ShrimathiDevkunvarNanalal Bhatt Vaishnav College for Women(Autonomous), Chromepet, Chennai – 600 004

Master of Computer Science
Approved Syllabus for the batch – 2016 - 2018

PG

Academic Council

31st May 2016

M.Sc. DEGREE COURSE IN COMPUTER SCIENCE

FIRST SEMESTER

S.No.	Course Components	Name of Course	Credits	Exam. Duration	Max. Marks		Total Marks	Lecture Hrs/week
					CIA	ESE		
1	Core -T1	Theory of Computation	4	3	25	75	100	5
2	Core -T2	Advanced Java Programming	4	3	25	75	100	5
3	Core -T3	Programming in PHP	3	3	25	75	100	5
4	Elective –I	Any one from the list of Electives	3	3	25	75	100	5
5	Core–P1	Practical – I: Advanced Java Programming Lab	2	3	20	30	50	5
6	Core–P2	Practical-II : PHP Programming lab	2	3	20	30	50	5
7	Soft Skill		2					
TOTAL			20				500	30

CIA – Continuous Internal Assessment ESE – End Semester Examination

SECOND SEMESTER

S.No	Course component	Name of Course	Credits	Exam. Duration	Max. Marks		Total Marks	Lecture hrs/ week
					CIA	ESE		
8	Core-T4	Design and Analysis of Algorithms	4	3	25	75	100	4
9	Core–T5	Network Programming	4	3	25	75	100	4
10	Core-T6	Programming in Python	3	3	25	75	100	4
11	Elective-II	Any one from the list of Electives	3	3	25	75	100	4
12	Elective-III	Any one from the list of Electives	3	3	25	75	100	4
13	Core–P3	Practical–Network	2	3	20	30	50	3

		ProgrammingLab						
14	Core–P4	Practical - Python Programming Lab	2	3	20	30	50	3
15	NME	Introduction to SQL	3	3	40	60	100	4
16	Soft skill		2					
TOTAL			26				700	30

CIA – Continuous Internal Assessment ESE – End Semester Examination

THIRD SEMESTER

S.No	Course Component	Name of Course	Credits	Exam. Duration	Max. Marks		Total Marks	Lecture Hrs/ week
					CIA	ESE		
17	Core-T7	Mobile Communications	4	3	25	75	100	4
18	Core-T8	Data Mining	4	3	25	75	100	4
19	Core-T9	Digital Image Processing	3	3	25	75	100	4
20	Elective–IV	Any one from the list of Electives	3	3	25	75	100	4
21	Elective–V	Any one from the list of Electives	3	3	25	75	100	4
22	Core–P5	Practical– : Data Mining Lab	2	3	20	30	50	3
23	Core –P6	Practical–: Digital Image Processing	2	3	20	30	50	3
24	NME	Java Script	3	3	40	60	100	4
25	* Internship	During summer vacation 4 to 6 weeks of I Year	2					
26	Soft skills		2					
TOTAL			28				700	30

CIA – Continuous Internal Assessment ESE – End Semester Examination

*** Internship will be carried out during the summer vacation of the first year and marks should be sent to the University by the College and the same will be included in the Third Semester Marks Statement.**

FOURTH SEMESTER

S. No.	Course components	Name of Course	Semester	Credits	Exam. Duration	Max. Marks		
						CIA	ESE	
27	Core	Project & Viva-Voce	IV	15	-	50	250	300
28	Soft skills			2				
TOTAL				17				300
Grand Total				**91**				**2200**

Recommended Credits Distribution: (Total should not be less than 91 Credits)

Course Type	**Course**	**Credits**	**Total Credits**
Core (Theory)	9	4 / 3	33
Core (Practical)	6	2	12
Core (Project)	1	15	15
Elective	5	3	15
Internship	1	2	2
Skill based courses	4	2	8
Non-major elective	2	3	6
Total			**91**

PROCEDURE FOR INTERNAL MARKS

Theory Internal Marks 25

Distribution

Tests	=	15
Seminar / Assignments	=	5
Group Discussion/Quiz	=	5
		25

Practical Internal Marks 20

Distribution

Tests	=	10
Record	=	10
		20

List of Electives:

1. Computer Architecture
2. System Software
3. Soft Computing
4. WAP and XML
5. Essentials of System Analysis and design
6. Software Testing
7. Cryptography
8. Distributed Operating Systems
9. Information Security
10. UML

DEGREE OF MASTER OF COMPUTER SCIENCE (M.Sc.)

SYLLABUS IN DETAIL

(Effective from the academic year 2016-2018 onwards)

Title of the Course/ Paper	**Theory of Computation**		Sub Code:
Core –T1	I Year & First Semester	Credit: 4	Hrs : 4
Objective of the course	This course introduces the concepts in automata theory.		

Course Outline

Unit 1: Automata -Introduction To Formal Proof – Additional Forms Of Proof – Inductive Proofs –Finite Automata (Fa) – Deterministic Finite Automata (Dfa) – Non-DeterministicFiniteAutomata (Nfa) – Finite Automata With Epsilon Transitions.

Unit 2: Regular Expressions And Languages - Regular Expression – Fa And Regular Expressions – Proving Languages Not To Be Regular – Closure Properties Of Regular Languages – Equivalence And Minimization Of Automata.

Unit 3: Context-Free Grammars And Languages - Context-Free Grammar (Cfg) – Parse Trees – Ambiguity In Grammars And Languages – Definition Of The Pushdown Automata – Languages Of A Pushdown Automata – Equivalence Of Pushdown Automata And Cfg– Deterministic Pushdown Automata.

Unit 4: Properties Of Context-Free Languages - Normal Forms For Cfg – Pumping Lemma For Cfl – Closure Properties Of Cfl – Turing Machines – Programming Techniques For Tm.

