MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for Master of Computer Application
(Choice Based Credit System)
(with effect from the academic year 2017- 2018 onwards)

Sem. (1)	**Sub. No. (2)**	**Subject Status (3)**	**Subject Title (4)**	**Contact Hrs./ Week (5)**	**Credits (6)**
III	15	Core - 15	Financial Management and Accounting	5	4
	16	Core - 16	Computer Graphics and Multimedia	5	4
	17	Core - 17	Advanced Java Programming	4	4
	18	Core - 18	Object Oriented Analysis Design using UML	4	4
	19	Core - 19	Microprocessor and its Applications	4	4
	20	Core - 20 Practical - 5	Graphics and Multimedia Lab	4	2
	21	Core - 21 Practical – 6	Advanced Java Programming Lab	4	2
			Subtotal	**30**	**24**
IV	22	Core - 22	Open Source Technology	5	4
	23	Core - 23	RDBMS	5	4
	24	Core - 24	Mobile computing	4	4
	25	Core - 25	Principles of Compiler Design	4	4
	26	Elective – 1 (Select any one)	a.Data Mining b. Professional Practice c. Soft Computing d. Bio Metrics e. Theory of computation	4	3
	27	Core - 26 Practical - 7	Open Source Technology Lab	4	2
	28	Core - 27 Practical - 8	RDBMS Lab	4	2
			Subtotal	**30**	**23**

Sem. (1)	Sub. No. (2)	Subject status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
V	29	Core - 28	.NET Programming	4	4
	30	Core - 29	Cloud Computing	4	4
	31	Core - 30	Data Communication and Networks	4	4
	32	Core - 31	Research Methodology	4	4
	33	Elective – 2 (Select any one)	a.Digital Image Processing b. Embedded Systems c. Security in Computing d. Big Data Analytics e. E-Commerce	4	3
	34	Core - 32 Practical - 9	.NET Programming Lab	4	2
	35	Core - 33	Mini Project	6+6*	8
			Subtotal	**30**	**29**
VI	36	Core - 34	Major Project	30+2*	16
			Subtotal	**30**	**16**
			Total	**180**	**140**

* Extra hours for Project

For the Project, flexible credits are b/w 5 – 8 & Hours per week are b/w 10 - 16.

Total number of credits **≥ 90** : 140
Total number of Core Courses : 34 (23T + 9P + 2 P)
Total number of Elective Courses : 2
Total hours : 180

1. ELECTIVE 1: (IV Semester) - Select any one

1. Data Mining
2. Professional Practice
3. Soft Computing
4. BioMetrics
5. Theory of computation

2. ELECTIVE 2: (V Semester) - Select any one

1. Digital Image Processing
2. Embedded Systems
3. Security in Computing
4. Big Data Analytics
5. E-Commerce

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FINANCIAL MANAGEMENT AND ACCOUNTING

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COURSE OBJECTIVES:

- To apply financial management concepts and tools to the problems.
- Gives the base level of the finance knowledge,common and future finance problems.

UNIT I FINANCIAL ACCOUNTING

Financial Accounting – Need or accounting – Definition – Objectives and Advantages – Branches of Accounting – Types of Accounts – Accounting rules – Accounting Cycle – Journal – Ledger – Trial Balance – trading & Profit and loss account and Balance sheet. **(15L)**

UNIT II FINANCIAL MANAGEMENT

Financial Management- Nature, Scope and Objectives – Finance functions – Profit maximization Vs Wealth maximization - Role and Responsibilities or a financial manager in the changing scenario – Methods of Financial management – Importance of Financial Management **(15L)**

UNIT III FINANCIAL STATEMENT ANALYSIS

Financial Statement Analysis and interpretation – Meaning and types of financial statement – Types of financial analysis – Steps in Financial statement analysis – Methodical Classification – Techniques of financial analysis – Limitations of financial analysis – Practical problems. **(15L)**

UNIT IV ANALYSIS OF FINANCIAL MANAGEMNT

Ratio analysis – meaning – Classification – Liquidity, Solvency, Profitability and turnover ratios – Advantages and limitations – Practical problems. Funds Flow analysis – Meaning uses – Preparation of funds flow statement. Cash flow analysis – Meaning – Preparation- Difference between fund flow and cash flow analysis – Utility and limitations of cash flow analysis – Practical problems. **(15L)**

UNIT V MANAGEMENT INFORMATION SYSTEM

Mechanized Accounting – Electronic Data Processing - Computer Applications in Accounting – MIS – Computer – Information technology & MIS. **(15L)**

COURSE OUTCOMES:

- The students are able to understand the basic concepts of accounting, preparation of journal, legder and balance sheet.
- Able to gain knowledge about financial management, financial statement and ratio analysis.
- Mechanized accounting describs how machines are used in accounting field.

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Reference Books:

1. S.P.Jain and K.L.Narang – Advanced Accounting, Kalyani Publishers, New Delhi.

2. S.P.Iyengar – Advanced Accounting, Sultan Chand and Sons, New Delhi.

3. R.L.Gupta and M.Radhaswamy – Advanced Accounting, Sultan Chand and Sons, New Delhi.

4. S.N.Maheswari and C.B.Gupta, Financial Management, Sultan Chand and Sons, New Delhi.

5. S.N.Maheswari, Management Accounting, Sultan Chand and Sons, New Delhi.

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COMPUTER GRAPHICS AND MULTIMEDIA

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COURSE OBJECTIVES:

- To provide the theory and practice of computer graphics and multimedia.
- To gives 2D, 3D concepts, graphical file formats.
- This gives the student to use text, graphics, sound, animation and video

UNIT I BASIC CONCEPTS

2D Transformations – Clipping – Window- View port Mapping – Graphical User Interfaces and Interactive Input Methods - Virtual Reality Environment. **(15L)**

UNIT II 3D GRAPHICS

3D Transformation – 3D viewing – Visible Surface Detection – Back Face Detection- Depth Buffer Method – Scan Line Method. **(15L)**

UNIT III FUNDAMENTALS

Uses of Multimedia Information: Defining the scope of multimedia, Hypertext and Colloborative research, Multimedia and Personalized computing, Multimedia on the map, Emerging applications, The challenges. The Convergence of computers, Communications, and entertainment products: The perspective of the future, key challenges ahead,Techical,regulatory,Social. Architectures and issues fornDistributed Multimedia systems: Distributed Multimedia systems, Synchronization, and QOS Architecture, The role of Standards, A work for Multimedia systems **(15L)**

UNIT IV VIDEO TECHNOLOGY

Video Technology: Raster Scanning Principles, Sensors for TV Cameras, Colour Fundamentals, Colour Video, Video Performance Measurements, Analog video Artifacts, Video equipements, Worldwide television standards. Digital Video and Image Compression: Video compression techniques, standardization of algorithm, The JPEG Image Compression Standard, ITU-T Recommendations, The JPEG Motion Video Compression Standard, DVI Technology. **(15L)**

UNIT V MULTIMEDIA SERVICES OVER THE PUBIC NETWORKS

Multimedia services over the pubic Networks: Requirements, Architecture, and protocols, Network services,applications. Multimedia Incharges: Quick time Movie File Format, QMFI, MHEG(Multimedia and Hypermedia Information Encoding Expert Group), Format Function and representation, Track model and Object model,Real Time Interchages. Multimedia

Conferencing: Teleconferencing Systems, Requirements of Multimedia Communications, Shared Applications Architecture and embedded Distributed objects, Multimedia Conferencing Architecture. **(15L)**

COURSE OUTCOMES:

- Enhance the perspective of modern computer system with modeling 2D and 3D visual information.
- Able to understand interactive animation using multimedia tools and gain knowledge of multimedia services.

Text Books:

1.Computer Graphics – Donald Hearn, M. Pauline Baker
2.John F.Koegel Bugord,"Multimedia Systems",Pearson Education , 2012

3. Fundamentals of Multimedia – Ze-Nian Li . Mark S.Drew

Reference Books:

1. Ralf Steinmez and Klara Nanrstedt "Multimedia Applications " Springer 2007

2. John F.Koegel Bufend "Multimedia Systems " Pearson Education, Delhi 2002

3. Mohammad Dastbaz. Designing Interactive Multimedia Systems

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ADVANCED JAVA PROGRAMMING

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COURSE OBJECTIVES:

- To understand the basics of java programming.
- To learn the concept of methodology, analysis and design
- Develop the quality and testing

UNIT I OOP AND JAVA

OOP and Java: OOP Principles – Introduction to Java Language – Data Types, Arrays,Operators,Control Statements – Creating and Executing a SimplenJava Applications Programs. Classes and Objects: Introduction – General From of a class - Object Creation – Methods – Methods Overloading – Constructors – Inheritance: Introduction to Inheritence – Using Super – Abstract and Final Classes. **(12 L)**

UNIT II INHERITANCE

Inheritance- Inheritance basics, Using super, Method Overriding, Abstract and Final Classes – Packages and Interfaces: Defining and importing packages, Acess Protection – Defining and Implementing Interface. Exception Handling: Default Exception handling – try – catch – throw – finally – Java's Built in Exceptions, custom Exception, Multithreading: Multithreaded programming – Creating a thread, Creating multiple threads. **(12 L)**

UNIT III APPLET PROGRAMMING

Applet Programming: Applet Basics – Applet classes – An Applet skeleton – Creating a Simple Applet – Syntax of HTML Applet tag. Abstract Window Toolkit(AWT): Introduction – event Classes – Event Listener Interfaces – AWT Classes – Working with Windows and Frames – Controls such as Label, Button, Check Box, Radio button,Choice, List, Scrollbar – Layout Managers – Menus – Dialog Boxes. **(12 L)**

UNIT IV NETWORKING

Networking: Introduction – InetAddress – TCP/IP and UDP Approach.RMI: Introduction – Remote Interface – java.rmi.Server Packages – Naming Class – RMI Exception – Creating a simple RMI Client and Server application. JDBC: Introduction – JDBC architecture – JDBC drivers – Writing JDBC applications – Statements objects (Statement, Prepared Statement and Callable Statement) – Result Set – Inserting and uploading records. **(12 L)**

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UNIT V JAVA BEANS

Java Beans: An Overview of Java Beans –Bean Development Kit – JAR Files – Introspection-Developing a simple Bean using the BDK. Java Servlets: Java Servlets–Servlet API(javax.servlet, javax.servlet.http) Reading Servlet Parameters – Handling HTTP Requests and Responses. – Working with Cookies – Tracking Sessions.

