

PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018

(AUTONOMOUS)

MASTER OF COMPUTER APPLICATIONS

REGULATIONS 2016

(CHOICE BASED CREDIT SYSTEM)

CURRICULUM

SEMESTER III

S.No.	Category	Course Code	Course Title	L	T	P	C
Theory							
1	BS	PMA16301	Resource Management Techniques	3	2	0	4
2	PC	CA16301	Computer Communication Networks	3	0	0	3
3	PC	CA16302	Object Oriented Software Engineering	3	0	0	3
4	PC	CA16303	Enterprise Resource Planning	3	0	0	3
5	PC	CA16304	Internet Programming	3	0	0	3
Practical							
6	PC	CA16305	Case Tools Laboratory	0	0	4	2
7	PC	CA16306	Internet Programming Laboratory	0	0	4	2
8	HS	EN16302	Communication and Soft Skills Laboratory	0	0	2	1
TOTAL				15	2	10	21

SEMESTER IV

S.No.	Category	Course Code	Course Title	L	T	P	C
Theory							
1	PC	CA16401	C# and .NET Framework	3	0	0	3
2	PC	CA16402	Data Mining and Data Warehousing	3	2	0	4
3	PC	CA16403	Web Programming	3	0	0	3
4	PC	CA16404	Cloud Computing	3	0	0	3
5	PE	CA1615*	Elective I	3	0	0	3
Practical							
6	PC	CA16405	C# and .NET Programming Laboratory	0	0	4	2
7	PC	CA16406	Web Programming Laboratory	0	0	4	2
8	EEC	CA16407	Technical Seminar and Report Writing	0	0	4	2
9	EEC	CA16408	Career Development Laboratory	0	0	2	1
TOTAL				15	1	14	23

PROFESSIONAL ELECTIVES (PE)

ELECTIVE I

S.No	Category	Course Code	Course Title	L	T	P	C
1	PE	CA16151	Financial Accounting	3	0	0	3
2	PE	CA16152	Information Security	3	0	0	3
3	PE	CA16153	Network Protocols	3	0	0	3
4	PE	CA16154	Software Testing and Quality Assurance	3	0	0	3
5	PE	CA16155	Game Programming	3	0	0	3
6	PE	CA16156	Advanced Data Base Management Systems	3	0	0	3

SEMESTER III

PMA16301

RESOURCE MANAGEMENT TECHNIQUES

3 2 0 4

COURSE OBJECTIVES

- To formulate the mathematical model of a linear programming problems
- To introduce the methods of solving integer programming
- To understand the application of transportation and assignment problems
- To expose the use of network modeling for project scheduling
- To expertise the concept queuing models and its applications

UNIT I LINEAR PROGRAMMING MODELS 15

Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Variants of Simplex method

UNIT II INTEGER PROGRAMMING MODELS 15

Formulation – Gomory’s IPP method – Gomory’s mixed integer method – Branch and Bound technique.

UNIT III TRANSPORTATION AND ASSIGNMENT MODELS 15

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm – Variants of the Assignment problem

UNIT IV SCHEDULING BY PERT AND CPM 15

Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

UNIT V QUEUEING MODELS 15

Queuing Theory – Single and multi-channel models – Infinite number of customers and infinite calling source.

TOTAL PERIODS 75

COURSE OUTCOMES

At the end of this course, the students will be able to

- understand the mathematical tools that are needed to solve optimization problems
- develop mathematical skills to analyse and solve IPP
- find optimal solution of transportation and assignment models applied in real life situation
- design networks for scheduling of projects by PERT and CPM.
- acquire skills in queuing models

REFERENCES

1. Taha H.A., “Operations Research : An Introduction“ 8th Edition, Pearson Education, 2011.
2. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, “Operations Research”, Pearson Education, Asia, 2013.
3. Prem Kumar Gupta, D.S. Hira, “Operations Research”, S.Chand & Company Ltd, New Delhi, 3rd Edition, 2013.
4. John W. Chinneck “Feasibility and Infeasibility in Optimization Algorithms and Computational Methods’ Springer, 2013
5. Ravindran, Phillips, Solberg, ”Operations Research: Principles And Practice”, 2ndEdition, JohnWiley& Sons, 01-Jul-2012

WEB LINKS

1. https://en.wikipedia.org/wiki/Resource_management
2. <https://www.wiziq.com/tutorial/211315-RESOURCE-MANAGEMENT-TECHNIQUE>
3. blog.mavenlink.com/resource-management-techniques

COURSE OBJECTIVES

- To understand networking concepts and basic communication model
- To know network architectures and data link layer for data communication.
- To analyze the function and design strategy of physical, data link, network layer and transport layer
- To acquire knowledge of various application protocol standard developed for internet.
- To study the trace for the flow of information from one node to another node in the network

UNIT I INTRODUCTION 9

Data Communications – Networks – Protocols and Standards. Network Models – OSI Model – Layers – TCP/IP Protocol Suite–Addressing. Digital Transmission – Digital-to-Digital Conversion – Analog-to-Digital Conversion – Transmission Modes. Analog Transmission – Digital-to-Analog Conversion – Analog-to-analog Conversion. Transmission Media – Guided and Unguided Media.

UNIT II DATA LINK LAYER 9

Error – detection and correction – Parity – LRC – CRC – Hamming code – Flow Control and Error control – stop and wait – go back-N ARQ – selective repeat ARQ- sliding window – HDLC. - LAN - IEEE 802.4 - IEEE 802.5 IEEE 802.11 – FDDI - SONET – Bridges.

UNIT III NETWORK LAYER 9

Internetworks–Circuit Switching- Packet Switching and Datagram approach – IP addressing methods– Subnetting – Routing – Distance Vector Routing – Link State Routing – BGP -Routers.

