	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme Code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**
CURRICULUM (Applicable to the students admitted from the academic year 2014-2015onwards)					

Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
THEORY								
P14MA101	Applied Probability & Statistics	3	1	0	4	50	50	100
P14IT101	Advanced Computer Architecture	3	0	0	3	50	50	100
P14IT102	Advanced Data Structures & Algorithms	3	0	0	3	50	50	100
P14IT103	Multimedia Communication & Networks	3	0	0	3	50	50	100
P14IT104	Database Technology	3	0	0	3	50	50	100
	Elective - I	3	0	0	3	50	50	100
PRACTICAL								
P14IT105	Data Structures Lab	0	0	3	2	50	50	100
P14IT106	Relational Database Management System Lab	0	0	3	2	50	50	100
				Total Credits	**23**	**400**	**400**	**800**

CA - Continuous Assessment, ESE - End Semester Examination

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme Code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**II**
CURRICULUM (Applicable to the students admitted from the academic year 2014-2015onwards)					

Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
THEORY								
P14IT207	Cloud Computing	3	0	0	3	50	50	100
P14IT208	Advanced Operating Systems	3	0	0	3	50	50	100
P14IT209	Object Oriented Analysis & Design	3	0	0	3	50	50	100
P14IT210	Cryptography and Information Security	3	0	0	3	50	50	100
	Elective-II	3	0	0	3	50	50	100
	Elective-III	3	0	0	3	50	50	100
PRACTICAL								
P14IT211	Software Development Lab	0	0	3	2	50	50	100
P14IT212	Operating Systems Lab	0	0	3	2	50	50	100
				Total Credits	**22**	**400**	**400**	**800**

CA - Continuous Assessment, ESE - End Semester Examination

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme Code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**III**
CURRICULUM (Applicable to the students admitted from the academic year 2014-2015onwards)					

Code	Course Title	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
THEORY								
P14IT313	Research Methodology & Data Analysis	3	0	0	3	50	50	100
	Elective – IV	3	0	0	3	50	50	100
	Elective – V	3	0	0	3	50	50	100
PRACTICAL								
P14IT314	Project Phase – I	0	0	0	6	50	50	100
				Total Credits	**15**	**200**	**200**	**400**

CA - Continuous Assessment, ESE - End Semester Examination

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme Code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**IV**
CURRICULUM (Applicable to the students admitted from the academic year 2014-2015onwards)					

Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
PRACTICAL								
P14IT415	Project Phase – II	0	0	0	12	50	50	100
		Total Credits			**12**	**50**	**50**	**100**

CA - Continuous Assessment, ESE - End Semester Examination

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme Code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**ELECTIVE**
CURRICULUM (Applicable to the students admitted from the academic year 2014-2015onwards)					

LIST OF ELECTIVES

Code	Course Name	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
THEORY								
P14ITE01	Open Source Systems	3	0	0	3	50	50	100
P14ITE02	Adhoc & Sensor Networks	3	0	0	3	50	50	100
P14ITE03	Soft Computing	3	0	0	3	50	50	100
P14ITE04	Supply Chain Management	3	0	0	3	50	50	100
P14ITE05	High Speed Networks	3	0	0	3	50	50	100
P14CSE27	Grid Computing	3	0	0	3	50	50	100
P14CSE28	XML & Web Services	3	0	0	3	50	50	100
P14ITE06	Agent Based Intelligent Systems	3	0	0	3	50	50	100
P14ITE07	Digital Image processing	3	0	0	3	50	50	100
P14ITE08	Bio Informatics Computing	3	0	0	3	50	50	100
P14ITE09	Embedded System	3	0	0	3	50	50	100
P14CSE29	Software Testing & Quality Assurance	3	0	0	3	50	50	100
P14CSE30	Software Project Management	3	0	0	3	50	50	100
P14CSE31	Information Security	3	0	0	3	50	50	100
P14ITE10	3G and 4G Wireless Networks	3	0	0	3	50	50	100
P14ITE11	Cyber Forensics	3	0	0	3	50	50	100

CA - Continuous Assessment, ESE - End Semester Examination

P14ITE12	Green Computing	3	0	0	3	50	50	100
P14ITE13	Knowledge Engineering	3	0	0	3	50	50	100
P14ITE14	Machine Learning	3	0	0	3	50	50	100
P14ITE15	Social Network Analysis	3	0	0	3	50	50	100
P14ITE16	Information Retrieval	3	0	0	3	50	50	100
P14ITE17	Software Metrics and Reliability	3	0	0	3	50	50	100
P14ITE18	Big Data Analytics	3	0	0	3	50	50	100
P14ITE19	Image Processing and Pattern Analysis	3	0	0	3	50	50	100
P14ITE20	Principles of Programming Languages	3	0	0	3	50	50	100
P14ITE21	Building Internet of Things	3	0	0	3	50	50	100
P14ITE22	Computer Graphics and Multimedia	3	0	0	3	50	50	100
P14ITE23	E-Learning	3	0	0	3	50	50	100
P14ITE24	Compiler Design	3	0	0	3	50	50	100
P14ITE25	Data Warehousing and Data Mining	3	0	0	3	50	50	100
P14ITE26	Human Computer Interaction	3	0	0	3	50	50	100
P14ITE27	Operations Research	3	0	0	3	50	50	100

CA - Continuous Assessment, ESE - End Semester Examination

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14MA101	**Applied Probability & Statistics**	3	1	0	4	50	50	100

Objective	• 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 use the concepts of multivariate normal distribution and principle component Analysis		
Unit – I	**ONE DIMENSIONAL RANDOM VARIABLES**	Periods	**12**
Random Variables-Probability Function-Moments-Moment Generation Function & their Properties-Binomial-Poisson-Geometric, Uniform & Exponential Distribution			
Unit – II	**TWO DIMENSIONAL RANDOM VARIABLES**	Periods	**12**
Joint Distributions-Marginal and Conditional distributions-Functions of two dimensional random variables-Regression curve-Correlation			
Unit - III	**ESTIMATION THEORY**	Periods	**12**
Un biased Estimators-Methods of Moments-Maximum Likelihood Estimation-Curve Fitting by Principle of Least Squares-Regression lines.			
Unit - IV	**TESTING OF HYPOTHESIS**	Periods	**12**
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	**12**
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”, Thomson and Duxbury,2002
2.	Richard Johnson.”Miller & Freund, Probability and Statistics for Engineers”, Prentice-Hall, Seventh Edition, 2007
3.	Richard.A.Johnson and Dean W.Wichern, “Applied Multivariate Statistical Analysis”, Pearson Education. Asia. 5th Edition, 2002.
4.	Gupta S.C and Kapoor V.K, “Fundamentals of Mathematical Statistics”, Sultan & sons 2001.
5.	Dallas E Johnson, “Applied Multivariate Methods for Data Analysis”, Thomson and Duxbury Press,1998

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT101	**Advanced Computer Architecture**	3	0	0	3	50	50	100

Objective	• To understand the concept of Architecture of Computers 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", 4th. edition, Morgan Kaufmann / Elsevier, 2007.
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.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT102	**Advanced Data Structures and Algorithms**	3	0	0	3	50	50	100

Objective	• 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.2008
2.	Ellis Horowitz, Sartaj Sahni, Dinesh Mehta," Fundamentals of Data Structures in C++", Second Edition, Universities Press, 2008.
FURTHER READINGS:	
1.	G. Brassard and P. Bratley," Algorithmics: Theory and Practice", Prentice –Hall,1988.
2.	Thomas H. Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein, " Introduction to Algorithms", Second Edition, PHI.2001

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT103	**Multimedia Communication & Networks**	3	0	0	3	50	50	100

Objective	• To understand the concept of Internet protocols & Routing • To study various Multimedia communication protocols & Wireless protocols for multimedia communication		
Unit - I	**IP NETWORKS**	Periods	**9**
Open Data Network Model – Narrow Waist Model of the Internet - Success and Limitations of the Internet – Suggested Improvements for IP and TCP – Significance of UDP in modern Communication – Network level Solutions – End to End Solutions – Best Effort service model – Scheduling and Dropping policies for Best Effort Service model			
Unit - II	**ADVANCED ROUTING**	Periods	**9**
Intra AS routing – Inter AS routing – Router Architecture – Switch Fabric – Active Queue Management – Head of Line blocking – Transition from IPv4 to IPv6 – Multicasting – Abstraction of Multicast groups – Group Management – IGMP – Group Shared Multicast Tree – Source based Multicast Tree – Multicast routing in Internet – DVMRP and MOSPF – PIM – Sparse mode and Dense mode			
Unit - III	**GUARANTEED SERVICE MODEL**	Periods	**9**
Best Effort service model – Scheduling and Dropping policies – Network Performance Parameters – Quality of Service and metrics – WFQ and its variants – Random Early Detection – QoS aware Routing – Admission Control – Resource Reservation – RSVP - Traffic Shaping Algorithms – Caching – Laissez Faire Approach - Possible Architectures – An Overview of QoS Architectures			
Unit - IV	**MULTIMEDIA COMMUNICATION**	Periods	**9**
Stream characteristics for Continuous media – Temporal Relationship – Object Stream Interactions, Media Levity, Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – Jitter – Fixed playout and Adaptive playout – Recovering from packet loss – RTSP — Multimedia Communication Standards – RTP/RTCP – SIP and H.263			
Unit - V	**WIRELESS MULTIMEDIA COMMUNICATION**	Periods	**9**
End to End QoS provisioning in Wireless Multimedia Networks – Adaptive Framework – MAC layer QoS enhancements in Wireless Networks – A Hybrid MAC protocol for 10 Multimedia Traffic – Call Admission Control in Wireless Multimedia Networks – A Global QoS Management for Wireless Networks			
		Total Periods	**45**