(12 L)

COURSE OUTCOMES*:*

- Able to understand Object Oriented Programming concepts, java and Applet programming.
- Develops learners knowlege to create client / server application, developing Java Beans and Servlet applications.

Reference Books:

1. Herbert Schildt, ―The Complete Reference, Seventh Edition, Tata McGraw-Hill

2. Joseph O'Neil, ―JavaBeans Programming, Tata McGraw-Hill

3. C.Muthu, Programming with Java, Second Edition, VNI.

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OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

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COURSE OBJECTIVES:

- The principles of object oriented technique with its requirements and design methods
- The application of the UML towards analysis and design of the OOAD is discussed

UNIT I INTRODUCTION

An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Metaclasses – Object oriented system development life cycle. **(12 L)**

UNIT II METHODOLOGY AND UML

Introduction – Survey – Rumbugh, Booch, Jacobson methods – Patterns – Creational – Abstract Factory – Factory Method – Behavioral – Momento – Mediator - Structural – Decorator - Facade -Concurrency Patterns –Lock – Reactor – Scheduler - Frameworks – Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Use case diagrams – Dynamic modeling – Model organization – Extensibility. **(12 L)**

UNIT III OBJECT ORIENTED ANALYSIS

Identifying Use case – Business object analysis – Use case driven object oriented analysis – Use case model – Documentation – Classification – Identifying object, relationships, attributes, methods –Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility. **(12 L)**

UNIT IV OBJECT ORIENTED DESIGN

Design process and benchmarking – Axioms – Corollaries – Designing classes – Class visibility –Refining attributes – Methods and protocols – Object storage and object interoperability – Databases– Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface-OOUI - MVC Architectural Pattern and Design – Designing the system. **(12 L)**

UNIT V QUALITY AND TESTING

Quality assurance – Testing strategies – Test cases – Automated Testing Tools – Case Study - Cryptanalysis – Health Care Systems- Inventory Control System - Rational Rose Suite. **(12 L)**

COURSE OUTCOMES:

- The Basic concepts of objects and various object oriented methodlogies are discussed.
- It provides a briefly understanding of various phases involved in designing an application or system.

Reference Books:

1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 2008.
2. Craig Larman, Applying UML and Patterns, 2nd Edition, Pearson, 2002.
3.Brahma Dathan, Sarnath Ramnath, "Object-Oriented Analysis, Design and Implementation",Universities Press, 2010.
4.Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide",Addison Wesley Long man, 1999.

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MICROPROCESSOR AND ITS APPLICATIONS

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COURSE OBJECTIVES:

- To study about microprocessor and its applications
- To learn about basic 8085 microprocessor and its operations and applications

UNIT I 8085 CONCEPTS

Microprocessors, Microcomputer and Assembly Language: Microprocessors – Microprocessors Instruction set and Computer Languages – Computers to single chip microcontrollers. Mention to 8085 assembly language Programming – The 8085 Programming model action Classification – Instruction, data format and storage – How to write, store and execute simple program, Overview of 8085 instruction set – Writing and assembling a program. **(12 L)**

UNIT II MICROPROCESSOR ARCHITECTURE

Microprocessor Architecture and Micro Computer Systems: Microprocessor Architecture and its operations – Memory – Input and Output (I/O) – Example of a Micro Computer System. Microprocessor Architecture and Memory interfacing: The 8085 MPU – Example 8085 based microcomputer - Memory interfacing - Interfacing the 8155 memory. **(12 L)**

UNIT III PROGRAMMING

Data transfer operation: Arithmetic operations – Logic operations – Branch operations - Writing assembling Language programs – Debugging a program. Programming techniques with additional Instruction: Programming techniques – Counting and Indexing – Additional data transfer and 16 bit arithmetic operations – Arithmetic operations related to memory - Logic operations related to memory - Logic operations – Rotate – Dynamic debugging. **(12 L)**

UNIT IV MICROPROCESSOR APPLICATIONS

Counters and Time Delays: Counters Time Delays – Hexadecimal counter. Modulo ten counter – Pulse Wave forms – Debugging counter and time Delay programs. Subroutine: Stack – Subroutine – Restart – Conditional call and Return subroutine concepts. BCD to Binary conversion – Binary to BCD conversion - BCD to seven segment.LED code conversion – BCD addition – BCD Subtraction – Multiplication- Subtraction with carry. **(12 L)**

UNIT V ADVANCED MICROPROCESSOR

Software Development System and Assemblers: Microprocessor-BasedSoftware Develoment Systems- Operating Systems and Programming Toolsn- Assemblers and Cross-Assemblers – Writing Programs Using a Cross Assemblers. Advanced processor: Advanced Microprocessor and Microcontrollers-Microprocessor-Architecture-Register organization and or protected addressing in 80286,80386 Microprocessor-80486 Microprocessors-Other Versions of Pentium – Applications . **(12 L)**

COURSE OUTCOMES:

- It enables the students to develop strong competencies in technology rich interactive environment.
- Can get a clear knowledge about microprocessor architecture, various data transfer operation, subroutine and application.

Text Books:

1.Ramesh S. Goanker - Microprocessor Architecture Programming and Applications with the 8085 – 5th Edition, Penram International Publishing Private Limited – 2011.

2.Microprocessor and Microcontrollers N.Senthil Kumar, M.Saravanan, S.Jeevananthan. OxfordUniversity Press.

Reference Books:

1.8085Microprocessor Programming and Interfacing N.K.Srinath, PHI Publication.

2. K.Ray & K.M.Bhurchandi,"Advanced Microprocessors and Peripherals Architectures,Programming and Interfacing",TMH,2002 reprint.

3. Microprocessor and Interfacing, N.Senthil Kumar,M.Saravanan,S.Jeevanthan and S.K.Shah.Oxford University Press.

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GRAPHICS AND MULTIMEDIA LAB

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GRAPHICS LAB

1. House
2. Moving a Car
3 .Bouncing a ball and Random Ball
4 .Polygon
5. DDA Line Drawing Algorithm
6. Bresenham's Line Drawing Algorithm
7. Circle Generating Algorithm
8. Circle within a circle
9. Ellipse Generating Algorithm
10. 2D Translation
11. 2D Scaling
12. 2D Rotation
13. Tiles and Cascade
14. Create a scenery of rain in the frame with sound of rain.
15 concentric Triangles

MULTIMEDIA LAB

I.FLASH

1. Frame by frame animation

2. Bouncing ball with button

II.PHOTOSHOP

3. Brouchure for an Institution

4.Cropping the Image

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5. Colour Models

III. DREAM WEAVER

6.Table

7.Linking Files

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ADVANCED JAVA PROGRAMMING LAB

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1. Write a java application program to demonstrate class with constructors.
2. Write a java application program to demonstrate inheritance
3. Write a java application program to demonstrate interface and package.
4. Write a java application program to create custom exception.
5. Write a java application program to create thread.
6. Write a java applet program to demonstrate life cycle of an applet.
7. Write a java applet program using AWT components (Using Event Handling)
8. Write a java applet program using AWT components (Using layout and menus).
9. Write a java applet program using swing components (Using Event Handling)
10. Write a program in java to implement a Client/Server application using sockets.
11. Write a program in Java to implement a client/Server application using RMI.
12. Write a program in Java to implement JDBC ODBC connection to view information.

13 Write a program in Java to implement JDBC ODBC connection to update information..

14. Write a program in Java to create a form and validate a password using Servlet.
15. Write a program in Java to Change the background color using servlet.
16. Develop a simple Java Bean.