UNIT IV TRANSPORT LAYER 9

Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

UNIT V APPLICATIONS 9

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, the students will be able to

- identify the components required to build different types of networks
- apply the functionalities needed for data communication into layers
- design the required functionality at each layer for given application
- analysis the working principles of various application protocols
- acquire knowledge about security issues and services available

REFERENCES

1. Larry L. Peterson & Bruce S. Davie, “Computer Networks – A systems Approach”, Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2013.
2. William Stallings, “Data and Computer Communications”, Ninth Edition, Prentice Hall, 2013.
3. Forouzan, “ Data Communication and Networking”, Fifth Edition , TMH 2013

4. Andrew S.Tannenbaum David J. Wetherall, "Computer Networks" Fifth Edition , Pearson Education 2013
5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-down Approach, Pearson Education, Limited, sixth edition,2013

WEB LINKS

1. www.networking-basics.net
2. www.lantronix.com › Resources › Networking Tutorials
3. www3.nd.edu/~cpoellab/teaching/cse40814_fall14/networks.pdf

COURSE OBJECTIVES

- To understand the phases in a Software Engineering concept
- To study the purpose of different UML diagrams
- To introduce the Requirements and Analysis of Object Oriented Concept
- To know the activities in the crucial phase of system design.
- To understand the key phases in the recent trends of RUP and agile development

UNIT I INTRODUCTION**9**

Introduction to Software Engineering-Concepts-Software engineering development activities-Managing software development

UNIT II MODELING WITH UML**9**

UML Diagrams: Use Case Diagrams - Class Diagrams – Interaction Diagrams - State Machine Diagrams - Activity Diagrams. Modeling Concepts - Diagram Organization - Diagram Extension

UNIT III REQUIREMENTS AND ANALYSIS**9**

Requirements Elicitation - Concepts - Activities & Managing Requirements Elicitation - **Analysis:** Concepts - Analysis Activities - Analysis Model

UNIT IV SYSTEM DESIGN**9**

Decomposing the System - Addressing Design Goals - Reusing Patterns - Specifying Interfaces - Mapping Models to Code

UNIT V AGILE DEVELOPMENT AND RATIONAL UNIFIED PROCESS**9**

Rational Unified Process Key Features - Software Best Practices – Static Structure – Dynamic Structure. Agile Development: Adapting to Scrum - Patterns for Adopting to Scrum - New Roles – Changed Roles – Sprints - Product Backlogs - Teamwork

TOTAL PERIODS 45**COURSE OUTCOMES**

At the end of this course, the students will be able to

- apply the basics concepts of object oriented software engineering.
- use the Knowledge documentation for object oriented software engineering using UML.
- analyze the Problem and alternative solutions using object oriented software engineering approach.
- manage Software process and build software engineering teams based on engineering approach.
- acquire knowledge about security issues and services available

REFERENCES

1. Bernd Bruegge, Alan H Dutoit, “Object-Oriented Software Engineering Using UML, Patterns, and Java”,3rd Edition, ISBN-10: 0136061257 | ISBN-13: 978-0136061250, 2010
2. Philippe Kruchten, “The Rational Unified Process: An Introduction”, 3rd Edition, ISBN-10: 0321197704,ISBN-13: 9780321579362. 2010.
3. Grady Booch, James Rumbaugh and Ivar Jacobson, “The Unified Modeling Language User Guide”, Addison-Wesley Longman, USA, 2nd Edition, ISBN-10: 0321267974, ISBN-13: 9780321267979, 2005.

4. Timothy Lethbridge, Robert Laganieri, “Object-Oriented Software Engineering: Practical Software Development using UML and Java”, ISBN-10: 0077109082 | ISBN-13: 978-0077109080, 2010

WEB LINKS

1. www.softwareengineering-basics.net
2. www.lantronix.com › Resources › Software Objects Tutorials
3. www3.nd.edu/~cpoellab/teaching/cse40814_fall14/Diagrams.pdf

COURSE OBJECTIVES

- To understand the concept of ERP
- To study the purpose of Enterprise Systems
- To know the major process of ERP
- To introduce the activities in Integration
- To understand the key phases in the recent trends of ERP development

UNIT I INTRODUCTION TO ERP 9

Overview – Benefits of ERP – ERP and Related Technologies – Business Process Reengineering – Online Analytical Processing - Supply Chain Management

UNIT II ERP IMPLEMENTATION 9

Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation - Vendors, Consultants and Users – Contracts – Project Management and Monitoring

UNIT III BUSINESS MODULES 9

Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintenance - Material Management – Quality Management – Sales and Distribution.

UNIT IV ERP MARKET 9

ERP Market Place – SAP AG – People Soft – Bean Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associations.

UNIT V ERP – PRESENT AND FUTURE 9

Turbo Charge the ERP System – EIA and E-Commerce-ERP and Internet Future Directions in ERP.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, the students will be able to

- conceive the basics concepts of ERP.
- use Knowledge documentation for Enterprise Systems
- analyze Problem and Process in ERP.
- manage Integration of ERP
- acquire knowledge about security issues and services available

REFERENCES

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 2012
2. Joesph A.Brady, Ellen F. Monk Bret J. Wangner, “Concepts in Enterprise Resource Planning”, Thomas Learning, 2010.
3. Vino Kumar Garg and N.K..Venkat Krishnan, “Enterprise Resource Planning-concepts and Planning”, Prentice Hall, 2010.

