MASTER OF SCIENCE
IN
COMPUTER SCIENCE

SYLLABUS 2018-19

(Outcome Based Education)

Dr. N.G.P. ARTS AND SCIENCE COLLEGE
(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu and Accredited by NAAC with 'A' Grade (2nd Cycle)
Dr. N.G.P.- Kalapatti Road, Coimbatore-641048, Tamil Nadu, India
Web: www.drngpasc.ac.in | Email: info@drngpasc.ac.in | Phone: +91-422-2369100

MASTER OF SCIENCE IN COMPUTER SCIENCE

REGULATIONS

ELIGIBILITY

Candidates for admission to the first year course leading to the Degree of Master of Science (COMPUTER SCIENCE) will be required to possess a pass in B.Sc. Computer Science / B.C.A. /B.Sc. Computer Technology / B.Sc. Information Technology /B.Sc Information Sciences/B.Sc Information Systems/ B.Sc. Software Systems/B.Sc Software Sciences / B.Sc Applied Sciences (Computer Science/Computer Technology) / B.Sc. Electronics of any University in Tamil Nadu or an Examination accepted as equivalent thereto by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the M.Sc. Computer Science Examination of this College after the programme of study of two academic years.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- Embrace future developments in the field of Computer Science and retain professional relevance.
- Gain agility in advanced programming languages and build software for wide area of applications.
- Work with applications of Internet Technologies in their profession with social and ethical responsibilities.
- Acquire the ability required to analyse, design, develop and maintain software development.
- Engage themselves in research oriented fields and life-long learning to adapt with the continuously evolving technology.

SCHEME OF EXAMINATIONS

Course Code	Course	Instruction Hours	EXAMINATIONS				
			Duration Hrs.	CA	CE	Total	Credit
SEMESTER I							
17PCS13A	Core- I : Real Time Operating Systems	4	3	25	75	100	4
17PCS13B	Core- II : Advanced Java Programming	4	3	25	75	100	4
17PCS13C	Core -III : Advanced Relational Database Management System	4	3	25	75	100	4
17PCS13D	Core-IV: Internet of Things	4	3	25	75	100	4
17PCS13P	Core Practical - I : Real Time Operating Systems	5	3	40	60	100	2
17PCS13Q	Core Practical-II : Advanced Java Programming	5	3	40	60	100	2
	Elective- I :	4	3	25	75	100	4
						700	**24**
SEMESTER II							
17PCS23A	Core-V : Design and Analysis of Algorithms	4	3	25	75	100	4
17PCS23B	Core -VI : Internet Programming	4	3	25	75	100	4
17PCS23C	Core-VII : Cloud Computing	4	3	25	75	100	4
17PCS23D	Core- VIII : Network Security	4	3	25	75	100	4
17PCS23P	Core Practical - III : Algorithms	5	3	40	60	100	2
17PCS23Q	Core Practical - IV: Internet Programming	5	3	40	60	100	2
17PCS23V	Core Project-I	-	3	20	30	50	4
	Elective- II:	4	3	25	75	100	4
						750	**28**

BoS Chairman/HoD
Department of Computer Science
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Academic Council * Dr.N.G.P. Arts and Science College * CHAIRMAN

SEMESTER III							
17PCS33A	Core- IX : Open Source Technology	4	3	25	75	100	4
17PCS33B	Core- X : Big Data Analytics	4	3	25	75	100	4
17PCS33C	Core- XI :Advanced Software Engineering	4	3	25	75	100	4
17PCS33D	Core- XII : Cyber Security	4	3	25	75	100	4
17PCS33P	Core Practical-V: Open Source Technology	5	3	40	60	100	2
17PCS33Q	Core Practical -VI : Big Data	5	3	40	60	100	2
	Elective- III:	4	3	25	75	100	4
						700	**24**
SEMESTER IV							
17PCS43V	Core Project-II			40	60	100	14
						100	**14**
Total						**2250**	**90**

ELECTIVE -I

(Student shall select any one of the following Course as Elective-I in First semester)

S.No	Course Code	Name of the Course
1.	17PCS1EA	Advanced Computer Architecture
2.	17PCS1EB	Object Oriented Analysis and Design
3.	17PCS1EC	Mobile Computing

ELECTIVE- II

(Student shall select any one of the following Course as Elective-II in Second semester)

S.No	Course Code	Name of the Course
1.	17PCS2EA	Software Testing
2.	17PCS2EB	Principles of Programming Languages
3.	17PCS2EC	Artificial Intelligence and Expert Systems

ELECTIVE- III

(Student shall select any one of the following Course as Elective-III in Third semester)

S.No	Course Code	Name of the Course
1.	17PCS3EA	Data Mining and Data Warehousing
2.	17PCS3EB	Soft Computing
3.	17PCS3EC	Mobile Operating System

Earning Extra credits is not mandatory for programme completion

Extra credits

Part	Subject	Credit	Total credits
1.	Publication with ISSN Journal	1	1
2.	Hindi /Other Foreign language	1	1
3.	Paper Presented in Sponsored National/ International Seminar/conference/ workshop	1	1
4.	Online Courses Prescribed By Department / Self study paper	1	1
5.	Representation – Academic/Sports /Social Activities/ Extra Curricular Activities at University/ District/ State/ National/ International	1	1
	Total	5	5

Rules:

The students can earn extra credits only if they complete the above during the course period (I to III semester) and based on the following criteria. Proof of Completion must be submitted in the office of the Controller of Examinations before the commencement of the IV Semester. (Earning Extra credits are not mandatory for Course completion)

1. Publication with ISSN Journal by a student and co-authored by staff member will be given one credit extra.
2. Student can opt Hindi/ French/ Other foreign Language approved by certified Institutions to earn one credit. The certificate (Hindi) must be obtained from **Dakshina Bharat Hindi Prachar Sabha** and

He/ she has to enroll and complete during their course period (**first to third semester)**

3. Student can earn one credit, if they complete any one online certification courses / Self study paper prescribed by the concerned department.

Self study Course offered by the PG and Research Department of Computer Science

S. No.	Semester	Course Code	Course Title
1.	III	17PCSSS1	M -Commerce
2.		17PCSSS2	Management Information System

4. Award Winners in /Social Activities / Extra Curricular /Co-Curricular Activities / Representation in Sports at University/ District / State/ National / International level can earn one extra credit.

PROGRAMME OUTCOMES

On the Successful completion of the Programme, Students will be able to

PO No.	Programme Outcome Statement
PO1	The ability to identify and analyze the requirements of Computer Science problems.
PO2	The understanding of professional and ethical responsibility in the field of computer science and to communicate effectively.
PO3	The ability to implement algorithms and paradigms with modern software tools.
PO4	The ability to function effectively on multi-disciplinary projects and problems.
PO5	The ability to recognize and respond towards research areas of computer science and the need for lifelong learning.

17PCS13A	CORE- I : REAL TIME OPERATING SYSTEMS	SEMESTER - I

PREAMBLE

- To learn the basic concepts of RTOS
- To Learn about scheduling, Deadlocks, allocation and the concepts of RTOS

COURSE OUTCOME

CO No	CO Statement	Knowledge Level
1.	Learn the concepts of Synchronization and Concurrency	K2
2.	Learn the basics of Exceptions and Interrupts	K2
3.	To get knowledge about I/O and Memory	K3
4.	To know about Real time operating system applications	K3
5.	To know about the deadlock of Real Time Operating Systems	K3

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**M**	**S**	**S**
CO2	**M**	**S**	**S**	**M**	**M**
CO3	**S**	**M**	**S**	**M**	**S**
CO4	**M**	**M**	**M**	**S**	**M**
CO5	**S**	**S**	**S**	**M**	**M**

S – Strong; M - Medium; L – Low.

17PCS13A	CORE- I : REAL TIME OPERATING SYSTEMS	SEMESTER - I

TotalCredits: 4

Hours Per week: 4

UNIT-I

REAL -TIME OPERATING SYSTEMS: A brief history of operating systems - RTOS Definition –The Scheduler –Objects –Services –Key Characteristics of an RTOS –Task Definition –Task States and Scheduling –Typical Task Structure and Operations.

UNIT-II

SYNCHRONISATION, COMMUNICATION AND CONCURRENCY: Semaphores –Typical Semaphore Operations and Use –Message Queues – Typical Queue States, Contents, Storage, Operations and Use –Pipes – Event Registers, Signals and Condition Variables –Resource Synchronization –Critical Sections.

UNIT-III

EXCEPTIONS AND INTERRUPTS: Introduction to Exceptions and Interrupts – Applications – Processing General Exceptions – Real-Time Clocks and System Clocks –Programmable Interval Timer –Timer Interrupt Service Routines.

UNIT-IV

I/O AND MEMORY: Basic I/O Concepts –The I/O Sub-system –Memory Management –Dynamic Memory Allocation and Fixed-size Memory

Allocation in Embedded Systems –Blocking and Non -Blocking Memory Functions–Hardware Memory Management Units.

UNIT-V

APPLICATIONS: Application Modularization for Concurrency –Rate Monotonic Analysis – Common Design Problems –Resource Classification –Deadlocks –Priority Inversion.

TEXT BOOK:

1. *Qing Li*, **"Real-Time Concepts for Embedded Systems",** CMP Books, 2003

REFERENCE BOOKS:

1. *Albert Cheng*, **"Real-Time Systems: Scheduling, Analysis and Verification",** Wiley Interscience, 2002

2. *Hermann Kopetz*, **"Real -Time Systems: Design Principles for Distributed Embedded Applications"**, Kluwer, 1997

3. *Insup Lee, Joseph Leung, and Sang Son*, "**Handbook of Real -Time Systems",** Chapman and Hall, 2008

4. *Krishna and Kang G Shin*, **"Real -Time Systems",** McGraw Hill, 2001

17PCS13B	CORE - II : ADVANCED JAVA PROGRAMMING	SEMESTER - I

PREAMBLE

- To focus on Graphical User Interface (GUI), multithreading.
- To learn about networking, and Database manipulation.

COURSE OUTCOME

CO .No	CO. Statement	Knowledge Level
1.	Understand the Basic OOPS and History of the Java Programming	K2
2.	Demonstrate Even Handling programming techniques	K3
3.	Demonstrate and Develop database connectivity skills	K3
4.	Implement the Servlet and JSP concepts in applications and develop small project	K4
5.	Analyze effective technique follow to develop EJB application	K4

Mapping with Programme Outcomes

Cos/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	M	S	S	M	M
CO3	S	S	S	M	S
CO4	M	M	M	S	M
CO5	M	S	S	M	M

S – Strong; M - Medium; L – Low.

17PCS13B	CORE - II : ADVANCED JAVA PROGRAMMING	SEMESTER - I

Total Credits: 4

Hours Per week: 4

UNIT – I

Java Fundamentals-Data types –Operators –Control Statements-Classes and objects.

UNIT – II

Methods and Classes -Inheritance –Packages –Interfaces –Exceptional Handling.

UNIT – III

Collections-File and Streams –Networking –Event Handling –AWT: Windows, Controls, Layout Managers and Menus –Swing –JDBC.

UNIT – IV

Java Servlets: Design –Life Cycle-cookies –Session tracking-Java Server Pages: Overview –Implicit Objects –Scripting –Standard Actions-Directives.