REFERENCES:	
1.	Jean Warland and Pravin Vareya, “High Performance Networks”, Morgan Kauffman Publishers, 2002
FURTHER READINGS:	
1.	Mahbub Hassan and Raj Jain, “High Performance TCP/IP Networking”, Pearson Education, 2004.
2.	William Stallings, “High Speed Networks: Performance and Quality of Service”, 2 nd Edition, Pearson Education, 2002.
3.	Kurose and Ross, “Computer Networks : A top down Approach”, Pearson Education, 2002
4.	Aura Ganz, Zvi Ganz and Kitti Wongthawaravat, “Multimedia Wireless Networks: Technologies, Standards and QoS”, Prentice Hall, 2003.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT104	**Database Technology**	3	0	0	3	50	50	100

Objective	• To study the various models and understand the Relational model in detail. • To write effective queries and optimize the queries. • To understand concepts related to transaction Processing and Database Administration.		
Unit - I	**INTRODUCTION**	Periods	**9**
Data models, structure of relational databases, component of management system – DDL, DML, database languages, SQL standard, database users and administrators			
Unit - II	**RELATIONAL DBMS**	Periods	**9**
Design issues - basic normal forms and additional normal forms, Transforming E-R diagram to relations, Integrity constraints, Query processing and optimization.			
Unit - III	**TRANSACTION PROCESSING**	Periods	**9**
Transaction concept, concurrent execution, isolation, testing for serializability, Concurrency control, lock based - time-stamp based - validation based protocols, multi-version schemes, deadlock handling.			
Unit - IV	**DATABASE ADMINISTRATION**	Periods	**9**
Functions of DBA, Data volume and usage analysis, security and authorization, recovery and atomicity, buffer management, backup systems.			
Unit - V	**ADVANCED DATABASES**	Periods	**9**
Object oriented, parallel, distributed, web databases			
		Total Periods	**45**

REFERENCES:	
1.	Abraham Silberschatz, Hanry F Korth, Sudarshan S, "Database Systems Concepts", McGraw Hill, 2007.
FURTHER READINGS:	
1.	Raghu Ramakrishnan, "Database Management Systems", McGraw Hill , 2003.
2.	Michael Kifer, Arthur Bernstein, Philip M Lewis, Prabin K Panigrahi, "Database Systems – An application oriented approach",Pearson Education, 2008.
3.	Jeffrey D Ullman, " A First Course in Database Systems", Pearson Education, 2007
4.	Date C J, "An Introduction to Database Systems", Pearson Education, 2003.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution ,Affiliated to Anna University,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT105	**Data Structures Lab**	0	0	3	2	50	50	100

LIST OF EXPERIMENTS:

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 PERIODS : 45

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution ,Affiliated to Anna University,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**I**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT106	**Relational Database Management System Lab**	0	0	3	2	50	50	100

LIST OF EXPERIMENTS:

1. Implementation of DDL and DML queries in SQL.
2. Create an Employee database to set various constraints.
3. Impose restrictions on queries for security reasons.
4. Use Rollback, Commit, save point, Grant and Revoke commands.
5. Developing applications effectively using RDBMS concepts.

TOTALPERIODS : 45

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**Information Technology**			Semester	**II**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT207	**Cloud Computing**	3	0	0	3	50	50	100

Objective	• To create, promote and exploit an open-source Cloud API and platform targeted for designing and developing multi-Cloud-oriented applications • To become familiar with various cloud computing services		
Unit - I	**UNDERSTANDING CLOUD COMPUTING**	Periods	**9**
Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services			
Unit - II	**DEVELOPING CLOUD SERVICES**	Periods	**9**
Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds			
Unit - III	**CLOUD COMPUTING FOR EVERYONE**	Periods	**9**
Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation			
Unit - IV	**USING CLOUD SERVICES**	Periods	**9**
Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files			
Unit – V	**OTHER WAYS TO COLLABORATE ONLINE**	Periods	**9**
Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis			
		Total Periods	**45**

REFERENCES:	
1.	Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.
FURTHER READINGS:	
1.	Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", "Applications and Data Centers in the Cloud with SLAs", Emereo Pty Limited, July 2008.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**II**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT208	**Advanced Operating Systems**	3	0	0	3	50	50	100

Objective	• 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. • To know the classic and current operating systems literature		
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:

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

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

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**II**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT209	**Object Oriented Analysis and Design**	3	0	0	3	50	50	100

Objective	• To become familiar with basics of objects & various methodologies for object oriented system development • To understand how to convert requirement to design & map the design to code • To study various design patterns and their applications.		
Unit – I	**INTRODUCTION**	Periods	**10**
Introduction to System Concepts - Managing Complex Software — Properties – Object Oriented Systems Development – Object Basics – Systems Development Life Cycle - Rumbaugh Methodology - Booch Methodology - Jacobson Methodology – Unified Process.			
Unit – II	**UNIFIED APPROACH**	Periods	**8**
Unified Approach – Unified Modeling Language – Static behavior diagrams – Dynamic behavior diagrams – Object Constraint Language			
Unit – III	**REQUIREMENTS & DESIGN**	Periods	**9**
Inception – Evolutionary Requirements – Domain Models – Operation Contracts - Requirements to Design – Design Axioms – Logical Architecture - Designing Objects with Responsibilities – Object Design – Designing for Visibility.			
Unit – IV	**PATTERNS**	Periods	**9**
Patterns – Analysis and Design patterns – GoF Patterns - Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint.			
Unit – V	**APPLICATIONS**	Periods	**9**
More Patterns – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design – Persistence framework with patterns			
		Total Periods	**45**

REFERENCES:	
1.	Craig Larman. “Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development”, Third Edition, Pearson Education, 2005.
2.	Fowler, Martin. UML Distilled. Third Edition, Pearson Education. 2004.
FURTHER READINGS:	
1.	Michael Blaha and James Rumbaugh, “Object-oriented modeling and designwith UML”, Prentice-Hall of India, 2005.
2.	Booch, Grady. Object Oriented Analysis and Design. Second Edition, Pearson Education 2000.
3.	Ali Bahrami, “Object Oriented Systems Development”, Tata McGrawHill, 1999.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**II**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT210	**Cryptography and Information Security**	3	0	0	3	50	50	100

Objective	• To understand the mathematics behind Cryptography. • To understand the standard algorithms used to provide confidentiality, integrity and authenticity. • To get the knowledge of various security practices applied in the field of information technology.		
Unit – I	**FUNDAMENTALS AND MATHEMATICS OF CRYPTOGRAPHY**	Periods	**9**
Overview - Classical Crypto Systems – Substitution Ciphers –Transposition Ciphers- Stream and Block Ciphers – Introduction to Number Theory – Congruences – Chinese Remainder theorem – Modular Arithmetic-Modular Exponentiation – Fermats and Eulers Theorem - Finite Fields – GF(2n) Fields.			
Unit – II	**ENCRYPTION TECHNIQUES**	Periods	**9**
Symmetric Encryption Techniques – DES – AES- Public-Key Cryptography and RSA – Key Management - Diffie-Hellman Key Exchange – Elliptic Curve Cryptography – Symmetric Key Distribution – Kerberos - X.509 Authentication Service - differential cryptanalysis – linear cryptanalysis - side channel attack - lattice reduction attack - Merkle-Hellman knapsack attack - Hellman's time-memory tradeoff (TMTO) attack			
Unit – III	**HASH FUNCTIONS AND SIGNATURES**	Periods	**9**
Message Authentication and Hash Functions – Description of MD Hash Family – Secure Hash Algorithms – SHA 512 - Digital Signatures and Authentication Protocols – Digital Signature Standard – Process, Services, Attacks on Digital Signature- Digital Signature Schemes.			
Unit – IV	**SECURITY PRACTICES**	Periods	**9**
Vulnerability Analysis - Flaw Hypothesis Methodology, NRL taxonomy and Aslam's model - Auditing - Anatomy of an Auditing System - Design of Auditing Systems - Posteriori Design - Auditing mechanisms - Risk Analysis and Management - Disaster Recovery Planning/Incident Response Planning - Intrusion Detection System			
Unit – V	**SECURE DEVELOPMENT**	Periods	**9**
Secure Coding - OWASP/SANS Top Vulnerabilities - Buffer Overflows - Incomplete mediation - XSS - Anti Cross Site Scripting Libraries - Canonical Data Format - Command Injection - Redirection - Inference – Application Controls - Secure Software Development Life Cycle - Testing, Maintenance and Operation - Evaluation of Security Systems			
		Total Periods	**45**

REFERENCES:

1.	William Stallings, "Cryptography and Network Security – Principles and Practices", Fourth Edition, PearsonEducation, 2006.
2.	Wade Trappe and Lawrence C. Washington, "Introduction to Cryptography with Coding Theory" Second Edition, Pearson Education, 2007
3.	Mark Stamp, "Information Security: Principles and Practice", Wiley Inter Science, 2011

4.	OWASP top ten security vulnerabilities: http://xml.coverpages.org/OWASP-TopTen.pdf
5.	Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Fourth Edition, Pearson Education, 2007.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**II**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT211	**Software Development Lab**	0	0	3	2	50	50	100

LIST OF EXPERIMENTS:

Analysis, Design and Implementation of Software system involving an application domain.

Sample systems are:

1. Core Banking
2. Health Care System
3. e-learning.
4. e-Commerce.
5. Enterprise Resource Planning Modules
6. Management Information System

Total Periods : 45

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution ,Affiliated to Anna University,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**II**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT212	**Operating Systems Lab**	0	0	3	2	50	50	100

LIST OF EXPERIMENTS:

Multiprocessor Operating Systems

1. Semaphores - Multiprocessor operating systems
2 Multithreading - Multiprocessor operating systems
3. Multiple sleeping barbers - Multiprocessor operating systems

Network Operating Systems

1. Identifying Local Area Network Hardware
2. Exploring Local Area Network Configuration Options
3. Verifying TCP/IP Settings
4. Sharing Resources
5. Testing LAN Connections

Real Time Operating Systems

1. A real-time program implementing an alarm clock shall be developed

Database Operating Systems

Assume any application (e.g.banking) on your own and do the following exercises.
1. Investigate and implement the ObjectStore's concurrency options.
2. Implement the concurrency conflict that occurs between multiple client applications.
3. Observe and implement the implication of nested transactions.