WEB LINKS

1. www.resourceplanning-basics.net
2. www.lantronix.com › Resources › Planning Tutorials
3. www3.nd.edu/~cpoellab/teaching/cse40814_fall14/Diagrams.pdf

COURSE OBJECTIVES

- To understand an overview of Java fundamentals concepts.
- To study the basics concept of Java I/O Streams.
- To familiarize concept of Applet and AWT concept.
- To know the basic of JDBC and RMI concept
- To introduce the web development of Swing concept

UNIT I FUNDAMENTALS OF JAVA**9**

Introduction to java - Features of java - basic-Access controls - Static and fixed methods - Inner classes - String class – Inheritance – Overriding – methods - Using Super - Abstract classes – Packages – Interfaces - Exception Handling - Threads.

UNIT II I/O STREAMS**9**

The Java I/O Classes and Interfaces, the Stream Classes. The Byte Streams: InputStream, OutputStream, File InputStream, FileOutputStream, PrintStream, DataInputStream, DataOutputStream. The Character Streams: Reader, Writer, FileReader, FileWriter, CharArrayReader, CharArrayWriter, BufferedReader, BufferWriter,

UNIT III APPLLET AND AWT**9**

AWT package – Layouts – Containers – Event Package – Event Model – Garbage Collection– Multithreading – Language Packages.

UNIT III JDBC & RMI**9**

JDBC – Introduction to JDBC and its components – implementing JDBC in Applet in – Introduction to RMI – Structure of RMI–implementing RMI Request scope

UNIT V SWINGS**9**

GUI Programming with Java -Introduction to swings, JLabel, ImageIcon, JTextField, JButton, JToggleButton, JChcekBoxes, JRadioButtons, JTabbedPane, JScrollPane, JList, JComboBox, JTrees, JTable.

TOTAL PERIODS 45**COURSE OUTCOMES**

At the end of this course, the students will be able to

- acquire knowledge about the overview on oops concepts.
- explore the basics of java, AWT and String handling
- learn and design in java spring framework and able to develop programs using it.
- acquire knowledge in java and java swings.
- design web development techniques on client-side and server side

REFERENCES

1. Rajkumar Buyya, S.Thamarai Selvi, Xingchen Chu, “Object–Oriented Programming with JAVA: Essentials and Applications”, Fourth Edition, Tata McGraw Hill Education Private Limited, 2013.
2. Herbert Schildt , “ Java: The Complete Reference ”, Ninth Edition, McGraw-Hill , 2014.
3. Felipe Gutierrez, “Introducing Spring Framework: A Primer” Apress, 2014.

4. P.Naughton and H.Schildt, "Java 2(Complete Reference)" by fourth Edition.
5. Kathy Sierra & Bert Bates, "Head First Servlets & Jsp" by O'Reilly publications.

WEB LINKS

1. <http://courses.acs.uwinnipeg.ca/3909-050/lectures/Week01.pdf>
2. <http://handbook.uts.edu.au/subjects/31242.html>
3. <http://studentsblog100.blogspot.in/2015/05/internet-programming-syllabus-5th-sem-cse-reg-2013.html>

COURSE OBJECTIVES

- To understand and practice the various fields such as analysis, design, development testing
- To develop skills to construct software of high quality with high reliability

LIST OF EXPERIMENTS

1. Practicing the different types of case tools such as Rational Rose / other Open Source to be used for all the phases of Software development life cycle.
2. Data modeling
3. Source code generators
4. Apply the following to typical application problems:
 - a. Project Planning
 - b. Software Requirement Analysis
 - c. Software Design
 - d. Data Modeling & Implementation
5. Software Estimation
6. Software Testing
7. A possible set of applications may be the following:
 - a. Library System
 - b. Student Marks Analyzing System
 - c. Text Editor.
 - d. Create a dictionary.
 - e. Telephone directory.
 - f. Inventory System.

TOTAL PERIODS 60**COURSE OUTCOMES**

At the end of this course, the students will be able to

- model software projects into high level design using DFD,UML diagrams
- measure the product and process performance using various metrics.

COURSE OBJECTIVES

- To understand and practice basics of java, AWT and Swing concept
- To understand and practice of JDBC and RMI concept

LIST OF EXPERIMENTS

1. Writing Java programs by making use of class, interface, package, etc for the following
 - a. Different types of inheritance study
 - b. Uses of 'this' keyword
 - c. Polymorphism
 - d. Creation of user specific packages
 - e. User specific exception handling
2. Write programs in Java for event handling Mouse and Keyboard events.
3. Write programs in Java to manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using AWT.
4. Write programs in Java using Layout Manager create different applications
5. Create an application using Java Applets.
6. Database using JDBC concept
7. Applications in RMI concept
8. Event Handling concept using Swing

TOTAL PERIODS 60**COURSE OUTCOMES**

At the end of this course, the students will be able to

- explore the features and create interactive application using Applet and Swing
- acquire knowledge about the JDBC and RMI Programs

COURSE OBJECTIVES

- To understand the basic communication concept and communication skills through various lab sessions.
- To help students develop the ability to communicate effectively in spoken English and develop their soft skills and interpersonal skills.
- To increase employability by developing students' communication skills in English.

UNIT I FORMAL AND INFORMAL CONVERSATION PRACTICE**6**

Role Play conversation - with family members, neighbours, friends, relatives etc. Simple Expressions – agreeing /disagreeing, persuading, wishing, consoling, advising, arguing, expressing opinions etc - Professional dialogues with superiors-Conversation with different professionals- Situations like - Government and Corporate Offices, Official Meetings, Educational Institutions, (At the railway junction, malls, post office, bank) etc.