UNIT – V

Remote Method Invocation: Remote Interface –Naming Class –RMI Security Manager Class –RMI Exceptions –Creating RMI Client and Server Classes.

TEXT BOOKS:

1. *Herbert Schildt*, "**The Complete Reference – JAVA 2"**, Seventh Edition, 2006.Chapters: 1-10, 17, 19, 20, 22-24, 29, 31.
2. *Deitel & Deitel* , "**Java How to Program"** , Pearson Education ,Seventh Edition,2008. Chapters: 18,20,24,25

REFERENCE BOOKS:

1. *Muthu*, "**Programming with Java"**, Vijay Nicole Imprints Private Ltd., 2004.
2. *Deitel H.M. & Deital P.J*, "**Java How to Program",** Prentice-Hall of India, Fifth
   Edition, 2003.
3. *Cay.S. Horstmann, Gary Cornel*, **"Core Java 2 – Vol. II- Advanced Features"**,
   Pearson Education, 2004.
4. *Tom Valsky*, "**Enterprise JavaBeans – Developing component based Distributed Applications**", Pearson Education, 1999.

17PCS13C	CORE - III : ADVANCED RELATIONAL DATABASE MANAGEMENT SYSTEM	SEMESTER - I

PREAMBLE

- To understand the concepts, techniques, and applications of the database management technology.
- To have the hands-on experience to use an existing database management system to develop a database application system.

COURSE OUTCOME

CO .No	CO. Statement	Knowledge Level
1.	To learn about Database system architecture	K2
2.	To know about the storage and file structure	K3
3.	To know about transaction and recovery basics	K2
4.	To learn about Parallel database and distributed transactions	K3
5.	To learn advanced application development	K2

Mapping with Programme Outcomes

Cos/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	S
CO2	M	S	S	S	M
CO3	S	S	M	M	S
CO4	M	M	M	S	M
CO5	M	M	M	M	M

S – Strong; M - Medium; L – Low.

17PCS13C	CORE - III : ADVANCED RELATIONAL DATABASE MANAGEMENT SYSTEM	SEMESTER - I

Total Credits: 4

Hours Per week: 4

UNIT - I

Database system architectures: Centralized systems – Client/Server systems – Parallel and Distributed systems. Advanced Querying and Information Retrieval: Decision-support systems – Data mining – Data warehousing – Information Retrieval system: Relevance ranking using Terms – Relevance using Hyperlinks – Directories.

UNIT - II

Storage and File Structure: File Organization – Organization of Records in Files – Data Dictionary storage – Database Buffer. Indexing and Hashing: Basic concepts - Ordered Indices- Static Hashing - Dynamic Hashing.

UNIT - III

Transactions: Concept – A simple Transaction Model – Storage structure – Transaction Atomicity and Durability – Transaction Isolation – Serializability - Transaction Isolation and Atomicity. Recovery System: Failure Classification – Storage - Recovery and Atomicity Recovery Algorithm – Buffer Management – Failure with loss of Non-volatile storage.

UNIT - IV

Parallel Databases: I/O Parallelism - Interquery Parallelism – Intraquery Parallelism –Interoperation Parallelism– Design of Parallel Systems. Distributed Databases: Homogeneous and Heterogeneous Databases –

Distributed Data Storage –Distributed Transactions – Commit Protocols – Concurrency control in Distributed Database –Availability – Distributed Query Processing

UNIT - V

Advanced Application Development: Performance Tuning, Advanced Transaction Processing: Transaction Processing Monitors – Transactional Workflows – Main Memory Databases – Real-time Transaction System – Long-Duration Transactions.

TEXT BOOK:

1. *Abraham Silberchatz, Henry F.Korth, S.Sudharshan,* **"Database System Concepts"**, Fifth Edition, McGraw Hill. (Unit I – Unit V), *2011.*

REFERENCE BOOK:

1. *Kevin Loney, George Koch,* **"ORACLE 9i-The Complete Reference"**, Tata McGraw Hill, 2008.

17PCS13D	CORE- IV : INTERNET OF THINGS	SEMESTER – I

PREAMBLE

- To Know about IoT concepts, IoT technologies, Creative thinking techniques, Co-creation techniques.
- To focus on the possibilities offered by the different technologies, and the creative thinking techniques to find innovative applications of combinations of various technologies in real-life scenarios.

COURSE OUTCOME

CO .No	CO. Statement	Knowledge Level
1.	To know about Internet of Things	K2
2.	To learn about Domain Specific IoTs	K2
3.	To Know about IoT Platforms Design Methodology	K3
4.	To learn about IoT Physical Devices and Endpoints	K3
5.	To learn about case study for IoT design	K2

Mapping with Programme Outcomes

Cos/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	S	S	S	S	S
CO3	S	M	S	M	S
CO4	M	M	M	S	M
CO5	M	S	S	M	M

S – Strong; M - Medium; L – Low.

17PCS13D	CORE- IV : INTERNET OF THINGS	SEMESTER – I

Total Credits: 4

Hours Per week: 4

UNIT- I

Introduction to Internet of Things: Introduction-Physical Design of IoT-Logical Design of IoT-IoT Enabled Technologies-IoT Levels and Deployment Templates. **IoT and M2M:** Introduction-M2M-Difference between IoT and M2M-SDN and NFV for IoT.

UNIT- II

Domain Specific IoTs: Introduction-Home Automation-Citites-Environment-Energy-Retail-Logistics-Agriculture-Industry-Health and Lifestyle. IoT System Management: Need for IoT System Management-SNMP-Network Operator Requirements.

UNIT- III

IoT Platforms Design Methodology: Introduction-IoT Design Methodology-Case Study on IoT System for Weather Monitoring – Motivation for Using Python. IoT Systems-Logical Design using Python: Introduction- Installing Python-Python Data Types and Data Structures-Control Flow-Functions-Modules-Packages-File Handling-Date/Time Operations-Classes-Python Packages of Interest for IoT.

UNIT- IV

IoT Physical Devices and Endpoints: IoT Device-Exemplary Device: Raspberry Pi-About the Board-Linux on Raspberry Pi-Raspberry Pi

Interfaces-Programming Raspberry Pi with Python-Other IoT Devices. IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models and Communication APIs-WAMP-Autobahn for IoT-Xively Cloud for IoT-Python Web Application Framework-Django-Designing a RESTful Web API-Amazon Web Services for IoT- SkyNet IoT Messaging Platform

UNIT- V

Case Studies Illustrating IoT Design: Introduction-Home Automation-Cities-Environment-Agriculture-Productivity Applications. Data Analytics for IoT: Introduction-Apache Hadoop-Using Hadoop Map Reduce for Batch Data Analysis-Apache Oozie-Apache Spark-Apache Strom-Using Apache Storm for Real-Time data Analysis

TEXT BOOK:

1. Arshdeep Bahga, Vijay Madisetti, **"Internet of Things-A Hands-on Approach**", University Press, 2015.

REFERENCE BOOK:

2. Ian G.Smith, **"The Internet of Things2012 New Horizons"**, IREC-Internet of Things European Research Cluster, 2012

17PCS13P	CORE PRACTICAL - I : REAL TIME OPERATING SYSTEMS	SEMESTER – I

Total Credits:2

Hours Per week: 5

PREAMBLE

- To demonstrate the process, memory, file and directory management issues under the UNIX/ LINUX operating system
- To introduce LINUX basic commands , simple programs in LINUX and administrative task of LINUX

LAB LIST

1. Scheduling
2. Interrupt Handling
3. Priority Handling
4. Resource Allocation
5. Deadlock Prevention
6. Deadlock Avoidance
7. Semaphores
8. File System

17PCS13Q	CORE PRACTICAL - II : ADVANCED JAVA PROGRAMMING	SEMESTER – I

Total Credits: 2
Hours Per week: 5

PREAMBLE

- To learn and development of Programs using JAVA Language.
- To Learn and Implement Servlets, JDBC and RMI Concepts.

LAB LIST

1. Implementation of Multi threading and Exception handling concepts
2. Implementation of I/O Streams
3. Programs in AWT, Swing and Event handling
4. Network Programming
5. Programs using JDBC.
6. Implementing Servlets / JSP
7. RMI
8. Implementation of Client Server.

17PCS23A	CORE - V : DESIGN AND ANALYSIS OF ALGORITHMS	SEMESTER – II

PREAMBLE

- To learn the various design and analysis of the algorithms
- To apply important algorithmic design paradigms and methods of analysis

COURSE OUTCOME

CO .No	CO. Statement	Knowledge Level
1.	To learn about algorithm definition and specification	K2
2.	To learn about Divide and Conquer	K2
3.	To learn about Greedy Method	K2
4.	To know about Dynamic Programming	K3
5.	To Learn about Backtracking	K3

Mapping with Programme Outcomes

Cos/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	M	M	S	M	M
CO3	S	S	M	M	S
CO4	M	M	S	S	M
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS23A	CORE - V : DESIGN AND ANALYSIS OF ALGORITHMS	SEMESTER – II

Total Credits: 4
Hours Per week: 4

UNIT- I

Introduction:-algorithm definition and specification – performance analysis – Elementary Data structures: stacks and queues – trees – dictionaries – priority queues – sets and disjoint set union – graphs – basic traversal and search techniques.

UNIT- II

Divide and Conquer: General Method –Binary Search – Finding the maximum and Minimum- Merge Sort-Quick sort- Strassen's Matrix Multiplication.

UNIT- III

Greedy Method: General Method-Knapsack problem-Tree vertex splitting-Job sequencing with deadlines-Minimum Cost Spanning Trees-Prim's Algorithm- Kruskal's Algorithm-Single Source shortest paths.

UNIT- IV

Dynamic Programming: General Method-Multistage graph-All pair shortest path-Optimal Binary search Trees-0/1 Knapsack -Traveling sales person problem-Flow Shop Scheduling.

UNIT- V

Backtracking: General Method, 8- Queen's problem-Sum of Subsets-Graph Coloring-Hamilton cycles-Knapsack problem. Branch and Bound: The method-0/1 Knapsack problem-Traveling salesmen problem.

TEXT BOOK:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran "**Fundamentals of Computer Algorithms**", Second Edition, University Press, 2013

REFERENCE BOOK:

1. Jean-Paul Trembley, Paul.G.Sorenson, "**Introduction to Data structures with Applications"**, Tata McGraw Hill, and Second Edition, 2010

17PCS23B	CORE - VI : INTERNET PROGRAMMING	SEMESTER – II

PREAMBLE

- To Learn the Basics of XHTML and CSS and their implementation.
- To Focus on the Concepts of JavaScript, ASP and Ajax

COURSE OUTCOME

CO .No	CO. Statement	Knowledge Level
1.	To learn about internet and XHTML	K2
2.	To learn about Java Script	K2
3.	To know about Java script arrays	K3
4.	To know about XML and RSS	K2
5.	To learn about Ajax	K3

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	M	M	M	M	M
CO3	M	S	S	M	M
CO4	S	M	S	S	S
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS23B	CORE - VI : INTERNET PROGRAMMING	SEMESTER – II

Total Credits: 4

Hours Per week: 4

UNIT- I

Introduction to computers and the Internet: history of the World Wide Web –Hardware trends –software trends -Web Resources. Introduction to XHTML: Introduction –markup language –editing XHTML –common tags –headers –text styling–linking–images-special characters-tables-forms-CSS-inline styles-embedded style sheets -linking external style sheets-backgrounds-user style sheets.

