

Shivaji University, Kolhapur.



**Revised Syllabus and Structure of
B. E. Part-I & II
(Information Technology)
Semester VII and VIII
(w. e. f. Academic Year 2016-17)**

SHIVAJI UNIVERSITY, KOLHAPUR

(To be implemented from Academic Year 2016-17)

Class: BE Part - I (Semester VII)

Branch: Information Technology

Sr. No.	Name of Subject	Teaching Scheme Per Week				Examination Scheme					
		L	T	P	Total	Theory Paper		T/W	OE	POE	Total
						Written	Online				
1.	Project Management	3	1	-	4	100	-	25	-	-	125
2.	Mobile Computing	3	1	-	4	100	-	25	-	-	125
3.	Advance Database Systems	3	-	2	5	100	-	25	-	50	175
4.	Elective-I	3	-	-	3	100	-	-	-	-	100
5.	Web Technology-I	2	-	4	6	-	-	50	-	50	100
6.	Mobile Application Development	2	-	2	4	-	-	50	-	-	50
7.	Project-I	-	-	2	2	-	-	50	75	-	125
Total		16	2	10	28	400	-	225	75	100	800

Class: BE Part - II (Semester VIII)

Branch: Information Technology

Sr. No.	Name of Subject	Teaching Scheme Per Week				Examination Scheme					
		L	T	P	Total	Theory Paper		T/W	OE	POE	Total
						Written	Online				
1.	Storage Networks	3	1	-	4	100	-	25	-	-	125
2.	Cloud Computing	3	1	-	4	100	-	25	-	-	125
3.	Information Technology and Business Methodology	3	1	-	4	100	-	25	-	-	125
4.	Elective-II	3	-	-	3	100	-	-	-	-	100
5.	Web Technology-II	2	-	4	6	-	-	50	-	50	100
6.	Advanced Software Technologies	3	-	2	5	-	-	50	-	50	100
7.	Project-II	-	-	4	4	-	-	50	75	-	125
Total		17	3	10	30	400	-	225	75	100	800

Elective I: BE Part - I (Semester VII)

1. Real Time Systems
2. Internet of Things
3. Data Mining
4. Mainframe System

Elective II: BE Part - II (Semester VIII)

1. Business Intelligent System
2. BigData and Hadoop
3. Service Oriented Architecture
4. Information Retrieval

Note:

1. The term work as prescribed in the syllabus is to be periodically and jointly assessed by a team of teachers from the concerned department.
2. In case of tutorials, students of different batches be assigned problems of different types and be guided for the solution of the problem during tutorial session. Problems thus solved be translated into computer programs wherever applicable and executed by respective batches during practical session.
3. The assignments of tutorials and practicals need to be submitted in the form of soft copy and or written journal.
4. Breakup of term work marks shall be as follows:
 - Mid-semester test – 5 marks.
 - End-semester test – 5 marks.
 - Tutorial assignments and / or practical performance – 15 marks.
5. Project work should be continually evaluated based on
 - a. The contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
 - b. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
 - c. **Care should be taken to avoid copying and outsourcing of the project work.**
6. In addition to the above list of electives, any other elective based on the current developments and need may be offered with prior sanction from the University Authorities.
7. The elective should be offered by the department, if the minimum number of students opting for a particular elective must be 15 students and it should be taught by the concerned teacher.

[Note: - Examination scheme and term work marks strictly as per above structure]

B. E. Information Technology Semester-VII (Revised)

1. Project Management

Lecture: 3 hrs /week

Theory: 100 marks

Tutorial: 1 hr/week

Term Work: 25 marks

Prerequisites:

1. Fundamentals of Economics and Management
2. Software Engineering
3. Software Testing and Quality Assurance

Course Objectives: This course aims at giving students fundamental knowledge about Project Management and the processes in Project Management

1. Understand the fundamental concepts of project management
2. Understand the nine project management knowledge areas
3. Understand the processes in the knowledge areas and inter dependencies between them
4. Understand the documents required for actual projects
5. Understand the commonly used tools and techniques for project management

Syllabus:

Unit 1: Introduction to Project Management (6)

Project, project management(PM), role of project manager, project management profession, system view of PM, organization, stakeholders, project phases and lifecycle, context of IT projects, process groups, mapping process groups to knowledge areas.

Unit 2: Project Integration and Scope Management (8)

Strategic planning and project selection, preliminary scope statements, project management plans, project execution, monitoring and controlling project work, integrated change control, closing project, software assistance scope planning and scope management plan, scope definition and project scope statement, creating the work breakdown structure, scope verification and control, software assistance.

Unit 3: Project Time and Cost Management (6)

Importance of project schedules, activity - definition, sequencing, resource estimating, duration estimating; schedule development and control, software assistance Importance, basic principles, cost estimating, budgeting and control, software assistance

Unit 4: Project Quality and Human Resource Management (8)

Importance, quality – planning, assurance and control, tools and techniques, modern quality management and improving IT project quality, software assistance

Importance, keys to managing people, human resource planning, acquiring, developing and managing project team, software assistance

Unit 5: Project Communication and Risk Management (8)

Importance, communication planning, information distribution, performance reporting, managing stakeholders, suggestions for improving project communication, software assistance

Importance, risk management planning, sources of risk, risk identification, qualitative and quantitative risk analysis, risk response planning, risk monitoring and control, software assistance

Unit 6: Project Procurement Management (4)

Importance, planning purchases and acquisitions, planning contracting, requesting seller responses, selecting sellers, administering the contract, closing the contract, software assistance

Text Books:

1. Information Technology Project Management (4th Edition) – Kathy Schwalbe, (Cengage Learning – India Edition)

Reference Books:

1. Project Management Core Textbook – Mantel Jr., Meredith, Shafer, Sutton with Gopalan (Wiley India Edition)
2. A Guide to the Project Management Body of Knowledge (Third Edition)- Newtown Square, PA, Project Management Institute, 2005
3. Effective Project Management: Traditional, Agile, Extreme – Robert K Wyosaki (Seventh Edition) Wiley India

Term Work:

Tutorial work to be considered for awarding of term work marks.

Guidelines for tutorials

Divide the batches into groups as per BE Project batches and ask them to complete tutorials based on your final year project using any of the open source project management tool or Microsoft Project Management 2010 or above trial version available. 8-10 tutorials from the sample list below should be allocated to the project groups. Faculty will evaluate the performance of the students in the tutorials and assign the term work marks

1. Survey of common project management tools and techniques by knowledge area and write a report on same.
2. Develop the project charter for project
3. Collect requirement using different techniques and develop scope of selected project
4. Creating WBS structure of selected project using different approaches
5. Develop project schedule network diagram for project
6. Develop entire schedule of project by estimating activity resources and duration
7. Problems on network diagram and critical path methods
8. Prepare the cost estimate by using any of the cost estimate types
9. Develop the project quality document
10. List and analysis different types of tools and techniques for quality control
11. Application of motivational theories to the group of students to study psychology of students
12. Develop communication management plan for selected project
13. Identify risk involved in project and prepare risk document
14. Develop the SOW (Statement of work) for the procurement of selected project.

2. Mobile Computing

Lecture: 3 hrs/week

Theory: 100 marks

Tutorial: 1 hr /week

Term Work: 25 marks

Prerequisites:

1. Data Communication
2. Computer Networks

Course Objectives: This course aims at giving students knowledge of Mobile Computing along with its applications in terms of the following

1. Define Mobile Computing , study its applications and look at current trends
2. Distinguish between different types of Mobility.
3. Analyze the performance of MAC protocols used for wired network and wireless networks.
4. Explore Theory and Research areas related to Mobile Computing
5. Acquire solid knowledge about mobile networks and mobile computing.

Syllabus:

Unit 1: Introduction to wireless communication (3)

Need and Application of wireless communication. Wireless Data Technologies Market for mobile.

Unit 2: Wireless transmission and Medium access Control (7)

Frequency for radio transmission signal antennas, signal propagation Multiplexing Modulation, Spread and Cellular systems.

Medium access control: Specialized MAC, SDMA, FDMA, TDMA & CDMA.

Unit 3: Telecommunications systems (7)

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services. UMTS and IMT-2000: UMTS releases and standardization, UMTS system architecture.

Unit 4: Wireless LAN (6)

Introduction, Infrared v/s Radio transmission, Infrastructure and ad-hoc Network, IEEE 802.11, Blue Tooth.

Unit 5: Mobile Network Layer and Transport Layer (6)

Mobile IP, DHCP, Mobile ad-hoc networks, Traditional TCP, Classical TCP improvements, TCP over 2.5/3G wireless networks.

Unit 6: Wireless application protocol

(7)

Architecture, Wireless datagram protocol, Wireless transport layer, security Wireless transaction protocol, Wireless session protocol, Wireless application environment , Wireless markup language, WMLScript, Mobile communications, Wireless telephony application, Push architecture, Push/pull services, Example stacks with WAP 1.x 429

Text Books:

1. Mobile Communications - Jochen Schiller - 2nd edition, Publication-Pearson Education.

Reference books:

1. Introduction to Wireless Telecommunications systems and Networks - Gary J. Mulett. Publications- Cengage Learning (India Edition).
2. Mobile Computing – Ashok K Talukdar, Roopa R Yavagal, Publication-TATA McGRAW HILL

Term work:

Tutorial work to be considered for awarding term work marks. It should consist of 8-10 assignments based on above topics.

3. Advanced Database Systems

Lectures: 3 hrs/Week

Practical: 2 hrs/Week

Theory: 100 Marks

Term work: 25 Marks

POE: 50 Marks

Prerequisites:

1. Database Engineering

Course Objectives:

1. Introduce the basics of query optimization and its cost estimation.
2. Understand the different types of database systems and their silent features.
3. Understand the concept of data warehousing.
4. Understand the concept of data mining and Web mining.