UNIT II ORAL REVIEW, RADIO SHOW AND NARRATIVE TECHNIQUES**6**

Oral review of books - Presentation of various radio programs like news, announcements, advertisements, entertainment programs etc. as a team activity. Understanding the basic narrative techniques- Narrating short Stories - Narrating real life experiences-Oral interpretation of charts, tables, graphs

UNIT III RÉSUMÉ / LETTER WRITING**6**

Preparation of résumé–structure –Types of resume – writing the various statement-Objectives- Types of letter – Job Application – accepting / declining job offer

UNIT IV PRESENTATION SKILLS AND GROUP DISCUSSION**6**

Elements of effective presentation – Structure of presentation – Speech acts – effective use to Presentation tools – Audience analysis – Preparing the PPT slides - Video samples- Importance of GD – GD in selection process - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work – Body Language - Mock GD - Video samples

UNIT V INTERVIEW SKILLS**6**

Kinds of interviews – one to one, group interview, telephone interview, online interview-stress

TOTAL PERIODS**30****COURSE OUTCOMES**

At the end of this course, the students will be able to

- speak effectively and confidently in English
- attend job interview with confidence.
- write effectively job applications with resume

REFERENCES

1. Sobana.S, Manivannan.R and Immanuel. G, “Communication and Soft Skills”, VK Publications, Sivakasi. 2016.
2. Anderson, P.V. “Technical Communication”, Thomson Edition, New Delhi, 2012.
3. Rizvi, Ashraf. M. Effective Technical Communication. Tata McGraw-Hill, New Delhi, 2012
4. Kumar Sanjay, Pushp Lata, “Communication Skills (With CD)”, Oxford University Press, New Delhi. 2011

5. Dutt, Kiranmai P and Geetha Rajeevan, "Basic Communication Skills", Foundation Books, New Delhi. 2012.

WEB LINKS

1. <http://writing-program.uchicago.edu/resources/grammar.htm>
2. <http://www.grammarbook.com/>
3. <http://www.myenglishteacher.eu/blog/english-grammar-9-websites-to-learn-and-practice-english-grammar/>

SEMESTER IV

CA16401

C# and .NET FRAMEWORK

3 0 0 3

COURSE OBJECTIVES

- To learn the .NET framework concept and understand the syntax of basic C# Programs.
- To understand the C# elements and OOPS concepts
- To study the fundamentals of window application programming and how to create a window applications
- To know the web based applications and learn advanced features of C#
- To know the foundation of CLR execution.

UNIT I INTRODUCTION TO C# 8

Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

UNIT II OBJECT ORIENTED ASPECTS OF C# 9

Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

UNIT III APPLICATION DEVELOPMENT ON .NET 8

Building Windows Applications, IDE, Standard Controls, Application Model, Accessing Data with ADO.NET-ADO .NET Architecture, Automatically generating SQL Statements

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 8

Programming Web Applications with Web Forms - ASP.Net, Programming Web Services, Asynchronous Communication

UNIT V THE CLR AND THE .NET FRAMEWORK 12

Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, the students will be able to

- apply the Visual Studio .NET to implementing basic C# elements
- analysis the C# OOPS Concepts.
- explain the basic ADO.NET structures and Understand the ADO.NET database connectivity
- list the ASP.NET Programming Model and able to create ASP pages for web applications
- design the internal functions of CLR and develop Web based applications on .NET CLR

REFERENCES

1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2014. (Unit I, II)
2. J. Liberty, "Programming C#", 2nd ed., O'Reilly, 2013. (Unit III, IV, V)
3. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2014.
4. Robinson et al, "Professional C#", 2nd ed., Wrox Press, 2013.
5. Andrew Troelsen, "C# and the .NET Platform", A1 Press, 2014.

WEB LINKS

1. www.tutorialspoint.com/csharp
2. <https://mva.microsoft.com/en-us/.../c-fundamentals-for-absolute-beginners-16169>
3. <http://csharp.net-tutorials.com/>

COURSE OBJECTIVES

- To expose the students to the concepts of Data warehousing Architecture and Implementation
- To Understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence
- To study the concept of Association Rule Mining
- To introduce the concept of classification and prediction in Data Mining
- To identify Business applications and Trends of Data mining

UNIT I DATA WAREHOUSE 15

Data Warehousing-Operational Database Systems vs. Data Warehouses-Multidimensional Data Model – Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture – Indexing – OLAP queries and Tools.

UNIT II DATA MINING & DATA PREPROCESSING 15

Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Pre-processing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III ASSOCIATION RULE MINING 15

Introduction-Data Mining Functionalities-Association Rule Mining - Mining Frequent Item Sets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV CLASSIFICATION & PREDICTION 15

Classification vs. Prediction–Data preparation for Classification and Prediction – Classification by Decision Tree Introduction–Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V CLUSTERING 15

Cluster Analysis:-Types of Data in Cluster Analysis–A Categorization of Major Clustering Methods– Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

TOTAL PERIODS 75

COURSE OUTCOMES

At the end of this course, the students will be able to

- apply the Store voluminous data for online processing
- prepare the Pre-process the data for mining applications
- design the association rules for mining the data
- practice and deploy appropriate classification techniques
- list the high dimensional data for better organization of the data

REFERENCES

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2012.
2. K.P. Soman, ShyamDiwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2012.
3. G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2013.
4. BERSON, ALEX & SMITH, STEPHEN J, Data Warehousing, Data Mining, and OLAP, TMH Pub. Co. Ltd, New Delhi, 2012
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Pearson Education,2012

WEB LINKS

1. http://www.tutorialspoint.com/dwh/dwh_overview.htm
2. <http://www.dei.unipd.it/~capri/SI/MATERIALE/DWDM0405.pdf>
3. <http://www.careerride.com/Data-warehousing-data-mining.aspx>

COURSE OBJECTIVES

- To understand and practice mark-up languages
- To study the basic of CSS style sheets
- To study the fundamentals of PHP concepts
- To know the form handling using PHP concept
- To understand and basics of PYTHON concept

UNIT I MARKUP LANGUAGE 9

Introduction to HTML and HTML5-Formatting and Fonts-Commenting Code– Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms.