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OPEN SOURCE TECHNOLOGY

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COURSE OBJECTIVES:

- To learn about PHP with MYSQL and HTML
- To learn about web database architectures
- To discuss the details about creation of web database easily

UNIT I PHP CRASH COURSE

PHP Crash Course: Before you begin – Creating a Sample Application – Embedded PHP in HTML – Adding Dynamic Content – Accessing form variables – Understanding identifiers. Examining Variable types – Declaring and using Constants – Understanding Variable Scope. Using operators – Working out the form totals – Understanding precedence and Associatively – Using variable functions. Making Decisions with Conditionals - Repeating actions through iteration. – Breaking out of a Control Structure or Script – Employing Alternative Control **15 L)**

UNIT II PHP AND MYSQL

Using Arrays: Array – Numerically indexed arrays – Arrays with different indices – Array operators – Multidimensional Arrays. String Manipulation and Regular Expressions:**Create a sample application:** Smart Form Mail – Formatting Strings – Functions using substr(). – Comparing Strings. Managing the Date and Time: Getting the date and Time from PHP – Converting between PHP and MySQL Date formats –Calculating Dates in PHP – Calculating Dates in MySQL – Using Microseconds – Using the Calendar Functions. **(15 L)**

UNIT III REUSING CODE AND WRITING FUNCTIONS

Reusing Code and Writing Functions: The Advantages of Reusing code –Using require () and include () Filename extensions and require () – Using require () for website templates. Using Functions in PHP: Calling Functions – Calling an undefined Function – Understanding case and function names – Defining your own functions – Examining Basic Function Structure – Using Parameters – Understanding Scope – Passing by reference versus Passing by value – Using the return Keyword – Implementing Recursion. **(15 L)**

UNIT IV REUSING CODE AND WRITING FUNCTIONS

Creating Your Web Database: Creating Databases and Users – Setting Up Users and Privileges – Introducing MySQL's Privilege System – Setting up a user for the web – Using the Right Database – Creating Database Tables. Working with Your MySQL Database: SQL – Inserting Data into the Database – Retrieving Data from Database: Retrieving Data with Specific Criteria – Retrieving Data in a Particular order. – Updating Records in the database – Altering Tables after Creation – Deleting Records from the Database – Dropping Tables – Dropping the whole Database. **(15 L)**

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UNIT V PHP WITH MYSQL DATABASE

Accessing Your MySQL Database from the web with PHP: How web Database Architectures work – Querying a Database from the web. Using Session Control in PHP: Session Control – Understanding Basic session Functionality – Implementing simple sessions – Creating a session Example – Configuring Session Control – Implementing Authentication with session. Interacting with the File System and the Server: Uploading files: HTML for File Upload – Writing the PHP to deal with the file – Avoiding Common Upload Problems. **(15 L)**

COURSE OUTCOMES:

- Able to know the benefits and features of opensource technology like PHP,MYSQL.
- The creation of database and web application in PHP and MYSQL using arrays, functions and SQL queries

Text Book:

1.PHP and MySQL Web Development – Fourth Edition (2010) by Luke Welling, Laura Thomson, Pearson Education

Reference Books:

1. A Beginner's Guide PHP by Vikram Vaswani, Tata Mcgraw Hill Education Private

2. PHP 6 and MySQL 5 by Larry Ullman, Pearson Education, 2008.

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RDBMS

L T P C

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COURSE OBJECTIVES:

- To understand the basic principles of RDBMS
- To learn about the performance criteria of DBMS
- To understand the use of SQL and PL/SQL

UNIT I INTRODUCTION

Introduction – Purpose of data base systems – Data Models – Data Languages – transaction management – storage Management – DBA – Database Users – System Structures – E-R Models—Entity and Entity Relationships – Mapping constraints and E-R Diagrams. **(15L)**

UNIT II RDBMS

Structure of Relational databases – Relational Algebra – Tuple Relational calculus – Domain Relational Calculus – Relational commercial languages (SQL,QBE,QUEL)- Integrity constraints – Normalization – Boyce – Codd – Third and Fourth normal forms – domain – key normal form.

(15L)

UNIT III SQL

Basic SQL Operations – creating a table – Insert – Rollback – Commit – Auto commit-Delete-Update-Select, From, where and Order by-Single value tests-Like-Simple tests against a list of values-Combining logic-Combining tables-Dropping a column-creating a table from a table-Date functions-Conversion functions-Translate-Decode-Creating a view-Advanced sub queries – Outer joins- Natural & inner joins – Union, Intersect & Minus – synonyms – indexes – Table spaces – Clusters – Sequences. **(15 L)**

UNIT IV RELATIONAL DATABASE OBJECTS

Basics of Object – Relational databases: Objects – Abstract Data types – Nested tables – Varying arrays – Large objects – References – Object Views – Naming conventions for objects – Structures of an Object. User, Roles and Privilege: Create a user – password management – Three standard roles – Format for Grant command – Revoking privileges – what user can Grant: Moving to another user – create synonym – Create a role – Granting privileges to a role – Granting role to another role – Adding password to a role - Removing a password from a role – Enabling & Disabling roles– Revoking privileges from a role – dropping roles **(15 L)**

UNIT V INTRODUCTION TO PL/SQL

An introduction to PL/SQL: PL/SQL overview – Declarations section – Executable command section – Exception handling section – Triggers: Syntax – Types of Triggers: Row level – statement – level – before & after – instead of – Schema – database – Level triggers – Enabling & Disabling triggers – Replacing & Dropping triggers – Procedures, functions & Packages:

syntax – Compile – Replace – Drop procedure, Functions & Packages – Cursor Management. **(15 L)**

COURSE OUTCOMES:

- The students can understand the basic conceptsof database, relational algebra.
- Be familiar with commercial relation database systems (oracle) and construct queries using SQL.

Reference Books:

1.Data System Concepts – Abraham Silberchatz, Henry K.Horth, McGraw Hill,2001.

2.ORACLE 9i – The Complete Reference – Kevin Loney, George Koch & The experts at Tusc, Tata Mc Graw Hill Publishing Company Ltd.,2002.

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MOBILE COMPUTING

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COURSE OBJECTIVES:

- To study the need and nature of mobile applications
- To learn the tools and platforms required for mobile applications
- To understand the design issues in mobile applications

UNIT I INTRODUCTION

Introduction: Mobility of bits and bytes – Wireless the beginning – Mobile Computing – Dialogue control – Networks – Middleware and gateways – Applications and services – Developing mobile computing applications. **Mobile Computing Architecture:** Architecture of Mobile Computing – Three Tire Architecture – Design Consideration for mobile computing - Making existing applications to mobile enabled. **Mobile Computing Through Telephony :** Multiple Access procedure – Satellite Communication System - Mobile Computing Through Telephone – Developing an IVR Application – Voice XML –Telephony Application Program Interface. **(12 L)**

UNIT II EMERGING TECHNOLOGIES

Emerging Technologies : Introduction – Bluetooth – Radio Frequency Identification(RFID) – Wireless Broadband(WIMAX) – Mobile IP – Internet Protocol version 6(IPV6).**Global System for Mobile Communication :** Introduction – GSM Architecture – GSM Entities – Call Routing in GSM – PLMN interface – GSM addresses and identifiers – Network Aspects in GSM – Mobility Management – GSM frequency allocation – Personal Communication service – Authentication and Security. **Short Message Service:** Mobile Computing over SMS - Short Message Service (SMS) – Value added Services through SMS – Accessing the SMS bearer.

(12 L)

UNIT III GENERAL PACKET RADIO SERVICE

General Packet Radio Service (GPRS) : Introduction – GPRS and Packet data Networking – GPRS Network Architecture - GPRS Network Operations – Data Services in GPRS – Applications for GPRS – Limitations of GPRS – Billing and Charging in GPRS – Enhanced Data rate for GSM Evaluation (EDGE).**Wireless Application Protocol:** Introduction – WAP – MMS – GPRS Applications.**CDMA and 3G:** Introduction – Spread Spectrum Technology – IS-95 – Wireless Data – Third Generation Networks – Applications of 3G. **(12 L)**

UNIT IV WIRELESS LAN

Wireless LAN: Wireless LAN Advantages – IEEE 802.11 Standards – Wireless LAN Architecture – Mobility in Wireless LAN – Deploying Wireless LAN – Mobile Adhoc Networks and Sensor Networks – Wireless LAN security – Wireless Access in Vehicular Environment – Wireless Local Loop – Hiper LAN – WIFI versus 3G.**Intelligent Networks and Interworking:** Fundamentals of Call Processing – Intelligence in the Networks – SS#7 Signalling – IN Conceptual Model (INCM) – Softswitch – Programmable Networks – Technologies and

Interfaces for IN. **Client Programming:** Mobile Phones – Features of Mobile phones – PDA – Design constraints in Applications for Handheld devices – Recent Developments in Client Technology. **(12 L)**

UNIT V PROGRAMMING FOR THE PALM OS

Programming for the PALM OS: History of PALM OS – PALM OS architecture – Application Development – Communication in PALM OS – Multimedia. **Wireless Devices with Symbian OS:** Introduction to Symbian OS - Symbian OS Architecture – Security on Symbian OS.**Security Issues in Mobile Computing:** Information Security – Security Techniques and Algorithms – Security Protocols – Public Key Infrastructure. **(12 L)**

COURSE OUTCOMES:

- Able to know about mobile computing and its architecture.
- Can gain knowledge about GPRS, wireless LAN and PALM OS.
- Able to know about information security algorithm of mobile computing.

Text Book:

1. Asoke K Talukder , Hasan Ahmed and Roopa R Yavagal, "Mobile Computing : Technology, Applications and Service Creation", Second Edition , TMH, 2010

References:

1.T.G.Palanivelu,R.Nakeeran,"Wireless and Mobile Communcation",PHI Learning Private Limited,2009

2.Raj Kamal, "Mobile Computing",Second Edition,Oxford University Press,2012

3.Jochen Schier,"Mobile Communcations",Second Edition,Pearson Education,2007.

4.William Stallings,"Wireless Communication and Networks",Pearson Education Asia,2002.

