributed Coordination-Based System– JINI.			
Total Periods			45



REFERENCES:	
1.	George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, Third Edition, Pearson Education Asia, 2002.
2.	Mukesh Singhal, “Advanced Concepts In Operating Systems”, First Edition, McGrawHill Series in Computer Science, 1994.
FURTHER READINGS:	
1.	Hagit Attiya and Jennifer Welch, “Distributed Computing: Fundamentals, Simulations and Advanced Topics”, Wiley, 2004.
2.	S.Tanenbaum, M.Van Steen, “Distributed Systems”, Pearson Education, 2004.
3.	M.L.Liu, “Distributed Computing Principles and Applications”, Pearson Addison Wesley,2004.

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Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE04	Agent Based Intelligent Systems	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the principles and concepts of knowledge Representation. To understand the models, theories and knowledge learning methods. 						
Unit - I	INTRODUCTION				Periods	9	
Definitions - Foundations - History - Intelligent Agents-Problem Solving-Searching - Heuristics -Constraint Satisfaction Problems - Game playing.							
Unit - II	KNOWLEDGE REPRESENTATION AND REASONING				Periods	9	
Logical Agents-First order logic-First Order Inference-Unification-Chaining- Resolution Strategies- Knowledge Representation-Objects-Actions-Events.							
Unit - III	PLANNING AGENTS				Periods	9	
Planning Problem-State Space Search-Partial Order Planning-Graphs-Nondeterministic Domains-Conditional Planning-Continuous Planning-Multi Agent Planning.							
Unit - IV	AGENTS AND UNCERTAINTY				Periods	9	
Acting under uncertainty – Probability Notation-Bayes Rule and use - Bayesian Networks-Other Approaches- Time and Uncertainty-Temporal Models- Utility Theory - Decision Network – Complex Decisions.							
Unit - V	HIGHER LEVEL AGENTS				Periods	9	
Knowledge in Learning-Relevance Information-Statistical Learning Methods- Reinforcement Learning- Communication-Formal Grammar-Augmented Grammars- Future of AI.							
Total Periods						45	



REFERENCES:	
1.	Stuart Russell and Peter Norvig, “Artificial Intelligence - A Modern Approach”, Second Edition, Prentice Hall, 2002.
FURTHER READINGS:	
1.	Michael Wooldridge, “An Introduction to Multi Agent System”, John Wiley, 2002.
2.	Patrick Henry Winston, “Artificial Intelligence”, Third Edition, AW, 1999.
3.	Nils.J.Nilsson, “Principles of Artificial Intelligence”, Narosa Publishing House, 1992.

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE05	Digital Image Processing	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To make the students to understand the fundamentals, elements of image processing. To understand the basics of Image enhancement and compression techniques. To know the different applications of image processing 						
Unit - I	DIGITAL IMAGE FUNDAMENTALS				Periods	9	
Introduction - Origins of Digital Image Processing, Fundamental Steps, Components. Fundamentals – Elements of Visual Perception, Light and Electromagnetic Spectrum, Image Sensing and acquisition, Image Sampling and Quantization, Basic Relationship between Pixels, Mathematical Tools in DIP.							
Unit - II	IMAGE ENHANCEMENT				Periods	10	
Spatial Filtering – Fundamentals, Intensity Transformation Functions, Histogram Processing, Smoothing and Sharpening Spatial Filters, Combining Spatial Enhancement Methods, Fuzzy Techniques. Frequency Domain – Sampling and the Fourier Transform of Sampled Functions, DFT of One Variable, Extension to Functions of Two Variable, Properties of 2 – D DFT, Image Smoothing and Sharpening .							
Unit - III	IMAGE RESTORATION AND COMPRESSION				Periods	9	
Introduction, Noise Models, Restoration in the Presence of Noise Only, Wiener Filtering, Constrained Least Square Filtering, Geometric Mean Filter. Wavelets and Multi Resolution Processing, Compression – Fundamentals, Basic Methods, Digital Image Watermarking.							
Unit - IV	IMAGE SEGMENTATION				Periods	9	
Fundamentals - Point, Line and Edge Detection, Thresholding, Region – Based Segmentation, Use of Motion in Segmentation, Segmentation using Morphological Watersheds. Morphological Image Processing – Basic Algorithms, Gray – Scale Morphology.							
Unit - V	APPLICATIONS OF IMAGE PROCESSING				Periods	8	
Representation and Description – Representation, Boundary and Regional Descriptors, Relational Descriptor. Object Recognition – Patterns and Patterns Classes, Recognition Based on Decisions – Theoretic Methods, Structural Methods.							
Total Periods						45	