Total Periods : 45

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2013**
Department	**INFORMATION TECHNOLOGY**			Semester	**III**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14IT313	**Research Methodology and Data Analysis**	3	0	0	3	50	50	100

Objective	• To understand the importance of Research • To acquire knowledge in Data Collection and Analysis of Data • To effectively write reports		
Unit - I	**INTRODUCTION TO RESEARCH**	Periods	**7**
Nature, scope, and design of social research; Review of literature: qualitative (literary), quantitative (meta-analysis)			
Unit - II	**HYPOTHESIS**	Periods	**9**
Hypothesis: sources, types and characteristics; Sample survey: sample and census survey, probability, non-probability and mixed sampling;			
Unit - III	**DATA COLLECTION**	Periods	**11**
Methods of data collection: historical method, case study, observation, ethnographic methods, interview, questionnaire, focus group discussion, participatory rural appraisal, experimental method, pre-testing, and pilot survey; Scaling techniques different scales, item analysis, reliability, validity; Method of secondary data collection: sources, sample criteria, characteristics;			
Unit - IV	**DATA ANALYSIS**	Periods	**9**
Data analysis: descriptive statistics, mean difference test, analysis of variance and experimental design; Bivariate and multivariate correlation and regression; Factor analysis, Cluster analysis, Discriminant analysis, Structural equation modelling, non-parametric statistics, Content analysis			
Unit - V	**REPORT WRITING**	Periods	**9**
Report writing: review, qualitative, and empirical article writing.			
		Total Periods	**45**

REFERENCES:

1.	C.M.Chaudhary, Research Methodology, RBSA Publishers, Jaipur, India 2009.
2.	R.Paneerselvam, Research Methodology, PHI Learning Pvt Ltd.,New Delhi 2009.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE01	**Open Source Systems**	3	0	0	3	50	50	100

Objective	• To understand the open source programming languages & operating systems • To study open source technologies and tools in order to incorporate with the IT industry. • To understand the different web servers and their service providers with different platforms.		
Unit - I	**INTRODUCTION**	Periods	**9**
Open source system definition - Merits and demerits of open source software vs. closed source or proprietary software and freeware – software licensing and intellectual property rights.			
Unit - II	**OPEN SOURCE OPERATING SYSTEMS**	Periods	**9**
OpenSolaris, OpenDarwin, MINIX, Haiku, Linux – General overview – Kernel types - architectures – Supported file systems - networking technologies - Security features.			
Unit - III	**OPEN SOURCE DATABASES**	Periods	**9**
MySQL, PostgreSQL, MaxDB, Firebird, Ingres – general properties - SQL standard compliance – supported platforms - programming interfaces.			
Unit - IV	**OPEN SOURCE PROGRAMMING LANGUAGES**	Periods	**9**
Perl, PHP, Python, Ruby – General features - Syntax and Style - Execution Environment - Programming in web environment – File handling and data storage.			
Unit - V	**OPEN SOURCE TOOLS & TECHNOLOGIES**	Periods	**9**
Apache Web server, Mozilla Firefox, Wikipedia, Eclipse software development platform.			
		Total Periods	**45**

REFERENCES:

1.	Chris DiBona, Mark Stone, Danese Cooper, “Open Sources 2.0, The Continuing Evolution”, O'Reilly Media, Inc., 2008.

FURTHER READINGS:

1.	Greg Kroab Hartman, “Linux Kernel in A Nutshell”, Shroff Publishers and Distributors, 2007.
2.	Tim Converse, Joyce Park, Clark Morgan, “PHP 5 and MYSQL Bible”, Wiley Dream Tech, 2005.
3.	Wesley J Chun, “Core Phython Programming”, Second edition, Pearson Education Asia, 2007.
4.	James Lee, Brent Ware, “Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl and PHP”, Addison - Wesley Professional, 2008.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE02	**Ad-Hoc & Sensor Networks**	3	0	0	3	50	50	100

Objective	▪ To understand the issues of MAC layer and routing protocols ▪ To study about the different types of adhoc routing protocols ▪ To learn about the QoS aware adhoc routing protocols ▪ To understand the routing and models of mesh networks.		
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 NETWORKS**	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", Pearson Education, 2004.
FURTHER READINGS:	
1.	Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufman Publishers, 2004.
2.	C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
3.	Thomas Krag and Sebastin Buettrich, "Wireless Mesh Networking", O'Reilly Publishers, 2007

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**Information Technology**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE03	**Soft Computing**	3	0	0	3	50	50	100

Objective	• To know various soft computing techniques and machine learning basics • To understand the concepts of genetic algorithms, neural networks, fuzzy logic & neuro-fuzzy modeling.		
Unit - I	**INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS**	Periods	**9**
Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics			
Unit - II	**GENETIC ALGORITHMS**	Periods	**9**
Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.			
Unit - III	**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 - IV	**FUZZY LOGIC**	Periods	**9**
Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.			
Unit - V	**NEURO-FUZZY MODELING**	Periods	**9**
Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies.			
		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.	George J. Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic-Theory and Applications”, Prentice Hall, 1995.

FURTHER READINGS:

1.	James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Edition., 2003.
2.	Mitchell Melanie, “An Introduction to Genetic Algorithm”, Prentice Hall, 1998.
3.	David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley, 1997.
4.	S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to Fuzzy Logic using MATLAB”, Springer, 2007.
5.	S.N.Sivanandam · S.N.Deepa, “ Introduction to Genetic Algorithms”, Springer, 2007.
6.	Jacek M. Zurada, “Introduction to Artificial Neural Systems”, PWS Publishers, 1992.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE04	**Supply Chain Management**	3	0	0	3	50	50	100

Objective	• To understand the fundamentals of Supply chain management and strategies • To study methods improve the overall organization performance and customer satisfaction by improving product or service delivery to consumer		
Unit - I	**FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT**	Periods	**9**
Supply chain networks, Integrated supply chain planning, Decision phases in s supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.			
Unit - II	**SCM STRATEGIES, PERFORMANCE**	Periods	**9**
Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.			
Unit - III	**PLANNING AND MANAGING INVENTORIES**	Periods	**9**
Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.			
Unit - IV	**DISTRIBUTION MANAGEMENT**	Periods	**9**
Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning,			
Unit - V	**STRATEGIC COST MANAGEMENT IN SUPPLY CHAIN**	Periods	**9**
The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.			
		Total Periods	**45**

REFERENCES:	
1.	David Simchi-Levi, Philip Kaminsky, and Edith Simchi-Levi ,"Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies", Second Edition, , McGraw-Hill/Irwin, New York, 2003.
2.	Sunil Chopra and Peter Meindel. "Supply Chain Management: Strategy, Planning, and Operation", Prentice Hall of India, 2002.
FURTHER READINGS:	
1.	Sunil Chopra & Peter Meindl,"Supply Chain Management" , Prentice Hall Publisher, 2001
2.	Robert Handfield & Ernest Nichols, "Introduction to Supply Chain Management" ,Prentice hall Publishers, 1999.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE05	**High Speed Networks**	3	0	0	3	50	50	100

Objective	• To get an introduction about ATM and Frame relay. • To provide an up-to-date survey of developments in High Speed Networks. • To know techniques involved to support real-time traffic and congestion control. • To understand different levels of quality of service (QoS) to different 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.
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 and 2, 2003.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14CSE27	**Grid Computing**	3	0	0	3	50	50	100

Objective	• To understand the grid technology and architecture of grid • To understand the infrastructure and services of grids • To have wide knowledge about grid computing through case studies		
Unit – I	**INTRODUCTION**	Periods	**9**
High Performance Computing, Cluster Computing, Meta-computing, Peer-to-Peer Computing, Internet Computing, Grid Computing – Types of grids - The Grid: Past, Present, Future - A New Infrastructure for 21st Century Science, Grid Applications			
Unit – II	**GRID COMPUTING TECHNOLOGY**	Periods	**9**
The Evolution of the Grid - Desktop Grids - Cluster Grids – HPC Grids – Computational and Data Grids.			
Unit – III	**THE ANATOMY OF THE GRID**	Periods	**9**
Virtual organizations, Grid architecture and its Relationship to other distributed technologies – autonomic computing – service on demand – SOA and the Grid – semantic grids - Service virtualization – Infrastructure and applications.			
Unit – IV	**THE OPEN GRID SERVICES ARCHITECTURE & INFRASTRUCTURE**	Periods	**9**
Evolution to OGSA, Physiology of the Grid: OGSA Infrastructure - OGSA Basic Services, Creating and Managing Grid Services, Managing Grid Environments - Grid-Enabling software applications, Grid-Enabling network services, Grid Security, Grid Resource Management and Scheduling - High-level Introduction to OGSI, Technical details of OGSI specification.			
Unit – V	**APPLICATION- CASE STUDY**	Periods	**9**
Globus Toolkit – Architecture, Programming model, Sample Implementation, High Level Services – Study of a cloud computing infrastructure.			
		Total Periods	**45**

REFERENCES:	
1	Ahmar Abbas, "Grid Computing Practical Guide to Technology and Applications", Firewall Media, New Delhi, 2008.
FURTHER READINGS:	
1	Ian Foster, Carl Kesselman, "The Grid : Blueprint for a New Computing Infrastructure", Morgan Kaufman, New Delhi, 2006.
2	Fran Berman, Geoffrey Fox, Anthony Hey J G, "Grid Computing Making the Global Infrastructure a Reality", Wiley, USA, 2003
3	Joshy Joseph, Craig Fallenstein, "Grid Computing", Pearson Education, New Delhi, 2004.
4	Prabhu C S R, "Grid and Cluster Computing", PHI Pvt Ltd, New Delhi, 2008.
5	Janakiraman, "Grid Computing-Models, A Research Monograph", Tata Mc Graw Hill, 2005.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution Affiliated to Anna University, Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course name	Periods per week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14CSE28	**XML and Web Services**	3	0	0	3	50	50	100