Syllabus:

Unit 1: Query Processing and Optimization (6)

Overview, Catalog Information for cost estimation, Measures of Query cost, Selection operation, Sorting, Join operation, Selection size estimation, Join size estimation, Transformation of relational expression.

Unit 2: Object Relational Databases (5)

Motivating example, Structured data types, Operations on structured data, Encapsulation and ADTs, Inheritance, Objects, OIDS and Reference types, Database design for an ORDBMS, Object identity, Nested collections, Storage and access methods, Query processing and optimization, Comparison of RDBMS and ORDBMS.

Unit 3: Parallel and Distributed Databases (8)

Architectures for parallel databases, Parallel query evaluation, Parallelizing individual operations, Parallel query optimization, Introduction to Distributed DBMS, Distributed DBMS architectures, Storing data in distributed DBMS, Distributed catalog management, Distributed query processing, Updating distributed data, Distributed concurrency control, Distributed recovery.

Unit 4: Decision Support (5)

Introduction to decision support, Data Warehousing, OLAP, Implementation Techniques for OLAP, Views and decision support, View materialization, Maintaining materialized views.

Unit 5: Data Mining and Information Retrieval (9)

Introduction, Counting Co-occurrences, Mining for rules, Tree structured rules, Clustering: K-means algorithm and BIRCH algorithm, Similarity search over sequences, Introduction to Information Retrieval: Vector space model, TF/IDF weighting of terms, indexing for text search, Web Mining: Web content mining- Crawlers, Web structure mining- PageRank and HITS algorithm & Web usage mining (only introduction).

Unit 6: Advanced Transaction Processing

(5)

Transaction-processing monitors, transactional workflows, main-memory databases, real-time transaction systems, long-duration transactions, transaction management in multi-databases.

Text Books:

1. Database System Concepts – Silberschatz, Korth, Sudarshan, 4th edition onwards [McGraw Hill] – Unit No. 1, 6.
2. Database Management Systems - Raghu Ram Krishnan, 3rd edition [McGraw Hill] Unit No. 2, 3, 4, 5.
3. Data Mining – Introductory & Advanced Topics -M. H. Dunham [Pearson Education] Unit No. 5 (For Web Mining)

Reference Books:

1. Fundamentals of Database Systems -Elmasri and Navathe, 5th edition [Pearson Education]
2. Database Systems – A Practical Approach to Design, Implementation and Management- Thomas Conolly, Carolyn Begg, Fourth Edition [Pearson].
3. Decision Support and Data Warehouse Systems -Mallach [TMH]
4. Data Mining Techniques- Linoff, Berry, 3rd edition [WILEY].

Term work:

It should consist of minimum 10 to 12 experiments based on the syllabus and experiment list mentioned below should be implemented using JAVA and any RDBMS like ORACLE / MySQL /IBM-DB2 / MSSQL SERVER , etc.

1. Implement merge join.
2. Implement hash join.
3. Create structured data types of ORDBMS and perform operations- create table using structured data types, insert data and solve queries.
4. Implement parallel joins, sorting and aggregates.
5. Implement vertical and horizontal fragmentation in distributed DBMS.
6. Implement semi join in distributed DBMS.
7. Implement bloom join in distributed DBMS.
8. Implement two phase commit in distributed DBMS.
9. Implementation of concurrency control in distributed DBMS.
10. Implementation of OLAP queries.
11. Implementation of cube operator in OLAP queries in data warehousing and decision support System.
12. Implement bitmap indexes.
13. Implement Apriori algorithm in data mining.
14. Implement K-Means clustering algorithm.
15. Implement Decision Tree of Data Mining problem.
16. Installation & Configuration - Case Study of IBM-DB2 database/MS-SQL server/Oracle/MySQL or any open source RDBMS

4. Elective-I

A) Real Time System

Lectures: 3 hrs/week

Theory: 100 marks

Prerequisites:

1. Operating System-I
2. Operating System-II

Course Objectives: This course aims at giving students a knowledge of real time operating systems along with its applications in terms of the following

1. Understanding of real time basic concepts and hardware requirements
2. An ability to specify and design real time systems
3. Understanding of real time kernels, inter-task communication and synchronization
4. Understanding of memory management in real time systems
5. Ability to analyze and optimize the system performance
6. Understanding of real time system reliability, testing and fault tolerance

Syllabus:

Unit 1: Basic Real- Time Concepts and Hardware Consideration (4)

Terminology, Real Time Design Issues, Examples of Real –Time Systems, Brief History, Basic Architecture, Hardware Interfacing, CPU, Memory and I/O

Unit 2: Real Time specification and Design Techniques (9)

Natural Languages, Mathematical Specification, Flowcharts, Structure Charts, Pseudocode and Programming Design Languages, Finite State Automata, Data Flow Diagram, Petrinets, Warnier–Orr Notation, State Charts

Unit 3: Real Time Operating Systems (7)

Pseudo kernels, Interrupt–Driven System, Preemptive Priority System, Hybrid System, Task Control Block Model, Process Scheduling, Round Robin Scheduling, Cyclic Executives, Fixed Priority and Dynamic Priority Scheduling, Buffering Data, Mailboxes, Critical Regions, Semaphores, Event Flags and Signals, Deadlock

Unit 4: Memory management (7)

Process Stack Management, Run Time Ring Buffer, Maximum Stack Size, Multiple Stack Arrangement, Memory Management in Task Control Block Model, Swapping, Overlays, Block or Page Management, Replacement Algorithms, Memory Locking, Working Set, Real Time Garbage Collection, Contiguous File System, Selecting Real Time Kernels

Unit 5: System Performance Analysis and Optimization

(5)

Response-Time Calculation, Interrupt Latency, Time-Loading and its Measurement, Reducing Response Times and Time-loading, Analysis of Memory Requirements, Reducing Memory Loading, I/O Performance.

Unit 6: Reliability, Testing & Fault Tolerance

(6)

Faults, Failures, Bugs and Effects, Reliability, Testing, Fault Tolerance, Real time applications

Text Books:

1. Real Time Systems Design & Analysis – An Engineer’s Handbook , second edition - P. A. Laplante [PHI] (Unit no. 2,5,6)
2. Real Time Systems Design and analysis – Phillip A. Laplante, Third edition (Wiley Publication) (Unit no. 1, 3, 4)

Reference Books:

1. Real Time Systems – C. M. Krishna, K. G. Shin [McGraw Hill]
2. Real-Time Systems and their Programming Languages - Burns, Alan and Andy Wellings (New York: Addison-Wesley)
3. The Design of Real-Time Applications - M. Blackman (New York: John Wiley & Sons)
4. Embedded and Real Time System-concepts, Design & Programming (Black Book by Dr. K.V. K. Prasad)

4. Elective-I

B) Internet of Things

Lectures: 3 hrs/week

Theory: 100 marks

Prerequisites:

1. Data Communication
2. Computer Networks

Course Objectives:

1. To learn Internet of Things Technology
2. To get basic knowledge of RFID, sensor and GPS technologies
3. To make students aware of wireless technologies, IoT applications.

Syllabus:

Unit 1: Introduction (6)

What is the Internet of Things? : History of IoT, About objects/things in the IoT, Overview and motivations, Examples of applications, IoT definitions, IoT Frame work, General observations, ITU-T views, working definitions, Basic nodal capabilities.

Unit 2: Fundamental IoT Mechanisms & Key Technologies (6)

Identification of IoT objects and services, Structural aspects of the IoT, Environment Characteristics, Traffic characteristics ,scalability, Interoperability, Security and Privacy, Open architecture, Key IoT Technologies ,Device Intelligence, Communication capabilities, Mobility support ,Device Power, Sensor Technology, RFID technology, Satellite Technology.

Unit 3: Radio Frequency Identification Technology and Wireless Sensor Networks (6)

Introduction, Principles of RFID, Components of an RFID system, Reader, RFID tags, RFID middleware, Issue.

Wireless Sensor Networks: History and context, the node, connecting nodes, networking nodes, securing communication.

Unit 4: Wireless Technologies for IoT: Layer ½ Connectivity (6)

WPAN Technologies for IoT/M2M, Zigbee /IEEE 802.15.4, Radio Frequency for consumer Electronics (RF4CE), Bluetooth and its low-energy profile , IEEE 802.15.6 WBANS, IEEE 802.15 WPAN TG4j,MBANS,NFC,dedicated short range communication(DSRC) & related protocols. Comparison of WPAN technologies cellular & mobile network technologies for IoT/M2M.

Unit 5: Governance of the Internet of Things (8)

Introduction, Notion of governance, aspects of governance, Aspects of governance Bodies subject to governing principles, private organizations, International regulation and supervisor, substantive principles for IoT governance, Legitimacy and inclusion of stakeholders, transparency, accountability. IoT infrastructure governance, robustness, availability, reliability, interoperability, access. Future governance issues, practical implications, legal implications.

Unit 6: Internet of Things Application Examples (8)

Smart Metering, advanced metering infrastructure, e-Health/Body area network, City automation, automotive applications. Home automation, smart cards, tracking, over-the-air passive surveillance/Ring of steel, Control application examples.

Text Books:

1. The Internet of Things: Connecting Objects to the Web, Hakima Chaouchi, Wiley Publications (Unit:1,3,5,6)
2. Building the Internet of Things with IPv6 and MIPv6 The Evolving World of M2M Communications, Daniel Minoli, Wiley Publications (Unit :2,4)

Reference Books:

1. Architecting the Internet of Things, Bernd Scholz-Reiter, Florian Michahelles, ISBN 978-3842-19156-5, Springer.
2. The Internet of Things' Key Applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi., ISBN 978-1-119-99435-0, Wiley Publications.