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PRINCIPLES OF COMPILER DESIGN

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COURSE OBJECTIVES:

- To understand the lexical and syntax analyzer
- To understand the top down design parsing techniques
- To understand the code generation

UNIT I INTRODUCTION

Introduction to Compiler: Language Processors – The Structure of Compiler – The Evolution of Programming Languages – The Science of Building a Compiler – Application of Compiler Technology Programming Language Basics. A simple Syntax – Directed Translator: Syntax Definition – Syntax – Directed Translation – Parsing – A Translator of Simple Expression – Lexical Analysis – Symbol Table – Intermediate Code Generation. **(12 L)**

UNIT II LEXICAL ANALYZER

Lexical Analysis: The Role of the Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – The Lexical – Analyzer Generator Lex – Finite Automata – From Regular Expression to Automata – Design of a Lexical – Analyzer Generator – Optimization of DFA – Based Pattern Matchers. **(12 L)**

UNIT III SYNTAX ANALYZER

Syntax Analysis: Introduction – Context – Free Grammars – Writing a Grammar – Top-Down Parsing – Bottom-Up Parsing – Introduction to LR Parsing: Simple LR – More Powerful LR Parsers – Using Ambiguous Grammars. **(12 L)**

UNIT IV INTERMEDIATE CODE GENERATION AND RUN- TIME ENVIRONMENT

Intermediate – Code Generation: Variants of Syntax Trees – Three – Address Code – Types and Declarations – Translations of Expressions – Type Checking – Control Flow – Back patching – Switch Statements – Intermediate Code for Procedures – Run-Time Environments: Storage Organization – Stack Allocation of Space – Access to Nonlocal Data on the Stack.

(12 L)

UNIT V CODE GENERATION

Code Generation: Issues in the Design of a Code Generator – The Target Language – Address in the Target Code – Basic Blocks and Flow Graph – Optimization of Basic Blocks – A Simple Code Generator – Peephole Optimization – Register Allocation and Assignments – Instruction

Selection by Tree Rewriting - Optimal Code Generation for Expression – Dynamic Programming Code-Generation. Machine-Independent optimization: The Principal Source of Optimization. **(12 L)**

COURSE OUTCOMES:

- The students can understand the basic concepts of compiler and its applications.
- Gain knowledge about various phases of compiler in detail.

Text Books:

1.Alfred V.Aho, Monica S. Lam, Ravi Sethi, Jeffrey D.Ullman, "Compilers –Principles, Techniques and Tools", Pearson Education Asia,2011.
2.Compiler Design, K. Muneeswaran, Oxford University Press.

Reference Books:

1.Alfred V. Aho,Ravi Sethi, Jeffrey D.Ullman, " Compilers – "Principles, Techniques and Tools", Pearson Education Asia,2007.
2. A. V. Aho,Ravi Sethi, J.D.Ullman, " Compilers – "Principles, Techniques and Tools", Addission – Wesley ,2003.
3.Allen I. Holub," Compiler Design in C", Prentice Hall of India,2001.
4.Fischer Leblanc, Crafting Compiler, Benjamin Cummings, Menlo Park, 1988.

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OPEN SOURCE TECHNOLOGY LAB

L T P C

0 0 4 2

1. Write a PHP Program to Perform Student Mark sheet using Operators and Decision making Statements.
2. Write a PHP Program to Generate Multiplication Table using Iterations.
3. Write a PHP Program to Implement Arrays.
4. Write a PHP Program to Implement Functions.
5. Write a PHP Program to Perform String Operations.
6. Perform the Following Operations in MySQL.
   (i) Create Database
   (ii) Drop Database
   (iii) Select Database
7. Perform the Following Operations in MySQL.
   (i) Create Tables
   (ii) Drop Tables
   (iii) Insert Query.
8. Perform the Following Operations in MySQL.
   (i) Select Query
   (ii) 'Where' Clause
   (iii) Update Query
9. Perform the Following Operations in MySQL.
   (i) Delete Query
   (ii) 'Like' Clause
   (iii) Sorting Results
10. Write a PHP Program to Connect MySQL Database to Display the Details of Particular Student.
11. Develop a Student Information System in PHP to allow View, Delete, Insert, Update the details of students.
12. Create a Login Module to Implement Sessions in PHP.
13. Write a PHP Program to Upload and Download Images from MySQL Database.
14. Create your own dynamic website using PHP and MySQL.

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RDBMS LAB

L T P C
0 0 4 2

1. Creating Table and Queries
2. Creating a Table and view
3. Creating partitioned table
4. Table creation with abstract data type
5. Creating book table and SQL report
6. PL/SQL Program to print student mark card
7. PL/SQL Program to find Discount and Net amount
8. PL/SQL to print Multiplication table
9. PL/SQL to handle exception
10. PL/SQL Program to copy and erase the value in LOB column
11. PL/SQL Program to display selected column
12. Create Table, sequence and index
13. Procedure to find member details
14. Function creation for palindrome checking
15. Trigger based row updation
16. Electricity Bill calculation
17. Trigger based table manipulation Restriction
18. PL/SQL Block to handle package

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1.DATA MINING

L T P C
4 0 0 3

COURSE OBJECTIVES:

- To learn about data mining and its applications
- To learn the algorithms and computation paradigms that allow computers, patterns in databases

UNIT I INTRODUCTION

Introduction: Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Databases – Data Mining Issues – Data Mining Metrics – Social Implication of Data Mining – Data Mining from a Data base Perspective. Data Mining Techniques: A Statistical Perspective on Data Mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms. **(12L)**

UNIT II CLASSIFICATION

Classification : Introduction – Statistical – Based Algorithms – Distance – Based Algorithms – Decision Tree – Based Algorithms – Neural Network – Based Algorithms – Rule Based Algorithms – combining Techniques.**Clustering:** Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms – Partitioned Algorithms – Clustering Large Databases – Clustering with Categorical Attributes. **(12L)**

UNIT III ASSOCIATION RULES

Association Rules: Introduction – Large Item sets – Basic Algorithms – Parallel and Distributed Algorithms – Comparing Approaches – Incremental rules – Advanced Association Rule Techniques – Measuring the Quality of Rules. **(12L)**

UNIT IV WEB MINING

Web Mining: Introduction – Web content Mining – Web structure Mining – Web usage mining Spatial Mining: Introduction – Spatial Data Overview – Spatial Data Mining Primitives – Generalization and Specialization – spatial rules – Spatial Classification Algorithms – Spatial Clustering Algorithms. **(12L)**

UNIT V CREATING DATA MINING APPLICATIONS WITH CODE

Creating Data Mining Applications With Code: What is DTS? –DTS Tasks – DTS Packages Workflow – DTS Designers – Using DTS to Create a Data Mining Model. Understanding Data Mining Structures: The Structures of the Data Mining Model case- Using code of Browse Data Mining Models – Using the schema Rowsets. **(12L)**

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COURSE OUTCOMES:

- The students will be able to understand the basics of data mining and its techniques.
- Design and deploy classification and clustering techniques.
- Discover knowledge in web mining and data mining applications.

Text Book :

1.Marget H. Dunham, "Data Mining Introductory and Advanced Concepts", Pearson Eduction 2003.
2.Data Mining with Microsoft SQL Server 2000.Technical Reference. Claude Sediman-PHI Private Limited 2001.

References:

1.G.K.Gupta."Introduction to Data Mining with Case Studies",3rd Edition, PHI,2015.
2.Pang-Ning Tan,Michael Steinbach and Vipin Kumar,"Introduction to Data Mining",Pearson Education,2007.
3.Jiawei Han and Micheline Kambar,"Data Mining Concepts and Techniques",Second Edition,Elsevier,Reprinted 2008

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PROFESSIONAL PRACTICE

L T P C
4 0 0 3

COURSE OBJECTIVES:

- To introduce the basics of Professional ethics
- To illustrate how to perform cracking, crime technologies
- To learn about various ethics and models

UNIT I COMPUTER ETHICS INTRODCUTION AND COMPUTER HACKING

A– Ethical theories - Professional Code of conduct – An ethical dilemma – A framework for ethical decision making - Computer hacking – Introduction -definition of hacking – Destructive programs –hacker ethics - Professional constraints – BCS code of conduct – To hack or not to hack? – Ethical positions on hacking **(12L)**

UNIT II ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY RIGHTS

Aspects of computer crime - Introduction - What is computer crime – computer security measures – Professional duties and obligations - Intellectual Property Rights – The nature of Intellectual property– Intellectual Property – Patents, Trademarks, Trade Secrets, Software Issues, Copyright - The extent and nature of software piracy – Ethical and professional issues – free software and open source code. **(12L)**

UNIT III REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY

Introduction – In defence of freedom expression – censorship – laws upholding free speech – Free speech and the Internet - Ethical and professional issues - Internet technologies and privacy –Safety and risk – assessment of safety and risk – risk benefit analysis – reducing risk. **(12L)**

UNIT IV COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES

Introduction – Principle of equal access – Obstacles to access for individuals – professional responsibility - Empowering computers in the workplace – Introduction – computers and employment – computers and the quality of work – computerized monitoring in the work place – telecommuting –social, legal and professional issues - Use of Software, Computers and Internet-based Tools -Liability for Software errors - Documentation Authentication and Control – Software engineering code of ethics and practices – IEEE-CS – ACM Joint task force. (**12L)**

UNIT V SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING

Software Development – strategies for engineering quality standards – Quality management standards – Social Networking – Company owned social network web site – the use of social networks in the hiring process – Social Networking ethical issues – Cyber bullying – cyber stalking – Online virtual world – Crime in virtual world - digital rights management - Online defamation – Piracy –Fraud. **(12 L)**

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COURSE OUTCOMES:

- Interalize the need for applying ethical principles and develops a responsible attitude the use of computers as well as technology.
- Able to envision the social impact on the project they develop.
- Understanding code of ethics and standards of computer professionals.