UNIT- II

Java Script –Introduction to scripting-simple program -obtaining user input with prompt dialogs-decision making-Java script control structures: If, if / else selection structure while, for do/while repetition structure – Logical Operators-Java Script Functions: Introduction –Program Modules in Java Script –Functions –Scope Rules –Recursion –Recursion Vs Iteration –Java Script Global Functions.

UNIT- III

Java Script Arrays: Introduction –Arrays –Declaring and Allocating Arrays –Reference Parameters –Passing Arrays to functions –Sorting Arrays –searching Arrays –Multiple Subscripted Arrays-Java Script Objects: Introduction –Math String, Data, Boolean and Number Objects-JavaScript events :Registering event handler-event onload -Event on mouse move, the event object and this-Form processing with onfocus and onblur-more events.

UNIT- IV

XML and RSS: Introduction -XML Basics-Structuring data-XML Namespaces-Document Type definitions -XML Schema documents-XML Vocabularies -MathML -Other markup Languages-Extensible style sheet Language and XSL Transformations-Document Object Model-RSS Web Resources.

UNIT- V

Ajax Enabled Rich Internet Applications-Introduction -Traditional web applications vs Ajax applications -RIAs with Ajax-history of Ajax-Raw Ajax Example -Creating a full scale Ajax Enabled application-Active Server Pages (ASP): Introduction –How ASP Work –Client –Side Scripting Versus Server Side Scripting –Web Server –Activex Components –File System Objects Session Tracking and cookies – Accessing a Database form an ASP.

TEXT BOOKS:

1. *Deitel, Deitel, Nieto*, **"Internet and World Wide Web - How to program"**, Fourth Edition-Pearson Education Asia, 2011.
2. *Thomas A. Powell,* **"The Complete Reference HTML and XHTML"**, fourth Edition, Tata McGraw Hill Pub.

REFERENCE BOOKS:

1. *Ralph Bravaco, Shai Simonson*, "**Java Programming : From the Ground Up**", Tata
   McGraw Hill Edition, 2012
2. *John Dean, Raymond Dean*, " Introduction **to Programming with JAVA –A Problem Solving Approach**", Tata Mc Graw Hill, 2012.

17PCS23C	CORE- VII: CLOUD COMPUTING	SEMESTER - II

PREAMBLE

- To understand the Cloud Computing
- To enable learner to use various Cloud computing concepts

COURSE OUTCOME

CO .No	CO. Statement	Knowledge Level
1.	Understanding the cloud computing	K2
2.	To learn about Data Storage in the Cloud	K2
3.	To know about General Security Advantages of Cloud-Based Solutions	K3
4.	To know about Managing the Cloud	K3
5.	To learn about Designing Cloud Based Solutions	K3

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	M	M	S	M
CO3	S	M	M	M	S
CO4	S	S	S	S	M
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS23C	CORE- VII: CLOUD COMPUTING	SEMESTER - II

Total Credits: 4
Hours Per Week: 4

UNIT-I

First Drive: Introduction Cloud Computing – Essentials - Benefits - Why Cloud? - Business and IT Perspective - Cloud and Virtualization - Cloud Service Requirements - Cloud and Dynamic Infrastructure - Cloud Computing Characteristics - Cloud Adoption - Cloud Rudiments. Introduction - Cloud Characteristics: On-Demand Service - Ubiquitous Network Access – Location-Independent Resource Pooling (Multi-Tenant) - Rapid Elasticity-Measured service.

UNIT-II

Cloud Deployment Models :Public clouds – Private Clouds – Hybrid Clouds – Community Clouds – Shared private clouds – Dedicated Private Clouds – Dynamic Private Clouds – Cloud Models Impact – Savings and Cost Metrics – commoditization in cloud Computing - Security in a Public Cloud – Public Versus Private Clouds - Cloud Infrastructure Self-Service – Cloud as a Service: Introduction - Gamut of Cloud Solutions :Platform-as-a-Service – Software-as-a-Service – Infrastructure-as-a-Service.

UNIT-III

Cloud Solutions: Introduction - Cloud Application Planning – Cloud Business and Operational Support Service (BSS and OSS) – Cloud Ecosystem – Cloud Business Process Management – Cloud service Management – On-Premise Cloud Orchestration and Provisioning Engine – Computing on Demand (CoD) – Cloudsourcing. Cloud Management:

Introduction: Service-Based Model – Resiliency – Provisioning – Asset Management – Cloud Governance – High Availability and Disaster Recovery – Charging Models, Usage Reporting, Billing, and Metering.

UNIT-IV

Cloud Offerings : Introduction - Information Storage, Retrievals, Archive, and Protection – Cloud Analytics :Cloud Business Analytics Competencies – How It Works: Analytics – Testing Under Cloud :Benefits – Value Proposition – The Biggest Benefiters – Cloud Offering Key Themes – Information Security :Expectation of Privacy – Security Challenges – Security compliance – Identity-Based Protection – Data Protection at Cloud – Application Security at cloud Deployment – Virtual Desktop Infrastructure – Storage Cloud.

UNIT-V

Cloud Virtualization Technology: Introduction - Virtualization Definition – Virtualization Benefits – Server Virtualization – Virtualization for x86 Architecture – Hypervisor Management Software – Virtual Infrastructure Requirements. Cloud Infrastructure Deep Dive : Introduction -Storage Virtualization – Storage Area Networks – Network-Attached storage - Cloud Server Virtualization – Networking Essential to Cloud.

TEXT BOOK

1. *Dr.Kumar Saurabh*, "**Cloud Computing**" **Second Edition,2014**.

REFERENCE BOOK

1. *Kris Jamsa*, "**Cloud Computing**" **Janes&Bartlett Learning,2014.**

2. *Anthony T.Velte, Toby J.Velte, Robert Elesepeter,*"**CLOUD COMPUTING-A PRACTICAL APPROACH**", **McGraw Hill Education, 2013**.

17PCS23D	CORE- VIII : NETWORK SECURITY	SEMESTER – II

PREAMBLE

- To know the concepts and trends in Network security
- To understand the Working of Different Security Algorithms.

COURSE OUTCOME

CO .No	CO. Statement	Knowledge Level
1.	To learn about Network Security	K2
2.	To learn about Symmetric key algorithms	K2
3.	To know about overview of Symmetric key Cryptography	K2
4.	To learn about Internet Security Protocols	K3
5.	To know about WAP Security	K3

Mapping with Programme Outcomes

Cos/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	M	M	M	M	M
CO3	M	S	S	S	S
CO4	S	M	M	S	S
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS23D	CORE- VIII : NETWORK SECURITY	SEMESTER – II

Total Credits: 4

Hours Per week: 4

UNIT- I

Need for Network Security -Security Approaches –Principles of Security –Types of Attacks - Cryptography concepts & Techniques: Plain text & Cipher text –Substitution Techniques –Transposition Techniques – Encryption & Decryption –Symmetric & Asymmetric key cryptography – Steganography

UNIT- II

Symmetric key algorithms: Algorithm types &modes –Overview of Symmetric key Cryptography –Data Encryption Standard

UNIT- III

IDEA –RC5 -Advanced Encryption Standard Overview and History of symmetric key Cryptography –RSA algorithm –Digital Signatures – Knapsack Algorithm

UNIT -IV

Digital Certificates –Private Key management Internet Security Protocols: Basic concepts -SSL –TLS-SHTTP

UNIT- V

TSP –SET –Electronic money –Email Security –WAP Security – Security in 3G-Security in GSM-User authentication & Kerberos: Authentication basics - Passwords –Authentication Tokens –Certificate based authentication –Biometric authentication –Kerberos

TEXT BOOK:

1. *Atul Kahate*, **"Cryptography & Network Security",** TMH Second Edition, 2008.

REFERENCES BOOKS:

1. *William Stallings*, "**Cryptography & Network Security Principles of Practices**", PHI 4thEdition, 2006.
2. *Forouzan*, "**Cryptography & Network Security**", TMH, Special Indian Edition, 2007.

17PCS23P	CORE PRACTICAL - III : ALGORITHMS	SEMESTER - II

Total Credits: 2

Hours Per week: 5

PREAMBLE

- To implement and solve problems using various algorithm design methods.
- To learn to do analysis of different Algorithm design methods.

LAB LIST

1. Graph and Tree traversals.
2. Divide and Conquer technique to arrange a set of numbers using merge sort.
3. Strassen's matrix multiplication using Divide and Conquer method.
4. Knapsack problem using greedy method.
5. Construct a minimum cost spanning tree using greedy method.
6. Construct optimal binary search trees using dynamic programming method
7. Traveling salesperson problem using dynamic programming approach.
8. Implement the 8-Queens Problem using backtracking.
9. Implement knapsack problem using backtracking.
10. Find the solution of traveling salesperson problem using branch and bound technique.

17PCS23Q	CORE PRACTICAL - IV : INTERNET PROGRAMMING	SEMESTER - II

Total Credits: 2

Hours Per week: 5

PREAMBLE

- To learn the concepts of website designing.
- To learn client& server side programming and web services.

LAB LIST

1. Web page creation using XHTML.

i) To embed an image map in a web page.

ii) To fix the hot spots.

iii) Show all the related information when the hot spots are clicked.

2. Web page creation with all types of cascading style sheets.

3. Programs for Implementing JavaScript using Operators and Functions.

4. Programs for Implementing JavaScript using Arrays.

5. Programs using XML-schema-XSLT/XSL.

6. Programs using AJAX.

7. Programs for Implementing Client side and Server side Scripting in ASP.

8. Programs in java to create three-tier applications using ASP and Databases.

i) For conducting online examination.

ii) For displaying students mark list.

17PCS23V	CORE PROJECT- I	SEMESTER – II

Total Credits: 4

PREAMBLE

- Enable to enhance their skills for software development.

PROJECT AND VIVA VOCE:

MINI PROJECT:

Each Student in the M.Sc CS First Year must compulsorily undergo Project work in the 2nd SEMESTER. Projects shall be done on Individual Basis. The Project Coordinator will allocate the project title and the Guide for each student. The Project Work Should be done Inside the College. Three Project Reviews will be conducted in which the Progress of Project work will be strictly evaluated by Respective Project Guide and Project Coordinator. Viva Voce will be conducted only in the presence of Industrialists or Academicians.

In the total of 50 Marks, 40% of marks are allocated for CA and 60% for CE Viva Voce.

Following guidelines are hereby enlisted for all the students based on the necessity and importance of the project

Basic framework

The stages in Project Work are given below:

- The student has to select a project in a related field of Computer Science / Information Technology.
- Students can opt various types of organizations for their major project. But before the training actually starts, profile of the organization must be submitted for evaluating the various parameters of the company like *Turnover of the organization, No. of employees and Location of the organization(Major Project Only)*

- After obtaining the approval from project guide, the student has to carry out the project work.

