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SHIVAJI UNIVERSITY, KOLHAPUR.

Revised Syllabus of

(B.E. Information Technology Sem –VII & VIII)

To be introduced from the academic year 2010-11

(i.e. from June 2010) Onwards

(Subject to the modifications will be made from time to time)

S HIVAJI UNIVERSITY, KOLHAPUR

STRUCTURE & SYLLABUS OF **B.E. INFORMATION TECHNOLOGY**
With effect from July 2010 (Semester – VII & VIII)

Semester – VII

Sr. No	Subject	L	T	P	Theory Marks	TW	POE	Oral	Total Marks
1	Mobile Technology	4	1	-	100	25	-	-	125
2	Advanced Database systems	4	-	2	100	25	-	-	125
3	Real Time Systems	3	1	-	100	25	-	-	125
4	Network Engineering	2	-	2	-	25	-	50	75
5	Web Technology - I	2	-	2	-	25	50	-	75
6	Elective - I	3	-	-	100	-	-	-	100
7	Project - I	-	-	4	-	50	-	75	125
Total		**18**	**2**	**10**	**400**	**175**	**50**	**125**	**750**

Semester – VIII

Sr. No	Subject	L	T	P	Theory Marks	TW	POE	Oral	Total Marks
1	Distributed Computing	4	-	2	100	25	-	25	150
2	Information Technology & Business Methodology	4	1	-	100	25	-	-	125
3	Storage Networks	3	1	-	100	25	-	-	125
4	Web Technology - II	2	-	4	-	50	50	-	100
5	Elective - II	3	1	-	100	25	-	-	125
6	Project - II	-	-	4	-	50	-	75	125
Total		**16**	**3**	**10**	**400**	**200**	**50**	**100**	**750**

Elective I:
1. Project Management
2. Cyber Laws

Elective II:
1. Business Intelligent System
2. ANN & Genetic Algorithm

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]

1) MOBILE TECHNOLOGY

Lecture   : 4 hrs week   **Theory: 100 Marks**
Tutorial   : 1 hr/week   **TW   : 25 marks**

Section – I

1. **Introduction to wireless communication:** Need and Application of wireless communication. Wireless Data Technologies Market for mobile.   **3 hrs.**

2. **Wireless transmission:** Frequency for radio transmission signal antennas, signal propagation Multiplexing Modulation, Spread and Cellular systems.   **4 hrs.**

3. **Medium Access Control:** Specialized MAC, SDMA, FDMA, TDMA & CDMA   **4 hrs.**

4. **GSM Technologies:** GSM architecture, entities, call routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, GSM Frequency Allocation, Authentication and Security, 3G Networks, Applications on 3G.   **6 hrs.**

5. **Services over Mobile Communication:** Mobile computing over SMS, Short Message Services, Value added services through SMS, GPRS and Packet Data Network, GPRS Network Architecture, GPRS Network Operations, Applications of GPRS, Limitations of GPRS.   **6 hrs.**

Section – II

6. **Wireless LAN:**
   Introduction, Infrared v/s Radio transmission, Infrastructure and ad-hoc Network, IEEE 802.11, Blue Tooth.   **4 hrs.**

7. **Mobile Network Layer:** Mobile IP, DHCP.   **2 hrs.**

8. **Mobile Transport Layer:** TCP, Fast and selective retransmission and recovery Transaction oriented TCP.   **4 hrs.**

9. **Wireless Application Protocol:** Introduction, WAP, MMS.   **4 hrs.**

10. **Wireless Device with Windows CE:** Introduction, Different flavors of Windows CE, Windows CE Architecture, Windows CE Development Environment.   **4 hrs.**

11. **Security Issues in Mobile Computing:** Introduction, Information Security, Security Techniques and Algorithms, Security Protocols, Public Key Infrastructure, Trust, Security Models, Security Frameworks for Mobile Environment.   **5 hrs.**

Text Books:
   1. Mobile Communications - Jochen Schiller - 2nd edition, Publication-Pearson Education. (For Chapter No. 1, 2, 3, 6, 7, 8)

2. Mobile Computing – Ashok K Talukdar, Roopa R Yavagal, Publication-TATA McGRAW HILL (For Chapter No. 4, 5, 9, 10, 11)

Reference Books:

1. Introduction to Wireless Telecommunications systems and Networks - Gary J. Mulett. [Cengage Learning (India Edition)]
2. Mobile Communication – G.K. Behra, Lopamudra Das, [Scitech Publication (India) PVT. LTD.]