Reference Books:

1. Penny Duquenoy, Simon Jones and Barry G Blundell, "Ethical, legal and professional issues in computing", Middlesex University Press, 2008
2. George Reynolds, "Ethics in Information Technology", Cengage Learning, 2011
3. Caroline Whitback," Ethics in Engineering Practice and Research ", Cambridge University Press, 2011
4. Richard Spinello, "Case Studies in Information and Computer Ethics", Prentice Hall, 1997.
5. John Weckert and Douglas Adeney, Computer and Information Ethics, Greenwood Press, 1997.
6. Sara Baase, "A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet", 3rd Edition, Prentice Hall, 2008
7. http://www.infosectoday.com/Articles/Intro_Computer_Ethics.htm

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SOFT COMPUTING

L T P C
4 0 0 3

COURSE OBJECTIVES:

- To learn the basics and necessity of soft computing
- To learn various neural network technologies and algorithms

UNIT 1 ARTIFICIAL NEURAL NETWORK

Artificial Neural Network : Basic Concepts of Neural networks - Evolution of Neural networks - Basic Models of Artificial neural network - Terminologies of ANN- McCulloch - Pitts Neuron - Linear separability - Hebb Network - Applications of Neural networks.Supervised learning Network : Introduction - Perceptron Networks - Adaptive Linear Neuron -Multiple Adaptive Linear Neurons - Back propagation Network - Radial Basis function Network**.** **(12 L)**

UNIT II ASSOCIATIVE MEMORY NETWORKS

Associative Memory Networks : Introduction – Training algorithms for pattern association – Auto associative Memory Network – Bidirectional Associative Memory – Hopfield Networks.Unsupervised Learning networks: Introduction – Fixed Weight Competitive Nets - Kohonen Self-Organizing Maps – Learning Vector Quantization – Adaptive Resonance Theory Network. **(12L)**

UNIT III INTRODUCTION TO CLASSICAL SETS AND FUZZY SETS

Introduction to Classical Sets and Fuzzy Sets : Introduction - Classical sets - Fuzzy Sets. Classical Relation and Fuzzy Relations :- Introduction - Cartesian product of a relation -Classical Relation - Fuzzy Relations. Membership Functions : Introduction - Features of Membership Functions – Fuzzification - Methods of Membership Value Assignments. Defuzzification : Introduction - Lambda-Cuts for Fuzzy Sets - Lambda-Cuts for Fuzzy Relations - Defuzzification Method. **(12L)**

UNIT IV GENETIC ALGORITHM

Genetic algorithm-fundamentals of genetic algorithms-history and concept-creation of springs-working principle-encoding-fitness function reproduction-genetic modeling-inheritance operator-cross over-inversion and deletion-mutation operator-bitwise operation-bitwise operator used in GA-generational cycle convergence of genetic algorithm-differences & similarities between GA & other traditional methods-advances in genetic algorithm. **(12 L)**

UNIT V HYBRID SYSTEMS AND APPLICATION OF SOFT COMPUTING

Hybrid systems and application of soft computing:Integration of neural networks,fuzzy logic and genetic algorithms-hybrid systems-neural networks,fuzzy logic and genetic algorithms hybrids-preview of the hybrid systems to be discussed.Genetic algorithm based back propagation networks-GA based with determination ANFIS-adaptive neuro-fuzzy inference systems-introduction-ANFIS Architecture-hybrid learning algorithm coactive neuro-fuzzy modeling-introduction-framework.application of soft computing –introduction-a fusion approach of multispectural images with SAR image for flood area analysis optimization of TSP using Genetic Algorithm Approach Genetic Algorithm based internet search technique **(12 L)**

COURSE OUTCOMES:

- The students can understand the implementation of machine learning through artificial neural networks.
- Able to understand fuzzy sets and crisp sets.
- Gain knowledge about hybrid system in soft computing and genetic algorithm to solve optimization problems.

***Text book*:**

S.N.Sivandam and S.N. Deepa, “Principle of Softcomputing “,Wiley-India,2007.

Reference Books:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing",Prentice-Hall of India, 2003
2. Kwang H.Lee, "First course on Fuzzy Theory and Applications", Springer–Verlag BerlinHeidelberg, 2005.
3. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall,1995.
4. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, andProgramming Techniques", Pearson Edn., 2003.
5. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", AddisonWesley, 2007.
6. Mitsuo Gen and Runwei Cheng,"Genetic Algorithms and Engineering Optimization", WileyPublishers 2000.
7. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
8. S.N.Sivanandam, S.N.Deepa, "Introduction to Genetic Algorithms", Springer, 2007.

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BIO METRICS

L T P C
4 0 0 3

COURSE OBJECTIVES:

- To introduce the basics of biometrics
- To illustrate how to perform the biometrics
- To learn about various biometric models

UNIT I BIOMETRICS

Biometrics: Benefits of Biometrics versus Traditional-Authentication methods- Benefits of Biometrics in Identification Systems. **Key Biometric Terms and Processes:** Definitions-Discussions-Logical versus Physical Access-How Biometric Matching Works. **Accuracy in Biometric Systems:** False Match Rate-False Non Match Rate – Failure –to-Enroll (FTE) Rate-Derived Metrics. **(12 L)**

UNIT II FINGER SCAN

Finger-Scan: Components - How Finger-Scan Technology Works – Competing Finger-Scan Technologies - Finger-Scan Deployments - Finger-Scan Strengths - Finger-Scan Weaknesses. **Facial-Scan:** Components - How Facial-Scan Technology Works - Competing Facial-Scan Technologies - Facial-Scan Deployments - Facial-Scan Strengths - Facial-Scan Weaknesses.

(12 L)

UNIT III IRIS SCAN

Iris-Scan: Components - Its Working – Deployments -Iris-Scan Strengths - Iris-Scan. **Voice-Scan:** Components - Its Working – Deployments - Voice-Scan Strengths - **(12 L)**

UNIT IV OTHER PHYSIOLOGICAL BIOMETRICS

Other Physiological Biometrics: Hand Scan: Components - Its Working - Deployments-Hand-Scan Strengths - Hand-Scan Weaknesses. **Retina- Scan:** Components - Its Working – Deployments - Retina-Scan Strengths - Retina-Scan Weaknesses. **Automated Fingerprint Identification Systems (AFIS):** Components - Its Working - Deployments – AFIS and Finger-Scan Differ. **(12 L)**

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UNIT V OTHER LEADING BEHAVIORAL BIOMETRICS

Other Leading Behavioral Biometrics: Signature-Scan: Components - It's Working – Deployments - Signature-Scan Strengths - Signature-Scan Weaknesses. **Keystroke Scan:** Components - Its Working – Keystroke-Scan Strengths - **(12 L)**

COURSE OUTCOMES:

- Learner can understand biometrics concepts and the terms associated with it.
- Able to understand the biilogical characteritics of biometrics like finger scan, iris scan,etc.,
- Also gives a clear knowledge about behavioural biometrics.

Text Books:

Samir Nanavati, Michael Thieme, Raj Nanavati "Biometrics Identity Verification in a Networked world", A Wiley Tech Brief, New Delhi, Reprint: 2011

Reference Books:

Biometrics: The Ultimate Reference – John D. Woodward,Jr.Nicholas M. Orlans Peter T.Higgins, Published by Dreamtech Press, 2003, New Delhi-110002.

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THEORY OF COMPUTATION

L T P C

4 0 0 3

COURSE OBJECTIVES:

- To learn about the basic grammar for programming language.
- To learn the basics of compilers and its applications.

UNIT I REGULAR LANGUAGES

Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions - Regular Expression – FA and Regular Expressions – Pumping lemma for Regular languages - Equivalence and minimization of Finite Automata. **(12 L)**

UNIT II CONTEXT FREE LANGUAGES

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Equivalence of Parse trees and derivation - Normal forms for CFG - Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG – Pumping lemma for CFL. **(12 L)**

UNIT III CLOSURE PROPERTIES AND TURING MACHINES

Closure properties of Regular Sets: Complement and Intersection – Closure properties of CFL: Union, Concatenation, Kleene Closure, Intersection and Complement – Turing Machines – Language of a Turing machine – Turing machine as a computing device - Various techniques for construction of TMs – Equivalence of one tape and multi-tape Turing machines. **(12 L)**

UNIT IV UNDECIDABILITY

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Rice theorem for Recursive and Recursively enumerable languages – Post's Correspondence Problem. **(12 L)**

UNIT V RECENT TRENDS & APPLICATIONS

Matrix grammar – Programmed grammar – Random context grammar – Regular Control grammar – Lindenmayer systems – A glance on DNA computing and Membrane computing. **(12 L)**

COURSE OUTCOMES:

- Able to understand the formation of deterministic and non-deterministic finite automata from a regular expression.
- Gain knowledge about construction of parse tree and closure properties.
- Gain some information of computing applications.

Text Books:

1. John E. Hopcroft and Jeffery D. Ullman, Introduction to Automata Theory, Languages and Computations, Narosa Publishing House, Delhi, 1989.
2. Kamala Krithivasan and R. Rama, Introduction to Formal Languages, Automata Theory and Computation, Pearson Education, Delhi, 2009.

References:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the theory of Computation, Second Edition, Prentice-Hall of India Pvt. Ltd, 2003.
2. J. Martin, Introduction to Languages and the Theory of Computation, Third Edition, Tata McGraw Hill, New Delhi, 2003.
3. MichealSipser, “Introduction of the Theory and Computation”, Thomsosn Learning, 1997.

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.NET PROGRAMMING

L T P C
4 0 0 4

COURSE OBJECTIVES:

- The Web fundamentals.
- Assessing web controls.
- To learn paging and sorting.
- Handling multiple tables in .Net.

UNIT I BASICS

ASP.NET applications, ASP.NET file types – Three ways to code web forms – ASP.Net configuration web form fundamentals: A simple page applet – Improving the currency converter – A deeper Look at HTML control classes – The page Class. **(12L)**

UNIT II WEB CONTROLS

Web controls: Stepping up to web controls – Web control classes – Auto post back and Web control events – A simple web page applet – Assessing web controls. **(12L)**

UNIT III VALIDATION AND RICH CONTROLS

Validation and rich controls : The calendar control – Formatting the calendar – Restricting Dates – The Ad Rotator – The advertisement file – The Ad Rotator class validation – The validation controls – The validation process – The validator class – A simple validation example.

(12L)

UNIT IV THE DATA LIST

The data list : Data grid & repeater : Introducing Templates – Using Templates with the Data List – Data Binding with Multiple Templates – Comparing the Template Controls – Preparing your list for selection & Editing – Selecting Items – Editing Items – Paging & Sorting with the Data Grid. **(12L)**

UNIT V OVERVIEW OF ADO.NET

Overview of ADO.NET – Introducing ADO.NET and Data management – Characteristics of ADO.NET – The ADO.NET object model. ADO.NET Data Access : SQL Basics – The SQL select statement – The SQL update Statement – The SQL Insert statement – The SQL delete statement –Accessing, creating a connection – Defining a select command – updating data – Accessing Disconnected Data – Selecting Multiple Tables – Modifying Disconnected Data –

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Updating Disconnected Data. **(12L)**

COURSE OUTCOMES:

- The students can understand about .NET programming frame works like ASP.NET.
- Can gain information about the various .NET controls and SQL statements.

Text & Reference Books:

1. ASP.NET – The complete reference – Matthew Mac Donald – Tata McGraw Hill 2005.

2. Rescued by Active server pages & ASP.NET – Rob Francis – Thomson Delmar Learning Edition 2005.

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CLOUD COMPUTING **L T P C**

4 0 0 4

COURSE OBJECTIVES:

- To study Architecture of cloud computing.
- To learn the security issues and management.
- To study mobile and cloud computing.

UNIT I INTRODUCTION

Cloud computing – An Overview : Introduction – History of cloud computing – Characteristics of cloud – Cloud computing model – Issues and challenges for cloud computing – Advantages and disadvantages of cloud computing – Security, Privacy and trust – Virtualization – Threats to cloud computing – Next generation of cloud computing.**Cloud computing Architecture:** Introduction - Cloud Architecture – Cloud computing models – Comparisons of Service models - Deployment models – Identity as a service **(12L)**

UNIT II VIRTUALIZATION IN CLOUD

Virtualization in Cloud : Virtualization – Implementation of Virtualization - Virtualization support at the OS level – Middleware support for Virtualization – Advantages of Virtualization – Application Virtualization - Virtualization implementation techniques – Hardware virtualization – Types of Virtualization – Load balancing in cloud computing – Logical cloud computing model – Virtualization for Data-centre. **Security Issues and challenges in Cloud computing:** Introduction - Security challenges in Cloud computing – Information Security in Cloud computing – Security, Privacy and Trust. **Security Management :** Introduction – Security in reference architecture – Security Issues in cloud computing – Classification of security issues – Types of attackers – Security risk in cloud computing – Security Threats against cloud computing – Novel security approaches – Emerging trends in security and privacy. **(12L)**

UNIT III VIRTUALIZATION SYSTEM SPECIFIC ATTACKS

Virtualization System specific Attacks : Attacks in cloud computing environment – Attacks in Hypervisor – Security challenges – Virtualization security solutions – Desktop virtualization Security – Planning and deployment for secure virtualization. WebServices: Amazon web services – Microsoft Azure – Google App Engine. **(12L)**

UNIT IV SERVICE ORIENTED ARCHITECTURE

Service Oriented Architecture: SOA components – Design principles of SOA – SOA requirements – Benefits of SOA – Significance of SOA in cloud computing – Challenges associated with SOA – Enterprise Service Bus – Web Services – Recurring Architectural Capabilities.**Migrating Applications to the Cloud computing :** Motivations for migration –

Issues in migrating the applications to the cloud – Challenges in migrating the applications to the cloud – Solutions – Types of migration – Planning for migrating the application to the cloud – Migration Roadmap – Cloud bursting. **Cloud Computing Applications:** Business applications – Finance and banking applications – Cloud computing in education. **(12L)**

UNIT V STANDARDS IN CLOUD COMPUTING

Standards in Cloud Computing : Standardization activities – Challenges – Fields of standardization – Role of Standards in cloud computing environment – Standardization organizations in Cloud Computing. **Mobile Cloud Computing :** Needs of mobile Cloud Computing – Mobile Cloud Computing Architecture – Technologies for MCC – MCC Applications – Issues in MCC – Challenges in building applications – Platforms.**Micro services:** Need of micro services – Micro service architecture – Benefits of Micro services – Drawbacks of micro services – Communication mechanisms – Decentralized data management - Essential check-lists for migration from monolithic to micro services - Comparison of Micro services with SOA. **(12L)**

COURSE OUTCOMES:

- Provides knowldege about the histrory and architecture of cloud computing.
- Addressess the core issuses of cloud computing security.
- Clear understanding of cloud computing standards and services.

Text book:

1. V.K.Pachghare, “Cloud Computing”, PHI, 2016.

Reference Books:

1. Michael Miller, “Cloud Computing”, Pearson Education, New Delhi, 2009
2. Anthony T.Velte, TobyJ.Velte, Pobert Elsenpeter,” Cloud Computing”,TMH,2010
3. Kumar Saurbh , “Cloud Computing – Insights into New-Era Infrastructure”, Wiley India, 2011.
4. John W.Rittinghouse and James F. Ransome, “Cloud Computing Implementation, Management and Security”, CRC press, 2010.
5. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
6.RajkumarBuyya, Christian Vecchiola, S.ThamaraiSelvi, ‘Mastering Cloud Computing”, TMGH,2013.
7. Gautam Shroff, Enterprise Cloud Computing, Cambridge University Press,2011

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DATA COMMUNICATION AND NETWORKS **L T P C**

4 0 0 4

COURSE OBJECTIVES:

- To study the protocols and OSI model.
- To learn about circuit switching.
- To study the networks layers.

UNIT I NETWORK FUNDAMENTALS

Data communications-Networks-Network types-Internet history-Protocol layering-TCP/IP Protocol suite-The OSI model. **(12L)**

UNIT II PHYSICAL LAYER

Data and signals-Transmission impairment-Digital-To-Digital conversion-Analog-To-Digital conversion-Transmission modes-Digital-to-Analog conversion-Analog-to-Analog-conversion.

(12L)

UNIT III TRANSMISSION MEDIA

Introduction-Guided media-Unguided media-Switching: Introduction-circuit-Switched Network-Packets Switching-Structure of a Switch. **(12L)**

UNIT IV DATA -LINK LAYER

Introduction-Error Detection and Correction: Introduction-Block Coding-Data-link-Layer Protocol-Point-To-Point protocol (PPP)-Ethernet Protocol-Fast Ethernet-Gigabit Ethernet. **(12L)**

UNIT V NETWORK LAYER

Network -Layer Services-Packet Switching-Routing Algorithms-Unicast Routing Protocol-Multicast Routing: Introduction-Multicasting basics-IPv6addressing-The IPv6 protocol-The ICMPv6 protocol **(12L)**

COURSE OUTCOMES:

- Able to get clear knowledge about the network fundamentals.
- Able to understand briefly about the network suppor layers and transmission media.

Text Book:

1. Forouzan, “Data Communications and Networking 5E”Fifth Edition, McGraw Hill Education, Edition 2013

Reference Books:

1. Achyut S Godbole, AtulHahate, “Data Communications and Networks” Second Edition 2011

2. Andrew S.Tannenbaum David J. Wetherall, “Computer Networks” Fifth Edition Pearson Education 2011.

3. William Stalling, “Data and Computer Communications”,Nineth Edition, Prentice Hall 2011.

4.John Cowley, “Communication and Network ”Second Edition 2011.

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RESEARCH METHODOLOGY **L T P C**

4 0 0 4

COURSE OBJECTIVES:

- To get the basic knowledge of Research Methodology.
- To study the measurement and scaling techniques of research area.
- To learn about data collection & report writing.