Unit 5: Undecidability - A Language That Is Not Recursively Enumerable (Re) – An Undecidable Problem That Is Re – Undecidable Problems About Turing Machine – Post's Correspondence Problem –The Classes P And Np.

1.Recommended Texts

(i) J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2007.

2. Reference Books

(i) H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.

(ii) Thomas A. Sudkamp," An Introduction to the Theory of Computer Science, Languages and Machines", Third Edition, Pearson Education, 2007.

(iii)Raymond GreenlawanH.James Hoover, " Fundamentals of Theory of Computation, Principles and Practice", Morgan Kaufmann Publishers, 1998.

(iv)MichealSipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

(v) J. Martin, "Introduction to Languages and the Theory of computation" Third Edition, Tata McGraw Hill, 2007.

3. e-References

http://engineeringppt.net/theory-of-computation-ppt-pdf-lecture-notes/

Title of the Course/ Paper	**Advanced Java Programming**		**Sub Code:**
Core –T2	I Year & First Semester	Credit: 4	Hrs: 4
Objective of the course	This course introduces the advanced concepts in java and makes the student to create efficient programs in networks.		

Course Outline

Unit 1: Servlets:Servlet overview – the Java web server – Simple servlet – servlet chaining –- Session management –Security – HTML forms – using JDBC in servlets – applet to servlet communication.

Unit 2: Java Beans: Introduction – Advantages of Java Beans-Application of Builder Tools- The java beans development kit- JAR Files – Introspection –Developing Simple Java Bean using the BDK-Bound Properties-Persistence-customizers - java beans API.

Unit 3: Swing :JApplet - Icons and Labels –Text Fields- Buttons – Combo Boxes – Tabbed Panes- Scroll Panes – Trees – Tables-Working with Menus

Unit 4: RMI – Overview – Developing applications with RMI:Declaring& Implementing remote interfaces-stubs &skeletons,Registering remote objects,writing RMI clients –Pushing data from RMI Servlet – RMI over Inter-ORB Protocol.

Unit 5: JSP –Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP.

1.Recommended Texts

(i) K. Moss, 1999, *"Java Servlets",* Second edition, Tata McGraw Hill, New Delhi.

(ii) H. Schildt, 2002, *"Java 2 Complete Reference",* 5th Edition, Tata McGraw-Hill, New Delhi.

(iii)SimonBrown,"Professional JSP",2nd Edition, Wrox Press Ltd.

2. Reference Books

(i) J. McGovern,R. Adatia,Y. Fain, 2003, *"J2EE 1.4 Bible"*, Wiley-dreamtech India Pvt. Ltd, New Delhi

(ii) D. R.Callaway, 1999, *"Inside Servlets"*, Addison Wesley, Boston

(iii)Joseph O'Neil, 1998, *"Java Beans from the Ground Up"*, Tata McGraw Hill, New Delhi.

(iv)TomValesky, *"Enterprise JavaBeans"*, Addison Wesley.

(v) Herbert Schildt, "Swing A Beginner's Guide", Tata McGraw Hill, New Delhi.

3. e-References

http://www.javalearner.com/advanced.htm
http://www.webucator.com/java/course/advanced-java-programming.cfm

Title of the Course/ Paper	**Programming in PHP**		**Sub Code:**
Core –T3	I Year & First Semester	Credit: 3	Hrs : 4
Objective of the course	This course introduces the concepts of Web Designing using PHP.		

Course Outline

Unit 1: Dynamic Content and the Web - PHP and MySQL's Place in Web Development - The components of a PHP Application - Integrating Many Sources of Information - Requesting Data from a Web Page. Developing Locally - working remotely.

Unit 2: Exploring PHP-PHP and HTML text - coding building blocks. PHP decision making-Expressions - Operator Concepts - Conditionals-Looping. Functions - calling functions - defining functions- Object-Oriented Programming. Arrays: Array fundamentals. Database basics: Data base design-Structured Query Language.

Unit 3: Using MySQL: MySQL Database - Managing the Database - Backing up and Restoring Data - Advanced SQL. Getting PHP to talk to MySQL: The process-querying the database with PHP functions - Using PEAR. Working with Forms: Building a form - Templates.

Unit 4: String functions-Date and time functions - File Manipulation – Calling System Calls - Modifying MySQL objects and PH data: Changing database objects from PHP - Manipulating table data-displaying results with Embedded links- presenting a form to add and process in one file - updating data – deleting data – performing a subquery

Unit 5: Cookies, Sessions and Access Control: Cookies - PHP and HTTP Authentication – sessions - using Auth_HTTP to Authenticate. Security: Session security. Validation and Error handling: Validating user input with JavaScript- Pattern Matching - Redisplaying a form after PHP validation fails. Building a Blog

1.Recommended Texts

(i) Michele Davis, Jon Phillips-Learning PHP and MySQL-2006 edition, O'Reilly publication

(ii) David Sklar, Nathan Torkington,*"Learning PHP 5"*,2004,O'Reilly.

(iii)W. Jason Gilmore,*"Beginning PHP and MySQL 5 "*, 20062nd edition,Apress

(iv)Kevin Yank,*"Build Your Own Database Driven Web Site Using PHP & MySQL" 2011*, 4th edition,Sitepoint.Ahsanul Bari,*"Cake Php Application Development",* 1st edition, 2008, Packet publishing ltd.

2. e-References

(i) www.w3schools.com/php

(ii) php.net/downloads.php

Title of the Course/ Paper	**Practical : Advanced Java Programming Lab**		**Sub Code:**
Core –P1	I Year & First Semester	Credit: 2	Hrs : 5
Objective of the course	This course gives practical training on Advanced concepts of programming in Java		

Exercises

1. HTML to Servlet Applications.
2. Applet to Servlet Communication.
3. Performing Java Database Connectivity using Servlets.
4. Implementing Swing Applications using controls.
5. Implementing Swing Applications using Menus.
6. Create a simple bean using JavaBeans.
7. Creating Web services with RMI.
8. Designing online applications with JSP.
9. Creating JSP program using JavaBeans.