REFERENCES:	
1.	Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing” , Third Edition, Pearson Education, 2007.
FURTHER READINGS:	
1.	Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, Second Edition, Thomson Learning, 2001.
2.	Anil K.Jain, “Fundamentals of Digital Image Processing”, Second Edition, Person Education, 2003.

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CSE06	Computer Network and Management	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the process of networking research aspects To understand the state-of-the-art in network protocols, architectures, and applications 		
Unit - I	HIGH SPEED NETWORKS	Periods	9
Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL. High Speed LAN's:Fast Ethernet, Gigabit Ethernet, Fibre Channel – Wireless LAN's.			
Unit - II	CONGESTION AND TRAFFIC MANAGEMENT	Periods	9
Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion –Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.			
Unit - III	TCP AND ATM CONGESTION CONTROL	Periods	9
TCP Flow control – TCP Congestion Control – Retransmission – Timer Management –Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes –Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.			
Unit - IV	INTEGRATED AND DIFFERENTIATED SERVICES	Periods	9
Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRfq, GPS, WFQ – Random Early Detection, Differentiated Services.			
Unit - V	PROTOCOLS FOR QoS SUPPORT	Periods	9
RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms –Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP –Protocol Architecture, Data Transfer Protocol, RTCP.			
Total Periods			45



REFERENCES:	
1.	William Stallings, “High Speed Networks and Internet”, Second Edition, Pearson Education, 2002.
2.	Taha, H.A. “Operations Research: An Introduction”, Ninth Edition, Pearson Education Edition, Asia, New Delhi, 2002.
FURTHER READINGS:	
1.	Warland & Pravin Varaiya, “High Performance Communication Networks”, Second Edition, Jean Harcourt Asia Pvt. Ltd., 2001.
2.	Irvan Pepelnjk, Jim Guichard and Jeff Apcar, “MPLS and VPN architecture”, Cisco Press, Volume 1 & 2, 2003.

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE07	XML and Web Services	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To Understand the XML technology and web services To Understand the concept of XML coding and emerging system development 							
Unit – I	INTRODUCTION					Periods	9	
Role Of XML - XML and The Web - XML Language Basics - SOAP - Web Services - Revolutions Of XML - Service Oriented Architecture (SOA).								
Unit – II	XML TECHNOLOGY					Periods	9	
XML - Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation – XML Infrastructure.								
Unit – III	SOAP					Periods	9	
Overview Of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.								
Unit – IV	WEB SERVICES					Periods	9	
Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And Web Services In E-Com - Overview Of .NET And J2EE.								
Unit – V	XML SECURITY					Periods	9	
Security Overview - Canonicalization - XML Security Framework - XML Encryption - XML Digital Signature - XKMS Structure - Guidelines For Signing XML Documents - XML In Practice.								
Total Periods							45	



REFERENCES:	
1.	Frank. P. Coyle, XML, Web Services And The Data Revolution, First Edition, Pearson Education, 2002.
FURTHER READINGS:	
1.	Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.
2.	Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
3.	McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CSE08	Computer Architecture and Parallel Processing	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To Understand Computer Design and Architecture To understand the state-of-the-art in parallel processing and computer hardware technologies 		
Unit – I	THEORY OF PARALLELISM	Periods	9
Parallel computer models - the state of computing, Multiprocessors and Multicomputers and Multivectors and SIMD computers, PRAM and VLSI models, Architectural development tracks. Program and network properties- Conditions of parallelism.			
Unit – II	PARTITIONING AND SCHEDULING	Periods	9
Program partitioning and scheduling, Program flow mechanisms, System interconnect architectures. Principles of scalable performance – performance matrices and measures, Parallel processing applications, speedup performance laws, scalability analysis and approaches.			
Unit – III	HARDWARE TECHNOLOGIES	Periods	9
Processor and memory hierarchy advanced processor technology, superscalar and vector processors, memory hierarchy technology, virtual memory technology, bus cache and shared memory - backplane bus systems, cache memory organisations, shared memory organisations, sequential and weak consistency models.			
Unit – IV	PIPELINING AND SUPERSCALAR TECHNOLOGIES	Periods	9
Parallel and scalable architectures, Multiprocessor and Multicomputers, Multivectorand SIMD computers, Scalable, Multithreaded and data flow architectures.			
Unit – V	SOFTWARE AND PARALLEL PROGRAMMING	Periods	9
Parallel models, Languages and compilers, Parallel program development and environments, UNIX, MACH and OSF/1 for parallel computers.			
Total Periods			45