Term work: It should consist of 10 to 12 assignments based on the topics of the syllabus.

2) ADVANCED DATABASE SYSTEMS

Lectures : 4 hrs/week   **Theory: 100 Marks**
Practical : 2 hrs/week   **TW   : 25 Marks**

Section-I

1. **Object-Oriented & Object Relational Databases:** Overview of Object-Oriented concepts, Object identity, Object structure, and type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Type extents and queries, Complex objects; Database schema design for OODBMS; OQL, Database design for an ORDBMS – Nested relations and collections; Storage and access methods, Systems comparison of RDBMS, OODBMS, ORDBMS. **7 hrs**

2. **Parallel and Distributed Databases** : Architectures for parallel database, Parallel query Evaluation, Parallelizing individual operation, Parallel Query Optimization, Distributed DBMS Architecture, Storing data in distributed DBMS, Distributed Catalog Management, Distributed query processing, Updating distributed data, Distributed concurrence control, Distributed recovery. **7 hrs**

3. **Advanced transaction processing :** Transaction-processing monitors, transactional workflows, main-memory databases, real-time transaction systems, long-duration transactions, transaction management in multi-databases. **5 hrs**

4. **Database Security :** Access Control, Grant & Revoke on Views and Integrity Constraints, Role Based security, Mandatory access control, Role of DBA security in Statistical Databases. **5 hrs**

Section-II

5. **Web databases :** Web search engines, web search architecture, Inverted indexes the IR way, Inverted indexes for web search engines, web crawling, Overview of XML, Structure of XML data, Document Schema, Querying XML data, Storage of XML data, XML applications. **6 hrs**

6. **Decision Support** : Introduction Data Warehousing OLAP, Implementation Techniques for OLAP,Views and decision support.   **6 hrs**

7. **Data Mining:** Introduction, Counting Co-occurrences, Mining for rules, Tree structured rules, Clustering, Similarity search over sequences, Additional data mining tasks.   **6 hrs**

8. **Enhanced Data Models for Advanced Applications:** Active database concepts, Temporal database concepts, Spatial databases, Concepts and architecture, Deductive databases and Query processing, Mobile databases, Multimedia Databases, Geographic information systems.   **6 hrs**

Text Books:
1. Database system concepts – Silberschatz, Korth, Sudarshan ,4th Edi. [MGH International Edition] -- Chapter No. 1, 2, 3, 5,6.
2. Fundamentals of Database Systems -Elmasri and Navathe, 4th edition [Pearson Education]   -- Chapter No. 4, 7.
3. Database Management Systems - Raghu Ram Krishnan. 2nd edition [McGraw Hill] -- Chapter No. 8

Reference Books:
1. Database System Design Implementation & Management - Rob & Control (Thomson Learning)
2. Decision support and data warehouse systems -Mallach (TMH)
3. Data Mining – Introductory & Advance Topic -M. H. Dunham[Pearson Edt.]

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 two phase commit in distributed DBMS
2) Implementation of Concurrency Control in distributed DBMS.
3) Implement parallel joins, sorting and aggregates.
4) Implementation of database security using grant & revoke.
5) Implementation of Web Interface to Databases.(Simulation of a search engine)
6) Implementation of querying on XML data using XML schema & XML types.
7) Implementation of OLAP queries
8) Implementation of cube operator in OLAP queries in data warehousing and decision support system
9) Implement Apriori algorithm in data mining
10) Implement view modification and materialization in data warehousing and decision support systems
11) Implement Decision Tree of Data Mining problem.
12) Installation & Configuration - Case Study of IBM-DB2 database/MS-SQL server/Oracle/ MySql or any open source RDBMS

3. REAL TIME SYSTEMS

Lectures   : 3 Hr/week   **Theory: 100 Marks**
Tutorial   : 1 Hr/week   **TW**   : 25 Marks