Student has to maintain the **project work diary**. The Project Work carried out should be in accordance with the approved project proposal

- All communication must be in writing. No verbal communication will be accepted.
- Student should adhere to the timings for submission of various reports as mentioned in the guidelines. No excuse will be entertained in any case.
- Student should prepare a Project Report at the end of his/her work, which his /her supervisor would certify and approve for submission (the Project Report should conform to the Standard Format laid down for Project Report).
- The student should submit the Project Report to the college**.**

Guide for the Project:

- Project guide will be allotted by the department to each student
- Each student will be working under a Project Guide for the project to be done.
- Student must report to his/her project guide regularly.

The student can also have a guide who could be the person under whose supervision the student is doing the project in the industry

Selection of Project:

- The selection of the project can be done in consultation with the project guide.
- Group of the students are not allowed to do a single project at a time.

It is possible that a group of student is doing different modules of the same project. In such cases, the student is required to do 3-5 modules of the large project

Submission of Project Report:

- The student will submit his/her project report in the prescribed format.
- Project Report will be submitted in triplicate (Hard Bound Copies) with the proper certification by the organization concerned in the specified format and color. None of copies of the project report will be returned to the student.
- The project reports along with a CD should be submitted to the HoD/Supervisor / Controller of examinations twenty days prior to the final semester examination.

A certificate from the supervisor should also be enclosed in the Project Report as provided in the format for project report.

Fields for Project:

- **GUI Tools** (**Front End)** - Visual Basic, Power Builder, X-Windows (X/lib, X/motif, X/Intrinsic), Oracle Developer 2000,VC++, Jbuilder
- **RDBMS(Back End) -** Oracle, Ingres, Sybase, Progress, SQL Plus, Versant, MY SQL, SQL Server, DB2
- **Languages -** C, C++, Java, VC++, C#
- **Scripting Languages -** PERL, SHELL Scripts (Unix), TcL/TK, PHP
- **.NET Platform –** Dya log APL, VB.Net, C#.Net, Visual C#.Net, Net, ASP.Net, Delphi
- **Middle Ware (Component) Technologies -** COM/DCOM, Active-X, EJB, WINCE, MSMQ, BEA, Message Q, MTS, CICS

- **Unix Internals -** Device Drivers, RPC, Threads, Socket programming
- **Architectural Concepts -** CORBA, TUXEDO, MQ SERIES
- **Internet Technologies -** DHTML, Java script, VB Script, Perl & CGI script, HTML, Java, Active X, RMI, CORBA, SWING, JSP, ASP, XML, EJB, Java Beans, Servlets, Visual Age for JAVA, UML, VRML, WML, Vignette, EDA, Broad vision, Ariba, iPlanet, ATG, Big Talk, CSS, XSL, Oracle ASP server, AWT, J2EE, LDAP, ColdFusion, Haskell 98
- **Wireless Technologies -** Blue Tooth, 3G, ISDN, EDGE
- **Real time Operating System/ Embedded Skills -** QNX, LINUX, OSEK, DSP, VRTX, RTXC, Nucleus
- **Operating Systems -** WINDOWS 2000/ME, WINDOWS NT, WINDOWS XP, UNIX, LINUX, IRIX, SUN SOLARIS, HP/UX, PSOS, VxWorks, AS400, AIX, DOS
- **Application Areas -** Financial / Insurance / Manufacturing / Multimedia / Computer Graphics / Instructional Design/ Database Management System/ Internet / Intranet / Computer Networking-Communication Software development/ E-Commerce/ ERP/ MRP/ TCP-IP programming / Routing protocols programming/ Socket programming.

NOTE:

i. **Projects should not be developed using the packages like Dbase III Dbase IV, FoxPro, Visual FoxPro, CYBASE and MS-Access. Also, projects should not be developed using the combination of Visual Basic as the front end and MS-Access as the back end.**

Students can also develop applications using tools/languages/software not listed above, if they are part of latest technologies

PHASES OF TRAINING PERIOD

- At the time of Review – I, students should present Title, Synopsis/Abstract of the project and module description.
- Students should present the Mid Term Report at the time of Review – II.
- Students should present the Development and Testing Report at the time of Review – III.
- Students should submit the complete Project Report at the time of Model Viva-Voce./

The external Viva-Voce will be conducted for all the students.

FORMATTING OF PROJECT:

- The whole project report should be nicely composed and presented.
- The dimension of the project report should be in A4 size only.
- Page Specification : (Written paper and source code)
  Left margin - 3.0 cms/1.18 inches
  Right margin- 2.0 cms/0.78 inches
  Top margin 2.54 cms/1 inch
  Bottom margin 2.54 cms/1 inch
- The project report should be typed in good word processor and should avoid spellings and grammatical mistakes.
- The impression on the typed copies should be black in color.
  Normal Body Text: Font Size: 12, Times New Roman, 1.5 lines Spacing, Justified.

Paragraph Heading Font Size: 14, Times New Roman, Left Aligned. 12 points above & below spacing

Chapter Heading Font Size: 16, Times New Roman, Centre Aligned, 30 points above and below spacing.

Coding Font size: 10, Courier New, Normal

- Students should use only one side of paper for printing.
- Page numbers - All text pages as well as Program source code listing should be numbered at the bottom center of the page.

Cover Page - Attractive and appealing cover page containing the Project Title, program details, Student & Guide details, month of submission etc.

COLOR - Cover Page Color is silver Gray

Letter of Authentication - To be submitted by students declaring that the Project Report is the original work of student and no reward had been attained for same project ever before. Students are advised not to **COPY** the project report from other students.

Authorization from Organization where such Project have been implemented with certificate showing the student name, register number and project name.

Certificate from Project Guide - Certificate from the Project Guide certifying the project work done under his/her guidance along with course, student, and project details complete in all respects.

Draft of Project Report

The size of the project report can be approximately **130 - 150** pages, which include the following details:

Certificate of the project guide

Certificate of the Organization

Acknowledgement

Synopsis / Abstract

Table of Contents

Appendices

Forms (input screen shots)

Sample Source Code

Output Screen shots

Reports

Sample Coding / Abstract Coding

- Along with it, if the student feels to add on any other topics as per the demand of the project or want to include the functionalities as per the SDLC(Software Development Life Cycle) or the Software Engineering model used, that can be done and included in the Project Report.

The project report must include all the components as per the SDLC. It is highly recommended to follow the approaches of Software Engineering methodology.

Arrangement of Contents

- Cover Page & Title Page
- Bonafide Certificate
- Synopsis / Abstract
- Table of Contents
- Chapters
- List of Tables
- List of Figures
- List of Symbols, Abbreviations and Nomenclature
- Appendices
- References

The table and figures shall be introduced in the appropriate places

- **List of Symbols, Abbreviations and Nomenclature –** One and a half spacing should be adopted for typing the matter under this head. Standard symbols, abbreviations etc. should be used.
- **Chapters –** The chapters may be broadly divided into 3 parts. Introductory chapter, Chapters developing the main theme of the project work and Conclusion.

  The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

  - ❖ Each chapter should be given an appropriate title.
  - ❖ Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
  - ❖ Footnotes should be used sparingly. They should be typed with single space and placed directly underneath in the very same page, which refers to the material they annotate.
- **Appendices –** Appendices are provided to give supplementary information, which is included in the main text as they may serve as a distraction and cloud the central theme.
  - ❖ Appendices should be numbered using Arabic numerals.
  - ❖ Appendices, Tables and References appearing in appendices should be numbered and referred to an appropriate place just as in the case of chapters.
  - ❖ Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.
- **List of References –** The listing of references should be typed 4 spaces below the heading "REFERENCES" in alphabetical order in single spacing and left justified. The reference material should be listed in the alphabetical order of the first author. The name of the

author/authors should be immediately followed by the year and other details.

A typical illustrative list given below relates to the citation example quoted above.

17PCS33A	CORE- IX : OPEN SOURCE TECHNOLOGY	SEMESTER - III

PREAMBLE

- To introduce the concept of open Source Software.
- To enable students to learn Linux Environment.
- To implement Python Programming Concepts.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To understand Linux.	K3
2.	To implement programs in python	K2
3.	To implement Decision making and Branching Concepts	K3
4.	Implementing Mapping and Set Types	K4
5.	To implement in Functions and Functional Programming	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**M**	**S**	**S**
CO2	**M**	**M**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**	**M**
CO4	**M**	**S**	**M**	**M**	**S**
CO5	**S**	**M**	**S**	**S**	**M**

S – Strong; M - Medium; L – Low.

17PCS33A	CORE- IX : OPEN SOURCE TECHNOLOGY	SEMESTER – III

Total Credits: 4
Hours Per week: 4

UNIT I

Open source Software: Introduction – Initiatives- Licenses – Features and Advantages - Linux: Introduction – Getting Started – File System – Basic Commands – Editors.

UNIT II

Python: Introduction – Origins – Features – Getting Started – Comments – Operators - Python Basics – Statements and Syntax – Variable Assignment - Identifiers – Basic Style Guidelines – Memory Management – First Python Program.

UNIT III

Python Objects: Python Objects – Types – Built – in Functions – Type Factory Functions . Number: Integers – Floating Point Numbers – Complex Numbers – Operators . Sequences : Strings, Lists and Tuples.

UNIT IV

Mapping and Set Types: Dictionaries – Sets . Conditionals and Loops: If – Else – Elif – Conditional Expressions - While – For – Break –Continue – Pass – Iterators - List Comprehensions – Generator Expressions

UNIT V

Files and Input/output: File Objects – File Functions – Methods – Attributes - Standard Files – File System – File Execution. Errors and Exceptions: Exceptions – Detecting and Handling Exceptions – Raising

Exceptions – Assertions - Functions and Functional Programming: Calling – Creating – Passing – Arguments – Recursion – Generators.

TEXT BOOKS:

1. *Petersen, Richard*, "**Linux: The Complete Reference",** 6th Edition, McGraw-Hill. 2008
2. *Wesley J Chun,* "**Core Python Programming**" Second Edition, Prentice Hall, 2009.

REFERENCE BOOKS:

1. *Dawson, Michael*, "**Python Programming for the Absolute Beginner",** Third Edition, Course Technology/Cengage Learning, 2009.

17PCS33B	CORE - X : BIG DATA ANALYTICS	SEMESTER - III

PREAMBLE

- Overview about Big data and introduces the technology behind it.
- Recent technologies available in the market dealing with big data.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To understand about Evolution, Characteristics and Challenges in Big data.	K3
2.	To implement programs in Hadoop Environment.	K2
3.	Implementation of MongoDB and MAPREDUCE Programming	K3
4.	Implementing Querying Using Hive.	K4
5.	To implement in Pig Environment its operators and Data types.	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**M**	**S**	**S**
CO2	**M**	**M**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**	**M**
CO4	**M**	**S**	**M**	**M**	**S**
CO5	**S**	**M**	**S**	**S**	**M**

S – Strong; M - Medium; L – Low.