UNIT II STYLE SHEET 9

The need for CSS, Introduction to CSS – Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds - Manipulating text - Margins and Padding - Positioning using CSS.

UNIT III INTRODUCTION TO PHP 9

PHP Introduction-Basic Development concept-types-Variables-Constants-Expressions-Operators-Control Structures-Arrays-Function

UNIT IV HANDLING FORM & SESSION HANDLING 9

Handling form with GET and POST – Cookies – Session – Server Variables

UNIT V INTRODUCTION TO PYTHON 9

The basic elements of python-Branching Programs-Control Structures-Strings-Functions and scoping-Tuples-Lists and Dictionaries-Lists and Mutability-Functions as Objects

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, the students will be able to

- apply the functionalities of scripting language
- design mark-up languages features and create interactive web pages
- develop the client side validation using PHP scripting languages
- design the Session Handling concept
- analysis the PYTHON applications

REFERENCES

1. Harvey & Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, “Internet and World Wide Web – How to Program”, Fifth Edition, Pearson Education, 2013
2. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’Reilly, 2012
3. Wesley J. Chun, “Core Python Programming”, Prentice Hall, 2012
4. Beginning PHP5 and MySQL: From Novice to Professional, W. Jason Gilmore, 2004
5. Vikram Vaswani, “PHP and MySQL”, Tata McGraw-Hill, 2005

WEB LINKS

1. www.webbasedprogramming.com
2. <https://www.php.net>
3. <https://www.python.org>

COURSE OBJECTIVES

- To introduce the broad perspective of cloud architecture and model to understand the concept of Virtualization and design of cloud Services to be familiar with the lead players in cloud.
- To understand the features of cloud virtualization
- To study the concept of cloud infrastructure
- To introduce the concept of cloud programming model
- To acquire the knowledge of cloud computing such as security, privacy and interoperability

UNIT I CLOUD ARCHITECTURE AND MODEL 9

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IAAS, PAAS, SAAS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II VIRTUALIZATION 9

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization – Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-centre Automation.

UNIT III CLOUD INFRASTRUCTURE 9

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV PROGRAMMING MODEL 9

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

UNIT V SECURITY IN THE CLOUD 9

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

TOTAL PERIODS 45**COURSE OUTCOMES**

At the end of this course, the students will be able to

- list the strengths and limitations of cloud computing
- apply the suitable virtualization concept.
- identify the architecture, infrastructure and delivery models of cloud computing
- design the appropriate cloud player, Programming Models and approach.
- design Cloud Services and Set a private cloud

REFERENCES

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management and Security”, CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009.
4. Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India, 2011.
5. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly

WEB LINKS

1. http://en.wikipedia.org/wiki/Cloud_computing
2. http://www.tutorialspoint.com/cloud_computing/cloud_computing_architecture.htm

COURSE OBJECTIVES

- To import the cost estimation techniques during the analysis of the project
- To import web applications using C# and .NET program

LIST OF EXPERIMENTS

1. Programs using Branching, Looping.
2. Programs using Methods, Arrays, Strings.
3. Programs using Structures, Enumerations.
4. Programs using Inheritance.
5. Programs using Polymorphism.
6. Programs using Interfaces.
7. Programs using Operator overloading.
8. Programs using Delegates, Events, Errors and Exceptions.
9. Program to Build an Calculator widget
10. Programs Using Multi Module Assembly
11. Programs using application development on .net.
12. Programs using Web applications.

TOTAL PERIOD 60**COURSE OUTCOMES**

At the end of this course, the students will be able to

- design the web applications using C# and .NET framework
- list the Dynamic Application using .NET Framework

COURSE OBJECTIVES

- To understand and practice embedded dynamic scripting on client side internet programming
- To understand and practice of PHP and Python concept

LIST OF EXPERIMENTS

1. Create a web page with the following using HTML5
 - a. To embed an image map in a web page
 - b. To fix the hot spots
 - c. Show all the related information when the hot spots are clicked.
2. Create a web page with all types of Cascading style sheets.
3. Use of conditional statements in PHP
4. Use of looping statements in PHP
5. Creating different types of arrays
6. Usage of array functions
7. Creating user defined functions
8. Creating simple webpage using PHP
9. Use of conditional statements in Python
10. Use of looping statements in Python
11. Creating different types of arrays in Python
12. Usage of array functions in Python
13. Creating user defined functions in Python

TOTAL PERIODS 60**COURSE OUTCOMES**

At the end of this course, the students will be able to

- explore mark-up languages features and create interactive web pages using them
- acquire knowledge about Open source PHP and Python libraries

CA16407	TECHNICAL SEMIANR AND REPORT WRITING	0	0	4	2
COURSE OBJECTIVES					
<ul style="list-style-type: none"> To evaluate a well-defined set of research subjects. 					
<ul style="list-style-type: none"> To summarize the findings concisely in a paper of scientific quality. 					
<ul style="list-style-type: none"> To evaluate based on the ability to understand a topic. 					
LIST OF EXPERIMENTS					
1. Every student selects a topic related to current trends and the same should be approved by the respective committee. This selection should have at least 5 distinct primary sources.					
2. Every student must write a short review of the topic and present it to fellow students and faculty (discuss the topic – expose the flaws – analyze the issues) every week.					
3. The faculty should evaluate the short review and award marks with respect to the following.					
a. Has the student analyzed – not merely quoted – the most significant portions of the primary sources Employed?					
b. Has the student offered original and convincing insights?					
c. Plagiarism to be checked.					
4. Every student should re-submit and present the review article including issues/ comments/ conclusions which had arisen during the previous discussion.					
5. Every student should submit a final paper as per project specifications along with all short review reports (at least 4 internal reviews) and corresponding evaluation comments.					
6. Every student should appear for a final external review exam to defend themselves.					
TOTAL PERIODS					60

COURSE OUTCOMES

At the end of the course the students will be able to

- practice the students to critically evaluate a well-defined set of research subjects
- practice the findings concisely in a paper of scientific quality
- practice evaluate based on the ability to understand a topic

COURSE OBJECTIVES

- To expose the communication media etiquette.
- To understand the interview skills
- To understand the concept of quantitative aptitude skills.
- To know the logical reasoning skills.
- To identify the verbal reasoning skills.