Objective	• 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, 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.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE06	**Agent Based Intelligent Systems**	3	0	0	3	50	50	100

Objective	• To become familiar with agents and their types. • To understand how to solve problems using the appropriate agents.		
Unit – I	**INTRODUCTION**	Periods	**5**
Basic Definitions- History – Intelligent Agents – Agents and Environments – Structure of Agents			
Unit – II	**PROBLEM SOLVING AGENTS**	Periods	**10**
Searching for Solutions – Uninformed Search Strategies – Informed Search strategies – online search agents and unknown environments – Constraint satisfaction problems.			
Unit – III	**KNOWLEDGE BASED AGENTS**	Periods	**10**
Knowledge representation - logic – proposition – Inference – First order logic – Inference in FOL - Algorithms – knowledge representation Issues.			
Unit – IV	**PLANNING & PROBABILISTIC AGENTS**	Periods	**9**
The planning problem – partial order planning – conditional planning – multi agent planning – uncertainty and probabilistic reasoning.			
Unit – V	**LEARNING agents**	Periods	**11**
learning from observations – learning decision trees – statistical learning methods – instance based learning – neural network techniques for learning - Introduction to communicative agents – probabilistic agents – perception and robotics – AI future.			
		Total Periods	**45**

REFERENCES:	
1	Stuart Russel, Peter Norvig, "Artificial Intelligence – A Modern Approach", Second edition, Pearson Education, 2006.
FURTHER READINGS:	
1	Padhy N P, "Artificial Intelligence and Intelligent Systems", Oxford University Press, New Delhi, 2005.
2	Nils J Nilsson, "Artificial Intelligence – A New Synthesis", Morgan Kaufmann, New Delhi, 2007.
3	George F Luger, "Artificial Intelligence – Structures and Strategies for Complex Problem Solving", Pearson Education, New Delhi, 2004.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE07	**Digital Image Processing**	3	0	0	3	50	50	100

Objective	• To know the fundamentals of an image and operations on a digital image • To understand various transformations of an image and techniques used for the operations on digital image.		
Unit – I	**DIGITAL IMAGE FUNDAMENTALS & TRANSFORMS**	Periods	**9**
Elements of digital image processing system-Image sensing and acquisition- Image sampling and quantization – Basic relationship between pixels. - Need for image transforms- Discrete Fourier transform- Discrete Cosine transform-Walsh transform- Hadamard transform- Hotelling transform- Haar transform- Radon transform.			
Unit – II	**IMAGE ENHANCEMENT**	Periods	**9**
Spatial domain methods- Frequency domain methods- Histogram modification techniques- Neighborhood averaging-median filtering- Lowpass filtering- averaging of multiple images- image sharpening by differentiation- high pass filtering			
Unit – III	**IMAGE FILTERING & RESTORATION**	Periods	**9**
Image observation models- restoration in the presence of noise only- spatial filtering: mean filters, order statistics filters, adaptive filters- Inverse filtering- Wiener filtering – Constrained least squares filtering- blind deconvolution.			
Unit – IV	**IMAGE CODING**	Periods	**9**
Quantization: scalar Quantization and vector Quantization-code word assignment: uniform length and variable length codeword assignment – differential pulse code modulation, two channel coders, pyramid coding; hybrid transform coding – wavelet coding.			
Unit – V	**IMAGE SEGMENTATION & REPRESENTATION**	Periods	**9**
Edge detection: Gradient operators - edge linking and boundary detection: Global processing via Hough transform, Graph theoretic techniques -Thresholding: Global thresholding, adaptive threshold-Representation: Chain codes, Polygonal approximations, Signatures, boundary segments, skeletons - Boundary descriptors: Shape numbers, Fourier descriptors, Statistical moments - Regional descriptors: Texture - Relational descriptors.			
		Total Periods	**45**

REFERENCES:	
1.	Gonzalez R C, Woods R E, ”Digital Image Processing”, Second edition, Pearson Education, 2002.
2.	Jain A K, ”Fundamentals of Digital Image Processing”, Prentice Hall of India,1989.
FURTHER READINGS:	
1.	Jae S Lim, ”Two-Dimensional Signal and Image Processing”, Prentice Hall,Inc., 1990.
2.	Kenneth R Castleman, ”Digital Image Processing”, Prentice Hall International,Inc., 2001.
3.	Milan Sonka, VaclauHlavac, Roger Boyle, “Image Processing, Analysis, and Machine Vision”, Brooks/Cole Publishing Company, 1999.
4.	William K Pratt, “Digital Image Processing”, John Wiley & Sons, 2003.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE08	**Bio Informatics Computing**	3	0	0	3	50	50	100

Objective	• 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**
Pair-wise 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.
FURTHER READINGS:	
1.	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.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE09	**Embedded System**	3	0	0	3	50	50	100

Objective	• 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 – Interprocess 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” , Elsevier, Second Edition ,2003.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14CSE29	**Software Testing and Quality Assurance**	3	0	0	3	50	50	100

Objective	• 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", Second Edition, Van Nostrand Reinhold, 1992.
FURTHER READINGS:	
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.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14CSE30	**Software Project Management**	3	0	0	3	50	50	100

Objective	• 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 **9**001 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.	Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2.	Humphrey,Watts,"Managing the Software Process ",Addison Wesley,1986.
FURTHER READINGS:	
1.	Pressman,Roger,"Software Engineerin,A Practitioner's approach", McGraw Hill,1997.
2.	Bob Hughes and Mike Cotterell,"Software Project Management", Fifth Edition, McGraw-Hill Education, 2009
3.	Wheelwright and Clark,"Revolutionising product development",The Free Press,1993.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14CSE31	**Information Security**	3	0	0	3	50	50	100

Objective	• 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, 2007.
2.	Whitman, “Principles of Information Security”, Second Edition, Pearson Education, 2008
3.	William Stallings, “Cryptography and Network Security: Principles and Practices”, Third Edition, Pearson Education, 2003.
4.	“Security in Computing ”, Charles P.Pfleeger and Shari Lawrence Pfleeger, Third Edition, 2003.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE10	**3G and 4G Wireless Networks**	3	0	0	3	50	50	100

Objectives	• To learn various generations of wireless and cellular networks. • To study about fundamentals of 3G Services, its protocols and applications. • To study about evolution of 4G Networks, its architecture and applications. • To study about Wi MAX networks, protocol stack and standards. • To understand about the emerging trends of smart phones and evolution of latest standards like DLNA and NFC.		
Unit – I	**INTRODUCTION**	Periods	**9**
Introduction: History of Mobile Cellular Systems - First Generation - Second Generation - Generation 2.5 - Overview of 3G & 4G. 3GPP and 3GPP2 standards			
Unit – II	**3G NETWORKS**	Periods	**9**
Evolution from GSM, 3G Services and Applications - UMTS network structure - Core network - UMTS Radio access - HSPA – HSUPA- HSDPA- CDMA 1X - EVDO Rev -0, Rev-A, Rev-B, Rev-C Architecture- Protocol stack.			
Unit – III	**4G LTE NETWORKS**	Periods	**9**
LTE: Introduction, Radio interface architecture - Physical layer, Access procedures – System Architecture Evolution (SAE) - Communication protocols – Interfaces.			
Unit – IV	**WIMAX NETWORKS**	Periods	**9**
Introduction – IEEE 802.16 – Frame Format – Protocols - OFDM – MIMO - IEEE 802.20- Applications.			
Unit – V	**DLNA & NFC REVOLUTION**	Periods	**9**
Introduction and Evolution - Applications of DLNA and NFC - DLNA Architecture and Protocol stack - Smart phone and NFC – Mobile Commerce and NFC – NFC tags –Security Issues.			
		Total Periods	**45**

REFERENCES:

6.	Juha Korhonen, “Introduction to 3G Mobile Communication”, Artech House, 2003
7.	Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming , “3G Evolution HSPA and LTE for Mobile Broadband”, Academic Press, 2008
8.	Flavio Muratore, “UMTS Mobile Communication for the Future”, John Wiley & Sons , 2001
9.	Harri Holma and Antti Toskala, “HSDPA/HSUPA for UMTS”, Johan Wiley & Sons, 2006.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE11	**Cyber Forensics**	3	0	0	3	50	50	100

Objectives	• To study the fundamentals of computer forensics. • To have an overview of techniques for Data Recovery and Evidence Collection. • To study various threats associated with security and information warfare. • To study the tools and tactics associated with cyber forensics.		
Unit – I	**INTRODUCTION**	Periods	7
Computer Forensics Fundamentals – Types of Computer Forensics Technology – Types of Vendor and Computer Forensics Services.			
Unit – II	**COMPUTER FORENSICS EVIDENCE AND CAPTURE**	Periods	8
Data Recovery – Evidence Collection and Data Seizure –Duplication and Preservation of Digital Evidence – Computer Image Verification and Authentication.			
Unit – III	**COMPUTER FORENSIC ANALYSIS**	Periods	10
Discover of Electronic Evidence – Identification of Data – Reconstructing Past Events Fighting against Macro Threats – Information Warfare Arsenal – Tactics of the Military–Tactics of Terrorist and Rogues – Tactics of Private Companies.			
Unit – IV	**INFORMATION WARFARE**	Periods	10
Arsenal – Surveillance Tools- Hackers and Theft of Components- Contemporary Computer Crime Identity Theft and Identity Fraud-Organized Crime & Terrorism Avenues Prosecution and Government Efforts-Applying the First Amendment to Computer Related Crime-The Fourth Amendment and Other Legal Issues.			
Unit – V	**COMPUTER FORENSIC CASES**	Periods	10
Developing Forensic Capabilities- Searching and Seizing Computer Related Evidence-Processing Evidence and Report Preparation - Future Issues.			
		Total Periods	**45**