REFERENCES:	
1.	Kai Hwang, “Advanced Computer Architecture ”, McGraw Hill International, 2001.
FURTHER READINGS:	
1.	Dezso Sima, Terence Fountain, Peter Kacsuk,”Advanced Computer architecture – A design Space Approach” , Pearson Education , 2003.
2.	John P.Shen, “Modern processor design. Fundamentals of super scalar processors”, Tata McGraw Hill, 2003.
3.	John P.Shen, “Modern processor design. Fundamentals of super scalar processors”, Tata McGraw Hill, 2003.
4.	Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata Mc-Graw Hill , 2002.

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Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE09	Bio Informatics Computing	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To Understand pattern matching To demonstrate drugs discovery components and system biology 		
Unit – I	INTRODUCTORY CONCEPTS	Periods	9
The Central Dogma – The Killer Application – Parallel Universes – Watson’s Definition – Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management.			
Unit – II	SEARCH ENGINES AND DATA VISUALIZATION	Periods	9
The search process – Search Engine Technology – Searching and Information Theory – Computational methods – Search Engines and Knowledge Management – Data Visualization – sequence visualization – structure visualization – user Interface – Animation Versus simulation – General Purpose Technologies.			
Unit – III	STATISTICS AND DATA MINING	Periods	9
Statistical concepts – Microarrays – Imperfect Data – Randomness – Variability – Approximation – Interface Noise – Assumptions – Sampling and Distributions – Hypothesis Testing – Quantifying Randomness – Data Analysis – Tool selection statistics of Alignment – Clustering and Classification – Data Mining – Methods – Selection and Sampling – Preprocessing and Cleaning – Transformation and Reduction – Data Mining Methods – Evaluation – Visualization – Designing new queries – Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools.			
Unit – IV	PATTERN MATCHING	Periods	9
Pairwise sequence alignment – Local versus global alignment – Multiple sequence alignment – Computational methods – Dot Matrix analysis – Substitution matrices – Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Dynamic Programming – Progressive strategies – Iterative strategies – Tools – Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities – Sequence Databases.			
Unit – V	MODELING AND SIMULATION	Periods	9
Drug Discovery – components – process – Perspectives – Numeric considerations – Algorithms – Hardware – Issues – Protein structure – AbInitio Methods – Heuristic methods – Systems Biology – Tools – Collaboration and Communications – standards - Issues – Security – Intellectual property.			
Total Periods			45



REFERENCES:	
1.	Bryan Bergeron, “Bio Informatics Computing”, Second Edition, Pearson Education, 2003.
2.	T.K.Attwood and D.J. Perry Smith, “Introduction to Bio Informatics, Longman Essen, 1999.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING		Semester	-	

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE10	Embedded System	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To Understand Embedded computing To Optimize assembly code and embedded system development. 							
Unit – I	EMBEDDED COMPUTING				Periods	9		
Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, ARM and Thumb Instruction sets								
Unit – II	EMBEDDED C PROGRAMMING				Periods	9		
C-looping structures – Register allocation – Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues.								
Unit – III	OPTIMIZING ASSEMBLY CODE				Periods	9		
Profiling and cycle counting – instruction scheduling – Register allocation – conditional execution – looping constructs – bit manipulation – efficient switches – optimized primitives.								
Unit – IV	PROCESSES AND OPERATING SYSTEMS				Periods	9		
Multiple tasks and processes – Context switching – Scheduling policies – Inter process communication mechanisms – Exception and interrupt handling - Performance issues.								
Unit – V	EMBEDDED SYSTEM DEVELOPMENT				Periods	9		
Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design methodologies – Case studies – Complete design of example embedded systems.								
Total Periods							45	