Title of the Course/ Paper	**Practical: PHP Programming LAB**		Sub Code:
Core –P2	I Year & First Semester	Credit: 2	Hrs: 4
Objective of the course	This course gives practical training on Programming in PHP		

Exercises

1. Get name of the user from a form and show greeting text
2. Write a calculator program
3. Write a program using functions
4. Write a program to use loops, control flow statements
5. Write a program to manipulate arrays
6. Write program to read and write files
7. Write a hit counter using cookies
8. Write a user login system using sessions
9. Database Program using mysql.
10. Write a blog system with comments using classes

Title of the Course/ Paper	**Design and Analysis of Algorithms**		**Sub Code:**
Core –T4	I Year & Second Semester	Credit: 4	Hrs: 4
Objective of the course	This course introduces the basic concepts of designing and analyzing of algorithms in writing computer programs.		

Course Outline

Unit 1: Introduction - Definition of Algorithm – pseudocode conventions – recursive algorithms – time and space complexity –big-"oh" notation – practical complexities – randomized algorithms – repeated element – primality testing - Divide and Conquer:General Method - Finding maximum and minimum – merge sort.

Unit 2: Divide and conquer – Quicksort, Selection sort, Strassen's matrix multiplication – Greedy Method:General Method –knapsack problem - Tree vertex splitting - Job sequencing with deadlines – optimal storage on tapes.

Unit 3: Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack.Search techniques for graphs – DFS-BFS-connected components – biconnected components.

Unit 4: Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.

Unit 5: Lower Bound Theory:Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of NP-Hard and NP-Complete problems.

1.Recommended Texts

(i) E. Horowitz, S. Sahni and S. Rajasekaran, "*Computer Algorithms*", 1997,Galgotia Publishers.

2. Reference Books

(i) G. Brassard and P. Bratley, "*Fundamentals of Algorithms*", 1st Edition 1997, PHI.

(ii) A.V.Aho, J.E. Hopcroft, J.D. Ullmann, " *The Design and Analysis of Computer Algorithms*" , 3rd Edition 1974 ,Addison Wesley, Boston.

3.e-References

(i) www.nptel.iitm.ac.in/video.php?subjectId=106102064

(ii) www.cs.berkeley.edu/~vazirani/algorithms.html

Title of the Course/ Paper	**Network Programming**		**Sub Code:**
Core –T5	I Year & Second Semester	Credit: 4	Hrs : 3
Objective of the course	This course makes the students to understand how to build a network application.		

Course Outline

Unit 1: INTRODUCTION - Environment of a UNIX process - Process control: fork, vfork, exit, wait, waitpid, exec functions, race condition – Process relationships – Signals : Signal concepts, Signal function – Interprocess Communication : Pipes, popen and pclose functions, FIFO, Message Queue, Semaphore, Shared Memory - overview of TCP/IP protocols

Unit 2: ELEMENTARY TCP SOCKETS -Introduction to Socket Programming – Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect,bind, listen, accept, read, write , close functions – Iterative Server – Concurrent Server.

Unit 3: APPLICATION DEVELOPMENT -TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients –boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

Unit 4: SOCKET OPTIONS, ELEMENTARY UDP SOCKETS -Socket options – getsocket and setsocket functions – generic socket options – IP socket options –ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions.

Unit 5: ADVANCED SOCKETS -Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

1.Recommended Texts

(i) W. Richard Stevens, B. Fenner, A.M. Rudoff, "Unix Network Programming – The Sockets Networking API", 3rd edition, Pearson, 2004.

(ii) W. Richard Stevens, S.A Rago, "Programming in the Unix environment", 2nd edition, Pearson,2005.

2. Reference Books

(i) W.Richard Stevens, S.A Rago, "Advanced Programming in the Unix environment", 3rd edition, Addison-wesley Professional Computing Series.

(ii) Stephen A.Rago, "Unix System V Network Programming", Addison Wesley, 1993.

3. e-References

(i) http://www.freebookcentre.net/UnixCategory/Free-Unix-Networking-Books-Download.html

(ii) http://www.ebook3000.com

Title of the Course/ Paper	**Programming in Python**		Sub Code:
Core –T6	I Year & Second Semester	Credit: 3	Hrs : 3
Objective of the course	This course introduces the concepts of Python programming.		

Course Outline

Unit 1: Introduction to Python - Why Python - Installing in various Operating Systems - Executing Python Programs - Basic Programming concepts - Variables, expressions and statements - Input/Output –Operators.

Unit 2: Conditions - Functions - Arguments - Return values - Iteration - Loops - Strings -Data Structures - Lists - Dictionaries - Tuples - Sequences - Exception Handling.

Unit 3: File Handling - Modules - Regular Expressions - Text handling - **O**bject Oriented Programming - Classes - Objects - Inheritance - Overloading - Polymorphism

Unit 4: Network Programming – Sending Mail- Multithreading-XML processing.

Unit 5: Interacting with Databases - Introduction to MySQL - interacting with MySQL-GUI programming-TKinter programming- Tkinter widgets-Geometry Mnagement.

1.Recommended Texts

(i) Allen B. Downey ,*"Think Python: How to Think Like a Computer Scientist "*,1st Edition 2012, O'Reilly.