4. Elective-I

C) Data Mining

Lectures: 3 hrs/week

Theory: 100 marks

Course Objectives: This course aims at giving students knowledge of Cloud computing along with its applications in terms of the following

1. Understanding basic data mining tasks
2. Understanding basic data mining techniques
3. Understanding basics of weka tool
4. Understanding the basics of web mining

Syllabus:

Unit 1: Introduction (6)

Basic data mining tasks, Classification, Regression, Time Series Analysis, Prediction, Clustering, Summarization, Association Rules, Sequence Discovery, Data Mining Versus Knowledge Discovery in Database, The Development of Data Mining, Data Mining Issues, Data Mining Metrics, Social Implications of Data Mining, Data Mining from a Database Perspective

Unit 2: Data Mining Techniques (6)

Introduction, A Statistical Perspective on Data Mining, Point Estimation, Models Based on Summarization, Bayes Theorem, Hypothesis testing, Regression and Correlation, Similarity Measures, Decision Trees

Unit 3: Classification (8)

Introduction, Issues in Classification, Statistical Based Algorithms, Regression, Bayesian Classification, Distance Based Algorithms, Simple Approach, K Nearest Neighbors, Decision Tree Based Algorithms, ID3, C4.5, CART, Scalable DT Techniques, Rule Based Algorithms, Generating Rules from a DT, Generating Rules from Neural Networks, Generating Rules without a DT or NN, Combining Techniques

Unit 4: Clustering (7)

Introduction, Similarity and Distance Measures, Outliers, Hierarchical Algorithms, Agglomerative Algorithms, Divisive Clustering, Partitional Algorithms, Minimum Spanning Tree, Squared Error Clustering Algorithm, K-Means Clustering, Nearest Neighbor Algorithm, PAM Algorithm, Bond Energy Algorithm, Clustering Large Database, BIRCH, DBSCAN, CURE Algorithm, Clustering with Categorical Attributes, Comparison

Unit 5: Association Rules (8)

Introduction, Large Item sets, Basic Algorithms, Apriori Algorithm, Sampling Algorithm, Partitioning, Parallel and Distributed Algorithm, Data Parallelism, Task Parallelism, Comparing Approaches, Incremental Rules, Advanced, Association Rule Techniques, Generalized

Association Rules, Multiple Level Association Rules, Quantitative Association Rules, Using Multiple Minimum Supports, Correlation Rules, Measuring the Quantity of the Rules , Introduction to Weka, What's in Weka?, How Do You Use It?, What Else Can You Do?, How Do You Get It?

Unit 6: Web Mining

(4)

Introduction, Web Content Mining, Web Structure Mining, Page Rank, Clever, Web Usage Mining, Preprocessing, Data Structures, Pattern Discovery, Pattern Analysis

Text Books:

1. Data Mining – Introductory & Advanced Topics -M. H. Dunham,3rd edition, [Pearson Education]
2. Data Mining Practical Machine Learning Tools and Techniques - Ian H. Witten, Eibe Frank,3rd edition , Morgan Kaufmann Publishers is an imprint of Elsevier (Unit 5-Weka)

Reference Books:

1. Mastering Data Mining by Michael J.A. Berry & G.S. Linoff (Wiley Student Edition)

4. Elective-I

D) Mainframe System

Lectures: 3 hrs/week

Theory: 100 Marks

Prerequisites:

1. Operating Systems-I
2. Database Engineering

Objectives: It is to introduce the students about

1. Need, features and configuration of Mainframe System
2. Mainframe operating system
3. Mainframe System Job control language
4. Cobol as Mainframe Programming language
5. DB2 as Mainframe Database Management System

Syllabus:

Unit 1: Introduction to IBM Mainframe (4)

Hardware configurations, Processors, Multiprocessing, Input/Output Devices, Applications, Characteristic Features of Mainframe Operating System, Mainframe Configurations, Roles in the Mainframe World, Typical Mainframe Workloads.

Unit 2: z/OS,MVS and VSAM (6)

z/Os and other Mainframe operating systems, What is z/OS,Overview of z/OS facilities,virtual Storage and other Mainframe Concepts, Workload management,MVS Concepts , Address Spaces ,Addressing Mode and Residence Mode , Multiple Virtual Storage, Multiprogramming ,MVS/370 Address Space Organizations, How data sets are stored, Catalogs ,Data Set Organization,VSAM Basics

Unit 3: Introduction to JCL (8)

Introduction to Job Control language-Mainframe information representation and storage, sequential and partitioned datasets, Indexed files, structure of JCL , JOB statement , EXEC statement ,JOB and EXEC statements, DD statement , JCL procedures and symbolic parameters, IBM utility programs.

Unit 4: COBOL Programming I (8)

Introduction, History, coding format for COBOL programs, structure of COBOL program, character set, COBOL words, data names and identifiers, literals, figurative constants, continuation of lines, language description notation, IDENTIFICATION DIVISION, ENVIRONMENT DIVISION, DATA DIVISION-Level structure, data description entries, USAGE Clause, REDEFINES Clause, RENAMES Clause, SIGN Clause ,FILE SECTION, WORKING-STORAGE SECTION, Editing, PROCEDURE DIVISION and basic verbs -

Structure, MOVE, Arithmetic and Sequence Control Verbs, Input and Output Verbs, Conditional Verb

Unit 5: COBOL Programming II (4)

Table Handling - OCCURS Clause and Subscripting , Assigning values to table elements , Multidimensional Tables, PERFORM verb and Table Handling ,Indexed Tables and Indexing , SET verb , SEARCH verb. Statements for Sequential Files- OPEN,CLOSE, WRITE, REWRITE.Miscellaneous verbs- SORT , MERGE, STRING, UNSTRING.

Unit 6: Overview of DB2 (6)

Introduction to DB2 , Major components of DB2- System Service component, Locking Service component, Database Service component, DB2 Application program preparation and Execution,DB2 Objects-Databases, Tablespaces, Stored tables, Indexes, Indexspaces, Storage groups, View, Bufferpool. DB2 SQL programming – Types of SQL statements, DCL, DDL, DML, Advanced SQL topics ,UPDATE operations, Aggregate functions

Text Books:

1. IBM Mainframe Handbook – Alexis Leon. (For Unit 1, 2, 3, 6)
2. M.K. Roy and D. Ghosh Dastidar, “Cobol Programming”, Tata McGraw Hill, Second Edition (For Unit 4 ,5)
3. Introduction to the New Mainframe z/OS Basics- Mike Ebbers, John Kettner, Wayne <http://www.redbooks.ibm.com/redbooks/pdfs/sg246366.pdf> (For Unit 1, 2)

5. Web Technology - I

Lectures: 2 hrs/week
Term Work: 50 Marks

Practical: 4 hrs/week
POE: 50 Marks

Prerequisites:

1. Application Development Tool-I

Course Objectives:

1. Introduce the students to emerging web technologies
2. Introduce the students with XML concepts and its application
3. Motivate the students to develop web applications using Servlet and JSP
4. To create awareness about the differences in Desktop and Web Application

Syllabus:

Unit 1: (4)

Introduction to XML: What is XML, XML verses HTML, XML terminology, XML standards, XML syntax checking, and the idea of markup, XML Structure, Organizing Information in XML, Creating Well-formed XML, and XML Namespaces. DTD Introduction to DTD, Document Type Declaration, Element Type Declaration, Attribute Declaration, Conditional Section, Limitations of DTD

XML Schema: Introduction, basic and complex schema, specifying frequency, element contents, content model reuse, anonymous types, mixed content, grouping of data, mandating all elements, choices, sequences, simple types- numeric, time, xml, string, binary data types, deriving types- facets, attributes

Unit 2: (4)

Extensible Stylesheet Language (XSL): Introduction to XSL, overview, XPATH, XSLT-templates, creating elements and attributes, looping and sorting, conditional processing, Defining variables.

Parsing XML: Introduction to Parser, Parsing approaches, JAXP, JAXP and SAX, JAXP and DOM.

Unit 3: (5)

Introduction: History of Web Applications, Support for Servlets, The Power of Servlets

HTTP Servlet Basics: HTTP Basics, The Servlet API , Page Generation, Server-Side Includes , Servlet Chaining and Filters , JavaServer Pages

The Servlet Life Cycle: The Servlet Alternative, Servlet Reloading, Init and Destroy, Single-Thread Model, Background Processing, Last Modified Times.

Retrieving Information: Initialization Parameters, The Server, The Client, The Request.

Sending HTML Information: The Structure of a Response, Sending a Normal Response, Using Persistent Connections, HTML Generation, Status Codes, HTTP Headers, When Things Go Wrong.

Unit 4: (3)

Handling Cookies: Benefits of Cookies, Some Problems with Cookies, Deleting Cookies, Sending and Receiving cookies, Using Cookies to Detect First-time Visitors.

Session Tracking: Need of Session Tracking, Session Tracking Basics, The Session Tracking API, Browser Sessions vs. Server Sessions, Encoding URLs sent to client

Unit 5: (4)

Overview of JSP technology: The Need for JSP, Benefits of JSP, Advantages of JSP over Competing Technologies, Installation of JSP pages, Basic Syntax

Invoking Java code with JSP scripting elements: Creating Template Text, Invoking Java Code from JSP, Limiting the amount of Java Code in JSP pages, Using JSP Expressions, Comparing Servlets to JSP pages, Writing Scriptlets, Using Scriptlets to make Parts of the JSP page Conditional, Using Declarations, Using Predefined Variables.