REFERENCES:	
1.	Andrew N Sloss, D. Symes, C. Wright, “ARM System Developers Guide”, Morgan Kaufmann / Elsevier, 2006.
FURTHER READINGS:	
1.	Michael J. Pont, “Embedded C”, Pearson Education, 2007.
2.	Wayne Wolf, “Computers as Components: Principles of Embedded Computer System Design”, Second Edition, Morgan Kaufmann / Elsevier, 2008.
3.	Steve Heath, “Embedded System Design”, Second Edition, Elsevier, 2003.

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE11	Multimedia Technology	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To Understand the multimedia architecture, application and scheduling To optimize the storage management 						
Unit - I	INTRODUCTION				Periods	9	
Multimedia Introduction – Multimedia Elements – Multimedia Applications – Multimedia System Architecture – Issues – Encoding – Data Compression Technologies – Need For Data Compression – Multimedia Input/Output Technologies – Evolving Technologies For Multimedia Systems.							
Unit - II	MULTIMEDIA SERVER ARCHITECTURE AND SCHEDULING				Periods	9	
Requirements of Multimedia Application – Client and Network Environment – OSI and ATM model – Middleware System Services Architecture – Multimedia Server: Hardware, Software and Topology – Scheduling: Client Session, Client Request and System Component – Organizing Multimedia Databases.							
Unit - III	MANAGING DISTRIBUTED MULTIMEDIA SYSTEMS				Periods	9	
Components of Distributed Multimedia Systems – Distributed Client – Server Operation – Multimedia Object Servers – Managing Distributed Objects – Distributed Application Design: Networking and Communications – Compression and Decompression – Work flow integration of indexing and QC.							
Unit - IV	STORAGE MANAGEMENT				Periods	9	
Introduction – Storage System Architecture – Placement of Multimedia Data in Storage Devices – Multimedia Document Retrieval – Issues: Single-Disk Issues – Multiple-Disk Organization – Storage Hierarchy – Access management and Optimization of Storage Distribution – Maximizing Network Transportation – Managing System Performance.							
Unit - V	CACHE STORAGE MANAGEMENT				Periods	9	
Introduction – Data Prefetching – Buffering – Caching – Characterization – Memory Cache – Memory Caching Policies – Generalized Interval Caching Policy – Performance evaluation of the GIC Policy – Affinity Routing for Multimedia Applications – Load Balancing – Disk Cache – Caching among disks – Issues – Disk Caching Policies.							
Total Periods						45	



REFERENCES:	
1.	Dinkai Sitaram and Asit Dan, “Multimedia Servers”, Morgan Kaufmann Publishers, 2000.
FURTHER READINGS:	
1.	Prabhat K. Andleigh, Kiran Thakrar, “Multimedia Systems Design”, Fourth Impression, Person Education, Inc and Dorling Kindersley Publishing, Inc, 2009.
2.	John F.Koegel Buford, “Multimedia Systems”, Person Education, Inc and Dorling Kindersley Publishing, Inc, 1994.

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE12	Software Testing and Quality Assurance	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand quality management processes To demonstrate the ability to apply multiple methods to develop reliability estimates for a software system. 		
Unit – I	FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE	Periods	9
Ethical Basis for Software Quality – Total Quality Management Principles – Software Processes and Methodologies.			
Unit – II	QUALITY STANDARDS	Periods	9
Quality Standards – Practices and Conventions – Software Configuration Management – Reviews and Audits –Enterprise Resource Planning Software.			
Unit – III	QUALITY METRIC SYSTEM	Periods	9
Measurement Theory – Software Quality Metrics – Designing Software Measurement Programs – Complexity Metrics and Models – Organizational Learning – Improving Quality with Methodologies – Structured/Information Engineering.			
Unit – IV	SOFTWARE TESTING – INTRODUCTION	Periods	9
Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions, Software Testing Principles – The Tester’s Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.			
Unit – V	TESTING ISSUES	Periods	9
Introduction to Testing Design Strategies – The Smarter Tester –Test Case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Equivalence Class Partitioning – Boundary Value Analysis – Other Black-box Test Design Approaches – Black-box testing and COTS – Using White-Box Approach to Test design – Test Adequacy Criteria – Coverage and Control Flow Graphs – Covering Code Logic – Paths – White-box Based Test Design – Additional White Box Test Design Approaches – Evaluating Test Adequacy Criteria.			
Total Periods			45