(ii) Jeff McNeil ,*"Python 2.6 Text Processing: Beginners Guide"*,2010 ,Packet Publications

(iii) Mark Pilgrim **,"***Dive Into Python "*, 2nd edition 2009,Apress

2. e-References

(i) *www.python.org/*

(ii) http://www.tutorialspoint.com/python/python_tutorial.pdf

(iii)*en.wikibooks.org/wiki/Python_Programming*

(iv)*https://www.coursera.org/course/interactivepython*

Title of the Course/ Paper	**Network Programming Lab**		**Sub Code:**
Core- P3	I Year & Second Semester	Credit: 2	Hrs: 4
Objective of the course	This course introduces the concepts of J2EE.		

Exercises

1. Implementation of File System Calls
2. Implementation of ICP Techniques – Pipe, FIFO, popen and pclose, Message Queue, Semaphore
3. Socket Programming
   a) TCP Sockets
   b) UDP Sockets
   c) Applications using Sockets (Chating)
4. Simulation of Sliding Window Protocol
5. Implementation of Thread Programming;
6. Implementation of Mutex Programming.
7. Implementation of I/O Multiplexing
8. DNS application.

Title of the Course/ Paper	**Python Programming Lab**		**Sub Code:**
Core – P4	I Year & Second Semester	Credit: 2	Hrs: 4
Objective of the course	This course introduces the concepts of Python programming.		

Exercises

1. Create a simple calculator to do all the arithmetic operations
2. Write a program to use control flow tools like if.
3. Write a program to use for loop
4. Data structures
   use list as stack
   use list as queue
   tuple, sequence
5. Create new module for mathematical operations and use in your program
6. Write a program to read and write files, create and delete directories
7. Write a program with exception handling
8. Write a program using classes
9. Connect with mysql and create a address book
10. Write a program string handling and regular expressions
11. Program to parse apache log file
12. Create a GUI program using python

Title of the Course/ Paper	**Introduction to SQL**		**Sub Code:**
Non major elective –I	I Year & First Semester	Credit: 3	Hrs : 4
Objective of the course	This course introduces the concepts of SQL.		

Title of the Course/ Paper	***NON MAJOR ELECTIVE: INTRODUCTION TO SQL***	
Course outline	Unit-1:	Introduction to SQL, SQL Structure - Data types – Constants - SQL Operators, SQL Statements-DDL-DML-TCL and select commands.
	Unit-2:	Built in function, aggregate function, Grouped by and having clause, Order by clause, Nested queries.
	Unit-3:	Sub queries and joins
	Unit-4:	Introduction to PL/SQL, Introduction to procedure - Introduction to function – Introduction to trigger.
	Unit-5:	Exercise based on the above units.

Books for Study:	1.	Database Systems using Oracle – Nilesh Shah, 2nd edition PHI

Title of the Course/ Paper	**Mobile Communications**		**Sub Code:**
Core – T7	II Year &Third Semester	Credit: 4	Hrs : 4
Objective of the course	This course introduces the concepts of Mobile Communications.		

Course Outline

Unit 1: Introduction - Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing –Wireless Transmissions –Multiplexing – Spread Spectrum and Cellular Systems- Medium Access Control – Comparisons.

Unit 2: Telecommunication Systems – GSM – Architecture – Sessions –Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems.

Unit 3: Wireless Lan - IEEE S02.11 – Hiper LAN – Bluetooth – Security and Link Management.

Unit 4: Mobile network layer - Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies.

Unit 5: Mobile transport layer - Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction oriented TCP - TCP over wireless – Performance.

1.Recommended Texts

(i) J.Schiller, *"Mobile Communications"*, Second Edition 2003, Pearson Education, Delhi.

2. Reference Books

(i) Hansmann, Merk, Nicklous, Stober, *"Principles of Mobile Computing"*, Second Edition 2004, Springer (India).

(ii) Pahlavan, Krishnamurthy, *"Principle of wireless Networks: A unified Approach"*, 2003, Pearson Education, Delhi.

(iii)W.Stallings, *"Wireless Communications and Networks"*, Second Edition 2004, Pearson Education, Delhi.

3. e-References

(i) www.nptel.iitm.ac.in/video.php?subjectId=117102062

Title of the Course/ Paper	**Data Mining**		**Sub Code:**
Core – T8	II Year &Third Semester	Credit: 4	Hrs :4
Objective of the course	This course introduces the concepts of Data Mining.		

Course Outline

Unit 1: Introduction: Data Mining tasks – Data Mining versus Knowledge Discovery in Data bases - Mining Issues – Metrics – Social implications of Data mining. Data Mining Techniques – Introduction – A statistical perspective on Data Mining – similarity measures – Decision Trees – Neural Networks – Genetic Algorithms.

Unit 2: Data Preprocessing: Why Preprocess the data – Data cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization.

Unit 3: Data Mining Techniques: Association Rule Mining – The Apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining.

Unit 4: Classification and Prediction: Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy.

Unit 5: Clustering Techniques: cluster Analysis – Clustering Methods – Similarity and Distance Measures – Hierarchical Methods - Partitional Methods – Outlier Analysis .

1. Recommended Texts

(i) Han and M. Kamber , 2001, *"Data Mining: Concepts and Techniques"*, Morgan Kaufmann, .New Delhi.

2. Reference Books

(i) M. H.Dunham, 2003, "*Data Mining : Introductory and Advanced Topics*" , Pearson Education, Delhi.

(ii) PaulrajPonnaiah, 2001,"*Data Warehousing Fundamentals*", Wiley Publishers.S.N. Sivananda and S. Sumathi, 2006, Data Mining, Thomsan Learning, Chennai.