UNIT I CORPORATE READINESS 6

Business Communication–Inter and Intra Personal Skills–Business Etiquettes – Corporate Ethics – Communication Media Etiquette

UNIT II INTERVIEW SKILLS 6

Resume Building – Group Discussions – Presentation Skills – Entrepreneur Skills – Psychometric Assessment – Mock Interview

UNIT III QUANTITATIVE APTITUDE (QA) 2 6

Profit & Loss–Clock–Power and Square Roots – Train – Boats & Streams – Probability – Calendars – Permutations and Combinations - Partnership – Simplification – Pipes & Cisterns – Puzzles

UNIT IV LOGICAL REASONING (LR) 2 6

Statements and Assumptions – Matching Definitions – Logical Games – Making Judgments – Statements & Conclusions – Verbal Classifications

UNIT V VERBAL REASONING (VR) 2 6

Syllogisms – Data Sufficiency – Dice – Series Completion – Character Puzzles – Cube & Cuboid – Arithmetic Reasoning

TOTAL PERIODS 30

COURSE OUTCOMES

At the end of the course the students will be able to

- speak effectively in english in all occasions
- face the interview process with confidence and perform better
- practice the placement Interviews
- practice the group discussions
- practice the communication skills

ELECTIVE I

CA16151

FINANCIAL ACCOUNTING

3 0 0 3

COURSE OBJECTIVES

- To understand an overview of accounting concepts.
- To know the basics ratio analysis
- To understand the knowledge in funds flow statement in accounting
- To develop budget and budgetary control concept
- To understand and practice of costing concept

UNIT I ACCOUNTING 9

Definition, Objectives, Advantages, Accounting Concepts, Accounting- Conventions. Methods of Accounting – Single Entry and Double Entry System. – Journal and Ledger – Preparation of Trial Balance.-Final Accounts: Trading and Profit and Loss Account and Balance Sheet of Sole- Proprietary Concern.

UNIT II RATIO ANALYSIS 9

Meaning – Advantages – Limitations – Classification of Ratio : Profitability, Turnover and Solvency Ratios.

UNIT III FUNDS FLOW STATEMENT 9

Concept of Funds – Funds flow Statement – Uses and Limitations – Preparation of Fund Flow Statement - Cash Flow Statement

UNIT IV BUDGET AND BUDGETARY CONTROL 9

Meaning and Definition - Objectives of Budgetary - Control, Advantages and Limitations Preparation of Different Types of Budgets.

UNIT V COSTING 9

Definition, Nature and Importance Advantages and Limitations of Cost Accounting – Classifications of Cost – Preparation of Cost Sheet- Marginal Costing: Meaning, Advantages Cost – Volume Profit Analysis – Break Even Analysis – Uses and Assumptions – Applications of Marginal Costing.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, the students will be able to

- apply the overview of accounting concepts.
- explain the basics ratio analysis concept
- develop and understand the funds flow statement
- analysis knowledge in budget and budgetary control
- apply the concept of costing

REFERENCES

1. Decenzo and Robbins, financial Accounting, Wilsey, 10th edition, 2012.
2. Mamoria C.B. and Mamoria. S., Personnel Management, Himalaya Publishing Company, 1997.
3. Mirza S. Saiyadain Ration Analysis , Tata McGraw Hill , 4th edition 2009.
4. Eugence Mckenna and Nic Beach Budget and Budgetary Control, Pearson Education Limited, 2002.

5. Dessler, Accounting and Costing, Pearson Education Limited, 2002

WEB LINKS

1. <http://courses.acs.uwinnipeg.ca/3909-050/lectures/Week01.pdf>
2. <http://handbook.uts.edu.au/subjects/31242.html>
3. <http://studentsblog100.blogspot.in/2015/05/internet-programming-syllabus-5th-sem-cse-reg-2013.html>

COURSE OBJECTIVES

- To understand the basics of cryptography
- To study the vulnerabilities in programs and to overcome them
- To learn the different kinds of security threats in networks and its solution
- To acquire the knowledge the different kinds of security threats in databases
- To learn about the models and standards for security.

UNIT I ELEMENTARY CRYPTOGRAPHY 9

Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms- Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption – Cryptographic Hash Functions – Key Exchange – Digital Signatures – Certificates.

UNIT II PROGRAM SECURITY 9

Secure programs – Non-malicious Program Errors – Viruses – Targeted Malicious code – Controls Against Program Threat – Control of Access to General Objects – User Authentication – Good Coding Practices – Open Web Application Security Project Flaws – Common Weakness Enumeration Most Dangerous Software Errors

UNIT III SECURITY IN NETWORKS 9

Threats in networks – Encryption – Virtual Private Networks – PKI – SSH – SSL – IPSec – Content Integrity – Access Controls – Wireless Security – Honeypots – Traffic Flow Security – Firewalls – Intrusion Detection Systems – Secure e-mail.