REFERENCES:	
1.	Schulmeyer, G. Gordon, James McManus, “Handbook of Software Quality Assurance”, Third Edition, Van Nostrand Reinhold, 1998.
2.	Edward Kit, “Software Testing in the Real World – Improving the Process”, Pearson Education, 2004.
3.	William E.Perry , “Effective methods for Software Testing”, Second Edition, Wiley, 2000.

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE13	Software Project Management	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the basic concepts of life cycle models. To develop the skills required to design and develop a process/project database. 							
Unit - I	BASIC CONCEPTS				Periods	9		
Product, Process and Project – Definition – Product Life Cycle – Project Life Cycle Models.								
Unit - II	FORMAT PROCESS MODELS AND THEIR USE				Periods	9		
Definition and Format model for a process – The ISO 9001 and CMM Models and their relevance to Project Management – Other Emerging Models like People CMM.								
Unit - III	UMBRELLA ACTIVITIES IN PROJECTS				Periods	9		
Metrics – Configuration Management – Software Quality Assurance – Risk Analysis.								
Unit - IV	IN STREAM ACTIVITIES IN PROJECTS				Periods	9		
Project Initiation – Project Planning – Execution and Tracking – Project Wind up – Concept of Process/Project Database.								
Unit – V	ENGINEERING AND PEOPLE ISSUES IN PROJECT MANAGEMENT				Periods	9		
Phases (Requirements, Design, Development, Testing , Maintenance, Deployment) – Engineering Activities and Management Issues in Each Phase – Special Considerations in Project Management for India and Geographical Distribution Issues.								
Total Periods							45	



REFERENCES:	
1.	Kelkar Sa, “Software Project Management” , PHI Learning, New Delhi, 2007.
2.	Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
FURTHER READINGS:	
1.	Pressman,Roger, ”Software Engineering- A Practitioner’s Approach”. McGraw Hill,1997.
2.	Bob Hughes and Mike Cotterell, “Software Project Management”, Third edition, Tata McGraw Hill 2004.
3.	Wheelwright and Clark, “Revolutionizing product development”, The Free Press,1993.

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P13CSE14	Information Security	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To make the students to understand the principles of encryption algorithms, conventional and public key cryptography. To understand the basics of Information Security To know the legal, ethical and professional issues in Information Security To know the technological aspects of Information Security 						
Unit - I	INTRODUCTION					Periods	9
An Overview of Computer Security, Access Control Matrix, Policy-Security policies, Confidentiality policies, Integrity policies and Hybrid policies.							
Unit - II	CRYPTOSYSTEMS					Periods	9
Cryptography- Key management – Session and Interchange keys, Key exchange and generation, Cryptographic Key Infrastructure, Storing and Revoking Keys, Digital Signatures, Cipher Techniques							
Unit - III	ACCESS CONTROL					Periods	9
Systems: Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem.							
Unit - IV	INTRUSION DETECTION					Periods	9
Malicious Logic, Vulnerability Analysis, Auditing and Intrusion Detection							
Unit - V	SECURITY ANALYSIS					Periods	9
Network Security, System Security, User Security and Program Security							
Total Periods							45

REFERENCES:	
1.	Matt Bishop, “Computer Security art and science”, Second Edition, Pearson Education 2002.
FURTHER READINGS:	
1.	Mark Merkow, James Breithaupt “ Information Security : Principles and Practices”, First Edition, Pearson Education, 2005.
2.	Whitman, “Principles of Information Security”, Second Edition, Pearson Education, 2007.
3.	William Stallings, “Cryptography and Network Security: Principles and Practices”, Third Edition, Pearson Education, 2003.
4.	Charles P.Pfleeger and Shari Lawrence Pfleeger, “Security in Computing”, Third Edition, 2002.