17PCS33B	CORE - X : BIG DATA ANALYTICS	SEMESTER - III

Total Credits: 4

Hours Per week: 4

UNIT-I

Introduction to Big Data: Characteristics of Big Data – Evolution of Big Data – Definition of Big Data – Challenges with Big data -Volume – Velocity – Variety – Why Big data – Traditional Business Intelligence vs. Big data – A typical Hadoop Environment – Coexistence of Big data and data warehouse

UNIT-II

Introduction to Hadoop: Introducing Hadoop – Why Hadoop – RDBMS vs. Hadoop – Distribute Computing Challenges – History – Hadoop Overview – Hadoop Distributors – HDFS – Processing Data with Hadoop – Managing Resources and Applications with Hadoop YARN – Interacting with Hadoop Ecosystem.

UNIT-III

Introduction to MongoDB: What is MongoDB – Why – Data Types – MongoDB Query Language. Introduction to MAPREDUCE Programming: Introduction – Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression.

UNIT-IV

Introduction to Hive: What is Hive – Architecture – Data Types – File Format – Hive Query Language – RCFile Implementation – SerDe – User-Defined Function.

UNIT-V

Introduction to Pig: What is Pig – Anatomy of Pig – Pig on Hadoop – Use case for Pig – Pig Latin Overview – Data Types in Pig –Running Pig –

Execution modes of Pig – HDFS Commands – Relational Operators – Eval Function – Complex Data types – Piggy bank - User-Defined Function – Parameter Substitution – Diagnostic operator – Pig vs. Hive.

TEXT BOOK:

1. *Seema Acharya, Subashini Chellappan*, "**Big Data and Analytics**", Wiley India Pvt Ltd, 2015.

REFERENCE BOOKS

1. *Chris Eaton, Dirk Deroos,Tom Deutsch, George Lapis, Paul Zikopoulos,* "**Understanding Big Data, Analytics for Enterprise Class Hadoop and Streaming Data**", Tata Mc Graw Hill,. 2012.
2. *O'Reilly Radar Team,* "**Planning for Big Data**",(eBook) (Refer eBook repository). 2012.

17PCS33C	CORE- XI: ADVANCED SOFTWARE ENGINEERING	SEMESTER - III

PREAMBLE

- To be able to design a software.
- To Use CASE tools for analyzing and designing software.
- Be able to confirm, verify and validate software.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To understand about Software Engineering	K3
2.	To implement Web Engineering	K2
3.	Implementation of Project Management	K3
4.	Implementing Advanced topic in Software Engineering	K4
5.	To Design Component based development: Engineering of component based systems	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**M**	**S**	**S**
CO2	**M**	**M**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**	**M**
CO4	**M**	**S**	**M**	**M**	**S**
CO5	**S**	**M**	**S**	**S**	**M**

S – Strong; M - Medium; L – Low.

17PCS33C	CORE- XI: ADVANCED SOFTWARE ENGINEERING	SEMESTER - III

Total Credits: 4
Hours Per week: 4

UNIT I

Introduction to Software Engineering : The evolving role of software – The changing nature of software – Software myths – A process frame work – Process technology – Process model – Agile process model.

UNIT II

Applying Web Engineering: Attributes of web based systems and applications – Web app engineering layers – Process – Practices – Web based systems – Planning web engineering projects – Team issues – Requirement analysis for web app – Models – Architecture design – Object oriented hyper media design method – Testing.

UNIT III

Project Management : The management spectrum – Estimation – Resources – Decomposition techniques – Empirical estimation models – Project scheduling – Defining the tasks – Risk management – Quality management – Concepts – Assurance – Reviews – Change management – Software configuration management – The SCM process.

UNIT IV

Advanced topic in Software Engineering : Formal methods – Basic concepts – Mathematical preliminaries – Mathematical notations – Formal specification languages – Object constraint languages – The Z Specifications – The ten commandments of formal methods – The clean

room approach – Functional specification – Clean room design – Clean room testing.

UNIT V

Component based development: Engineering of component based systems – The CBSE process – Domain engineering – Component based development – Classifying and retrieving components – Economics of CBSE – Re-engineering: Business process re-engineering – Software re-engineering – Reverse engineering – Restructuring – Forward engineering – The economics of re-engineering.

TEXT BOOKS:

1. *Roger S. Pressman*, "**Software Engineering – A practitioner's Approach**", Sixth edition, McGraw Hill International Edition, 2005.

17PCS33D	CORE - XII : CYBER SECURITY	SEMESTER - III

PREAMBLE

- To Learn the Basics of Cyber Security.
- To Know the Security Policies and cyber management issues.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To Understand Cyber security Principles, measures and challenges.	K2
2.	To understand about the cyber offenses	K3
3.	To Demonstrate attacks Mobile and Wireless Devices.	K4
4.	To Understand various attacks and Phishing.	K3
5.	To Study Governments various security Policies	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	S	S	M	M
CO3	S	M	S	M	S
CO4	M	M	M	S	M
CO5	S	S	S	M	M

S – Strong; M - Medium; L – Low.

17PCS33D	CORE - XII : CYBER SECURITY	SEMESTER - III

Total Credits: 4

Hours Per week: 4

UNIT-I

Introduction: Cybercrime definition and origins of the world,-Cybercrime and information security-Cyber criminals- Classifications of cybercrime- Cybercrime : The Legal Perspective-Cybercrime : An Indian Perspective

UNIT-II

Cyberoffenses :Introduction - How criminal plan the attacks, Social Engineering-Cyber stalking, Cybercafe and Cybercrimes- Attack vector- Cloud computing

UNIT-III

Cybercrime : Introduction - Proliferation of Mobile and Wireless Devices- Trends in Mobility-Credit Card Frauds in Mobile and Wireless Computing Era- Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices-Authentication Service Security- Attacks on Mobile/Cell Phones- Mobile Devices: Security Implications for Organizations- Organizational Measures for Handling Mobile- Devices-Related Security Issues- Organizational Security Policies and Measures in Mobile Computing Era- Laptops

UNIT-IV

Tools and Methods used in Cybercrime : Proxy Servers and Anonymizers-Phishing, Password Cracking, Keyloggers and Spywares - Virus and Worms-Trojan Horses and Backdoors - Steganography - DoS DDoS Attacks- Attacks on Wireless Networks

UNIT-V

Cybercrimes and Cybersecurity: The Legal Perspectives : Introduction – Cybercrime and the Legal Landscape around the world - Why do we need

Cyberlaws: The Indian Context - The Indian IT Act – Challenges to Indian Law and Cybercrime Scenario in India – Digital Signature and the Indian IT Act

TEXT BOOKS:

1. *NinaGodbole, Sunit Belapure*, "**Cyber Security**" Wiley India Pvt Ltd, New Delhi,2011

REFERENCE BOOKS:

1. *Rick Howard*, "**Cyber Security Essentials**", Auerbach Publications, 2011.
2. *Richard A, Clarke and Robert Knake,* "**Cyber war: The Next Threat to National Security & What to Do About It"**, Ecco, 2010.
3. *Dan Shoemaker*, "**Cyber security The Essential Body Of Knowledge"**, 1st ed. Cengage Learning, 2011.

17PCS33P	CORE PRACTICAL-V: OPEN SOURCE TECHNOLOGY	SEMESTER - III

Total Credits: 2

Hours Per week: 5

PREAMBLE

- To learn to implement Basic Python Concepts.
- To develop of File Programs using Python language.

LAB LIST

1. Program to implement various operators.
2. Program to implement looping.
3. Program to implement Branching.
4. Program to implement string operations.
5. Program to implement lists.
6. Program to implement tuples.
7. Program to perform file operations.
8. Program to handle exceptions.
9. Program to implement user defined functions.
10. Program to implement recursion in functions

17PCS33Q	CORE PRACTICAL -VI : BIG DATA	SEMESTER – III

Total Credits: 2

Hours Per week: 5

PREAMBLE

- To learn the setting up of Hadoop and Map Reduce Environment.
- To implement Programs in Pig and Hive.

LAB LIST

1. Perform setting up and Installing Hadoop in its three operating modes:

- Standalone,
- Pseudo distributed,
- Fully distributed

2. Implement the following file management tasks in Hadoop:

- Adding files and directories
- Retrieving files
- Deleting files

3. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

4. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for

analysis with Map Reduce, since it is semi structured and record-oriented.

5. Implement Matrix Multiplication with Hadoop Map Reduce

6. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

7. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.

17PCS1EA	ELECTIVE - I : ADVANCED COMPUTER ARCHITECTURE	SEMESTER - I

PREAMBLE

- To learn about major components of Advanced Computer Architecture.
- To learn about parallel processing, solving problems in parallel and SIMD processors, SIMD arrays.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To learn about parallel processing	K2
2.	To learn about Solving Problems in Parallel	K2
3.	To know about Principles Linear Pipelining, design and Characteristic.	K3
4.	To demonstrate SIMD Array Processors	K4
5.	To design Parallel Algorithms	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	S
CO2	M	M	M	M	M
CO3	M	S	S	S	S
CO4	S	M	M	S	S
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS1EA	ELECTIVE - I : ADVANCED COMPUTER ARCHITECTURE	SEMESTER - I

Total Credits: 4

Hours Per week: 4

UNIT- I

Introduction to parallel processing – Trends towards parallel processing – Parallelism in Uniprocessor Systems – Parallel Computer structures – Architectural Classification schemes – Flynn' Classification – Feng's Classification – Handler's Classification – Parallel Processing Applications

UNIT- II

Solving Problems in Parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel processing with specialized Processor – Inter-task Dependency. Instructional Level Parallel Processing – Pipelining of Processing Elements – Delays in Pipeline Execution – Difficulties in Pipelining

UNIT- III

Principles Linear Pipelining – Classification of Pipeline Processors – General Pipeline and Reservation tables – Arithmetic Pipeline – Design Examples – Data Buffering and Busing structure – Internal forwarding and Register Tagging – Hazard Detection and Resolution – Job sequencing and Collision prevention – Vector processing requirements – Characteristics – Pipelined Vector Processing methods.

UNIT- IV

SIMD Array Processors – Organization – Masking and Data routing – Inter PE communications – SIMD Interconnection Networks – Static Vs Dynamic – Mesh connected Iliac – Cube interconnection network –

Shuffle-Exchange and Omega networks - Multiprocessor Architecture and programming Functional structures – interconnection Networks.

UNIT- V

Parallel Algorithms: Models of computation – Analysis of Parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations.

TEXT BOOKS:

1. *Kai Hwang, Faye A. Briggs,* "**Computer Architecture and Parallel Processing",** MGH, [Unit I, III, IV].
2. *Rajaraman.V, C. Siva Ram Murthy,*. **Parallel Computers Architectures and Programming**, [Third Edition], PHI, [Unit II, V], 2004.

REFERENCE BOOKS:

1. *Kai Hwang,* "**Advanced Computer Architecture – Parallelism, Scalability, Programmability"**, Tata McGraw Hill, 2011.
2. *Michael J. Quinn, "* **Parallel Computing Theory and Practice"**, [Second Edition], TMH, 2009.