UNIT IV SECURITY IN DATABASES 9

Security requirements of database systems – Reliability and Integrity in databases –Redundancy – Recovery – Concurrency/ Consistency – Monitors – Sensitive Data – Types of disclosures – Inference-finding and confirming SQL injection

UNIT V SECURITY MODELS AND STANDARDS 9

Secure SDLC – Secure Application Testing – Security architecture models – Trusted Computing Base – Bell-LaPadula Confidentiality Model – Biba Integrity Model – Graham-Denning Access Control Model – Harrison - Ruzzo-Ulman Model – Secure Frameworks – COSO – CobiT – Compliances – PCI DSS – Security Standards - ISO 27000 family of standards – NIST.

TOTAL PERIODS 45**COURSE OUTCOMES**

At the end of this course, the students will be able to

- apply cryptographic algorithms for encrypting and decryption for secure data transmission.
- analysis the importance of Program Security
- list the security in networks
- get the knowledge about the security services available for internet and web applications
- apply the data vulnerability and SQL injection

REFERENCES

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson Education, 2007.
2. Michael Whitman, Herbert J. Mattord, "Management of Information Security", Third Edition, Course Technology, 2010.
3. William Stallings, "Cryptography and Network Security : Principles and Practices", Fifth Edition, Prentice Hall, 2010.
4. Michael Howard, David LeBlanc, John Viega, "24 Deadly Sins of Software Security: Programming Flaws and How to Fix Them", First Edition, McGrawHill Osborne Media, 2009.
5. Matt Bishop, "Computer Security: Art and Science", First Edition, Addison-wesley

WEB LINKS

1. https://www.owasp.org/index.php/Top_10_2010
2. https://www.pcisecuritystandards.org/security_standards/pci_dss.shtml

COURSE OBJECTIVES

- To understand the fundamentals of networking standards and protocols
- To know the knowledge of routing protocols
- To learn the gaming engine design
- To understand the security and telephony protocol
- To learn the network environment and protocols

UNIT I FUNDAMENTALS OF NETWORKING STANDARDS AND PROTOCOLS 9

Network Communication Architecture and Protocols - OSI Network Architecture seven Layers Model - Definition and Overview of TCP/IP Protocols -TCP/IP Four Layers Architecture Model - Other Network Architecture Models: IBM SNA.

UNIT II ROUTED AND ROUTING PROTOCOLS 9

Application Layer Protocols-Presentation Layer Protocols- Session Layer Protocols – Transport Layer Protocols - Network Layer Protocols - Data Link Layer Protocols - Routing Protocols - Multicasting Protocols - MPLS.

UNIT III GAMING ENGINE DESIGN 9

Overview of ISDN – Channels – User access – Protocols Network management requirements – Network monitoring – Network control – SNMP V₁, V₂ and V₃ – Concepts, MIBs – Implementation issues-RMON.

UNIT IV SECURITY AND TELEPHONY PROTOCOLS 9

Network Security Technologies and Protocols - AAA Protocols - Tunneling Protocols – Security Protocols- Private key encryption – Data encryption system, public key encryption – RSA – Elliptic curve cryptography–Authentication mechanisms– Web security -Secured Routing Protocols - IP telephony -Voice over IP and VOIP Protocols –Signaling Protocols- Media/CODEC.

UNIT V NETWORK ENVIRONMENTS AND PROTOCOLS 9

Wide Area Network and WAN Protocols - Frame relay - ATM - Broadband Access Protocols –PPP Protocols - Local Area Network and LAN Protocols - Ethernet Protocols - Virtual LAN Protocols -Wireless LAN Protocols - Metropolitan Area Network and MAN Protocol - Storage Area Network and SAN Protocols.

TOTAL PERIODS 45**COURSE OUTCOMES**

At the end of this course, the students will be able to

- analysis Ability to study, analyze and design seven layers of protocols of wired and wireless networks.
- design Cloud Services and Set a private cloud
- design ISDN and Network Protocols
- implement the broadband access protocol
- apply the Network Environment in Network Protocol

REFERENCES

1. Javvin, “Network Protocols” , Javvin Technologies Inc , second edition, 2005
2. William Stallings, “Cryptography and Network Security”, PHI, 2000.
3. Mani Subramanian, “Network Management–Principles and Practices”, Addison Wesley, 2000

4. William Stallings, “SNMP, SNMPV2, SNMPV3 and RMON1 and 2”, 3rd Edition, Addison Wesley, 1999
5. William Stallings, “Data and Computer Communications” 5th Edition, PHI, 1997.

WEB LINKS

1. <http://www.ciscopress.com/articles/article.asp?p=2180210&seqNum=7>
2. <http://www.networkworld.com/article/2289123/lan-wan/telephony-protocols.html>

COURSE OBJECTIVES

- To understand an overview of software testing concepts.
- To know the basics analysis of activity planning
- To understand the knowledge of RISK management
- To develop the software configuration management
- To know the practice of software quality assurance

UNIT I INTRODUCTION**9**

Software Projects various other types of projects - Problems with software projects - an overview of project-planning - Project evaluation - Project Analysis and technical planning - Project estimates - Preparation of Estimates - COCOMO model - Function Point Analysis - Putnam Model - Non-development overheads.

UNIT II ACTIVITY PLANNING**9**

Project schedules - Sequencing and scheduling projects - Network planning models - Shortening project duration Identifying critical activities.

UNIT III RISK MANAGEMENT**9**

Resource allocation - Monitoring and Control - Managing people and organizing teams - Planning for small projects- Handling large projects - Divide and Conquer - Software Project survival.

UNIT IV SOFTWARE CONFIGURATION MANAGEMENT**9**

Basic functions, responsibilities, standards, configuration Management, Prototyping - Models of prototyping.

UNIT V SOFTWARE QUALITY ASSURANCE**9**

Quality and the quality system - standards and procedures - Technical activities – components - Continuous Improvement - Software Tasks - Management responsibility - Quality System - Contract Review – Document Control - Product identification and trace ability.