Unit 6: (6)

Controlling the Structure of generated Servlets: The JSP page Directives: The import Attribute, The contentType and PageEncoding Attributes, Conditionally Generating Excel Spreadsheets, The session Attribute, the isELIgnored Attribute, The buffer and autoFlush Attributes, The Info Attribute, The errorPage and isErrorPage Attributes, The isThreadSafe Attribute.

Including Files and Applets in JSP pages: Including Pages at Request Time: The JSP:include Action, Including Files at page Translation Time: The include Directive, Forwarding Requests with jsp:forward, Including Applets for the Java plug-In

Accessing Databases With Jdbc: Connecting to databases, Simplifying JDBC usage, Using precompiled (parameterized) queries, Creating and executing stored procedures, Updating data through transactions, Using JDO and other object-to-relational mappings

Text Books:

1. XML and Related Technologies – Atul Kahate [Pearson Education]- (Unit 1 and 2)
2. Java Servlet Programming – Jason Hunter[SPD O'REILLY]- (Unit 3)
3. Core-Servlet and JavaServer Pages Volume -1, 2nd Edition [Marty Hall, Larry Brown, Pearson Education] -(Unit 4, 5 and 6)

Reference Books:

1. Java Server Programming Java EE7 (J2EE1.7) Black Book- Kogent Learning Solutions Inc.-Dreamtech Press
2. Head First Servlets and JSP: Passing the Sun Certified Web Component Developer Exam -2nd Edition-Bryan Basham, Kathy Sierra, Bert Bates- O'REILLY

Term Work- Term work marks is based on regular practical performance and final internal practical oral examination as well.

Sample Experiment List:

It should consist of 12-15 experiments based on the following topics.

1. Create different types of valid XML documents
2. Search information from XML document using SAX parser
3. Navigating the Document Object Model tree for given XML Document
4. Creating XML document using DOM.
5. Write XSLT styles-sheet to convert XML document to HTML
6. XML Validation using XSchema.
7. Remote Procedure call using XML.
8. Installation, Configuration of Tomcat Server and Deployment of servlet based application
9. Write a servlet to store form data to database – use Type 4 JDBC driver.
10. Write a servlet to search data from database.
11. Session Management using Servlet
12. Write a JSP application to display database contents
13. Write a JSP application to input book information and store in the database. Application must provide facility to search book based on title of book, and author.
14. Write a JSP application to input student information like first name, last name, department, date of birth, class, marks obtained in five subjects and store this information into database. Also generate report showing aggregate marks of all the students.
15. Write a JSP application to demonstrate Session Management using JSP (Application Controlled Authentication)

6. Mobile Application Development

Lecture: 2 hrs. /Week

Practical: 2hrs. /week

Term Work: 50 Marks

Prerequisites:

1. Application Development Tool – I

Course Objectives: This course aims to study how to develop an own android application and how to deploy that android application for use

1. To study about the android architecture and the tools for developing android Applications
2. To create an android application.
3. To learn about the user interfaces used in android applications.
4. Learn about deployment of android application.

Syllabus:

Unit 1: Android Overview (2)

Overview of Android, History, Android Versions, Android OS stack: Linux kernel, Native Libraries/DVM, Application Framework, Applications, Activity, Activity lifecycle, Fragments, Activity Back Stack, Process and Threads

Unit 2: Android Development Environment (2)

Introduction to Android SDK, Android Emulator, Creating a Project, Project Directory Structure, DDMS, Logging in Android (Logcat), Android Manifest File, Permissions

Unit 3: Intents and Layouts (7)

XML, Android View Hierarchies, Linear Layouts, Relative Layout, Table Layout, Frame Layout Sliding, Using Padding and Margins with Layouts.

What Is an Intent? Android Intent Messaging via Intent Objects, Types of Intents, Using Intents with Activities, Sending Intents (Telephony, SMS), Broadcast Receivers,

Unit 4: Input Controls, Input Events, Dialogs (7)

Buttons, Text Fields, Checkboxes, Radio Buttons, Toggle Buttons, Spinners, Event Listeners, Event Handlers, Touch Mode, Handling Focus, Dialogs: Alerts, Popups, Toasts

Unit 5: Menus, Notification and ActionBar (4)

Menus, Options menu, Context menu, Popup menu, Handling menu click events, Creating a Notification, Notification actions, Notification priority, Managing Notifications, Removing notifications.

Unit 6: Android Database and App Market

(5)

Installing SQLite plugin, DbHelper, The Database Schema and Its Creation, Four Major Operations, Cursors, Example, publish app to the Android Market

Text Books:

1. Beginning Android application development by Wei-Mag Lee.
2. Learning Android by Marko Gargenta Publisher: O'Reilly Media
3. Android Apps for Absolute Beginners by Wallace Jackson SECOND EDITION

Reference Books:

1. Professional Android 4 Application Development by Reto Meier Publisher: Wiley India
2. Android in Action Third Edition by W.Frank Ableson, Robi Sen, Chris King, C. Enrique Ortiz
3. The Android Developer's Cook book "Building Applications with the Android SDK" by James Steele

Open Source Resources:

<http://developer.android.com/guide/index.html>

<http://eclipse.org>.

Term Work:

Guidelines for term work distribution

The distribution of the term work marks is as follows

- 30 marks for performance in practical and experiments
- 20 marks for mini-project (android app) to be developed.

Guidelines for experiment list

The experiment list should consist of minimum 12 practical assignments on the above topics. Each experiment should be a problem statement which can be solved using some features of Android. Experiment List is given below

1. Installation of Android SDK, emulator, creating simple project and study of android project structure.
2. Installing apk on mobile device/tablet, configuring mobile device/tablet in Android Studio with developer option and running app directly on mobile device/tablet
3. Write a program to use of different layouts.(Create Login form using Linear Layout and Relative Layout).
4. Write a program to study Intents for switching between activities. - Create Registration Activity and Registration Layout. Take label of Register or New user on Login screen and on click of New user or Register label click , move from Login Activity to Registration Activity.
5. Write a program to use of Intents for SMS and Telephony.
6. Write a program to study and demonstrate BroadcastReceiver.
7. Program to demonstrate Buttons, Text Fields, Checkboxes, Radio Buttons, and Toggle Buttons with their events handler (Give one app to create which will cover 7, 8, 9 and 10 practicals, because of which students can understand the use of these controls in practical case)
8. Program to demonstrate Spinners, Touch Mode, Alerts, Popups, and Toasts with their events handler

9. Program to demonstrate Touch Mode, Menus with their events handler
10. Program to demonstrate notification with their action.
11. Write a program to study and use of SQLite database.
12. Study of publishing app to the Android Market.

Guidelines for Mini-project (Android app)

Two students (Maximum) in a group will carry out a mini project.

A batch of practical should be divided into mini project groups. The faculty should guide the project group for selection of the topic and the work to be done. The mini project should consist of defining the problem, analyzing, designing the solution and implementing it using android. The work will be jointly assessed by a team of faculty from the department. A hard copy of project report, along with a softcopy of the programs is to be submitted to the department.

7. Project -I

Practical: 2 hrs. /week

Term Work: 50 Marks

OE: 75 Marks

The project work is to be carried out in two semesters of B.E Information Technology. The project should be undertaken preferably by group of 4-5 students who will jointly work and implement the project in the two semesters. In Semester I, The group will select a project with the approval of the Guide (staff member) and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages before second week of August in the academic year. The group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work at the end of semester –VII as a part of the term work submission in the form of a joint report.

The term work assessment will be done jointly by teachers appointed by Head of the Institution.

The oral examination will be conducted by an internal and external examiner as appointed by the University.

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
3. **Care should be taken to avoid copying and outsourcing of the project work.**

B.E. Information Technology Semester-VIII (Revised)

1. Storage Networks

Lecture: 3 hrs/week

Theory: 100 marks

Tutorial: 1 hr /week

Term Work: 25 marks

Prerequisites:

1. Computer Networks
2. Internet Technology

Course Objectives: This course aims at giving students a knowledge of Storage Networks in terms of the following

1. Define Storage Networks, study its applications.
2. Identify Key challenges in storage networks.
3. Be aware of significance of Data protection.
4. Understand importance of backup and replication
5. Know business needs of storage management

Syllabus:

Unit 1:Introduction to information storage and Storage System Environment (7)

Evolution of storage technology and architecture, Data Center Infrastructure, Key challenges in Managing Information, Information Lifecycle. Components of Storage System Environment, Disk Drive Components, Disk Drive Performance, Laws governing disk Performance, Logical Components of Host, Application requirements and disk performance.

Data Protection: RAID Implementation of RAID, RAID array components, RAID levels, Comparison, RAID Impact on disk performance, Hot Spares.

Unit 2:Intelligent Storage System and Direct Attached Storage (5)

Components of Intelligent Storage System, Intelligent Storage Array. Direct Attached Storage – types, benefits and limitation, Disk drive Interface, Introduction to parallel SCSI, SCSI command model.

Unit 3:Fibre Channel (5)

Overview, The SAN and Its Evolution, Components of SAN, FC Connectivity, Fibre Channel Ports, Fibre Channel Architecture, Zoning, Fibre Channel Login Types, FC Topologies.

Unit 4:Network -Attached Storage (6)

Local File Systems, Network File System and File Servers, Benefits of NAS, NAS file I/O, Components of NAS, NAS Implementations, NAS File sharing Protocols, NAS I/O operations,

Factors affecting NAS Performance. Case Study: Direct Access File System, Shared Disk File System Comparison: NAS Fibre Channel SAN and iSCSI SAN.