17PCS1EB	ELECTIVE- I :OBJECT ORIENTED ANALYSIS AND DESIGN	SEMESTER - I

PREAMBLE

- To acquire knowledge on trends and principles of object oriented methodologies.
- To Gain problem solving skills using object based models.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To learn about Object Oriented System Development and basics	K2
2.	To learn about Object Oriented System Development Methodology, Booch Methodology, Jacobson Methodologies, Patterns and Unified approach.	K2
3.	To know about Unified Modeling Language, UML Class Diagram and UML Dynamic Modeling.	K3
4.	To demonstrate OO Design axioms, Designing Methods and Protocols.	K4
5.	To design Quality Assurance testing	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	M	M	M	M
CO3	S	S	S	M	S
CO4	S	M	M	S	M
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS1EB	ELECTIVE- I :OBJECT ORIENTED ANALYSIS AND DESIGN	SEMESTER - I

Total Credits: 4

Hours Per week: 4

UNIT - I

Object Oriented System Development: Introduction- Object Oriented Systems Development Methodology- Why an Object Orientation. Object Basics: Introduction – Objects – Attributes – Object Behavior and Methods – Encapsulation and Information Hiding – Class Hierarchy – Object Relationships and Associations – Polymorphism – Aggregations and Object Containment. Static and Dynamic Binding.

UNIT - II

Object Oriented System Development: Analysis – Design – Prototyping. Methodologies: The Booch Methodology: The Macro Development – The Micro Development Process. The Jacobson et al Methodologies: Use cases- Object Oriented Software Engineering – Object Oriented Business Engineering. Patterns: Generative and Non generative patterns- Pattern Templates- Anti patterns- capturing patterns. Unified approach: Analysis – Design – Modeling based on Unified Modeling Language

UNIT – III

Unified Modeling Language: Introduction – Static and Dynamic Models – UML Diagrams – UML Class Diagram: Class Notation – Object Diagram – Class Interface Notation- Binary Association Notation- Association Rule – Qualifier- Multiplicity- OR Association- N-Ary Association – Aggregation and composition-Generalization – Use Case Diagram – UML Dynamic Modeling: UML Interaction Diagrams – Sequence diagrams – collaboration diagrams – state chart diagram – Activity diagram.

UNIT - IV

OO Design axioms: Design axioms. Designing Classes: Introduction – Design philosophy – UML Object Constraint Language- The process – Class visibility: Private and protected protocol Layers – Public Protocol Layer- Refining attributes: Attribute types – UML Attribute Presentation. Designing Methods and Protocols: Design Issues - UML Operation presentation. Access layer: Introduction – OODBMS: OOD Vs Traditional Databases- Object Relational Systems: Mapping – Table class Mapping – Table Multiple class Mapping-Table Inherited Classes Mapping- Keys for Instance Navigation. View layer: Introduction – Designing view layer classes.

UNIT - V

Quality Assurance testing: Quality assurance tests- Testing Strategies- Impact of Inheritance in testing – Test Cases: Guidelines for developing Quality Assurance Test cases. Test Plan: Guidelines for Developing test plans. Usability testing: Guidelines for developing Usability Testing. User Satisfaction Testing: Guidelines for developing a User Satisfaction Testing

TEXT BOOKS:

1. *Ali Brahmi,* "**Object Oriented System Development"**, Tata McGraw-Hill International Edition, [Unit I to V], 2013.

REFERENCE BOOKS:

1. *Addison-Wesley, Grady Booch,.* "**Object-Oriented Analysis and Design",**[Second Edition]. Pearson Education Asia, 2010.
2. *James Rumbaugh, Micheal Blah,* "**Object Oriented Modeling and Design",** [Tenth Edition], Prentice Hall of India, *2001.*

17PCS1EC	**ELECTIVE - I : MOBILE COMPUTING**	**SEMESTER - I**

PREAMBLE

- To understand the concept of wireless mobile computing.
- To understand World Wide Web and its applications.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	**CO. Statement**	**Knowledge Level**
1.	Understanding the Vertical and applications of Wireless Networking	K2
2.	To know about Space division multiplexing	K2
3.	To learn about Comparison of S/T/F/CDMA	K3
4.	To demonstrate the UMTS and IMT	K4
5.	To design a case study on World Wide Web	K5

Mapping with Programme Outcomes

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**M**	**M**	**M**	**S**	**M**
CO3	**S**	**S**	**S**	**M**	**S**
CO4	**S**	**S**	**S**	**S**	**M**
CO5	**M**	**M**	**M**	**M**	**S**

S – Strong; M - Medium; L – Low.

17PCS1EC	ELECTIVE - I : MOBILE COMPUTING	SEMESTER - I

Total Credits: 4
Hours Per Week: 4

UNIT - I

Introduction – Vertical and applications of Wireless Networking – Positioning of Wireless networking relative to wired networks – Wireless LAN and Wireless WAN – Wireless PBXs map – The Radio Spectrum cell size and achievable throughput. Wireless transmission – Frequencies for radio transmission – Regulations – Signals, Antennas, Signal propagation, path loss of radio signals, Additional signal propagation effects- Multi-path propagation – Multiplexing.

UNIT - II

Space division multiplexing – Frequency division multiplexing – time division multiplexing – Code division multiplexing. Spread spectrum – Direct sequence spread spectrum – Frequency hopping spread spectrum – Cellular systems. Medium access control – Hidden and exposed terminals – Near and far terminals – SDMA, FDMA, TDMA, Fixed TDM, Classical Aloha, slotted Aloha, Carrier sense multiple access– Reservation TDMA – Multiple access with collision avoidance – Polling – CDMA – Spread Aloha multiple access

UNIT – III

Comparison of S/T/F/CDMA.GSM – Mobile services – System architecture – Radio interface – Protocols – Localization and calling – Handover – Security – Location Management for Mobile Cellular Systems – GPRS – Mobile services – System Architecture.

UNIT - IV

UMTS and IMT – 2000.Wireless LAN – Infra red vs. radio transmission – Infrastructure and ad-hoc network – IEEE 802.11 – System architecture – Protocol architecture – Physics layer – Medium access control layer – MAC management – Blue tooth. Mobile network layer – Mobile IP – Goals, assumptions and requirements – entities and terminology – packet delivery – Agent discovery – Registration – Tunneling and encapsulation Recent technologies.

UNIT - V

World Wide Web - WAP – Architecture – wireless datagram Protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language, WML script – Mobile computing applications using J2ME.

TEXT BOOKS:

1. *John Schiller,* 2003. **Mobile Communications**, Addison Wesley.

REFERENCE BOOKS:

1. *1.Steve Mann and Scoot Schibli*, **The Wireless Application Protocol**, John Wiley &Sons, inc.
2. *Steve Mann*, 2000. **Programming Applications With The Wire Less Application Protocol**, John Wiley & Sons, Inc.

17PCS2EA	ELECTIVE – II : SOFTWARE TESTING	SEMESTER - II

PREAMBLE

- To know the strategy in testing.
- To understand the test methodologies and the testing techniques.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	Understanding the tackling the testing maze and test outline	K2
2.	To know about Building a software testing environment and process	K2
3.	To learn about Overview of the software testing process , Using tables and spreadsheets	K3
4.	To demonstrate Testing software system security	K4
5.	To design Testing objects oriented software and Testing web applications	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	S
CO2	M	M	M	M	M
CO3	S	S	S	M	S
CO4	S	S	M	S	M
CO5	M	M	M	M	M

S – Strong; M - Medium; L – Low.

17PCS2EA	ELECTIVE – II : SOFTWARE TESTING	SEMESTER - II

Total Credits: 4

Hours Per week: 4

UNIT I

Software testing background: Infamous Software Error Case Studies – A bug – The cost of Bugs- Work of software tester do?- what makes a good software tester ? The realities of software testing: Testing Axioms-Software testing terms and definitions.

UNIT II

Examining the specification: Getting started- performing high level review of the specification-low level specification test techniques.

UNIT III

Testing the software with Blinders On: Dynamic black-Box testing: Testing the software while Blind Folded- Test to pass and test to fail-Equivalence portioning – data testing- state testing- other black-box test techniques.

UNIT IV

Testing the Documentation: Types of Software Documentation – The importance of Documentation Testing – What to look for when reviewing documentation – The Realities of Documentation Testing. Testing for Software security : War games- the movie- Understanding the Motivation- Threat Modeling – Is Software Security is a Feature? – Understanding the Buffer Overrun- Using Safe String Functions – Computer Forensics. Website Testing: Web page fundamentals – Black-Box Testing –Gray-Box Testing-White-Box Testing – Configuration and compatibility Testing- Usability Testing – introducing Automation.

UNIT V

Planning Your Test Efforts: The Goal of Test planning – Test Planning Topics. Writing and Tracking Test Cases: the goals of Test Case Planning – Test Case Planning Overview – Test Case Organization and Tracking. Reporting what you find: Getting your Bugs fixed- Isolating and RE producing Bugs- Not all bugs are created equal-A Bug's Life cycle – Bug tracking systems. Measuring your Success : using the information in the bug tracking database – Metrics that you will use in your daily testing- Common project – level metrices

TEXT BOOK

1. Ron Patton, "**Software testing",** second edition – Pearson education.
2. *Robert V.Binder*, "**Testing Object Oriented Systems : Models, Patterns and Tools** ", Addision Wesley Publication.

REFERENCE BOOK

1. *William E Perry*, "**Effective Methods for S/W Testing** ", Wiley Publications. 2nd Edition

17PCS2EB	ELECTIVE – II : PRINCIPLES OF PROGRAMMING LANGUAGES	SEMESTER - II

PREAMBLE

- To understand and describe syntax and semantics of programming languages
- To understand data, data types, and basic statements, object-orientation, concurrency, and event handling in programming languages

Course Outcome

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To learn about Language Design Issues and Translation Issue	K2
2.	To know about Modeling Language Properties	K3
3.	To know about Encapsulation	K3
4.	To demonstrate the Logic programming and Functional Programming	K4
5.	To design Formal Semantic and Parallel Programming	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	M	M	M	M
CO3	S	S	S	M	S
CO4	S	M	M	S	M
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS2EB	ELECTIVE – II : PRINCIPLES OF PROGRAMMING LANGUAGES	SEMESTER - II

Total Credits: 4
Hours Per week: 4

UNIT-I

Language Design Issues: History-Role of Programming languages – Programming environments - Impact of machine Architectures – Language Translation Issues: Programming language Syntax- Stages in Translation - formal Translation models - recursive descent Parsing.

UNIT-II

Modeling Language Properties: Formal Properties of Languages- Language Semantics-Elementary data Types: Properties of Types and Object- Scalar Data Types - Composite Data Types.

UNIT-III

Encapsulation: Structured data types - Abstract data types - Encapsulation by sub programs Type Definitions Inheritance: - Polymorphisms.

UNIT-IV

Functional Programming: Programs as Functions- Functional Programming in an Imperative Language - LISP – Functional Programming with static typing - delayed evaluation- Mathematical functional programming- recursive functions and lambda calculus - Logic programming : Logic and Logic Programs - Horn Clauses - Prolog - Problems with logic programming.

UNIT-V

Formal Semantics: Sample small language - operational Semantics - Denotation Semantics - Axiomatic Semantics - Program correctness -

Parallel Programming: Parallel Processing and programming languages - threads - Semaphore - monitors-message passing - parallelism Non Imperative Languages.

TEXT BOOKS :

1. *Terrence W Pratt*, *Marvin V Zelkowitz* and *Tadepalli V Gopal* ,"**Programming Languages - Design and Implementation**", PHI Publications, 4th edition, 2013.
2. *Kenneth C. Louden*, "**Programming Languages-Principles and Practices**", Cengage Learning Publications, 2nd Edition, 2008.