REFERENCES:

1.	John R. Vacca, "Computer Forensics: Computer Crime Scene Investigation, Volume1, Cengage Learning, 2005
2.	Marjie T Britz , "Computer Forensics and Cyber Crime: An Introduction, 2/e,Pearson Education, 2008.
3.	Marie-Helen Maras, "Computer Forensics: Cybercriminals, Laws, and Evidence", Jones & Bartlett Publishers, 2011.
4.	Chad Steel, "Windows Forensics", Wiley India, 2006.Majid Yar, "Cybercrime and Society", Sage Publications, 2006.Robert M Slade, "Software Forensics", Tata Mc Graw Hill, 2004.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE12	**Green Computing**	3	0	0	3	50	50	100

Objectives	• To introduce the concept of green computing. • To create awareness of energy efficient computing. • To understand the power management in computing devices • To analyze the consumption of power in data centers		
Unit – I	**INTRODUCTION**	Periods	**9**
Energy- efficient – power efficient and thermal aware computing and communication - Newton's cooling model and basic thermodynamics and sustainability.			
Unit – II	**POWER MANAGEMENT**	Periods	**9**
Operating system Directed power management – Power management history and motivation – key power management concepts – power management scenarios – ACPI desktop motherboard design			
Unit – III	**DEVELOPMENT OF EFFICIENT POWER MANAGEMENT SYSTEM**	Periods	**9**
Dual mode desktop power delivery – system BIOS – Designing mobile systems – Communication with peripheral devices – Drivers – Developing robust power managed applications			
Unit – IV	**ENERGY EFFICIENT DATA CENTER**	Periods	**9**
Data center power consumption – Power metrics – Energy efficient data center tuning – energy efficient server management – Industry vision and recommendations			
Unit – V	**CASE STUDIES AND APPLICATION**	Periods	**9**
Google green datacenter - IBM green technology - Microsoft – Case Studies – Applying Green IT Strategies and Applications to a Home – Hospital - Packaging Industry and Telecom Sector.			
		Total Periods	**45**

REFERENCES:

1.	Jerzy Kolinski, Ram Chary, Andrew Henroid, and Barry Press, "Building the Power-Efficient PC A Developer's Guide to ACPI Power Management", Intel Press August 2001.
2.	Lauri Minas, Brad Ellison, "Energy Efficiency for Information Technology: How to Reduce Power Consumption in Servers and Data Centers", Intel Press, 2009.
3.	Bhuvan Unhelkar, "Green IT Strategies and Applications-Using Environmental Intelligence", CRC Press, June 2011.
4.	Wu Chun Feng, "Green Computing: Large-Scale Energy Efficiency", CRC Press INC, 2013.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE13	**Knowledge Engineering**	3	0	0	3	50	50	100

Objectives	• To learn about proposition logic and predicate logics. • To acquire knowledge about modal and non monotonic logics. • To apply object oriented abstractions for various expert systems. • To understand various planning strategies for problem solving.		
Unit – I	**INTRODUCTION AND PROPOSITION LOGIC**	Periods	**9**
The Need for Formal Languages for Representing (Machine-Understandable) Knowledge - Reasoning Services and Logic-Based Reasoning - High Level Architecture of KR&R Systems - Propositional Logic - Syntax and Semantics of Propositional Logic – Reasoning in Proposition Logic - Limitations.			
Unit – II	**FIRST ORDER PREDICATE LOGIC AND DERIVATIVES**	Periods	**9**
Syntax and Semantics of First Order Logic - Knowledge Engineering using First Order Logic - Reasoning in First Order Logic - Normal Forms - Herbrand Interpretations and Herbrand's Theorem - Undecidability of the Satisfiability and Validity Problems -Resolution in First Order Logic - Description Logics as Fragments of First Order Logic -Syntax and Semantics – Reasoning with Description Logics.			
Unit – III	**MODAL AND NON MONOTONIC LOGICS**	Periods	**9**
Temporal Logic – Syntax and Semantics – KR using Temporal Logic – Epistemic Logic – Syntax and Semantics – KR using Epistemic Logic – Non Monotonic Logic- Uncertainty – Fuzzy logic.			
Unit – IV	**OBJECT ORIENTED REPRESENTATION**	Periods	**9**
Semantic Networks- Object Oriented Representations – Frame Formalism – Structured Descriptions – Meaning and Entailment - Taxonomies and Classification – Inheritance – Conceptual Dependency- Scripts – Expert Systems.			
Unit – V	**ACTIONS AND PLANNING**	Periods	**9**
Actions – Situational Calculus – Frame Problem – Representing Complex Actions – Planning – STRIPS/ ADL – Planning as Reasoning – Hierarchical and Conditional Planning.			
		Total Periods	**45**

REFERENCES:

1.	Ronald Brachman, Hector Levesque, “Knowledge Representation and Reasoning”, The Morgan Kaufmann Series in Artificial Intelligence, 2004.
2.	Elaine Rich, S.Nair, “Artificial intelligence”, Third edition, Tata McGraw-Hill Education, 2010
3.	John F. Sowa, “Knowledge Representation: Logical, Philosophical, and Computational Foundations”, 2000.
4.	Arthur B. Markman, “Knowledge Representation”, Lawrence Erlbaum Associates, 1998.
5.	S.C. Mehrotra, Ratnadeep R. Deshmukh, Sachin N. Deshmukh, Ramesh R. Manza, “Knowledge Engineering” , Alpha Science, 2011.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE14	**Machine Learning**	3	0	0	3	50	50	100

Objectives	• To understand the concepts of machine learning. • To appreciate supervised and unsupervised learning and their applications. • To understand the theoretical and practical aspects of Probabilistic Graphical Models. • To appreciate the concepts and algorithms of reinforcement learning. • To learn aspects of computational learning theory.

Unit – I	**INTRODUCTION**	Periods	**9**

Machine Learning - Machine Learning Foundations –Overview – Applications - Types of Machine Learning - Basic Concepts in Machine Learning - Examples of Machine Learning - Applications - Linear Models for Regression - Linear Basis Function Models - The Bias-Variance Decomposition - Bayesian Linear Regression - Bayesian Model Comparison.

Unit – II	**SUPERVISED LEARNING**	Periods	**9**

Linear Models for Classification - Discriminant Functions - Probabilistic Generative Models - Probabilistic Discriminative Models - Bayesian Logistic Regression - Decision Trees - Classification Trees - Regression Trees – Pruning - Neural Networks - Feed-Forward Network Functions - Error Back-Propagation - Regularization - Mixture Density and Bayesian Neural Networks - Kernel Methods - Dual Representations - Radial Basis Function Networks – Ensemble methods - Bagging - Boosting.

Unit – III	**UNSUPERVISED LEARNING**	Periods	**9**

Clustering- K-means - EM - Mixtures of Gaussians - The EM Algorithm in General –Model Selection for Latent Variable Models - High-Dimensional Spaces -- The Curse of Dimensionality - Dimensionality Reduction - Factor Analysis - Principal Component Analysis - Probabilistic PCA Independent Components Analysis.

Unit – IV	**PROBABILISTIC GRAPHICAL MODELS**	Periods	**9**

Directed Graphical Models - Bayesian Networks - Exploiting Independence Properties – From Distributions to Graphs - Examples - Markov Random Fields - Inference in Graphical Models - Learning –Naive Bayes Classifiers - Markov Models – Hidden Markov Models – Inference – Learning- Generalization – Undirected graphical models - Markov Random Fields- Conditional Independence Properties - Parameterization of MRFs - Examples - Learning - Conditional
Random Fields (CRFs) - Structural SVMs.

Unit – V	**ADVANCED LEARNING**	Periods	**9**

Sampling – Basic sampling methods – Monte Carlo - Reinforcement Learning - K-Armed Bandit- Elements - Model- Based Learning - Value Iteration- Policy Iteration - Temporal Difference Learning- Exploration Strategies- Deterministic and Non-deterministic Rewards and Actions- Eligibility Traces- Generalization- Partially Observable States- The Setting- Example - Semi- Supervised Learning - Computational Learning Theory - Mistake Bound Analysis – Sample Complexity Analysis - VC Dimension - Occam Learning - Accuracy and Confidence Boosting.

	Total Periods	**45**

REFERENCES:

1.	Christopher Bishop, “Pattern Recognition and Machine Learning” Springer, 2006
2.	Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press, 2012

3.	Ethem Alpaydin, “Introduction to Machine Learning”, Prentice Hall of India, 2005
4.	Tom Mitchell, "Machine Learning", McGraw-Hill, 1997.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE15	**Social Network Analysis**	3	0	0	3	50	50	100

Objectives	• To gain knowledge about the current web development and emergence of Social Web. • To study about the modeling, aggregating and knowledge representation of Semantic Web. • To learn about the extraction and mining tools for Social networks. • To gain knowledge on Web personalization and Web Visualization of Social networks.

Unit – I	**INTRODUCTION TO SOCIAL NETWORK ANALYSIS**	Periods	**9**

Introduction to Web - Limitations of current Web – Development of Semantic Web – Emergence of the Social Web - Network analysis - Development of Social Network Analysis - Key concepts and measures in network analysis - Electronic sources for network analysis - Electronic discussion networks, Blogs and online communities, Web-based networks - Applications of Social Network Analysis.

Unit – II	**MODELING, AGGREGATING AND KNOWLEDGE REPRESENTATION**	Periods	**8**

Ontology and their role in the Semantic Web - Ontology-based Knowledge Representation - Ontology languages for the Semantic Web – RDF and OWL - Modeling and aggregating social network data - State-of-the-art in network data representation, Ontological representation of social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data, Advanced Representations.