Unit 5:Storage Virtualization (5)

Forms of Virtualization, SNIA Storage Virtualization Taxonomy, Storage Virtualization Configurations, Storage Virtualization Challenges, Types of Storage Virtualization.

Unit 6: Business Continuity, Backup and Recovery and Replication (8)

Introduction, Information Availability, Cause of Information unavailability, Measuring information Availability, Consequences of down time, BC terminology, BC planning life cycle, Failure Analysis, BC Technology Solutions, Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods, Backup Process, Backup and Restore Operations, Backup Topology,

Replication: Local Replication, Use Local Replicas, Data Consistency, Local Replication Technologies, Restore and Restart Considerations

Text Books:

1. Information Storage and Management - G. Somasudaram – EMC Education Services (Wiley India Edition)

Reference books:

1. Storage Networks Explained - Ulf Troppen, Rainer Erkens, Wolfgang Müller (Wiley India Edition)

Term work:

Guideline for Tutorial:

Tutorial work to be considered for awarding term work marks. It should consist of 8-10 assignments based on above topics. In tutorial session Students are expected to go through case study of following systems EMC CLARiiON and Symmetrix, EMC PowerPath, EMC NetWorker, EMC TimeFinderand EMC SnapView, EMC SRDF, EMC SAN Copy, and EMC MirrorView.

2. Cloud Computing

Lecture: 3 hrs. /week

Theory: 100 marks

Tutorial: 1 hr. /week

Term Work: 25 marks

Prerequisites:

1. Computer Networks
2. Operating System-I
3. Information Security

Course Objectives: This course aims at giving students a knowledge of Cloud computing along with its applications in terms of the following

1. Understanding the systems, protocols and mechanisms to support cloud computing.
2. Understanding the architecture of cloud computing
3. Discuss Cloud Platforms in Industry
4. Understanding cloud computing applications.
5. Discuss Cloud Security and various challenges

Syllabus:

Unit 1: Introduction (6)

Definition, Historical Developments, Computing Platforms and Technologies. Building cloud computing environments, Principles of Parallel and Distributed Computing: Parallel versus Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing, and Technologies for Distributed Computing.

Unit 2: Virtualization (6)

Characteristics, Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

Unit 3: Cloud Computing Architecture (7)

Cloud Reference Model, Types of Clouds, And Economics of Clouds, Open Challenges, Cloud Platforms in Industry: Amazon Web Services, Google AppEngine, And Microsoft Azure.

Unit 4: Cloud Applications (7)

Scientific Applications in – Healthcare, Biology, Geo-Science; Business Applications in– CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming.

Unit 5: Advanced Topics in Cloud Computing: (5)

Energy Efficiency in Clouds, Market Based Management of Clouds, Federated Clouds / InterCloud, Third Party Cloud Services.

Unit 6: Understanding Cloud Security:**(7)**

Securing the Cloud, The security boundary, Security service boundary, Security mapping, Securing Data, Brokered cloud storage access, Storage location and tenancy, Encryption, Auditing and compliance, Establishing Identity and Presence, Identity protocol standards

Text Books:

1. Mastering Cloud Computing, Buyya R, Vecchiola C, Selvi S T, McGraw Hill Education (India), 2013.
2. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing Inc. 2011 (Unit, VI)

Reference books:

1. Buyya R, Broberg J, Goscinski A, "Cloud Computing - Principles and Paradigms", Wiley, 2011.

Term work:

It should consist of 10-12 tutorial based on above topic & case study on cloud service providers like AMAZON EC2, salesforce.com etc.

3. Information Technology and Business Methodology

Lecture: 3 hrs /week

Theory: 100 Marks

Tutorial: 1hr /week

Term Work: 25 Marks

Prerequisites:

1. Fundamentals of Economic & Management

Course Objectives: This course aims at giving students fundamental knowledge about two commonly used business applications ERP and CRM

1. To impart knowledge about different facets of ERP Systems
2. To impart knowledge of ERP implementation process and get familiar with the common pitfalls
3. To make students familiar with SAP-R3
4. To impart knowledge of different concepts in CRM
5. To impart understanding of the functionalities in CRM like SFA, EMA and CIC
6. To impart knowledge of the CRM implementation process and get familiar with the common pitfalls

Syllabus:

Unit 1: Introduction and Business Modeling (7)

Overview, accommodating variety, integrated management information, integration, supply chain and resource management, integrated data model, scope, Technology and benefits of ERP & the modern enterprise

Overview, concept, significance and principles of business engineering, BRP, ERP and IT business engineering with IT, ERP and management concerns, building an MIS, Business as a system, core process in a manufacturing company, entities for data model in a manufacturing company, extended ERP

Unit 2:ERP Implementation (5)

Overview, role of consultants, vendors and users, customization, precautions, post implementation, option, ERP implementation methodology and guidelines for ERP implementation

Unit 3: Getting Started with SAP-R3 (6)

The client – or SAP customer, the clients representative, the SAP consultant, the SAP R/3 business application software architecture, financial accounting and controlling (FI/CO) modules, the sales and distribution (SD) module, the materials management (MM) module, the plant maintenance (PM) and service management, the production planning(PP) module, the project system (PS) module, the human resources (HR) module, the SAP retail model, industry solutions (IS) modules, the ASAP roadmap

Unit 4: Introduction to CRM

(6)

Definition of CRM technology, CRM technology components, customer life style, customer interaction, Introduction to eCRM: difference between CRM & eCRM, features of eCRM

Unit 5: SFA, EMA, CIC

(8)

Sales Force Automation (SFA): Definition & need of SFA, barriers to successful SFA, SFA: functionality, technological aspect of SFA: data synchronization, flexibility & Performance, reporting tools

Enterprise Marketing automation (EMA): Components of EMA, marketing campaign, Campaign planning & management, business analytic tools. , EMA components (promotions, events, and loyalty & retention programs), response management

Call Centers Mean Customer Interaction: The functionality, technological implementation, what is ACD (automatic call distribution), IVR (interactive voice response), CTI (computer telephony integration), web enabling the call center, automated intelligent call routing, logging& monitoring

Unit 6: Implementation and ASP

(4)

Implementing CRM: Pre implementation, kick off meeting, requirements gathering, Prototyping & detailed proposal generation, development of customization, Power User Beta Test & Data import, training, roll out & system hand off, ongoing support. System Optimization, follow up

Introduction to ASP (application service provider): Who are ASP's? , their role & function, advantage & disadvantage of implementing ASP

Text Books:

1. Enterprise resource planning - Vinod Kumar Garg & N. K. Venkita Krishna, Second edition [PHI] (for Unit 1 and 2)
2. SAP Project Management – Joy Ghosh, First edition, Mcgraw Hill (For Unit 3)
3. CRM at the Speed of Light – Paul Greenberg, Second Edition, TMH (For Unit 4, 5, 6)

Reference Books:

1. Enterprise resource planning - Alexls Leon.[McGraw Hill]
2. The CRM Handbook- Jill Dyche [Addison Wesley IT series]
3. Customer Relationship Management- Buttle, Francis. (2009), (2nd Edition)[Elsevier Publishing

Guidelines for tutorials

- Tutorials shall be conducted as per the project groups
- It should consist of 8-10 assignments based on the following topics:
- Make report of 2-3 pages on Supply chain management
- Briefly describe the different business processes in manufacturing or any other industry
- Make survey report of 3-5 pages on different ERP packages in the market
- You have decided to implement ERP modules in your company/Organization. Prepare pre and post implementation strategies.
- Go through the different case studies of companies/Organizations and make conclusion based upon your analysis.

- Prepare brief report on SAP R/3
- Brief the SFA and EMA.
- Make survey report on different CRM products in the market.
- Prepare brief report on pre and post implementation strategies of CRM model in organization.
- Each will choose a real organization to study and be directed to provide a design and implementation plan for moving the organization forward with respect to the incorporation of technology or outside organization in support of a business process. The first component of the analysis is to document the current and desired strategy, organization design including processes and the supporting IT. Given this information the student/team will then propose possibilities for moving the organization forward and finally justify a specific choice.
- The faculty shall evaluate the performance of the students and assign the term work marks according to the performance

4. Elective-II

A) Business Intelligent System

Lectures: 3 hrs/week

Theory: 100 marks

Prerequisites:

1. Advance Database Systems

Course Objectives:

1. To introduce the students limitations of transaction processing systems and benefits of Analytical processing systems
2. Business Intelligence systems, its architecture and to use it as a decision making systems
3. Designing Dimensional model, Fact table and dimension tables and correlate them using various models like star schema, snow flack schema
4. Design and development of Business Intelligent Applications

Syllabus:

Unit 1: Introducing the Technical Architecture (7)

The value of architecture, Technical Architecture overview, Back room Architecture, Presentation Server Architecture, Front room Architecture, Infrastructure, Metadata, and Security.

Unit 2: Introducing Dimensional Modeling (6)

Making the Case for Dimensional Modeling, Dimensional Modeling primer, Enterprise Data Warehouse Bus Architecture, More on Dimensions & Facts.

Unit 3: Designing the Dimensional Modeling (5)

Modeling Process overview, Getting Organized, Four Step Modeling Process, Design the Dimensional Model.

Unit 4: Introducing Extract, Transformation & Load (6)

Round up the requirements, the 34 subsystems of ETL, Extracting Data, Cleaning & Conforming data, Delivering Data for Presentation

Unit 5: Introducing Business Intelligence Applications (6)

Importance of B.I. Applications, Analytical cycle for B.I., Types of B.I. Applications, Navigating Applications via the B.I. portal.