REFERENCE BOOKS :

1. *Daniel P Friedman*, *Mitchell Wand and Christopher T Haynes*, "**Essentials of programming languages**", 2nd Edition, PHI Publishers, 2005.

17PCS2EC	ELECTIVE – II : ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	SEMESTER - II

PREAMBLE

- To know the basic concepts of artificial Intelligence.
- To learn various AI techniques.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To learn about AI Problems	K2
2.	Understanding of Heuristic search techniques, Knowledge representation issues	K3
3.	To know about Using predicate logic	K3
4.	To demonstrate the representation of knowledge using rules	K4
5.	To analyze Expert Systems	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	S
CO2	M	M	M	S	M
CO3	S	S	S	M	S
CO4	S	S	S	S	M
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS2EC	ELECTIVE – II : ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	SEMESTER - II

Total Credits: 4

Hours Per week: 4

UNIT – I

Introduction: AI Problems – AI techniques – criteria for success. Problems, problem spaces, search: state space search – production systems – problem characteristics – issues in design of search.

UNIT – II

Heuristic search techniques: generate and test – hill climbing – best-first, problem reduction, constraint satisfaction, means-end analysis. Knowledge representation issues: representations and mappings – approaches to knowledge representations – issues in knowledge representations – frame problem.

UNIT – III

Using predicate logic: Representing simple facts in logic - representing instance and is a relationships – computable functions and predicates – resolution – natural deduction

UNIT – IV

Representing knowledge using rules: Procedural Vs declarative knowledge logic programming – forward Vs backward reasoning – matching – control knowledge.

UNIT – V

Expert Systems – Definition – Features– Organization – Characteristics – Prospector – Knowledge Representation in expert systems-Nature of Expert system Tools –Stages in the development of Expert system tools – EMYCIN.

TEXT BOOKS:

1. *Elaine Rich and Kevin Knight*, "**Artificial Intelligence**", Tata McGraw Hill Publication, 2nd Edition, 2001
2. *Donald A.Waterman*, '**A Guide to Expert Systems'**, Pearson Education, 2009.

REFERENCE BOOKS:

1. *George F Luger*," **Artificial Intelligence**", 4th Edition, Pearson Education Publications 2002.

17PCS3EA	ELECTIVE – III : DATA MINING AND WAREHOUSING	SEMESTER - III

PREAMBLE

- Differentiate Online Transaction Processing and Online Analytical processing.
- Learn Multidimensional schemas suitable for data warehousing.
- Inculcate knowledge on data mining query languages.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To understand about Basic data mining tasks	K3
2.	To implement Classification algorithms	K2
3.	Implementation of Clustering algorithms	K3
4.	Implementing in OLAP TOOLS	K4
5.	To implement in data Warehouse	K5

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**M**	**S**	**S**
CO2	**M**	**M**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**	**M**
CO4	**M**	**S**	**M**	**M**	**S**
CO5	**S**	**M**	**S**	**S**	**M**

S – Strong; M - Medium; L – Low.

17PCS3EA	ELECTIVE – III : DATA MINING AND WAREHOUSING	SEMESTER - III

Total Credits: 4
Hours Per week: 4

UNIT I

Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective. Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.

UNIT II

Classification: Introduction – Statistical – based algorithms -distance – based algorithms – decision tree -based algorithms -neural network – based algorithms –rule -based algorithms – combining techniques.

UNIT III

Clustering: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms -Partitional Algorithms. Association rules: Introduction -large item sets -basic algorithms – parallel & distributed algorithms – comparing approaches-incremental rules – advanced association rules techniques – measuring the quality of rules.

UNIT IV

Data warehousing: introduction -characteristics of a data warehouse – data marts – other aspects of data mart. Online analytical processing: introduction -OLTP & OLAP systems – data modeling –star schema for multidimensional view –data modeling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.

UNIT V

Developing a data warehouse: why and how to build a data warehouse – data warehouse architectural strategies and organization issues -design consideration – data content – metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse. Applications of data warehousing and data mining in government: Introduction national data warehouses – other areas for data warehousing and data mining.

TEXT BOOKS:

1. *Margaret H. Dunham*, "**Data mining introductory and advanced topics**", Pearson education, 2003.
2. *C.S.R. Prabhu*, "**Data warehousing concepts, techniques, products and a applications**", PHI, Second Edition.
3. *Arun K.Pujari*, "**Data mining and its Techniques**", Universities Press (India) Pvt. Ltd, 2003.

17PCS3EB	ELECTIVE - III : SOFT COMPUTING	SEMESTER - III

PREAMBLE

- To learn the concepts of Neural Networks and its applications
- To learn about Fuzzy set theory, fuzzy logic and genetic algorithms.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	To Implement about soft computing techniques.	K4
2.	To understand architectures of neural and back propagation networks	K3
3.	Applying the soft computing techniques in real time applications	K4
4.	To Demonstrate the genetic algorithms and its working	K5
5.	To understand the Genetic modeling and its applications	K4

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**M**	**M**	**S**	**M**
CO2	**M**	**S**	**S**	**M**	**M**
CO3	**S**	**S**	**S**	**M**	**S**
CO4	**M**	**M**	**M**	**S**	**M**
CO5	**M**	**S**	**S**	**M**	**M**

S – Strong; M - Medium; L – Low.

17PCS3EB	ELECTIVE - III : SOFT COMPUTING	SEMESTER - III

Total Credits: 4

Hours Per week: 4

UNIT-I

Fundamentals of Neural Networks: Basic Concepts of Neural Network - Model of Artificial Neuron - Neural Network Architectures - Characteristics of Neural Networks - Learning Methods – Taxonomy - History of Neural Network - Early Neural Network Architectures.

UNIT-II

Back Propagation: Networks Architecture of Back Propagation Network - Back Propagation Learning – Illustratrations – Applications - Effect of Tuning Parameters of the Back Propagation Neural Network - Selection of various parameters in Back Propagation Neural Network - Variations of Standard Back Propagation algorithms.

UNIT-III

Fuzzy set: Theory - Crisp Sets - Fuzzy Sets – Crisp Relations – Fuzzy Relations – Fuzzy Systems: Crisp Logic – Predicate Logic – Fuzzy Logic – Fuzzy Rule Based System – Applications.

UNIT-IV

Genetic Algorithms: History – Basic Concepts – Creation of Offsprings – Working Principle – Encoding – Fitness Function – Reproduction.

UNIT-V

Genetic Modeling: Inheritance Operators – Cross Over – Inversion and Deletion – Mutation Operator – Bit - wise operators - Generational cycle – Applications – Advances in Genetic Algorithm.

TEXT BOOK:

1. *Rajasekaran. S and Vijayalakshmi Pai*, "**Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Application**", Prentice Hall of India Pvt Ltd, 2014.

REFERENCE BOOKS:

1. *Fakhreddine O. Karray, Clarence De Silva*, "**Soft Computing and Intelligent Systems Design"**, Pearson Education, 2009.

17PCS3EC	ELECTIVE - III : MOBILE OPERATING SYSTEM	SEMESTER - III

Total Credits: 4
Hours Per Week: 4

PREAMBLE

- To introduce basic concepts of Android Programming.
- To introduce Building Mobile Application using Android.

COURSE OUTCOME

On the successful completion of the course, students will be able to

CO .No	CO. Statement	Knowledge Level
1.	Understanding the Android Fundamentals	K2
2.	To learn about Android Applications	K2
3.	To know about Android User Interface Design Essentials	K3
4.	To learn about Using Common Android APIs	K3
5.	Understanding the Mobile Software Development	K3

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	M	M	S	S	M
CO3	S	S	M	M	S
CO4	S	M	S	S	M
CO5	M	M	M	M	S

S – Strong; M - Medium; L – Low.

17PCS3EC	ELECTIVE - III : MOBILE OPERATING SYSTEM	SEMESTER - III

Total Credits: 4
Hours Per Week: 4

UNIT - I

Introduction to Android History of Mobile Software Development - The Open Handset Alliance - The Android Platform - Android SDK - Building a sample Android application. Android Application Design Essentials: Anatomy of an Android applications - Android terminologies – Application Context, Activities, Services, Intents.

UNIT - II

Android Application Design Essentials: Receiving and Broadcasting Intents - Android Manifest File and its common settings - Using Intent Filter, Permissions - Managing Application resources in a hierarchy - Working with different types of resources

UNIT - III

Android User Interface Design Essentials: User Interface Screen elements - Designing User Interfaces with Layouts - Drawing and Working with Animation.

UNIT - IV

Using Common Android APIs: Using Android Data and Storage APIs - Managing data using SQ Lite - Sharing Data between Applications with Content Providers - Using Android Networking APIs - Using Android Web APIs - Using Android Telephony APIs.

UNIT - V

Deploying Android Application to the World: The Mobile Software Development Process - Testing Android Applications - Selling your Android application

TEXT BOOK:

1. *Lauren Darcey and Shane Conder,* "**Android Wireless Application Development"**, Second Edition, Pearson Education, 2011.

REFERENCE BOOKS:

1. *Reto Meier,* "**Professional Android 2 Application Development"**, Wiley India Pvt Ltd,2011.
2. *Mark L Murphy*, "**Beginning Android"**, Wiley India Pvt Ltd, 2009.

17PCSSS1	SELF STUDY PAPER-I : M -COMMERCE	SEMESTER: III

Total Credits: 1

PREAMBLE

- To understand basics of Mobile Commerce.
- To understand about Mobile security and services.

UNIT-I

Introduction: What is M-Commerce? - NTTDoCoMo's i-Mode Portal - Nordea's WAP Solo Mobile Banking Service - Webraska's SmartZone Platform -The Forces Behind the M-Commerce "Revolution" - Applications -and Services -What's So Special about M-Commerce?

UNIT-II

Mobile Communications: The Transition to 3G : Introduction -Mobile Communications: A Quick Primer -Historical Perspective -Basic Architecture -What Is So Special about Mobile -Communication? -Basic Multiplexing Schemes -Separating Uplink and Downlink Traffic -The 2G Landscape -A Closer Look at GSM -A Word about Roaming and Billing - Transition Toward 3G.

UNIT-III

Mobile Security and Payment: Introduction -Revisiting Security: The Role of Cryptography -Secret Key Cryptography -GSM's SIM-Based Authentication -Public Key Cryptography -Digital Signatures -Certificate Authorities -Combining Public and Secret Key Cryptography -Message Authentication Codes -The Combinations Are Many -Revisiting WAP Security and the Role of the WIM Module -Mobile Payment -Mobile

Payment Standardization Efforts -Different Mobile Payment Scenarios - MeT in Slow Motion.

UNIT -IV

Mobile Commerce Services Today: Introduction -Revisiting Mobile Portals -Voice Portals -Mobile Information Services -Mobile Directory Services -Mobile Banking and Trading -Mobile E-Tailing and E-Ticketing -Mobile Entertainment - Digital Bridges-Mobile Business Applications and Services

UNIT-V

Next-Generation M-Commerce: -Introduction -Next-Generation M-Commerce Scenarios -Personalization -3GPP's Personal Service Environment -Microsoft's .NET Passport -Location-Based Services -A Brief Overview of Competing Positioning Solutions -Handset-Based Positioning Solutions -Network-Based Positioning Solutions -A Fragmented Landscape –Signal Soft -Toward Context-Aware Services.