Unit – III	**EXTRACTION AND MINING COMMUNITITES IN WEB SOCIAL NETWORKS**	Periods	**10**

Extracting evolution of Web Community from a Series of Web Archive - Detecting Communities in Social Networks -Definition of Community - Evaluating Communities - Methods for Community Detection & Mining - Applications of Community Mining Algorithms - Tools for Detecting Communities Social Network Infrastructures and Communities - Decentralized Online Social Networks- Multi-Relational Characterization of Dynamic Social Network Communities.

Unit – IV	**PREDICTING HUMAN BEHAVIOR AND PRIVACY ISSUES**	Periods	**10**

Understanding and Predicting Human Behaviour for Social Communities - User Data Management - Inference and Distribution - Enabling New Human Experiences - Reality Mining - Context- Awareness - Privacy in Online Social Networks - Trust in Online Environment - Trust Models Based on Subjective Logic - Trust Network Analysis - Trust Transitivity Analysis - Combining Trust and Reputation - Trust Derivation Based on Trust Comparisons - Attack Spectrum and Countermeasures.

Unit – V	**VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS**	Periods	**8**

Graph Theory- Centrality- Clustering - Node-Edge Diagrams, Matrix representation, Visualizing Online Social Networks - Visualizing Social Networks with Matrix-Based Representations- Matrix- Node-Link Diagrams - Hybrid Representations - Applications - Covert Networks – Community Welfare - Collaboration Networks - Co-Citation Networks.

	Total Periods	**45**

REFERENCES:	
1.	Peter Mika, “Social Networks and the Semantic Web”, First Edition, Springer, 2007.
2.	Borko Furht, “Handbook of Social Network Technologies and Applications”, First edition, Springer,2010.
3.	Guandong Xu , Yanchun Zhang and Lin Li, “Web Mining and Social Networking Techniques and applications”, First Edition, Springer,2011.
4.	Dion Goh and Schubert Foo, “Social information retrieval systems: emerging technologies and applications for searching the Web effectively”, IGI Global snippet, 2008.
5.	Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, “Collaborative and Social Information Retrieval and Access: Techniques for Improved User Modelling”, IGI Global snippet, 200**9**.
6.	John G. Breslin, Alexandre Passant and Stefan Decker, “The Social Semantic Web”, Springer, 2009.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE16	**Information Retrieval**	3	0	0	3	50	50	100

Objectives	• To understand the basics of Information Retrieval with pertinence to modeling, query operations and indexing. • To get an understanding of machine learning techniques for text classification and clustering. • To understand the various applications of Information Retrieval giving emphasis to Multimedia IR, Web Search. • To understand the concepts of digital libraries.

Unit – I	**INTRODUCTION**	Periods	**9**
Introduction - Goals and History of IR - The Impact of the Web on IR - The Role of Artificial Intelligence (AI) in IR - Basic IR Models - Boolean and Vector-Space Retrieval Models – Ranked Retrieval - Text-Similarity Metrics - TF-IDF (Term Frequency/Inverse Document Frequency) Weighting - Cosine Similarity.			
Unit – II	**PREPROCESSING**	Periods	**9**
Basic Tokenizing Indexing and Implementation of Vector-Space Retrieval - Simple Tokenizing - Stop-Word Removal and Stemming - Inverted Indices - Efficient Processing with Sparse Vectors - Query Operations and Languages - Relevance Feedback - Query Expansion - Query Languages.			
Unit – III	**METRICS**	Periods	**9**
Experimental Evaluation of IR - Performance Metrics – Recall - Precision and F Measure - Evaluations on Benchmark Text Collections - Text Representation - Word Statistics - Zipf's Law - Porter Stemmer – Morphology - Index Term Selection - Using Thesauri - Metadata and Markup Languages - Web Search - Search Engines – Spidering – Metacrawlers - Directed Spidering – Link Analysis Shopping Agents.			
Unit – IV	**CATEGORIZATION AND CLUSTERING**	Periods	**9**
Text Categorization and Clustering - Categorization Algorithms - Naive Bayes - Decision Trees and Nearest Neighbor - Clustering Algorithms - Agglomerative Clustering - K-Means – Expectation Maximization (EM) - Applications to Information Filtering – Organization and Relevance Feedback.			
Unit – V	**Extraction and Integration**	Periods	**9**
Recommender Systems - Collaborative Filtering and Content-Based Recommendation of Documents and Products Information Extraction and Integration - Extracting Data from Text – XML - Semantic Web - Collecting and Integrating Specialized Information on the Web.			
		Total Periods	**45**

REFERENCES:

1.	Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, “Introduction to Information Retrieval”, Cambridge University Press, 2008
2.	Ricci, F, Rokach, L. Shapira, B.Kantor, “Recommender Systems Handbook”, First Edition, 2011.
3.	Brusilovsky, Peter, “The Adaptive Web: Methods and Strategies of Web Personalization”, Springer, 2007

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE17	**Software Metrics & Reliability**	3	0	0	3	50	50	100

Objectives	• To gain basic knowledge about metrics, measurement theory and related terminologies • To measure the quality level of internal and external attributes of the software product • To introduce the basics of software reliability and to illustrate how to perform planning, executing and testing for software reliability • To explore various metrics and models of software reliability

Unit – I	**FUNDAMENTALS OF MEASUREMENTS**	Periods	**9**
Measurements in Software Engineering – Scope of Software Metrics – Fundamentals of Measurements Theory – Goal Based Framework – Software Measurement Validation.			
Unit – II	**METRICS AND MODELS**	Periods	**9**
Measurement of Internal Product Attributes – Size and Structure – External Product Attributes - Measurement of Quality– Reliability Model – Exponential Distribution and Reliability Growth Model – Availability Metrics.			
Unit – III	**INTRODUCTION TO SOFTWARE RELIABILITY**	Periods	**9**
Basic Concepts – Failure and Faults – Environment – Availability –Modeling –uses.			
Unit – IV	**SOFTWARE RELIABILITY MODELING**	Periods	**9**
Concepts – General Model Characteristic – Historical Development of models – Model Classification scheme – Markovian models – General concepts – General Poisson Type Models – Binomial Type Models – Poisson Type models – Fault reduction factor for Poisson Type models.			
Unit – V	**COMPARISON OF SOFTWARE RELIABILITY MODELS**	Periods	**9**
Comparison Criteria – Failure Data – Comparison of Predictive Validity of Model Groups – Recommended Models – Comparison of Time Domains – Calendar Time Modeling – Limiting Resource Concept – Resource Usage model – Resource Utilization – Calendar Time Estimation and confidence Intervals.			
		Total Periods	**45**

REFERENCES:

1.	John D. Musa, “Software Reliability Engineering”, Tata McGraw Hill, 2004.
2.	Norman E . Fenton, Shari Lawrence Pfleeger, "Software metrics", Second Edition, International Student Edition, 2003.
3.	John D. Musa, Anthony Iannino, Kazuhira Okumoto, “Software Reliability – Measurement, Prediction, Application, Series in Software Engineering and Technology”, McGraw Hill, 1987.
4.	Stephen H. Kan, “Metrics and Models in Software Quality Engineering”, Second Edition, Addison-Wesley Professional,2002
5.	N.Fenton and B.Little Wood,” Software Reliability and Metrics”, Springer, 1991
6.	Michael R.Lyu,” Handbook of Software Reliability Engineering”, McGraw-Hill, 1996
7.	Steven R.Rakitin, “Software Verification and Validation for Practitioners and Managers”, Artech House, Inc. Norwood, MA, USA, 2001

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE18	**Big Data Analytics**	3	0	0	3	50	50	100

Objectives	• To explore the fundamental concepts of big data analytics • To learn to analyze the big data using intelligent techniques. • To understand the various search methods and visualization techniques. • To learn to use various techniques for mining data stream. • To understand the applications using Map Reduce Concepts.

Unit – I	**INTRODUCTION TO BIG DATA**	Periods	8
Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.			
Unit – II	**DATA ANALYSIS**	Periods	11
Regression Modeling - Multivariate Analysis – Bayesian Methods – Bayesian Paradigm – Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees			
Unit – III	**SEARCH METHODS AND VISUALIZATION**	Periods	**9**
Search by simulated Annealing – Stochastic, Adaptive search by Evaluation – Evaluation Strategies – Genetic Algorithm – Genetic Programming – Visualization – Classification of Visual Data Analysis Techniques – Data Types – Visualization Techniques – Interaction techniques – Specific Visual data analysis Techniques.			
Unit – IV	**MINING DATA STREAMS**	Periods	8
Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.			
Unit – V	**FRAMEWORKS**	Periods	**9**
Map Reduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Case Study.			
		Total Periods	**45**

REFERENCES:

1.	Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2.	Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
3.	Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
4.	Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
5.	Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
6.	Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.

7.	Da Ruan, Guoquing Chen, Etienne E.Kerre, Geert Wets, Intelligent Data Mining, Springer,2007
8.	Paul Zikopoulos ,Dirk deRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles, David Corrigan , "Harness the Power of Big Data The IBM Big Data Platform", Tata McGraw Hill Publications, 2012
9.	Michael Minelli, Michele Chambers, Ambiga Dhiraj ," Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses",Wiley Publications,2013
10.	Zikopoulos, Paul, Chris Eaton, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", Tata McGraw Hill Publications, 2011

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE19	**Image Processing & Pattern Analysis**	3	0	0	3	50	50	100

Objectives	• To introduce the student to various Image processing and Pattern recognition techniques. • To study the Image fundamentals. • To study the mathematical morphology necessary for Image processing and Image segmentation. • To study the Image Representation and description and feature extraction. • To study the principles of Pattern Recognition.