UNIT I INTRODUCTION

Research Methodology: Introduction - Meaning of Research – Objectives of Research – Types of Research – Motivation of Research – Research approaches – Significance of Research – Research Methods versus Methodology – Research and Scientific method – Research process – Criteria of good Research – Problems encountered by Researchers in India. Defining the Research problem : What is a Research problem - Selecting the Problem – Technique involved Defining a problem. Research design: Meaning – Need for Research Design – Features of Good Design – Important concept relating to Research design – Different Research designs – Basic Principles of Experimental Designs **(12L)**

UNIT II SAMPLING DESIGN AND SCALING TECHNIQUES

Sampling Design : Census and sample survey – Implications of a sample design – Steps in sample design - Criteria of selecting a sampling procedure – Characteristics of a good sample design – Different types of sample design – How to select a random sample – Random sample from an infinite Universe – Complex random sampling designs. **Measurements and scaling techniques :** Measurement in Research – Measurement scales – Sources of error in Measurement – Test and sound Measurements – Technique of developing measurement tools – Scaling, Meaning of scaling – Scale classification bases – Important scaling techniques – Scale Construction techniques. **(12L)**

UNIT III SAMPLE TESTING TECHNIQUES

Chi-Square Test for large samples – Definition of Chi-Square – Limitations of Chi-Square test - Chi-Square test as a test of goodness of fit and as a test of independence – Yate's correction and its applications – Analysis of variance(ANOVA) : Concept – One way ANOVA – ANOVA in test in Latin Square Design **(12L)**

UNIT IV DATA COLLECTION AND REPORT WRITING

Data Collection : Methods of Data collection – Collection of Primary Data – Observation Method – Interview method – Collection of data through Questionnaires – Collection of data through Schedules – Some other methods of data collection – Collection of secondary data – Selection of appropriate method for data collection.

Interpretation and Report Writing : Meaning of interpretation – Why interpretation – Technique of interpretation – Precaution in Interpretation – Significance of Report Writing –

Different Steps in Writing Report – Layout of the Research Report – Types of Reports – Mechanics of Writing a Research Report – Precautions for Writing Research Reports.

(12L)

UNIT – V Algorithmic Research:

Introduction – Algorithmic Research Problems – Types of Solution Procedure/ Algorithm – Steps of Development of Algorithm – Steps of Algorithmic research – Design of Experiments and Comparison of Algorithms – Meta Heuristics for Combinational Problems. The computer – Its role in Research – The Computer and Computer Technology – The Computer System – Important Characteristics - Computer Applications – Computer and Researchers. **(12L)**

COURSE OUTCOMES:

- Can gain knowledge about the various researches and methologies.
- Able to know about the scaling techniques in research and data collection through schedules.
- Provides knowledge about the report writing, interpretation and algorithmic research.

Text Books:

1.C.R.Kothari, "Research Methodology Methods and Techniques", Second edition, New Age International Publishers, 2010.

2. R.Panneerselvam, "Research Methodology", PHI, 2009.

Reference Books:

1. S.P.Gupta, Introduction to Mathematical Statics"
2. D.K.Bhattacharyya, "Research Methodology", First Edition, EBP, 2003.
3. Sancheti and Kapoor, "Business Statics".

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DIGITAL IMAGE PROCESSING **L T P C**

3 0 0 3

COURSE OBJECTIVES:

- To get the basic knowledge of Digital Image Processing.
- To study about frequency domain.
- To learn about colour image processing.
- To learn about image segmentation.

UNIT I INTRODUCTION

Introduction:-Fundamentals-The MATLAB Desktop-Using Mat lab Editor Debugger- getting help-saving and Retrieving work session data-Digital Image Representation- Image I/O and Display –Classes and Image Types-M-Function Programming. 305 Intensity Transformation and Spatial Filtering: - Background-Intensity transformation - histogram processing and function Plotting-Spatial filtering-Image processing toolbox standard spatial filters. **(9L)**

UNIT II FILTERING IN FREQUENCY DOMAIN

Filtering in Frequency Domain:-The 2-D Discrete Fourier transform-Computing and Visualizing the 2-D DFT in MATLAB – Filtering in the Frequency domain- Obtaining frequency domain filters from spatial filters- Generating filters directly in the frequency domain-sharpening frequency domain filters. Image Restoration and Reconstruction:- A model of the image degradation / restoration process- noise models- Restoration in the presence of noise only-Spatial filtering- periodic noise reduction by frequency domain filtering- Modeling in degradation function-Direct inverse filtering –wiener filtering- Constrained least squares filtering – Iterative non-linear restoration using the Lucy- Richardson algorithm- Blind deconvolution - Geometric transformation and image registration. **(9L)**

UNIT III COLOR IMAGE PROCESSING

Color image processing:-Colour image representation in matlab-converting to other color spaces-The basics of color image processing-Color transformation-spatial filtering of colour images-Working directly in a RGB vector space Wavelets:-Background - The fast wavelet transform-working with wavelet decomposition structures-the inverse wavelet transform-wavelets in image processing. **(9L)**

UNIT IV IMAGE COMPRESSION

Image compression:-Background-coding redundancy-spatial redundancy-irrelevant information-jpeg compression Morphological image processor:-preliminaries-dilation and erosion-combining dilation and erosion-labeling connected components –morphological reconstruction-gray scale morphology 306. **(9L)**

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UNIT V IMAGE SEGMENTATION

Image segmentation:- Image segmentation-point, line and edge detection-Line detection using the Hough transform-thresholding-region-based segmentation using the watershed transform Representation and description:-Background-Representation-Boundary descriptors-regional descriptors using principal components for descriptors. **(9L)**

COURSE OUTCOMES:

- Able to understand the fundamentals of digital image processing and MATLAB.
- Exposure about image processing, image compression and segmentation.

Reference Books:

1.Rafael C.Gonzalez, Richard E.Woods, Steven L.Eddins, Image Processing Using MATLAB, Second edition, Tata McGraw Hill Education Private Limited, New Delhi.

2. Anil.K.Jain, Fundamentals of Digital Image Processing, Prentice-Hall, 1989.

3. Chanda&Majumdar, Digital Image Processing and Analysis, Prentice Hall, 3rd Edition

4. S.Sridhar, Digital Image Processing, Oxford University Press 2011

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EMBEDDED SYSTEMS **L T P C**

3 0 0 3

COURSE OBJECTIVES:

- To get the basic knowledge of microprocessor.
- To get the knowledge of embedded systems.
- To learn about Real time operating systems.

UNIT I INTRODUCTION TO MICROPROCESSORS

Evolution Of Microprocessors - 8-Bit Processor - 8085 Architecture – Register Organization - Instruction Set – Timing Diagram- Addressing Modes – Interrupts- Interrupt Service Routines- Assembly Language Programming Using 8085. **(9L)**

UNIT II INTRODUCTION TO EMBEDDED SYSTEMS

Embedded Systems- Processor Embedded Into A System-Embedded Hardware And Software Units-Applications-Design Process – Intel 8051 Architecture- Processor And Memory Organization-Interrupts Of 8051 - Assembly Language Programming Using 8051. **(9L)**

UNIT III INTERFACING WITH 8051

Input-Output Interfacing – Bus Standards – PCI – ISA – Timing And Control – Input Output Devices –Serial And Parallel Communication – Motor Control-Programming Display Devices – ARM Architecture. **(9L)**

UNIT IV REAL TIME OPERATING SYSTEM

Inter Process Communication – Signal Functions – Socket Programming – Mailbox - Pipes – RTOS – OS Services – Process Management - Timer Function –Event Function – Memory Management –Device, Files And I/O Subsystem – Basic Design of RTOS. **(9L)**

UNIT V RTOS PROGRAMMING

Basic Functions – Types of RTOS – RTOS μCOS – RT Linux – Real Time Linux Functions- Programming with RT Linux – Case Study. **(9L)**

COURSE OUTCOMES:

- The learners can understand the funcationality of 8085 and 8051 microprocessors.
- Acquire knowledge of real time operating systems and implement real time functions.

Reference Books:

1.Rajkamal, "Embedded System: Architecture, Programming And Design" Tata McGraw-Hill Education, Second Edition, 2008.
2. B.KanthRao, "Embedded Systems" PHI Learning Private Limited, 2011.
3. Marilyn Wolf, "Computers As A Components" Third Edition, Morgan Kaufmann Series 2012.

4. A.P.Godse & A.O.Mulani ”Embedded Systems” Third Edition, Technical publications 2009.
5. Mohamed Rafiquzzaman, “Microprocessors and Micro computer-based system design”, CRC Press, Second Edition, 2013.

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SECURITY IN COMPUTING **L T P C**

3 0 0 3

COURSE OBJECTIVES:

- To learn about program security.
- To study the Data base securities.
- To study the Network and Computer securities.

UNIT I CRYPTOGRAPHY:

Cryptography: Terminology and Background – Substitution ciphers - The Caesar cipher, The Vernam cipher, Book cipher; Transposition ciphers. DES – AES - Public key encryption - RSA encryption - Possible attacks on RSA-Uses of Encryption. **(9L)**

UNIT II PROGRAM SECURITY

Program Security : Secure programs – Fixing faults, Unexpected behavior, Types of flaws; Nonmalicious Program errors Virus and other malicious code – Kinds of malicious code, How Viruses attach, Document viruses, How viruses gain control, Homes for viruses, Virus Signatures, The source of Viruses, Prevention of Virus Infection. Targeted malicious code – Trojans, Trapdoors, Salami Attack. **(9L)**

UNIT III SECURITY IN DATABASES

Security in Databases : Security Requirements - Integrity of the database, Element Integrity, Audibility, Access control, User authentication, Availability, SQL injection; Reliability and Integrity – Protection features from the operating system, Two-phase update, Redundancy/Internal consistency, Recovery, Concurrency/Consistency, Monitors; Sensitive data - Access decisions, Types of disclosures, Security versus Precision; Inference – Direct Attack , Indirect Attack; Multilevel databases – Granularity , Security Issues **(9L)**

UNIT IV SECURITY IN NETWORKS

Security in Networks: Threats in Networks – What makes a network vulnerable? Categories of attack, Who attacks Networks? Network Security Controls – Security Threat analysis, Effect of security in architecture of network, Encryption, Content integrity, Strong authentication, Access controls, Wireless security, Alarms and alerts, Honeypots, Traffic flow security. Firewalls – Design of firewalls, Types of Firewalls, Personal Firewalls, and Comparison of Firewall Types.