3. e-References

(i) http://nptel.iitm.ac.in/video.php?subjectId=106106093

(ii) http://cecs.louisville.edu/datamining/PDF/0471228524.pdf

Title of the Course/ Paper	**Digital Image Processing**		**Sub Code:**
Core-T9	II Year &Third Semester	Credit: 3	Hrs : 4
Objective of the course	This course introduces the basic concepts of DIP		

Course Outline

Unit 1: Introduction – steps in image processing, Image acquisition, representation, sampling and quantization, relationship between pixels. – color models – basics of color image processing

Unit 2: Image enhancement in spatial domain – some basic gray level transformations – histogram processing – enhancement using arithmetic, logic operations – basics of spatial filtering and smoothing

Unit 3: Image enhancement in Frequency domain – Introduction to Fourier transform: 1- D, 2 –D DFT and its inverse transform, smoothing and sharpening filters.

Unit 4: Image restoration: Model of degradation and restoration process – noise models – restoration in the presence of noise- periodic noise reduction.. Image segmentation: Thresholding and region based segmentation.

Unit 5: Image compression: Fundamentals – models – information theory – error free compression –Lossy compression: predictive and transform coding. JPEG standard.

1. Recommended Texts

(i) R.C. Gonzalez, R.E.Woods, "Digital Image processing", Pearson Education, Second Edition, 2002.

2. Reference Books

(i) Anil K. Jain," Fundamentals of Digital image Processing", Prentice Hall of India, New Delhi, Second Edition,1994.

(ii) Pratt. W.K., "Digital Image Processing", John Wiley & Sons, Third Edition, 1978.

(iii)Rosenfled A. &Kak, A.C, "Digital Picture Processing", Vol .I & II, Academic, 1982.

3. e-References

(i) http://www.nptel.iitm.ac.in/video.php?subjectId=117105079

(ii) http://en.wikipedia.org/wiki/Digital_image_processing

(iii)http://www.library.cornell.edu/preservation/tutorial/contents.html

Title of the Course/ Paper	**Data Mining Lab**		Sub Code:
Core – P5	II Year & Third Semester	Credit: 2	Hrs : 5
Objective of the course	This lab gives hands on training on the concepts of Data Mining.		

Exercises

(i) Data Preprocessing:

1. Filter:
   a) supervised b) unsupervised
2. Attribute Selection:
   a) A Search method: best-first, forward selection, random, exhaustive, genetic algorithm, ranking,…
   b) An evaluation method: correlation-based, wrapper, information gain, chi-squared,…

(ii) Classification

a) Implemented learning schemes : Decision trees, instance based classifiers, support vector machines, mlp, logistic regression, Bayes' networks,…
b) Meta Classifiers:Bagging ,boosting,stacking,…

(iii)Clustering

a) Implement schemes: k-means,EM,cobweb,X-means,FarthestFirst

(iv) Association Rule

a) Apriori

Title of the Course/ Paper	**Digital Image Processing Lab**		**Sub Code:**
Core – P6	II Year & Third Semester	Credit: 2	Hrs : 5
Objective of the course	This lab gives hands on training on the concepts of Digital Image Processing.		

Exercises

1. Simple Mathematical calculations.
2. Vector operations
3. Matrix operations.
4. Scripts and Functions.
5. Plotting
6. Conditional Branching.
7. Iteration.
8. Basic Image operations.
9. Image enhancement operations.
10. Basic Image segmentation.

Title of the Course/ Paper	**JavaScript**		**Sub Code:**
Non Major Elective –II	I Year & Second Semester	Credit: 3	Hrs : 4
Objective of the course	This course introduces the concepts of Java Script.		

Course outline	Unit-1:	Introduction to JavaScript, Advantages of JavaScript, JavaScript Syntax, data types, variables.
	Unit-2:	Arrays-Operators and Expressions-Programming constructors – Conditional checking-Controlled and Endless Loops.
	Unit-3:	Dialog box-Alert-Prompt-Confirm - Functions – Built-in – User defined.
	Unit-4:	Form Objects-Event handling- built-in objects-user defined objects.
	Unit-5:	Sample Programs.
Books for Study:	1.	Ivan Bayross – Web Enabled Commercial Application Development, HTML, DHTML, JAVASCRIPT, PERL ,CGI

Title of the Course/ Paper	**Computer Architecture**		**Sub Code:**
Elective -I		Credit: 3	
Objective of the course	This course introduces the concepts of data representation in computer, basic hardware units, and their functioning in computer.		

Course Outline

Unit 1: Data representation - Data types - complements, fixed point and floating point representation other binary codes - micro operations: Register transfer language, Register transfer, Bus and Memory transfer, Arithmetic, logic, and shift micro operations, Arithmetic logic shift unit - micro programmed control - control memory - Address sequencing - micro program example - design of control unit.

Unit 2: Central processing unit: General register and stack organizations, instruction formats - Addressing modes, Data transfer and manipulation - program control, RISC - Pipelining - Arithmetic and instruction, RISC pipeline - Vector processing and Array processors.

Unit 3: Computer Arithmetic - Addition and subtraction, Multiplication and division, floating point and decimal Arithmetic operations.

Unit 4: Input-Output organization - peripheral devices, I/O interface, Asynchronous data transfer, modes of transfer, priority interrupt, direct memory access, I/O processor, serial communications.

Unit 5: Memory organization - Memory hierarchy - main memory - Auxiliary memory - associative, cache and virtual memory, memory management hardware - multi processors: Interconnection structures, Inter processor arbitration.

1.Recommended Texts

(i) M.M. Mano, *"Computer System architecture"*, PHI (Third Edition) 1993

2. Reference Books

(i) V. C. Hamacher, G.Vranesic, S. G.Zaky, *"Computer Organiation"*, McGraw Hill.

(ii) J. P.Hayes, *"Computer architecture"*, McGraw Hill, ISE, 1988.

(iii)H. K, Briggs. F.A – *"Computer Architecture and Parallel Processing"*, McGraw Hill ISE, 1988.