Unit – I	**INTRODUCTION**	Periods	**9**
Elements of an Image Processing System- Mathematical Preliminaries- Image Enhancement- Grayscale Transformation- Piecewise Linear Transformation-Bit Plane Slicing- Histogram Equalization--Histogram Specification- Enhancement by Arithmetic Operations- Smoothing Filter- Sharpening Filter- Image Blur Types and Quality Measures.			
Unit – II	**MATHEMATICAL MORPHOLOGY AND IMAGE SEGMENTATION**	Periods	**9**
Binary Morphology-Opening and Closing- Hit-or-Miss Transform- Grayscale Morphology- Basic morphological Algorithms- Morphological Filters-Thresholding-Object (Component) Labeling- Locating Object Contours by the Snake Model- Edge Operators-Edge Linking by Adaptive Mathematical morphology-Automatic Seeded Region Growing- A Top-Down Region Dividing Approach.			
Unit – III	**IMAGE REPRESENTATION AND DESCRIPTION AND FEATURE EXTRACTION**	Periods	**9**
Run-Length Coding- Binary Tree and Quadtree- Contour Representation-Skeletonization by Thinning-Medial Axis Transformation-Object Representation and Tolerance- Fourier Descriptor and Moment Invariants-Shape Number and Hierarchical Features-Corner Detection- Hough Transform-Principal Component Analysis-Linear Discriminate Analysis- Feature Reduction in Input and Feature Spaces.			
Unit – IV	**PATTERN RECOGNITION**	Periods	**9**
The Unsupervised Clustering Algorithm-Bayes Classifier- Support Vector Machine- Neural Networks-The Adaptive Resonance Theory Network-Fuzzy Sets in Image Analysis-Document image processing and classification-Block Segmentation and Classification- Rule-Based Character Recognition system- Logo Identification-Fuzzy Typographical Analysis for Character Pre classification-Fuzzy Model for Character Classification.			
Unit – V	**APPLICATIONS**	Periods	**9**
Face and Facial Feature Extraction-Extraction of Head and Face Boundaries and Facial Features- Recognizing Facial Action Units-Facial Expression Recognition in JAFFE Database-Image Steganography- Types of Steganography- Applications of Steganography- Embedding Security and Imperceptibility- Examples of Steganography Software-Genetic Algorithm Based Steganography.			
		Total Periods	**45**

REFERENCES:	
1.	Image Processing and Pattern Recognition: Fundamentals and Techniques- Frank Y Shih, Willey IEEE Press, April 2010
2.	Rafael C. Gonzalez, Richard E. Woods, Steven Eddins," Digital Image Processing using MATLAB", Pearson Education, Inc., 2004.
3.	D.E. Dudgeon and R.M. Mersereau, "Multidimensional Digital Signal Processing", Prentice Hall Professional Technical Reference, 1990.
4.	William K. Pratt, " Digital Image Processing", John Wiley, New York, 2002.
5.	Milan Sonka et al, "Image Processing, Analysis and Machine Vision", Brookes/Cole, Vikas Publishing House, 2nd edition, 1999;
6.	Sid Ahmed, M.A., " Image Processing Theory, Algorithms and Architectures", McGrawHill, 1995

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE20	**Principles of Programming Languages**	3	0	0	3	50	50	100

Objectives	• To understand and describe syntax and semantics of programming languages • To understand data, data types, and basic statements • To understand call-return architecture and ways of implementing them • To understand object-orientation, concurrency, and event handling in programming languages • To develop programs in non-procedural programming paradigms		
Unit – I	**SYNTAX AND SEMANTICS**	Periods	**9**
Evolution of programming languages – describing syntax – context-free grammars – attribute grammars – describing semantics – lexical analysis – parsing – recursive-decent – bottom-up parsing			
Unit – II	**DATA, DATA TYPES, AND BASIC STATEMENTS**	Periods	**9**
Names – variables – binding – type checking – scope – scope rules – lifetime and garbage collection – primitive data types – strings – array types – associative arrays – record types – union types – pointers and references – Arithmetic expressions – overloaded operators – type conversions – relational and boolean expressions – assignment statements – mixed-mode assignments – control structures – selection – iterations – branching – guarded statements			
Unit – III	**SUBPROGRAMS AND IMPLEMENTATIONS**	Periods	**9**
Subprograms – design issues – local referencing – parameter passing – overloaded methods – generic methods – design issues for functions – semantics of call and return – implementing simple subprograms – stack and dynamic local variables – nested subprograms – blocks – dynamic scoping			
Unit – IV	**OBJECT-ORIENTATION, CONCURRENCY, AND EVENT HANDLING**	Periods	**9**
Object-orientation – design issues for OOP languages – implementation of object-oriented constructs – concurrency – semaphores – monitors – message passing – threads – statement level concurrency – exception handling – even handling			
Unit – V	**FUNCTIONAL AND LOGIC PROGRAMMING LANGUAGES**	Periods	**9**
Introduction to lambda calculus – fundamentals of functional programming languages – Programming with Scheme – Programming with ML – Introduction to logic and logic programming – Programming with Prolog – multi-paradigm languages			
		Total Periods	**45**

REFERENCES:

1.	Robert W. Sebesta, “Concepts of Programming Languages”, Tenth Edition, Addison Wesley, 2012.
2.	Michael L. Scott, “Programming Language Pragmatics”, Third Edition, Morgan Kaufmann, 2009.
3.	R. Kent Dybvig, “The Scheme programming language”, Fourth Edition, MIT Press, 2009.
4.	Jeffrey D. Ullman, “Elements of ML programming”, Second Edition, Prentice Hall, 1998.
5.	Richard A. O'Keefe, “The craft of Prolog”, MIT Press, 2009

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE21	**Building Internet of Things**	3	0	0	3	50	50	100

Objectives	• To understand the fundamentals of Internet of Things. • To build a small low cost embedded system using Arduino or equivalent boards. • To apply the concept of Internet of Things in the real world scenarios.		
Unit – I	**INTRODUCTION**	Periods	**9**
Definition – phases – Foundations – Policy– Challenges and Issues - identification - security - privacy			
Unit – II	**COMPONENTS IN INTERNET OF THINGS**	Periods	**9**
Control Units – Sensors – Communication modules – Power Sources – Communication Technologies – RFID – Bluetooth – Zigbee – Wifi – Rflinks – Mobile Internet – Wired Communication			
Unit – III	**PROGRAMMING THE MICROCONTROLLER FOR IOT**	Periods	**9**
Basics of Sensors and actuators – examples and working principles of sensors and actuators – Cloud computing and IOT – Arduino/Equivalent Microcontroller platform – Setting up the board - Programming for IOT – Reading from Sensors			
Unit – IV	**COMMUNICATION**	Periods	**9**
Connecting microcontroller with mobile devices – communication through Bluetooth and USB – connection with the internet using WIFI / Ethernet			
Unit – V	**APPLICATIONS**	Periods	**9**
Set up cloud environment – send data from microcontroller to cloud – Case studies – Open Source e-Health sensor platform – BeClose Elderly monitoring – Other recent projects.			
		Total Periods	**45**

REFERENCES:	
1.	Charalampos Doukas , "Building Internet of Things with the Arduino",Fifth Edition Create space, April 2002
2.	http://postscapes.com/
3.	http://www.theinternetofthings.eu/what-is-the-internet-of-things

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE22	**Computer Graphics and Multimedia**	3	0	0	3	50	50	100

Objectives	• To understand the basic concepts of graphics designs. • To familiarize the student with the transformation and projection techniques. • To expose the student to various color models. • To appreciate the use of multimedia authoring tools and multimedia compression techniques.		
Unit – I	**INTRODUCTION TO GRAPHICS**	Periods	**9**
Introduction - Design and Drawing - Pictures Storage and Display - Basic Graphics Pipeline, Bitmap and Vector-Based Graphics - Attributes of output primitives – Line, Circle and Ellipse drawing algorithms and Other Conics.			
Unit – II	**TRANSFORMATION AND PROJECTION**	Periods	**9**
Two dimensional Geometric Transformation – Camera View Port – Viewing Pipeline –Viewing Transformation - Parallel and Perspective Viewing and Projections - Three Dimensional Object Representation –Visualization of Data Sets – Visible Surface Identification - Three-Dimensional Transformations - Two- Dimensional Clipping - Polygon Clipping - Clipping In Three Dimensions - Text Clipping.			
Unit – III	**CURVE AND SURFACE DESIGN AND COLOUR MODELS**	Periods	**9**
Parametric Curve Design - Spline Curve Representation - Bezier Curves - B-Spline Curves and Surface Design - Constructive Solid Geometry - Color Models – RGB – YIQ – CMY - HSV – Animations – General Computer Animation, Raster - Key Frame - Graphics Programming using OPENGL – Basic Graphics Primitives – Drawing Three Dimensional Objects - Drawing Three Dimensional Scenes.			
Unit – IV	**MULTIMEDIA AUTHORING AND DATA REPRESENTATIONS**	Periods	**9**
Introduction to Multimedia – Multimedia Authoring Tools – Graphics and Image Data Representations – Basics of Digital Video – Types of Video Signals – Analog and Digital Video – Digitization of Sound – Quantization and Transmission of Audio - MIDI.			
Unit – V	**MULTIMEDIA DATA COMPRESSION**	Periods	**9**
Lossless and Lossy Compression Algorithms – Image Compression Standards – Basic Audio and Video Compression Techniques – MPEG Audio and Video Coding – Computer and Multimedia Networks – Content Based Retrieval.			
		Total Periods	**45**

REFERENCES:

1.	Donald Hearn, Pauline Baker, "Computer Graphics – C Version", Second Edition, Pearson Education,2004.
2.	James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, "Computer Graphics- Principles and Practice", Second Edition in C, Pearson Education, 2007.
3.	F.S. Hill, "Computer Graphics using OPENGL", Second Edition, Pearson Education, 2003.
4.	Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia", Prentice Hall, 2004.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE23	**E-Learning**	3	0	0	3	50	50	100