TOTAL PERIODS 45**COURSE OUTCOMES**

At the end of this course, the students will be able to

- apply the overview of software testing concepts.
- explore the basics activity planning concept
- analysis the RISK management concept
- design the acquire knowledge in software configuration management control
- understand the software quality assurance

REFERENCES

1. Mike Cotterell and Bob Hughes, “Software Project Management - Inclination”, Tata McGraw Hill, 2006.
2. Robert K. Wysocki, Robert Beck Jr and David B. Crane, “Effective Project Management”, John Wiley & Sons Inc, 2002.
3. Steve McConnell, “Software Project Survival Guide”, Microsoft Press, 2000.

4. Gerald M. Weinberg, "Quality Software Management", Volume I, Systems Thinking, Dorset House Publishing, 2002
5. Gerald M. Weinberg, "Quality Software Management", Volume II, First Order Measurement, Dorset House Publishing, 2002.

WEB LINKS

1. <http://courses.acs.uwinnipeg.ca/3909-050/lectures/Week01.pdf>
2. <http://handbook.uts.edu.au/subjects/31242.html>
3. <http://studentsblog100.blogspot.in/2015/05/linux-programming-syllabus-5th-sem-cse-reg-2013.html>

COURSE OBJECTIVES

- To understand the concepts of game design and development.
- To learn the processes, mechanics and issues in game design.
- To be exposed to the core architectures of game programming.
- To know about game programming platforms, frameworks and engines.
- To learn to develop games.

UNIT I 3D GRAPHICS FOR GAME PROGRAMMING 9

3D Transformations, Quaternions, 3D Modeling and Rendering, Ray Tracing, Shader Models, Lighting, Color, Texturing, Camera and Projections, Culling and Clipping, Character Animation, Physics-based Simulation, Scene Graphs.

UNIT II GAME ENGINE DESIGN 9

Game engine architecture, Engine support systems, Resources and File systems, Game loop and real-time simulation, Human Interface devices, Collision and rigid body dynamics, Game profiling.

UNIT III GAME PROGRAMMING 9

Application layer, Game logic, Game views, managing memory, controlling the main loop, loading and caching game data, User Interface management, Game event management.

UNIT IV NG PLATFORMS AND FRAMEWORKS 9

2D and 3D Game development using Flash, DirectX, Java, Python, Game engines – DX Studio, Unity.

UNIT V GAME DEVELOPMENT 9

Developing 2D and 3D interactive games using DirectX or Python – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, the students will be able to

- discuss the concepts of Game design and development.
- design the processes, and use mechanics for game development.
- explain the Core architectures of Game Programming.
- use Game programming platforms, frameworks and engines.
- create interactive Games.

REFERENCES

1. Mike Mc Shaffrly and David Graham, "Game Coding Complete", Fourth Edition, Cengage Learning, PTR, 2012
2. Jason Gregory, "Game Engine Architecture", CRC Press / A K Peters, 2009.
3. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", 2nd Edition Prentice Hall / New Riders 2009.
4. Eric Lengyel, "Mathematics for 3D Game Programming and Computer Graphics", 3rd Edition, Course Technology PTR, 2011

5. Jesse Schell, The Art of Game Design: A book of lenses, 1st Edition, CRC Press, 2008.

WEB LINKS

1. <http://courses.acs.uwinnipeg.ca/3909-050/lectures/Week01.pdf>
2. <http://handbook.uts.edu.au/subjects/31242.html>
3. <http://studentsblog100.blogspot.in/2015/05/linux-programming-syllabus-5th-sem-cse-reg-2013.html>

COURSE OBJECTIVES

- To learn the modeling and design of databases.
- To acquire knowledge on parallel and distributed databases and its applications.
- To study the usage and applications of object oriented database
- To understand the principles of intelligent databases.
- To understand the usage of advanced data models.

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems- Distributed Database Concepts – Distributed Data Storage–Distributed Transactions–Commit Protocols – Concurrency Control – Distributed Query Processing – Case Studies

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES 9

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL –OQL – Object Relational and Extended – Relational Systems: Object Relational features in SQL/Oracle – Case Studies.

UNIT III INTELLIGENT DATABASES 9

Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications- Design Principles for Active Rules- Temporal Databases: Overview of Temporal Databases- TSQL2- Deductive Databases: Logic of Query Languages – Datalog- Recursive Rules-Syntax and Semantics of Datalog Languages- Implementation of Rules and Recursion- Recursive Queries in SQL- Spatial Databases- Spatial Data Types- Spatial Relationships - Spatial Data Structures- Spatial Access Methods- Spatial DB Implementation.

UNIT IV ADVANCED DATA MODELS 9

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management – Location Dependent Data Distribution - Mobile Transaction Models -Concurrency Control - Transaction Commit Protocols - Multimedia Databases- Information Retrieval- Data warehousing- Data Mining- Text Mining.

UNIT V EMERGING TECHNOLOGIES 9

XML Databases: XML-Related Technologies-XML Schema- XML Query Languages-Storing XML in Databases -XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems- Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures- Cloud Data Models- Query Languages- Introduction to Big Data-Storage-Analysis.

TOTAL PERIODS 45**COURSE OUTCOMES**

At the end of this course, the students will be able to

- select the appropriate high performance database like parallel and distributed database
- model and represent the real world data using object oriented database

- design a semantic based database to meaningful data access
- embed the rule set in the database to implement intelligent databases
- represent the data using XML database for better interoperability

REFERENCES

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/ Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.
3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", Fifth Edition, McGraw Hill, 2006.
4. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
5. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, 3rd Edition 2004.

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