(9L)

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UNIT V LEGAL AND ETHICAL ISSUES IN COMPUTER SECURITY

Legal and Ethical Issues in Computer Security : Protecting Programs and data – Information and the law - Redress for software failures – Selling correct software, Reporting software flaws. Computer Crime : Why a separate category for computer crime is needed, Why computer crime is hard to define, Why computer crime is hard to prosecute, Indian Cyber law offences, Cyber Pornography, Accessing Protected System, Tampering with Computer Source code. Ethical Issues in Computer Security: Differences between the Law and the Ethics, Studying Ethics, Ethical Reasoning. **(9L)**

COURSE OUTCOMES:

- To understand cryptographic algorithms for secure data transmission and digital signature for secure e-documents.

Text Book

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, ―Security in Computing‖, Fourth Edition, Pearson Education, 2007.

References

1.Michael Whitman, Herbert J. Mattord,-Management of Information Security, Third Edition, Course Technology, 2010.
2.William Stallings,-Cryptography and Network Security: Principles and Practices, Fifth Edition. PHI, 2010.
3. V.K.Pachghare,- Cryptography and Information Security, PHI, 2013.

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BIG DATA ANALYTICS **L T P C**

3 0 0 3

COURSE OBJECTIVES:

- To get the basic knowledge of Data model of Big Data.
- To learn about distributed system.
- To study the different layers in computing.

UNIT I NEW PARADIGM FOR BIG DATA

A new paradigm for big data: Scaling with a traditional database – Desired properties of a Big Data System-The problems with fully incremental architectures-Lambda Architecture-Recent Trends in Technology. Batch Layer: DATA model for Big DATA - The properties of data- the fact-based model for representing data- Graph schemas. Data Model for Big Data: Why serialization framework? - Apache thrift – Limitations of serialization frameworks. **(9L)**

UNIT II DATA STORAGE ON THE BATCH LAYER

Data Storage on the batch layer: Storage requirements for the master dataset – Choosing a storage solution for the batch layer – How distributed file systems work – Storing a master dataset with distributed file system – Vertical partitioning – Low-level nature of distributed file systems – Storing the SuperWebAnalytics.com master dataset on a distributed file system **(9L)**

UNIT III DATA STORAGE ARCHITECHURE AND ALGORITHM

Data storage on the batch layer: Illustration - Using the Hadoop Distributed File System – Data storage in the batch layer with Pail – Storing the master dataset for SuperWebAnalytics.com. Batch layer : Motivating examples – Computing on the batch layer – Recomputation algorithms vs. incremental algorithms –Scalability in the batch layer – Map Reduce: a paradigm for Big Data computing – Low-level nature of Map Reduce-Pipe diagrams: a higher-level way of thinking about batch computation Batch layer: Illustration: An illustrative example- Common pitfalls of data-processing tools – An introduction to JCascalog – Composition. An example batch layer: Architecture and algorithms: Design of the SuperWebAnalytics.com batch layer – Workflow overview – Ingesting new data – URL normalization – User-identifier normalization – Duplicate page views – Computing batch views. **(9L)**

UNIT IV SERVING LAYER

Serving layer: Performance metrics for the serving layer- The serving layer solution to the normalization/denormalization problem- Requirements for a serving layer database- Designing a serving layer for Super WebAnalytics.com – Contrasting with a fully incremental solution. Serving layer: Illustration: Basics of Elephant DB – Building the serving layer for SuperWebAnalytics.com **(9L)**

UNIT V SPEED LAYER REAL-TIME VIEWS

Speed Layer Real-time views: Computing real-time views – Storing real-time views – Challenges of incremental computation – Asynchronous versus Synchronous updates – Expiring

real-time views. Real-time views: Illustration: Cassandra's data model – Using Cassandra. Queuing and stream processing: Queuing – Steam processing – Higher-level, one-at-a-time stream processing – SuperWebAnalytics.com speed layer. Queuing and stream processing: Illustration: Defining topologies with Apache Storm – Apache Storm clusters and deployment – Guaranteeing message processing – Implementing the SuperWebAnalytics.com unique-over-time speed layer. Lambda Architecture in depth: Defining data systems – batch and serving layers – Speed layer – Query layer. **(9L)**

COURSE OUTCOMES:

- The students will be able to work with big data platform.
- Analyze the big data analytic techniques for useful business applictions.
- Unserstood about the HADOOP and Map Reduce technologies associated with big data analysis**.**

Text Book :

1. Nathan Marz and James Warren, "Big Data Principles and best practices of scalable real-time data systems", Manning publications co., Dreamtech Press, Edition 2016.

References:

1. Viktor Mayer-Schönberger and Kenneth Cukier, "Big Data: A Revolution That Will Transform How We Live, Work, and Think", Houghton Mifflin Harcourt, 2013

2.Zikopoulos, Paul and Chris Eaton, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, TMH, 2011.

3. Glenn J.Myatt, "Making Sense of Data", John Wiley&Sons, 2007.

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E-COMMERCE **L T P C**

3 0 0 3

COURSE OBJECTIVES:

- To study the history of E-Commerce.
- To get the knowledge of digital signatures.
- To study about mobile commerce with on line and off line modes.

UNIT I HISTORY OF E-COMMERCE

History of E-commerce: Advantages of E-Commerce - Disadvantages of E-commerce - Transition to E-commerce in India - Some Pioneering Indian case studies. Business model for E-commerce - E-business model based on relationship of transaction parties - E-Business model based on the relationship of transaction types. **(9L)**

UNIT II E-MARKETING

E-marketing: Traditional marketing - Identifying web presence goals - The browsing behavior model-online marketing - E-Advertising - Internet marketing trends - Target markets - Marketing strategies. **(9L)**

UNIT III E-PAYMENT SYSTEM

E-payment system: Digital payment requirements, Digital token based E-payment system - Classification of new payment system - Properties of electronic cash-cheque payment systems on internet - Risk and E-payment systems-Designing E-payment systems - Digital Signature.

(9L)

UNIT IV E-CUSTOMER RELATIONSHIP MANAGEMENT

E-customer relationship management: Customer relationship management - E-supply chain (Benefits, E-supply chain architecture, Major Trends in E-SCM). **(9L)**

UNIT-V MOBILE COMMERCE

Mobile commerce: Growth of mobile commerce - Technologies for Mobile commerce-Wireless technologies - Mobile commerce - Intelligent web design - Requirement of intelligent web sites - Setting web sites goals and objectives - Anand online and offline model. **(9L)**

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COURSE OUTCOMES:

- Able to understand E-commerce principles in marketing places, digital payment systems and customer relationship management.
- The learners can get an exposure to current technological advancement in M-Commerce.

Text &Reference Books:

1.E-Commerce – A Managerial perspective – P.T.Joseph, Prentice Hall of India (P)Ltd., 2002.

2.E-Commerce – David Whitley, Tata McGraw Hill Edition,2005.

3.Frontiers of Electronic Commerce – Kalkota and Whinston, Pearson Education, 2004.

4.E-Commerce-Gray P.Schneider, Thompson Cour4se Technology, 2004.

5.E-Business, ParagKulkarni, SunitaJahirabadkar, PradipChande, Oxford University Press.

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NET PROGRAMMING LAB

1. Case conversion
2. Current Data and time
3. Rupees conversion
4. Changing background colour
5. Checklist program using web server controls
6. Table creation
7. Control being monitored for change event
8. Greeting card creation
9. Range validator
10. Server validation
11. Compare validation
12. Calandar Control
13. Creating Advertisement using AdRotator class

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MINI PROJECT

The objective of the project is to enable the students to work in a project of latest topic. Each student shall have a guide from the Department.

During this semester, the students are expected to complete the project and submit a full-fledged report comprising of the complete system developed along with implementation and test results.

Internal Assessment Component	Marks
I Review on 50% Completion	20
Final Review	20
Report	10
Total	**50**

A Vivo-voce will be conducted by two External Examiners and the marks shall be contributed as per the under mentioned components.

External Assessment Component	Marks
Report	20
Presentation	20
Viva-voce	10
Total	**50**

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MAJOR PROJECT

The objective of the project is to enable the students to work in a project of latest topic / research area / industrial applications. Each student shall have a guide from the Department.

During this semester the students are expected to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem. Also during this semester, the students are expected to complete the project and submit a full-fledged report comprising of the complete system developed along with implementation and test results. The departmental committee shall examine the students for 100 marks and the evaluation is based on continuous internal assessment comprising of two reviews.

Internal Assessment Component	Marks
I Review on 50% Completion	20
Final Review	20
Report	10
Total	**50**

A Vivo-voce will be conducted by two External Examiners and the marks shall be contributed as per the under mentioned components.

External Assessment Component	Marks
Report	20
Presentation	10
Viva-voce	20
Total	**50**