Title of the Course/ Paper	**System Software**		Sub Code:
Elective -II		Credit: 3	
Objective of the course	This course introduces the concepts of System Software		

Course Outline

Unit 1: Language processors – Language processing activities and fundamentals – Language specification – Development Tools – Data Structures for Language processing- Scanners and Parsers.

Unit 2: Assemblers: Elements of Assembly language programming - Overview of the Assembly process - Design of a Two-pass Assembler - A single pass Assembler for the IBM PC.

Unit 3: Macros and Macro processors – Macro definition, call , and expansion – Nested macro calls – Advanced macro facilities - Design of a macro preprocessor - Compilers: Aspects of compilation .

Unit 4: Compilers and Interpreters – Memory allocation - Compilation of Expressions and Control structures - Code optimization – Interpreters.

Unit 5: Linkers: Linking and Relocation concepts – Design of a linker – Self relocating Programs – A linker for MS DOS - Linking for over-lays – loaders - Software tools: Software tools for program development - Editors - Debug monitors - Programming environments – User interfaces.

1.Recommended Texts

(i) D. M. Dhamdhere, 1999, Systems Programming and Operating Systems, Second Revised Edition, Tata McGraw-Hill, New Delhi.

(ii)

2. Reference Books

(i) L. L. Beck, 1996, System Software An Introduction to System Programming, 3rd edition, Addison-Wesley.

Title of the Course/ Paper	**Soft Computing**		**Sub Code:**
Elective-III		Credit: 3	
Objective of the course	This course introduces the concepts of Neural Networks, Fuzzy and Genetic Algorithms.		

Course Outline

Unit 1: Introduction : Neural Networks-Fuzzy Logic – Genetic Algorithms – Hybrid Systems. Artificial Neural Network – Fundamental Concept – Basic Models of Neural Network-Important Terminologies of ANN-McCulloch-Pitts Neuron – Linear Separability – Hebb Network.

Unit 2: Supervised Learning Network – Perceptron Networks - Adaptive Linear Neuron – Back-Propagation Network-Radial Basis Function Network. Associative Memory Networks :BiDirectional Associative Memory – Hopfield Networks.

Unit 3: Introduction to Classical Sets and Fuzzy Sets : Classical Sets-Fuzzy Sets. Classical Relations and fuzzy Relations: Cartesian Product of Relation – Classical Relation-Fuzzy Relations. Membership Functions : Features of the Membership functions – Fuzzification – Methods of Membership Value Assignments

Unit 4: Defuzzification – Lamda-Cuts for Fuzzy sets and Fuzzy Relation-Fuzzy Arithmetic and Fuzzy Measures: Fuzzy Rule Base and Arithmetic Reasoning: Truth values and Tables in Fuzzy logic- Fuzzy Propositions – Formation of Rules – Decomposition and Aggregation of rules- Fuzzy reasoning-Fuzzy Inference Systems

Unit 5: Genetic Algorithm -Introduction – Basic Operators and Terminologies in GAs – Traditional Algorithm vs. Genetic Algorithm – Simple GA – General Genetic Algorithm – The Scheme Theorem – Classification of Genetic Algorithm – Holland Classifier Systems – Genetic Programming.

1. Recommended Texts

(i) S.N. Sivanandan and S.N. Deepa, *"Principles of Soft Computing"*, Wiley India, 2007.ISBN: 10: 81-265-1075-7.

2. Reference Books

(i) S. Rajasekaran and G.A.V.Pai, *"Neural Networks, Fuzzy Logic and Genetic Algorithms"*,PHI, 2003.

(ii) Timothy J.Ross, "*Fuzzy Logic with Engineering Applications*", McGraw-Hill, 1997.

(iii)J.S.R.Jang, C.T.Sun and E.Mizutani, "*Neuro-Fuzzy and Soft Computing",* PHI, 2004, Pearson Education.

3. e-References

(i) http://www.nptel.iitm.ac.in/video.php?subjectId=117105084

(ii) *www.nptel.iitm.ac.in/syllabus/111106049*

(iii)*www.iitg.ac.in/rkbc/CE602/GA.pdf*

Title of the Course/ Paper	**WAP and XML**		**Sub Code:**
Elective-IV		Credit: 3	
Objective of the course	This course introduces the concepts of SAD.		

Course Outline

Unit 1: Overview of WAP:WAP and the wireless World – WAP Application Architecture – WAP Internal Structure – WAP Versus the Web – Setting up WAP: Available Software products – WAP resources – The Development Tool Kits.

Unit 2: WAP gateways : Definition – Functionality of a WAP gateway – The Web model Versus the WAP Model – Positioning of a WAP gateway in the Network – Selecting a WAP Gateway – BASIC WML : eXentsible Markup Language – WML structure – A Basic WML Card – Text formatting – Navigation – Advanced Display Features.

Unit 3: Interacting with the user : Making a selection – Events Variables – Input parameter passing – WML script – Need for WML script – lexical structure – Variable & literals – Operators – Automatic data type conversion – Control Constructs – Functions – Using the standard Libraries – Programs – Dealing with errors.

Unit 4: XML: Introduction XML : An Eagle's Eye view of XML – XML Definition – Life of an XML Document – Related Technologies – An Introduction to XML Applications – XML Applications – XML for XML – First XML Documents Structuring Data : Examining the Data XMLizing the Data – The advantages of the XML format – Preparing a style sheet for Document Display.

Unit 5: Attributes, Empty Tags and XSL: Attributes – Attributes Versus Elements – Empty Tags – XSL – Well formed XML Documents – Foreign Languages and Non-Roman Text : - Non Roman Scripts on the Web – Scripts, Character sets, Fonts and Glyphs – Legacy Character sets – The Unicode Character set – Procedure to Write XML in Unicode.

1.Recommended Texts

(i) For Unit – I, II & III: Charles Arehart and Others, 2000, Professional WAP with WML, WML, WML script, ASP, JSP, XML, XSLT, WTA, Push and Voice XML, Shroff Publishers and Distributors Pvt. Ltd..