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Programme	M.E.	Programme code	201	Regulation	2013
Department	COMPUTER SCIENCE AND ENGINEERING			Semester	-

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P		C	CA	ESE
P13CSE15	Visual Programming	3	0	0	3	50	50	100

Objective	<ul style="list-style-type: none"> To understand the concept of Windows and Visual programming using C++ To develop the skills and understanding required to design and develop visual C++ applications. 						
Unit - I	INTRODUCTION					Periods	9
Windows Programming Fundamentals – MFC – Windows – Graphics – Menus – Mouse and keyboard – Bitmaps – Palettes – Device-Independent Bitmaps.							
Unit - II	CONTROL AND I/O					Periods	9
Controls – Modal and Modeless Dialog – Property – Data I/O – Sound – Timer.							
Unit - III	TOOLBARS					Periods	9
Memory management – SDI – MDI – MFC for Advanced windows user Interface – status bar and Toolbars – Tree view – List view – Threads.							
Unit - IV	DATABASE CONNECTIVITY					Periods	9
ODBC – MFC Database classes – DAO - DLLs – Working with Images.							
Unit - V	COM					Periods	9
COM Fundamentals – ActiveX control – ATL – Internet Programming .							
Total Periods							45

REFERENCES:	
1.	Richard C.Leinecker and Tom Archer, “Visual C++ 6 Programming Bible”, Wiley Dream Tech Press, 2006.
FURTHER READINGS:	
1.	Lars Klander, “Core Visual C++ 6”, Pearson Education, 2000.
2.	Deital, DEital, Liperi and Yaeger “Visual V++ .NET How to Program” , Pearson Education, 2004.

Annexure-I

List of Service Courses

Programme: **Department of Computer Science and Engineering**

Semester	Course Code	Course Name	Service Programme
Elective	P13CSE16	Neural Networks and Its Applications	M.E. Applied Electronics
Elective	P13CSE16	Neural Networks and Its Applications	M.E.VLSI Design
Elective	P13CSE17	Genetic Algorithms and their Applications	M.E.VLSI Design
Elective	P13CSE18	Digital Speech Signal Processing	M.E.VLSI Design

Annexure-II

List of Common Courses

Programme: **Department of Computer Science and Engineering**

Semester	Course Code	Course Name	Common to			
			Programme	Semester	Course Code	Course Name
I	P13MA101	Applied Probability and Statistics	M.Tech.IT	I	P13MA101	Applied Probability and Statistics
I	P13CS101	Advanced Computer Architecture	M.Tech.IT	I	P13CS101	Advanced Computer Architecture
I	P13CS103	Advanced Data Structures and Algorithms	M.Tech.IT	I	P13CS103	Advanced Data Structures and Algorithms
I	P13CS106	Data Structures Lab	M.Tech.IT	I	P13CS106	Data Structures Lab
II	P13CS210	Advanced Operating Systems	M.Tech.IT	II	P13CS210	Advanced Operating Systems
Elective	P13CSE02	Grid Computing	M.Tech.IT	Elective	P13CSE02	Grid Computing
Elective	P13CSE04	Agent Based Intelligent Systems	M.Tech.IT	Elective	P13CSE04	Agent Based Intelligent Systems
Elective	P13CSE05	Digital Image Processing	M.Tech.IT	Elective	P13CSE05	Digital Image Processing
Elective	P13CSE07	XML and Web Services	M.Tech.IT	Elective	P13CSE07	XML and Web Services
Elective	P13CSE09	Bio Informatics Computing	M.Tech.IT	Elective	P13CSE09	Bio Informatics Computing
Elective	P13CSE10	Embedded System	M.Tech.IT	Elective	P13CSE10	Embedded System
Elective	P13CSE12	Software Testing and Quality Assurance	M.Tech.IT	Elective	P13CSE12	Software Testing and Quality Assurance
Elective	P13CSE13	Software Project Management	M.Tech.IT	Elective	P13CSE13	Software Project Management

Elective	P13CSE14	Information Security	M.Tech.IT	Elective	P13CSE14	Information Security
Elective	P13CSE08	Computer Architecture and Parallel Processing	M.E. Applied Electronics	Elective	P13CSE08	Computer Architecture and Parallel Processing
Elective	P13CSE08	Computer Architecture and Parallel Processing	M.E.VLSI Design	Elective	P13CSE08	Computer Architecture and Parallel Processing