Objectives	• To gain knowledge about modern technology for learning. • To acquaint with the E-Learning Tools. • To learn technologies involved in E-learning application development. • To become aware of the current business potential of E-learning based business		
Unit – I	**INTRODUCTION**	Periods	**9**
Introduction – Learning - the role of Training - the role of E-Learning – New Era - E-Learning Revolution - E-Learning Strategy			
Unit – II	**KNOWLEDGE MANAGEMENT**	Periods	**9**
Computer Based Training – Pitfalls - classroom course to the web-case study – knowledge Management – types – benefits - knowledge management pyramid - community and collaboration in knowledge management - knowledge management for professionals – services – building knowledge management solution			
Unit – III	**E-LEARNING ARCHITECTURE**	Periods	**9**
Integrating E-Learning and Classroom Learning - building Learning Architecture – Learning Architecture for - sales development - financial consultants - initial call center training, executives - E-Learning Applications			
Unit – IV	**LEARNING MANAGEMENT SYSTEM**	Periods	**9**
Building and Managing an E-Learning Infrastructure - Learning portals - Learning Management Systems (LMS) - Building Learning Culture – strategies - E-Learning costs – justification – Quality – demonstration - E-Learning- service – speed evaluation			
Unit – V	**CASE STUDY**	Periods	**9**
Reinventing the Training Organization – Training at CISCO System – case study - creating E-learning strategy for self – future of E-learning.			
		Total Periods	**45**

REFERENCES:

1.	Marc J.Rosenberg, "E-Learning: Strategies for Delivering Knowledge in the Digital Age", McGraw Hill, 2001.
2.	Safeeullah Soomro, "E-Learning Experiences and Future", In Tech Publication, 2010
3.	Frank Rennie, "E-Learning and Social Networking Handbook – Resources for Higher Education" , Tara Morrison, 2012
4.	Saul Carliner and Patti Shank, "The E-Learning Handbook: Past Promises, Present Challenges", Pfeiffer Publication, 2008.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE24	**Compiler Design**	3	0	0	3	50	50	100

Objectives	• To understand the optimization techniques used in compiler design. • To be aware of the various computer architectures that support parallelism. • To become familiar with the theoretical background needed for code optimization. • To understand the techniques used for identifying parallelism in a sequential program. • To learn the various optimization algorithms.		
Unit – I	**INTRODUCTION**	Periods	**9**
Language Processors - The Structure of a Compiler – The Evolution of Programming Languages- The Science of Building a Compiler – Applications of Compiler Technology Programming Language Basics - The Lexical Analyzer Generator -Parser Generator - Overview of Basic Blocks and Flow Graphs - Optimization of Basic Blocks - Principle Sources of Optimization.			
Unit – II	**INSTRUCTION-LEVEL PARALLELISM**	Periods	**9**
Processor Architectures – Code-Scheduling Constraints – Basic-Block Scheduling –Global Code Scheduling – Software Pipelining.			
Unit – III	**OPTIMIZING FOR PARALLELISM AND LOCALITY – THEORY**	Periods	**9**
Basic Concepts – Matrix-Multiply: An Example - Iteration Spaces - Affine Array Indexes – Data Reuse Array data dependence Analysis.			
Unit – IV	**OPTIMIZING FOR PARALLELISM AND LOCALITY- APPLICATION**	Periods	**9**
Finding Synchronization - Free Parallelism – Synchronization Between Parallel Loops – Pipelining – Locality Optimizations – Other Uses of Affine Transforms.			
Unit – V	**INTERPROCEDURAL ANALYSIS**	Periods	**9**
Basic Concepts – Need for Interprocedural Analysis – A Logical Representation of Data Flow – A Simple Pointer-Analysis Algorithm – Context Insensitive Interprocedural Analysis - Context- Sensitive Pointer-Analysis - Datalog Implementation by Binary Decision Diagrams.			
		Total Periods	**45**

REFERENCES:

1.	Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D.Ullman, “Compilers:Principles, Techniques and Tools”, Second Edition, Pearson Education,2008.
2.	Randy Allen, Ken Kennedy, “Optimizing Compilers for Modern Architectures: A Dependence-based Approach”, Morgan Kaufmann Publishers, 2002.
3.	Steven S. Muchnick, “Advanced Compiler Design and Implementation”, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE25	**Data Warehousing and Data Mining**	3	0	0	3	50	50	100

Objectives	• To understand Data mining principles and techniques and introduce Data Mining as a cutting edge business intelligence. • To study the overview of developing areas – Web mining, Text mining and ethical aspects of Data mining. • To identify Business applications and Trends of Data mining.		
Unit – I	**DATA WAREHOUSE**	Periods	**9**
Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools.			
Unit – II	**DATA MINING & DATA PREPROCESSING**	Periods	**9**
Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.			
Unit – III	**ASSOCIATION RULE MINING**	Periods	**9**
Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint- Based Association Mining.			
Unit – IV	**CLASSIFICATION & PREDICTION**	Periods	**9**
Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.			
Unit – V	**CLUSTERING**	Periods	**9**
Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint- Based Cluster Analysis – Outlier Analysis.			
		Total Periods	**45**

REFERENCES:

1.	Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2008.
2.	K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3.	G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE26	**Human Computer Interaction**	3	0	0	3	50	50	100

Objectives	• To learn the principles and fundamentals of human computer interaction (HCI). • To analyze HCI theories, as they relate to collaborative or social software. • To establish target users, functional requirements, and interface requirements for a given computer application. • To understand user interface design principles, and apply them to designing an interface. • To learn user interface designs through usability inspection and user models. • To know the applications of multimedia on HCI.

Unit – I	**DESIGN PROCESS**	Periods	**9**

Humans – Information Process – Computer – Information Process – Differences and Similarities – Need for Interaction – Models – Ergonomics – Style – Context – Paradigms – Designing of Interactive Systems – Usability – Paradigm shift – Interaction Design Basics – Design Process – Scenarios – Users Need – Complexity of Design

Unit – II	**DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS**	Periods	**9**

Software Process – Usability Engineering – Issue based Information Systems – Iterative Design Practices – Design Rules – Maximum Usability – Principles – Standards and Guidelines – Design Patterns – Programming Tools – Windowing Systems – Interaction Tool Kit – User Interface Management System – Evaluation Techniques – Evaluation Design – Evaluating Implementations – Observational Methods.

Unit – III	**MODELS**	Periods	**9**

Universal Design Principles – Multimodal Systems – User Support – Presentation and Implementation Issues – Types – Requirements – Approaches – Cognitive Model – Hierarchical Model – Linguistic Model – Physical and Device Models – Socio technical Models – Communication and Collaboration Models – Task Models – Task Analysis and Design.

Unit – IV	**EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI**	Periods	**9**

Basic Design Structure – Single Independent Variable – Multiple Independent Variable – Factorial Design – Split-Plot Design – Random Errors – Experimental Procedure – Statistical Analysis – Tests – Analysis of Variance Test – Regression – Chi-Square Test – Survey – Probabilistic Sampling – Non-Probabilistic Sampling – Developing Survey Questions.

Unit – V	**THEORIES**	Periods	**9**

Dialogue Notations and Design – Dialogue Need – Dialogue Design Notations – Graphical – Textual - Representing Dialogue – Formal Descriptions – Dialogue Analysis – System Models – Interaction Models – Relationship with Dialogue – Formalisms – Formal Notations – Interstitial Behavior – Virtual Reality – Modeling Rich Interaction – Status Event Analysis – Properties – Rich Contexts – Sensor-based Systems – Groupware – Applications – Ubiquitous Computing – Virtual Reality

	Total Periods	**45**

REFERENCES:	
1.	Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, “Human Computer Interaction”, Third Edition, Prentice Hall, 2004.
2	Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, “Research Methods in Human- Computer Interaction”, Wiley, 2010
3.	Ben Shneiderman and Catherine Plaisant, “Designing the User Interface: Strategies for Effective Human-Computer Interaction”, Fifth Edition, Addison-Wesley Publishing Co, 2009.

	VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (Autonomous Institution, Affiliated to Anna University ,Chennai) Elayampalayam, Tiruchengode – 637 205				
Programme	**M.Tech.**	Programme code	**204**	Regulation	**2014**
Department	**INFORMATION TECHNOLOGY**			Semester	**-**

Course code	Course Name	Periods Per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
P14ITE27	**Operations Research**	3	0	0	3	50	50	100

Objectives	This course aims at providing the necessary basic concepts of a few deterministic optimization techniques, queuing theory, simulation and apply them to various engineering problems.		
Unit – I	**QUEUING MODELS**	Periods	**9**
Markovian Queues - Steady state analysis of Single and Multi-server Models - Little's Formula - Finite and Infinite Capacity Models - Machine Interference Model - Self-Service Queue.			
Unit – II	**LINEAR PROGRAMMING**	Periods	**9**
Formulation - Graphical Solution - Simplex Method - Two-Phase Method - Transportation and Assignment Models.			
Unit – III	**NON-LINEAR PROGRAMMING**	Periods	**9**
Constrained Problems - Equality Constraints - Lagrangean Method - Inequality Constraints - Karush – Kuhn - Tucker (KKT) Conditions - Quadratic Programming.			
Unit – IV	**DYNAMIC PROGRAMMING**	Periods	**9**
Dynamic Programming - Principle of Optimality - Forward and Backward Recursion – Applications of Dynamic Programming - Problem of Dimensionality.			
Unit – V	**SIMULATION MODELING**	Periods	**9**
Monte Carlo Simulation - Types of Simulation - Elements of Discrete Event Simulation - Generation of Random Numbers - Applications to Queuing systems.			
		Total Periods	**45**

REFERENCES:

1.	Taha H.A, "Operations Research: An Introduction", Pearson Education, New Delhi, Ninth Edition, 2010.
2.	Gupta P.K. and Hira, D.S., "Operations Research", S.Chand & Company Ltd., Revised Edition, 2012.
3.	Ravindran A., Don T. Phillips and James J. Solberg, "Operations Research", Wiley-India Edition, Second Edition, 2006.
4.	Sharma J. K., "Operations Research", Macmillan Publishers India Ltd., Third Edition, 2009.