Section – I

1. **Basic Real- Time Concepts & Hardware Consideration:** Terminology, Real Time design Issues, Example, Real –Time systems, brief history, basic architecture, H/W interfacing, CPU, Memory & I/O. **5 hrs.**

2. **Real Time specification and design Techniques:** Natural Languages, Mathematical specification, flowcharts, structure charts, Pseudocode and programming design languages, finite state Automata , Data flow diagram petrinets, Warnier –Orr Notation, State charts Sanity in using graphical Techniques. **7 hrs.**

3. **Real Time Kernals:** Pseudokernels, Interrupt –Driven system, Preemptive Priority System, Hybrid System, Task control block model, Process Scheduling ,RR scheduling, Cyclic Executives, Fixed Priority & Dynamic Priority scheduling. **4 hrs.**

4. **Inter-Task Communication and Synchronization :** Buffering Data, Mailboxes, Critical Regions, Semaphores, Event flags and signals, Deadlock. **4 hrs**

Section – II

5. **Real-Time Memory Management:** 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 algorithm, Memory locking, Working set, Real time garbage collection, contiguous file system, Selecting Real-time kernels. **5 hrs**

6. **System Performance Analysis and Optimization :** Response-Time Calculation, Interrupt Latency, Time-Loading and its Measurement, Scheduling Is NP-Complete, Reducing Response Times and Time-loading, Analysis of Memory Requirements, Reducing Memory-loading, I/O Performance. **6 hr**s

7. **Reliability, Testing and Fault Tolerance:** Faults, Failures, Bugs and Effects, Reliability, Testing, Fault Tolerance. **4 hr**s

8. **Real Time Applications:** Real time systems on complex systems, real time data bases, real time image processing, Real time process control. **3 hrs.**

Text Books:
     1. Real Time Systems Design & Analysis – An Engineer's Handbook , second edition - P.A. Laplante [PHI] (for chapter no. 2,4,6,7,8)

2. Real Time Systems Design and analysis – Phillip A. Laplante, Third edition (Wiley Publication) (for chapter no. 1,3,5)

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.K. Prasad.

Term work:-
It should consist of 10-12 tutorial based on above topic & case study on any of the mentioned RTOS like RTLinux, Windows CE,QNX,POSIX.

4) 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. 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
   f) Network Management Using SNMP. **3 hrs**

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.

5) WEB TECHNOLOGY-I

Lectures   **: 2Hrs/week**   **TW : 25 M**
Practical   **: 2 Hrs/week**   **POE: 50 M**

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
4. To create awareness about the differences in Desktop and Web Application

1. **Introduction to XML:** What is XML, XML verses HTML, XML terminology, XML standards, XML syntax checking, The idea of markup, XML Structure, Organizing information in XML, Creating Well-formed XML, XML Namespaces. DTD-Introduction to DTD, Document Type Declaration, Element Type Declaration, Attribute Declaration, Conditional Section, Limitations of DTD **2 hrs**

2. **Parsing XML:** Introduction to Parser, Parsing approaches, JAXP, JAXP and SAX, JAXP and DOM. **3 hrs**

3. **Extensible Stylesheet Language(XSL):** Introduction to XSL, overview, XPATH, XSLT – templates, creating elements and attributes, looping and sorting, conditional processing, defining variables. **2 hrs**

4. **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. **2 hrs**

5. **Introduction to Servlet:** History of web applications, support for web application, power of servlet, a Servlet's job, basic servlet code, configuration of apache tomcat server, set up Development Environment, Compiling and Deploying Servlet, Web Application - directory structure, Deployment descriptor, Assigning custom URLs to servlet. **1 hrs**

6. **Structure of Servlet:** HTTP basic, The servlet API, Page Generation, The Servlet Life Cycle – The Service method, doGet and doPost methods, Init method, destroy method, The Single Thread Model Interface. **1 hrs**

7. **Retrieving Information :** Servlet Init Parameters and Parameter Names, Information about server, Context Init Parameters, The Client Information – information about client machine, Restricting Access, Information about user, The Request – Request Parameter, path information, Serving files, Serving Resources, Request Headers, Handling Post Request. **2 hrs**