TEXT BOOK:

1. *Norman Sadeh*, "**M-Commerce Technologies, Services, and Business Models**", Wiley Computer Publishing, 2003.

REFERENCE BOOKS:

1. *Brian Ernest Mennecke*, "**Mobile Commerce: Technology, Theory, and Applications**",IRM Press,2003
2. *Paul May*, "**Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business**", Cambridge University Press, 2001.
3. *Nansi Shi*," **Mobile Commerce Applications**", Idea Group Publishing,2004.

17PCSSS2	SELF STUDY PAPER-II : MANAGEMENT INFORMATION SYSTEM	SEMESTER: III

Total Credit: 1

PREAMBLE

- To understand basics of Management Information System

UNIT - I

Introduction – environment of organizations – management information - system – information flow – need and sources – management decisions – importance and role.

UNIT - II

Characteristics of computer information system – importance of computer – role of the computer – types of computer – Software – Hardware – CPU – MU – Input – Output – application and operations

UNIT – III

System classification – concept characteristics – elements – feedback control – boundary – function and operations – system design – function of system analyst - assignment and investigation – implementation – evaluation and maintenance of MIS.

UNIT- IV

Transactions processing information systems – information systems for managers – intelligence system – decision support system – integration – data collection and preparation – database – components – utility of the operation of the data base technology.

UNIT-V

Functional Management information systems – production, marketing, accounting, personnel, financial, relationship – impact and their role in the managerial decision – making.

TEXT BOOK:

1. *CVS Murthy*, **"Management Information System",** Himalaya Pub. House-New Delhi, 2014.
2. *Davis & Olson*, "**Management Information System**", Mc Graw Hill Pub.

REFERENCE BOOKS:

1. *R. Senapathi*, **"Management Information System"**, Lakshmi Publications.
2. *Lucas*, "**The analysis, design and implementation of information system**", Mc Graw Hill Pub.
3. *G.M. Scott*, "**Principles of management information system**", Mc Graw Hill Pub.

17PCS43V	CORE PROJECT- II	SEMESTER – IV

Total Credits: 14

PREAMBLE

- Enable to enhance their skills for software development.

PROJECT AND VIVA VOCE:

Each Student in the M.Sc CS Final Year must compulsorily undergo Project work in the 4th SEMESTER. Projects shall be done on Individual Basis. The Project Coordinator will allocate the project title and the Guide for each student. The Project Work Should be done in Software Concern. Three Project Reviews will be conducted in which the Progress of Project work will be strictly evaluated by Respective Project Guide and Project Coordinator. Viva Voce will be conducted only in the presence of Industrialists or Academicians.

In the total of 100 Marks, 40% of marks are allocated for CA and 60% for CE Viva Voce.

Following guidelines are hereby enlisted for all the students based on the necessity and importance of the project

Basic framework

The stages in Project Work are given below:

- The student has to select a project in a related field of Computer Science / Information Technology.
- Students can opt various types of organizations for their major project. But before the training actually starts, profile of the organization must be submitted for evaluating the various

parameters of the company like *Turnover of the organization, No. of employees and Location of the organization(Major Project Only)*

- After obtaining the approval from project guide, the student has to carry out the project work.

Student has to maintain the **project work diary**. The Project Work carried out should be in accordance with the approved project proposal

- All communication must be in writing. No verbal communication will be accepted.
- Student should adhere to the timings for submission of various reports as mentioned in the guidelines. No excuse will be entertained in any case.
- Student should prepare a Project Report at the end of his/her work, which his /her supervisor would certify and approve for submission (the Project Report should conform to the Standard Format laid down for Project Report).
- The student should submit the Project Report to the college**.**

Guide for the Project:

- Project guide will be allotted by the department to each student
- Each student will be working under a Project Guide for the project to be done.
- Student must report to his/her project guide regularly.

The student can also have a guide who could be the person under whose supervision the student is doing the project in the industry

Selection of Project:

- The selection of the project can be done in consultation with the project guide.

- Group of the students are not allowed to do a single project at a time.

It is possible that a group of student is doing different modules of the same project. In such cases, the student is required to do 3-5 modules of the large project

Submission of Project Report:

- The student will submit his/her project report in the prescribed format.
- Project Report will be submitted in triplicate (Hard Bound Copies) with the proper certification by the organization concerned in the specified format and color. None of copies of the project report will be returned to the student.
- The project reports along with a CD should be submitted to the HoD/Supervisor / Controller of examinations twenty days prior to the final semester examination.

A certificate from the supervisor should also be enclosed in the Project Report as provided in the format for project report.

Fields for Project:

- **GUI Tools** (**Front End)** - Visual Basic, Power Builder, X-Windows (X/lib, X/motif, X/Intrinsic), Oracle Developer 2000,VC++, Jbuilder
- **RDBMS(Back End) -** Oracle, Ingres, Sybase, Progress, SQL Plus, Versant, MY SQL, SQL Server, DB2
- **Languages -** C, C++, Java, VC++, C#
- **Scripting Languages -** PERL, SHELL Scripts (Unix), TcL/TK, PHP
- **.NET Platform –** Dya log APL, VB.Net, C#.Net, Visual C#.Net, Net, ASP.Net, Delphi

- **Middle Ware (Component) Technologies -** COM/DCOM, Active-X, EJB, WINCE, MSMQ, BEA, Message Q, MTS, CICS
- **Unix Internals -** Device Drivers, RPC, Threads, Socket programming
- **Architectural Concepts -** CORBA, TUXEDO, MQ SERIES
- **Internet Technologies -** DHTML, Java script, VB Script, Perl & CGI script, HTML, Java, Active X, RMI, CORBA, SWING, JSP, ASP, XML, EJB, Java Beans, Servlets, Visual Age for JAVA, UML, VRML, WML, Vignette, EDA, Broad vision, Ariba, iPlanet, ATG, Big Talk, CSS, XSL, Oracle ASP server, AWT, J2EE, LDAP, ColdFusion, Haskell 98
- **Wireless Technologies -** Blue Tooth, 3G, ISDN, EDGE
- **Real time Operating System/ Embedded Skills -** QNX, LINUX, OSEK, DSP, VRTX, RTXC, Nucleus
- **Operating Systems -** WINDOWS 2000/ME, WINDOWS NT, WINDOWS XP, UNIX, LINUX, IRIX, SUN SOLARIS, HP/UX, PSOS, VxWorks, AS400, AIX, DOS
- **Application Areas -** Financial / Insurance / Manufacturing / Multimedia / Computer Graphics / Instructional Design/ Database Management System/ Internet / Intranet / Computer Networking-Communication Software development/ E-Commerce/ ERP/ MRP/ TCP-IP programming / Routing protocols programming/ Socket programming.

NOTE:

i. **Projects should not be developed using the packages like Dbase III Dbase IV, FoxPro, Visual FoxPro, CYBASE and MS-Access. Also, projects should not be developed using the combination of Visual Basic as the front end and MS-Access as the back end.**

Students can also develop applications using tools/languages/software not listed above, if they are part of latest technologies

Phases of Training Period

- At the time of Review – I, students should present Title, Synopsis/Abstract of the project and module description.
- Students should present the Mid Term Report at the time of Review – II.
- Students should present the Development and Testing Report at the time of Review – III.
- Students should submit the complete Project Report at the time of Model Viva-Voce./

  The external Viva-Voce will be conducted for all the students.

Formatting of Project:

- The whole project report should be nicely composed and presented.
- The dimension of the project report should be in A4 size only.
- Page Specification : (Written paper and source code)

  Left margin - 3.0 cms/1.18 inches

  Right margin- 2.0 cms/0.78 inches

  Top margin 2.54 cms/1 inch

  Bottom margin 2.54 cms/1 inch
- The project report should be typed in good word processor and should avoid spellings and grammatical mistakes.
- The impression on the typed copies should be black in color.

  Normal Body Text: Font Size: 12, Times New Roman, 1.5 lines Spacing, Justified.

Paragraph Heading Font Size: 14, Times New Roman, Left Aligned. 12 points above & below spacing

Chapter Heading Font Size: 16, Times New Roman, Centre Aligned, 30 points above and below spacing.

Coding Font size: 10, Courier New, Normal

- Students should use only one side of paper for printing.
- Page numbers - All text pages as well as Program source code listing should be numbered at the bottom center of the page.

Cover Page - Attractive and appealing cover page containing the Project Title, program details, Student & Guide details, month of submission etc.

COLOR - Cover Page Color is silver Gray

Letter of Authentication - To be submitted by students declaring that the Project Report is the original work of student and no reward had been attained for same project ever before. Students are advised not to **COPY** the project report from other students.

Authorization from Organization where such Project have been implemented with certificate showing the student name, register number and project name.

Certificate from Project Guide - Certificate from the Project Guide certifying the project work done under his/her guidance along with course, student, and project details complete in all respects.

Draft of Project Report

The size of the project report can be approximately **130 - 150** pages, which include the following details:

Certificate of the project guide

Certificate of the Organization

Acknowledgement

Synopsis / Abstract

Table of Contents

Appendices

Forms (input screen shots)

Sample Source Code

Output Screen shots

Reports

Sample Coding / Abstract Coding

- Along with it, if the student feels to add on any other topics as per the demand of the project or want to include the functionalities as per the SDLC(Software Development Life Cycle) or the Software Engineering model used, that can be done and included in the Project Report.

The project report must include all the components as per the SDLC. It is highly recommended to follow the approaches of Software Engineering methodology.

Arrangement of Contents

- Cover Page & Title Page
- Bonafide Certificate
- Synopsis / Abstract
- Table of Contents
- Chapters
- List of Tables
- List of Figures
- List of Symbols, Abbreviations and Nomenclature
- Appendices
- References

The table and figures shall be introduced in the appropriate places

- **List of Symbols, Abbreviations and Nomenclature** – One and a half spacing should be adopted for typing the matter under this head. Standard symbols, abbreviations etc. should be used.
- **Chapters –** The chapters may be broadly divided into 3 parts. Introductory chapter, Chapters developing the main theme of the project work and Conclusion.

  The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

  - ❖ Each chapter should be given an appropriate title.
  - ❖ Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
  - ❖ Footnotes should be used sparingly. They should be typed with single space and placed directly underneath in the very same page, which refers to the material they annotate.
- **Appendices** – Appendices are provided to give supplementary information, which is included in the main text as they may serve as a distraction and cloud the central theme.
  - ❖ Appendices should be numbered using Arabic numerals.
  - ❖ Appendices, Tables and References appearing in appendices should be numbered and referred to an appropriate place just as in the case of chapters.
  - ❖ Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.
- **List of References** – The listing of references should be typed 4 spaces below the heading "REFERENCES" in alphabetical order in single spacing and left justified. The reference material should be listed in the alphabetical order of the first author. The name of the

author/authors should be immediately followed by the year and other details.

A typical illustrative list given below relates to the citation example quoted above.

BoS Chairman/HoD
Department of Computer Science
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Academic Council
Dr.V. Rajendran
CHAIRMAN
Dr. N.G.P. Arts and Science College