(ii) For Unit – IV & V: Elliotte Rusty Harold, 2000, XML TM Bible, IDG Boobs India (P) Ltd.

2. e-References

(i) http://www.roseindia.net/wap/index.shtml

Title of the Course/ Paper	**Essentials of System Analysis and Design**		**Sub Code:**
Elective –V		Credit:3	
Objective of the course	This course introduces the concepts of system analysis and design.		

Unit - I : Foundations for system development – The systems development environment – What Is Information Systems Analysis and Design- Systems Analysis and Design: Core Concepts- Systems - Definition of a System and Its Parts - Important System Concepts - A Modern Approach to Systems Analysis and Design - Your Role in Systems Development - Developing Information Systems and the Systems Development Life Cycle -Alternative Approaches to Development - Prototyping - Computer-Aided Software Engineering (CASE) Tools - Joint Application Design - Rapid Application Development - Participatory Design - Agile Methodologies.

Unit - II: Managing the information systems project-Pine Valley Furniture Company Background - Managing the Information Systems Project - Initiating the Project - Planning the Project- Executing the Project - Closing Down the Project- Representing and Scheduling Project Plans - Representing Project Plans - Calculating Expected Time Durations Using PERT- Constructing a Gantt Chart and Network Diagram at Pine Valley Furniture - Using Project Management Software - Establishing a Project Starting Date - Entering Tasks and Assigning Task Relationships - Selecting a Scheduling Method to Review Project Reports.

Unit-III: Systems Planning and selection-Identifying and Selecting Projects - The Process of Identifying and Selecting Information Systems Development Projects - Deliverables and Outcomes - Initiating and Planning Systems Development Projects - The Process of Initiating and Planning Systems Development Projects - Deliverables and Outcomes - Assessing Project Feasibility- Assessing Economic Feasibility - Assessing Other Feasibility Concerns - Building the Baseline Project Plan - Reviewing the Baseline Project Plan - Pine Valley Furniture WebStore: Systems Planning and Selection - Internet Basics - Pine Valley Furniture WebStore.

Unit-IV: System Analysis and design Performing Requirements Determination - The Process of Determining Requirements- Deliverables and Outcomes- Requirements Structuring - Traditional Methods for Determining Requirements - Interviewing and Listening -Directly Observing Users - Analyzing Procedures and Other Documents - Modern Methods for Determining System Requirements- Joint Application Design - Using Prototyping during Requirements Determination Radical Methods for Determining System Requirements - Identifying Processes to Reengineer Disruptive Technologies.Structuring system requirements-Process modeling- and conceptual modeling.

Unit-V: System design – Designing human interface – Designing forms and reports – Designing Interfaces and dialogues-Designing databases-Database design-Relational database model-Normalization-Transforming ER diagrams to relations.System implementation and operation – Software Application testing.

TextBook:

Joseph S. Valacich University of Arizona Joey F. George Iowa State University Jeffrey A. Hoffer University of Dayton,"Essentials of Systems Analysis and Design" FIFTH EDITION Pearson Publishing.

Reference:

1.James A. Senn –" Analysis and Design of Information Systems "

e-References:

1 **.** http://www.slideshare.net/samirchandra44/sad-14522467

Title of the Course/ Paper	**Software Testing**		**Sub Code:**
Elective-VI		Credit: 3	
Objective of the course	This course introduces the concepts of Software Testing.		

Course Outline

Unit 1: Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging Model for Testing – Bugs – Types of Bugs – Testing during Development Life- cycle.Requirement Traceability matrix-Work Bench.Principles of software testing, Salient features of Good Testing-Challenges in Testing-cost Aspect of Testing-Developing Testing Methodologies.

Unit 2: Domain Testing: Domains and Paths – Domains and Interface Testing-Metrics –Linguistic and Structural Metric.

Unit 3: Software Testing Process-Verification and Validation-Levels of Testing-Testing Approaches-Types of Testing-Test Plan.

Unit 4: Test Model- Defect Management-Levels of Testing-Acceptance Testing-Special Tests-Test Planning.

Unit 5: Software Testing Tools Overview- QTP Tools-Performance Testing Tools-Load Runner Tool. Testing Management Tools-Test Director-GUI Testing-Silk Test-Open Source Testing Tool- JMeter.

1. Recommended Texts

(i) B. Beizer , 2003, "*Software Testing Techniques*", Second Edition , DreamTech India, New Delhi.(UNIT I and II) .

(ii) K.V.KK. Prasad , 2005, "*Software Testing Tools*", DreamTech. India, New Delhi. (UNIT III,IV and V).

(iii)M.G.Limaye,2009,"*Software Testing Principles,Techniques and Tools*",TataMc.Graw Hill Education Private Limited,NewDelhi.(UNIT III and IV)

2. Reference Books

(i) Burnstein, "*Practical Software Testing*", 1st Edition 2003, Springer International Edition.

(ii) M G Limaye, "*Software Testing*", 2009, TMH, New Delhi.

3. e-References

(i) http://awards.istqb.org/award-winner/boris-beizer.html

(ii) http://www.testingreferences.com/testinghistory.php

(iii)http://www.swquality.com/users/pustaver/Books/books.htm

(iv)http://www.bullseye.com/coverage.html

(v) http://www.mcr.org.in/sureshmudunuri/stm/
http://lyle.smu.edu/~tian/class/7314.09f/ref.html

Title of the Course/ Paper	**Cryptography**		**Sub Code:**
Elective-VII		Credit: 3	
Objective of the course	This course introduces the concepts of Cryptography.		

Course Outline

Unit 1: Conventional encryption model –Security Concepts-Substitution and Transposition Ciphers- DES algorithm –AES algorithm - Random number generation.