Unit 6: Designing & Developing B.I Applications (6)

B.I. Application resource planning, B.I. Application Specification, B.I. Application Development, B.I. Application maintenance

Text Books:

1. The Data Warehouse Lifecycle Toolkit By Ralph Kimball, Margy Ross, Warren Thornthwaite, Joy Mundy, Bob Becker 2nd edition, Wiley Publication

Reference Books:

1. Fundamentals of Business Analytics by R.N. Prasad, Seema Acharya Wiley Publication
2. Data Warehousing in the Real World By Anahory & Murray, Pearson Education
3. Data Warehousing Fundamentals By Ponniah Wiley Publication

4. Elective-II

B) BigData and Hadoop

Lecture: 3 hrs/week

Theory: 100 Marks

Prerequisites:

1. Advance Database Systems

Course Objectives: This course aims at giving students knowledge of current trends of Bigdata and Hadoop and their application.

1. To understand the basic concepts of big data
2. To understand how big data helps in analysis of application data
3. To understand concept of Hadoop and its need.
4. To understand Hadoop data storage structure.

Syllabus:

Unit 1: Introduction to Big Data (7)

Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data? Other Characteristics of Data Which are not Definitional Traits of Big Data, Why Big Data? Are We Just an Information Consumer or Do we also Produce Information? Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment , A Typical Hadoop Environment, What is New Today? What is changing in the Realms of BigData?

Unit 2: Big Data Analytics (7)

Where do we Begin? What is Big Data Analytics? What Big Data Analytics Isn't? Why this Sudden Hype around Big Data Analytics? Classification of Analytics, Greatest Challenges that Prevent Businesses from Capitalizing on Big Data, Top Challenges Facing Big Data, Why is Big Data Analytics Important? What Kind of Technologies are we looking Toward to Help Meet the Challenges Posed by Big Data? Data Science, Data Scientist...Your New Best Friend!!!, Terminologies Used in Big Data Environments, Basically Available Soft State Eventual Consistency (BASE), Few Top Analytics Tools

Unit 3:Introduction to Hadoop and MapReduce (5)

Data, Data Storage and Analysis, Comparison with Other Systems, A Brief History of Hadoop, Apache Hadoop and the Hadoop Ecosystem

MapReduce : A Weather Dataset, Data Format, Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Hadoop Pipes

Unit 4:The Hadoop Distributed File system (6)

The Design of HDFS, HDFS Concepts, The Command-Line Interface, Hadoop Filesystems, The Java Interface, Data Flow, Parallel Copying with distcp, Hadoop Archives

Unit 5:How MapReduce Works and Features (7)

Anatomy of a MapReduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution

MapReduce Features: Counters, Sorting, Joins, MapReduce Library Classes

Unit 6:Administering Hadoop (5)

HDFS, Monitoring, Maintenance

Case Studies: Nutch Search Engine, Log Processing at Rackspace

Text Books:

1. Big Data and Analytics-Seema Acharya, Subhashini Chellappan, Infosys Limited, Publication: Wiley India Private Limited,1st Edition 2015 (Unit 1 and 2)
2. Hadoop: the definite guide-Tom White [O' Reilly], 3rd Edition (Unit 3,4,5 and 6)

Reference Books:

1. Microsoft Big Data solutions- By Adam Jorgensen, James Rowland-Jones, John Welch, Dan Clark, Christopher Price, Brain Mitchell, Wiley brand

4. Elective-II

C) Service Oriented Architecture

Lectures: 3 hours/week

Theory: 100 Marks

Prerequisites:

- 1) Web Technology-I

Course Objectives: This course aims at giving students fundamental knowledge about Service Oriented Architecture and its use in developing web services

1. Understand the concepts of SOA along with its evolution
2. Be aware of the key issues facing many organizations, especially dealing with integration among systems and providing architectural abstractions for them
3. Integrate SOA technologies with Web Services paradigms
4. Know related technologies and implementation basics of SOA

Syllabus:

Unit 1: Introduction to SOA

(6)

Fundamental SOA- Common Misperceptions about SOA- Common tangible benefits of SOA- Common pitfalls of adopting SOA. The Evolution of SOA:-from XML to Web services to SOA, Comparing SOA with N-tier architecture, The continuing evolution of SOA, The roots of SOA.

Unit 2: Web Services and Primitive

(6)

Web Services and Primitive SOA: The Web services framework- Services, Service descriptions, messaging with SOAP.

Web Services and Contemporary SOA: Message exchange patterns- Service activity coordination-Atomic transactions- Business activities-Orchestration-Choreography.

Unit 3: Service Orientation and security

(6)

Web Services and Contemporary SOA: Addressing- Reliable messaging- Correlation- Policies Metadata exchange- Security- Notification and eventing. SOA and Service-Oriented: Principles of Service-Oriented-Service-orientation and the enterprise- Anatomy of a service-oriented architecture- Common principle of service-orientation-Service Layers –Service orientation and contemporary SOA

Unit 4: Building SOA

(6)

SOA Delivery Strategies- SOA delivery lifecycle phases. Service-Oriented Analysis: Introduction to service-oriented analysis- Benefits of a business-centric SOA Deriving business services- Service-Oriented Analysis: Service modeling, Service modeling guidelines- Classifying service model logic- Contrasting service modeling approaches.

Unit 5: Service Oriented Design**(6)**

Introduction to service-oriented design- WSDL-related XML Schema language basics- WSDL language basics- SOAP language basics- Service interface, design tools. SOA Composition Guidelines: Steps to composing SOA Considerations for choosing service layers and SOA standards, positioning of cores and SOA extensions.

Unit 6: Recent Trends in SOA**(6)**

Overview-Service design of business service, application service, task centric service and guidelines. SOA Business Process Design: WS-BPEL language basics WS Coordination overview, Service oriented business process design, Case study RailCo ltd.

Text Books:

1. Service-Oriented Architecture: Concepts, Technology & Design (1st Edition) – Thomas Erl (Pearson – Prentice Hall PTR)

Reference Books:

1. SOA Principles of Service Design(1st Edition)- Thomas Erl (Pearson- Prentice Hall PTR)
2. Applied SOA- Service oriented Architecture and Design Strategies- Michael Rosen, Boris Lublinsky, Kevin T Smith, Marc J Balcer (Wiley)

4. Elective-II

D) Information Retrieval

Lecture: 3 hrs/week

Theory: 100 marks

Prerequisites:

1. Advance Database Systems
2. Web Technology-I

Course Objectives: This course aims to introduce

1. Need of Information Retrieval
2. Use of IR in Information Search
3. Information Retrieval Modeling and Evaluation
4. Preprocessing in IR Systems
5. Text based and Web Based Retrieval Systems

Syllabus:

Unit 1: Introduction to Information Retrieval (5)

Information Retrieval in Libraries and Digital Libraries, The IR Problem, The IR System, How the Web Changed Search. User Interfaces for Search, Search Interfaces Today, Visualization in Search Interfaces

Unit 2: Information Retrieval Modeling (7)

IR Models: Modeling and Ranking, Characterization of an IR Model, A Taxonomy of IR Models, Classic Information Retrieval: Basic Concepts, The Boolean Model, Term Weighting, TF-IDF Weights, Document Length Normalization, The Vector Model, Set-Based Model, Extended Boolean Model, Generalized Vector Space Model, Latent Semantic Indexing Model, The Hypertext Model, Web based Models, Structured Text Retrieval

Unit 3: Information Retrieval Evaluation (6)

Retrieval Metrics: Precision and Recall, Single Value Summaries: P@n, MAP, MRR, F, User-Oriented Measures, DCG: Discounted Cumulated Gain, BPREF: Binary Preferences, Rank Correlation Metrics

Unit 4: Documents: Languages & Properties (7)

Metadata, Text Document Format, Markup Languages, RDF: Resource Description Framework, Text Properties, Information Theory, Text Similarity, Document Preprocessing, Lexical Analysis of the Text, Elimination of Stopwords, Stemming, Keyword Selection, Queries: Languages & Properties, Query Languages: Keyword-Based Querying, Structural Queries, Query Protocols, Query Properties,

Unit 5: Text Classification and Indexing**(6)**

A Characterization of Text Classification, Unsupervised Algorithms, Supervised Algorithms, Feature Selection or Dimensionality Reduction, Evaluation Metrics, Inverted Indexes

Unit 6: Web Retrieval**(5)**

The Web ,Characteristics , Structure of the Web , Modeling the Web , Link Analysis, Search Engine Architectures, Search Engine Ranking, Managing Web Data, Search Engine User Interaction, Browsing, Beyond Browsing

Text Books:

1. Modern Information Retrieval The Concepts and Technology behind Search by Ricardo Baeza-Yates Berthier Ribeiro-Neto Second edition Addison-Wesley 2011

Reference books:

1. Introduction to Information Retrieval by C.D. Manning, P. Raghavan, H. Schütze. Cambridge UP, 2008.
2. Search Engines: Information Retrieval in Practice by Bruce Croft, Donald Metzler, Trevor Strohman Pearson 2010

5. Web Technology-II

Lectures: 2 hrs/week
Term Work: 50 marks

Practical: 4 hrs/week
POE: 50 marks

Prerequisites:

1. Application Development Tool - II
2. Web Technology - I

Course Objectives:

1. Understand emerging Web technologies concepts and tools.
2. Understand client side and server side scripting languages and validation techniques.
3. Able to learn database access technologies and state management techniques.
4. Able to develop real life Web applications using ASP.NET and PHP.

Syllabus:

Unit 1: (5)

ASP.NET: Introducing One ASP.NET, Simplifying a Complex Ecosystem, How Do You Benefit?