Unit 2: Number Theory: Modular arithmetic – Euler's theorem – Euclid's algorithm – Extended Euclidean Algorithm and its applications- Chinese remainder theorem – Prime numbers and factorization –Discrete Logarithms.

Unit 3: Principles of Public key Cryptography– RSA algorithm – Key Management-Diffie – Hellman key exchange

Unit 4: Message Authentication and Hash functions: Authentication requirements – Authentication function- Message Authentication codes- Hash functions-Secure Hash Algorithm.

Unit 5: Digital Signature and Authentication Protocols: Digital Signature-Authentication Protocols –Digital Signature Standard.

1. Recommended Texts

(i) Stallings, W., 2005 ,"*Cryptography and Network Security Principles and Practice*", Pearson Education, Delhi.

2. Reference Books

(i) Charlie Kaufman, Radia Perlman, Mike specimen, "*Network Security- Private Communication in a public world*",Second Edition, Pearson/PHI.

(ii) Michael Welsehenbach, 2005, "*Cryptography in C & C++",* John Wiley.

3. e-References

(i) http://www.cs.auckland.ac.nz/~pgut001/tutorial

(ii)www.nptel.iitm.ac.in/courses/106105031

Title of the Course/ Paper	**Distributed Operating Systems**		**Sub Code: PCS/CE/3004**
Elective-XIII		Credit: 3	
Objective of the course	This course introduces the concepts of Distributed Operating Systems.		

Course Outline

Unit 1: Distributed Computing Systems:Definition, Evolution – models –Popularity of Distributing Computing Systems. Distributed operating system-definition –design issues – Introduction to Distributed computing environment. ATM Technology. Message passing – Introduction –desirable features of a good message passing system – issues in IPC, synchronization – buffering – Multidatagram Messages, encoding and decoding of message data, process addressing – failure handling – group communication.

Unit 2: RPC : Introduction – Model,transparency of RPC, implementation, stub generation,RPC messages, Marshalling arguments and results, server management, semantics, protocols, CIS binding, exception handling,security,special types of RPC,heterogeneous environment, lightweight RPC,optimization. Distributed Shared Memory : Architecture –design and implementation issues, granularity, structure of shared memory space ,consistency models, replacement strategy, thrashing, hetrogenous DSM, advantages.

Unit 3: Synchronizati**o**n: Clock synchronization – event ordering – mutual exclusion – deadlock –election algorithms Process management: process migration – threads.

Unit 4: Resource Management : Features of Global scheduling Algorithm, Task assignment approach, loading sharing approach. Distributed File Systems : Features, File Models, Accessing models. File sharing semantics, file caching schemes, replication, fault tolerance, Atomic Transaction, design principles.

Unit 5: Naming system : Features, fundamental terminology and concepts, system oriented names, object locating mechanism, human oriented names, names caches, naming and security.Security : Potential attacks to computers, cryptography, authentication, access control, digital signatures, design principles.

1. Recommended Texts

(i) Pradeep K. Sinha, "*Distributed Operating Systems* ", PHI 2002.

2. Reference Books

(i) Andrew S.Tanenbaum, "*Distributed Operating Systems*", Addision Wesley Longman, (Singapore) Private Limited

3. e-References

(i) www.cs.iit.edu/~sun/pdfd/cs550-lec1.pdf

Title of the Course/ Paper	**Information Security**		**Sub Code:**
Elective-IX		Credit: 3	
Objective of the course	This course introduces the concepts of Information Security.		

Course Outline

Unit 1: Security Attacks (Interruption, Interception, Modification and Fabrication), SecurityServices (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms.

Unit 2: Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos,X.509 Directory Authentication Service.

Unit 3: Email privacy: Pretty Good Privacy (PGP) and S/MIME.P Security Overview, IP Security Architecture, Authentication Header, Encapsulating, Security Payload, Combining Security Associations and Key Management.

Unit 4: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security(TLS), Secure Electronic Transaction (SET).

Unit 5: Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats.Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

1. Recommended Texts

(i) William Stallings , 2008, "*Network Security Essentials (Applications and Standards)*",Pearson Education.

2. Reference Books

(i) Eric Maiwald , 2004, "*Fundamentals of Network Security*", Dreamtech press

(ii) Charlie Kaufman, Radia Perlman and Mike Speciner, "*Network Security - Private Communication in a Public World*", Second Edition, Pearson/PHI.

3. e-References

(i) www.privacy.med.miami.edu/tutorials/security_basics.pdf

Title of the Course/ Paper	**Unified Modeling Language**		Sub Code: PCS/CE/2003
Elective-X		Credit: 3	
Objective of the course	This course introduces the concepts of UML.		

Course Outline

Unit 1: Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture

Unit 2: Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.Interfaces,Types and Roles, Packages. Class & Object Diagrams: Terms, Concepts, modeling techniques for Class & Object Diagrams.

Unit 3: Basic Behavioral Modeling: Interactions, Interaction diagrams. Use cases, Use case Diagrams, Activity Diagrams.

Unit 4: Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Unit 5: Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

1.Recommended Texts

(i) Grady Booch, James Rumbaugh, Ivar Jacobson, *"The Unified Modeling Language User Guide",*2nd edition 2005, Pearson Education.

(ii) Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, *"UML Toolkit"*,2nd Edition 2003,WILEY-Dreamtech India Pvt. Ltd.

2. Reference Books

(i) Pascal Roques,*"Modeling Software Systems Using UML2"*, WILEY-DreamTech India Pvt. Ltd.

(ii) AtulKahate,*"Object Oriented Analysis & Design"*, 2000, Tata McGraw-Hill.

3. e-References

(i) www.uml-tutorials.trireme.com

(ii) www.smartdraw.com/resources/tutorials/uml-diagrams