HTML5 and CSS3 Design with ASP.NET: HTML5 Overview, CSS3 Overview, Working with HTML and CSS in Visual Studio

ASP.NET Web Forms Structure: Application Location Options, the ASP.NET Page Structure Options, and ASP.NET 4.5 Page Directives, ASP.NET Page Events Dealing with Postbacks, Cross-Page Posting, ASP.NET Application Folders, Compilation, Build Providers, Global.asax,

Unit 2: (5)

ASP.NET Server Controls and Client-Side Scripts: ASP.NET Server Controls, HTML Server Controls, Identifying ASP.NET Server Controls, Manipulating Pages and Server Controls with JavaScript

ASP.NET Web Server Controls: An Overview of Web Server Controls, The Label, Literal, TextBox, Button, LinkButton, ImageButton, Hyperlink, DropDownList, Visually Removing Items from a Collection, ListBox, CheckBox, Checkbox List, Radio Button, RadioButtonList, Image, Table, Calendar, Ad Rotator, Xml, Panel, Placeholder, BulletedList, HiddenField, FileUpload, MultiView and View Server Controls, Wizard Server Control, ImageMap Server Control.

Validation Server Controls: Understanding Validation, Client-Side versus Server-Side Validation, ASP.NET Validation Server Controls, Turning Off Client-Side Validation, Using Images and Sounds for Error Notifications, Working with Validation Groups

Unit 3:**(7)**

Data Management with ADO .NET: Basic ADO.NET Features, Common ADO.NET Tasks, Basic ADO.NET Namespaces and Classes, Using the Connection Object, Using the Command Object ,Using the DataReader Object, Using DataAdapter, Using Parameters, Understanding DataSet and DataTable.

Data Binding: Data Source Controls, Data Source Control Caching, Data-Bound Controls, Other Data-Bound Controls, Inline Data-Binding Syntax, Using Expressions and Expression Builders

State Management: Your Session State Choices Understanding the Session Object in ASP.NET, The Application Object, QueryStrings, Cookies, Postbacks and Cross-Page Postbacks, Hidden Fields, ViewState, and ControlState, UsingHttpContext. Current. Items for Very Short-Term Storage

ASP.NET AJAX: Understanding the Need for Ajax, ASP.NET AJAX and Visual Studio, Building ASP.NET AJAX Applications, ASP.NET AJAX's Server-Side Controls.

Unit 4:**(3)**

Introducing PHP: History, General Language Feature

PHP Basics : Embedding PHP code in Your Web Pages, Outputting Data to the Browser, PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures

Functions: Invoking a Function, Creating a Function, Function Libraries,
Array: Creating an array, outputting a Array, Merging, slicing, splicing and Dissecting Arrays, Other useful Array Functions.

Unit 5:**(4)**

Object-Oriented PHP: The benefits of OOP, Key OOP Concepts, Constructor and Destructors, Helper Functions.

Advanced OOP Features: Object Cloning, Inheritance, Interfaces, Abstract classes, and Introducing namespaces.

Strings and Regular Expressions: Regular Expressions, Other String-Specific Functions, Alternatives for Regular Expression Functions

Working with HTML Forms: PHP and Web Forms, Validating Form Data Handling File Uploads: Uploading Files with PHP

Networking: DNS, Services, and Servers, Mail, Common Networking Tasks

Unit 6:**(3)**

Using PHP with MySQL: Installation Prerequisites, Using the mysqli Extension, Interacting with the Database, Executing Database Transactions.

Session Handlers: What Is Session Handling, Configuration Directives, Working with Sessions, Practical Session-Handling Examples, Creating Custom Session Handlers

CMS Technologies: Drupal, Joomla, Word press Introduction and Installation

Text Books:

1. Professional ASP.NET 4.5 in C# and VB-Published by John Wiley & Sons, Inc. (WROX) (Unit 1, 2, 3)
2. Beginning PHP and MySQL: From Novice to Professional, Fourth Edition - W. Jason Gilmore (Unit 4, 5, 6)

Reference Books:

1. ASP.NET 4.5 COVERS C# 2012 AND VB 2012 CODES - black book – Kogent Learning Solutions Inc. Dreamtech Press
2. Professional ASP.NET 4.0 in C# and VB-Published by John Wiley & Sons, Inc. (WROX)
3. Teach Yourself PHP, MYSQL, Apache - Julie C Meloni [SAMS Publication]
4. PHP5 and MySQL Bible Tim Converse, Joyce Park, Clark Morgan

Open Source Resources:

1. <http://php.net>

Term Work-

Sample Experiment List:

It should consist of 15-18 experiments based on the following topics.

1. Accepting and validating user entered data using ASP.NET.
2. Accepting and validating book catalog information using validating controls.
3. Write a program to demonstrate session management in ASP.Net.
4. Display database contents from SQL server or Oracle database using SQL Command class from ASP.NET.
5. Display parameterized data using SqlDataReader and GridView in ASP.NET.
6. Database access using DataSet in ASP.NET.
7. Displaying data using DataView in ASP.NET.
8. Write a program to read, add, update and delete record from database using ADO.Net control SqlDataReader.
9. Installing Apache and PHP on Linux, Configuring PHP at Build Time on Linux. Or Installation of XAMPP.
10. Hello world Program-Embedded HTML with PHP.
11. Program based on PHP variables, Expression, arrays, control structure
12. Experiment Based on OOP and Advance OOP PHP.
13. Experiment based on form validation using PHP using regular expressions etc.
14. Experiment based on upload various types file.
15. Experiment based on send Mail using PHP.
16. Experiment based on database handling using PHP through HTML Forms.(Insert, delete, update records)
17. Experiment based on session Management (create Login Application).
18. Installation of CMS-Joomla/ Drupal/WordPress- Install different modules, plug-ins and learn how to customize it etc.

6. Advanced Software Technologies

Lectures: 3 hrs/week
Term Work: 50 marks

Practical: 2 hrs/week
POE: 50 marks

Prerequisites:

1. Application Development Tools - I
2. Web Technology – I

Course Objectives:

1. To build robust back-end functionality using Enterprise JavaBeans (EJB) technologies.
2. To understand fundamentals and components of Struts framework.
3. To understand MVC and how it is applied in Struts framework.
4. Learning Fundamentals of Hibernate

Syllabus:

Unit 1: Java Beans and EJB (7)

Java Bean- Concepts, Writing process, Applications,

EJB Architecture : Overview of EJB software architecture, View of EJB Conversation, Building and Deploying EJBs, Roles in EJB.

Unit 2: EJB Applications (6)

EJB Session Beans, EJB entity beans, Lifecycle of Beans, EJB clients, Steps in developing an application with EJB.

Unit 3: Struts 2: web application framework (7)

what's a framework? Why use a framework? A brief history, Struts 2: the MVC pattern, How Struts 2 works, saying hello to Struts 2

Core concepts: Working with Struts 2 actions, Adding workflow with interceptors, Data transfer: OGNL and type conversion.

Unit 4: Building the view: tags and results (7)

Building a view, UI component tags, Results in detail, exploring the validation framework, Extending Struts 2 with plug-ins: Plug-in overview, Common plug-ins, SiteMesh, Tiles, JFreeChart

Unit 5: AJAX (6)

AJAX Overview, Dojo's Event System, Using the Struts Dojo Plug-in, The head Tag, The div Tag, The a Tag, The datetimepicker Tag, The tabbedpanel Tag, The textarea Tag, The autocompleter Tag, The tree and tree node Tags

Unit 6: HIBERNATE

(6)

Introduction, Writing the application, application development approach, creating database and tables in MySQL, creating a web application, Adding the required library files, creating a java bean class, creating hibernate configuration and mapping file, adding a mapping resource, creating JSPs.

Text Books:

1. Mastering Enterprise Java Beans-Ed Roman, John Wiley & Sons Inc.
2. Struts 2 in Action by Donald Brown, Chad Michael Davis, Scott Stanlick
3. Struts 2 Design and Programming: A Tutorial by Budi Kurniawan

Reference Books:

1. Struts 2: The Complete Reference by James Holmes
2. Valesky – Enterprise Java Beans – Addison Wesley
3. Java Server Programming – Java EE7 (J2EE 1.7) Black Book. Kogent Solutions
4. Java EE 6 for Beginners, Sharanam Shah, Vaishali Shah, SPD

Term work: The experiment list should consist of minimum 10-12 practical assignments on the below or similar topics.

1. Introduction and configuration of EJB.
2. Write a program to study use of Session Bean
3. Write a program to study use of Entity Bean
4. Write a program to study use of Message Driven Bean
5. Study of EJB Deployment
6. Introduction and configuration of struts 2
7. Write a program for Login page with validation in struts 2
8. Write a program to implement File upload in struts 2
9. Introduction to Dojo's Event System, use of Struts Dojo Plug-in and tags.
10. Introduction to hibernate framework and hello world example
11. Write a program to study use of hibernate mapping with example
12. Write a program to implement Hibernate inheritance: Table per class hierarchy

7. Project –II

Practical: 4 hrs/week
OE: 75 Marks

Term Work: 50 Marks

The group will continue to work on the project selected during the semester VII and submit the completed project work to the department at the end of semester VIII as mentioned below.

1. The workable project.
2. The project report in the bound journal complete in all respect with the following : -
 - i. Problem specifications
 - ii. System definition – requirement analysis.
 - iii. System design – dataflow diagrams, database design
 - iv. System implementation – algorithm, code documentation
 - v. Test results and test report.
 - vi. In case of object oriented approach – appropriate process be followed.

Term work will be jointly assessed by a panel of teachers appointed by head of the institution. Oral examination will be conducted by internal and external examiners as appointed by the University.

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
- 3. Care should be taken to avoid copying and outsourcing of the project work.**

SYLLABUS FOR EQUIVALENT SUBJECTS

Network Engineering

Lectures : 2 Hrs/Week

TW: 25 Marks

Practical : 2 Hrs/Week

OE : 50 Marks

1. Network Hardware: Network Introduction, Network Interface Adapter-Function, Features, Selection of NIC, Cabling a Network – Cable properties, Standards, Types, cable installation. Network Interconnection devices: Repeaters, Hubs, Bridges, Routers, Switches. Server Technologies: Multiple processor servers, Server storage technologies. Designing a Network.

2 hrs.

2. Network Operating System: a) Windows 2003/2008 Server, b) Linux: Overview & Features, Networking Architecture, File System, Networking Services, Clients-Text based clients, GUI based clients, Remote Desktop.

3 hrs.

3. Installation of NOS: a) Windows 2003/2008 Server, b) Linux

2 hrs.

4. Directory Services: Active directory architecture, Deploying active directory, Designing active directory, Managing Active directory. Configuration of

a)Active directory service (ADS) on Windows Server

b) LDAP on Linux Server

3 hrs.

5. Managing users, groups and File System: Managing users and groups on windows and Linux, RAID, LVM, Disk Quotas.

3 hrs.

6. Installation & Configuration of Network services

a. BOOTP/DHCP

b. DNS

c. Web Server

d. File Server.

e. mail Server

f. Print Server

3 hrs.

7. Security related issues: File Sharing & security, Firewalls, SELINUX, and Server Security.

3 hrs.

8. Network Management and troubleshooting tools

a) Operating System utilities

b) TCP/IP utilitie

c) Network analyzer

d) Traffic analysis

e) Protocol analysis

Reference Books :

1. The complete Reference Networking - Craig Zacker [TMH Publication]
2. Windows 2003 Server Complete Reference - Kathy Ivans [TMGH]
3. Windows 2008 Server Complete Reference- Kathy Ivans [TMGH]
4. The complete reference Linux -Richard L. Peterson [Tata Mcgraw Hill Publication]
5. Step-by-Step guides from www.redhat.com
6. Network security tools – Nitesh Dhanjani, Justine Clark [Oreilly publication]
7. <http://sectools.org>
8. Networking Bible – Sosinsky (Wiley India)
9. Linux Lab : Hands on Linux by D. Ambawade & D.N. Shah [dreamtech press]

Term work:

It should consist of 12 experiments on above topics. There should be at least one experiment on every topic. Assignments can be performed in a group (maximum 5 students per group) of students

Following is the reference list of assignments:

1. Installation of NOS
 - a. Linux (Kickstart, NFS, FTP)
 - b. Windows 2003 or 2008 Server
2. Configuration of DHCP Server on Linux and Windows Server with static as well as dynamic address bindings.
3. Configuration of Domain Name Server with forward & reverse zones on Linux and Windows Server. Add records like A, MX, SOA, NS, AAAA, PTR, CNAME, etc. Use client side utilities for DNS (like dig, nslookup, host) to check the server.
4. Installation and configuration of Active Directory Service- add users, hosts, define group policies, etc.
5. Implementing centralized login system using LDAP or RADIUS or NIS.
6. Configure File Server with DISK QUOTAS.
7. Configure Web Server with Virtual Hosting support.
8. Configure Email server on Linux (Sendmail or EXIM)
9. Study of different security tools:
 - a. Nmap
 - b. Nessus
 - c. Nikto
 - d. Snort
10. Writing packet sniffers & packet crafter using LIBPCAP & LIBNET
11. Study of GnuPG.

Cyber Laws

Lectures: 3 hrs/week

Theory: 100 Marks

Objective:

1. To learn IT security – threats, detection and prevention
2. To understand Cyber Laws and provisions.

Section-I

- 1. Object and Scope of the IT Act:** Genesis, Object, Scope of the Act, Amendments. **3 hrs**
- 2. E-Governance and IT Act 2000:** Legal recognition of electronic records, Legal recognition of digital signature, Use of electronic records and digital signatures in Government and its agencies. **7 hrs**
- 3. Certifying Authorities:** Need of Certifying Authority and Power, Appointment, function of Controller, Who can be a Certifying Authority? Digital Signature Certifications, Generation, Suspension and Revocation of Digital Signature Certificate. **7 hrs**

Section-II

- 4. Domain Name Disputes and Trademark Law:** Concept of Domain Names, New Concepts in Trademark Jurisprudence, Cyber squatting, Reverse Hijacking, Meta tags, Framing, Spamming, Jurisdiction in Trademark Dispute. **6 hrs**
- 5. The Cyber Crimes (S-65 to S-74) :** Tampering with Computer Source Documents(S-65), Hacking with Computer System(S-66),Publishing of Information Which is Obscene in Electronic Form(s-67), Offences : Breach of Confidentiality & Privacy (S-72), Offences : Related to Digital Signature Certificate (S-73 & S-74) **7 hrs**
- 6. E-banking and legal issues:** Regulating e-transactions, Role of RBI and legal issues, International transactions of e-cash, Credit card and internet, Laws relating to internet credit cards. **6 hrs**

References:

1. Cyber Law in India by Farooq Ahmad – Pioneer Books
2. Information Technology Law and Practice by Vakul Sharma – Universal Law Publishing Co. Pvt. Ltd.
3. The Indian Cyber Law by Suresh T Vishwanathan – Bharat Law house New Delhi.
4. Hand book of Cyber & E-commerce Laws by P.M. Bakshi & R.K.Suri – Bharat Law house, New Delhi.
5. Guide to Cyber Laws by Rodney D. Ryder – Wadhwa and Company Nagpur.
6. The Information Technology Act,2000 – Bare Act – Professional Book Publishers – New Delhi

Artificial Neural Network & Genetic Algorithm

Lectures: 3 hrs week
Tutorial: 1 hr/week

Theory: 100 Marks
TW: 25 marks

Section – I

- 1. Introduction:** Inspiration from Neuroscience, History, Issues. **2 hrs**
- 2. Hopfield Model:** Associative memory problem, Model, Stochastic Networks, Capacity of Stochastic n/w. **4 hrs**
- 3. Optimization Problems:** Weighted matching problem, Traveling salesman problem, Graph bipartitioning, Optimization problems in image processing. **4 hrs**
- 4. Simple Perceptrons:** Feed forward n/w, Threshold units, linear units, nonlinear units, stochastic units, Capacity of simple perceptrons. **3 hrs**
- 5. Multi-Layer n/w:** Back propagation, Examples & applications, Performance of multilayer feed forward network, Kohoanan self-organizing n/w. **4 hrs**

Section – II

- 6. Learning:** Supervised, Unsupervised (Hebbian /Competitive), Adaptive resonance theory.
- 7. Introduction to Genetic Algorithm:** Robustness of traditional optimization and search methods, Goals of Optimization, GA v/s Traditional methods, Simple GA, GA at work, Similarity templates, Learning the lingo, Mathematical foundations- The fundamental theorem, Schema processing at work, The 2-armed & k-armed Bandit Problem, The building block hypothesis, Minimal Deceptive Problem. **5 hrs**
- 8. GA Operators:** Data structures, Reproduction, Roulette-wheel selection, Boltzmann selection, Tournament selection rank, Selection- Steady- state selection, Crossover, mutation, A Time to Reproduce, a Time to Cross, Mapping Objective Functions to Fitness Form, Fitness Scaling, Codings- A Multi-parameter, Mapped, Fixed-point Coding, Discretization, Constraints. **4 hrs**
- 9. Applications of GA:** The rise of GA, GA Applications of Historical Interest, DE JONG and Function Optimization, Current applications of GA. **3 hrs**
- 10. Advanced Operators & Techniques in Genetic Search:** Dominance, Diploidy & Abeyance, Inversion & other reordering operators, Other Micro Operators, Niche and Speciation, Multiobjective Optimization, Knowledge Based techniques, GA & Parallel Processes, Real life problem. **4 hrs**

Reference Books:

1. Introduction to Theory of Neural Computation – Hertz, Keogh, Palmer.
2. Genetic Algorithms – David E. Goldberg [Publication- Pearson Education]
3. Introduction to Artificial Neural Networks- B. Yegnanarayana [PHI]

Term work:

It should consist of 10-12 assignments based on the topics of the syllabus.

Equivalences of B. E. (IT) for repeater / backlog students

BE (IT) Sem.-VII

Sr. No.	BE (IT) –I (Pre-Revised)	Equivalent / Replacement subject (Revised)
1.	Mobile Technology	Mobile Computing of B. E. (IT) Sem-VII
2.	Advanced Database Systems	Advanced Database Systems of B. E. (IT) Sem-VII
3.	Real Time Systems	Real Time Systems of B. E. (IT) Sem-VII (Elective-I : A)
4.	Network Engineering	Network Engineering
5.	Web Technology - I	Web Technology – I of B. E. (IT) Sem-VII
6.	Elective - I	
	A) Project Management	Project Management of B. E. (IT) Sem-VII
	B) Cyber Laws	Cyber Laws

BE (IT) Sem.-VIII

Sr. No.	BE (IT) –I (Pre-Revised)	Equivalent / Replacement subject (Revised)
1.	Distributed Computing	Cloud Computing of B. E. (IT) Sem-VIII
2.	Information Technology & Business Methodology	Information Technology & Business Methodology of B. E.(IT) Sem-VIII
3.	Storage Networks	Storage Networks of B.E. (IT) Sem-VIII
4.	Web Technology - II	Web Technology – II of B. E.(IT) Sem-VIII
5.	Elective - II	
	A) Business Intelligent System	Business Intelligent System of B. E. (IT) Sem-VIII
	B) ANN and Genetic Algorithm	ANN and Genetic Algorithm