8. **Creating Response in Servlet:** The Structure of response, sending normal response, using persistent connection, response buffering, controlling response buffer, status codes, setting status code, HTTP headers, setting HTTP headers, Redirecting request, client pull, configuring error pages, logging, Exceptions. **2 hrs**

9. **Session Management in servlet:** Session tracking**,** Session tracking Mechanisms – Hidden Form Fields, URL Rewriting, cookies, Session Tracking APIs, session life cycle, Setting session timeout, life cycle methods, manually invalidating session, Session ID, non cookie Fallbacks. **2 hrs**

10. **Java Server Pages:** Need for JSP, Benefits of JSP, Advantages of JSP over other technologies, Installation of JSP pages, Creating Template Text, Invoking Java Code From JSP, Limiting the JAVA code in JSP, Using JSP Expression, Example of JSP Expression, Comparing Servlet to JSP, Writing Scriptlets, Scriptlet examples, Scriptlet for conditional execution, Using Declaration, Declaration Example, Using Predefined Variables, JSP page Directive – import, contentType, pageEncoding, session, buffer, autoFlush, errorPage. **3 hrs**

11. **Web Services :** Introduction to Web Services, Comparison of Web Services with traditional technologies, Buzzwords in Web Services, Java Web Services, RESTful Web Services **3 hrs**

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

Reference Books:
1. The XML Handbook – Charls Goldfarb.
2. Learning XML – Erik Ray[SPD O'REILLY 2nd Edition]
3. Web Technologies - Black Book [Dreamtech Press]
4. Head First – Servlet and JSP - Bryan Basham[SPD O'REILLY, 2nd Edition]

Term Work: It should consist of 10-12 experiments based on the following topics.
1. Create different types of XML documents.
2. Search information from XML document using SAX parser.
3. Navigating the Document Object Model tree for given XML Document.
4. Editing, Updating 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. Storing XML contents to database.
9. Installation, Configuration of Tomcat Server and Deployment of servlet based application.
10. Write a servlet to store form data to database – use Type 4 JDBC driver and Database connectivity support from server.
11. Session Management using Servlet.
12. Write a JSP application to display database contents.
13. Write an JSP application to search particular information in database
14. Session Management using JSP.

5) ELECTIVE-I

a. Project Management

Lectures: 3 hrs/week   **Theory: 100 Marks**

Objectives:

1. Provide students with a basic understanding of project management principles and practices.
2. Increase the student's ability to function effectively on a project team.
3. Describe and understand the purpose of each component of a project plan document
4. Demonstrate competency in the creation and management of a project plan
5. Share best practices and tools related to project management

SECTION – I

1. **Introduction to Project Management :** 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 groups to knowledge areas.   **5 hrs**

2. **Project Integration Management:** 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.
                                                                4 hrs

3. **Scope management:** scope planning and scope management plan, scope definition and project scope statement, creating the work breakdown structure, scope verification and control, software assistance.   **3 hrs**

4. **Time management:** Importance of project schedules, activity - definition, sequencing, resource estimating, duration estimating; schedule development and control, software assistance.   **3 hrs**

5. **Cost management:** Importance, basic principles, cost estimating, budgeting and control, software assistance. **3 hrs**

SECTION – II

6. **Quality management:** Importance, quality - planning assurance control, tools and techniques, modern quality management and improving IT project quality, software assistance. **4 hrs**

7. **Human Resource management:** Importance, keys to managing people, human resource planning, acquiring, developing and managing project team, software assistance. **4 hrs**

8. **Communication management**: Importance, communication planning, information distribution, performance reporting, managing stakeholders, suggestions for improving project communication, software assistance. **3 hrs**

9. **Risk management:** Importance, risk management planning, sources of risk, risk identification, qualitative and quantitative risk analysis, risk response planning, risk monitoring and control, software assistance. **4 hrs**

10. **Procurement management:** Importance, planning purchases and acquisitions, planning contracting, requesting seller responses, selecting sellers, administering the contract, closing the contract, software assistance. **3 hrs**

Text Book:
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. Project Management- A systems Approach to planning, scheduling and controlling - Harold Kerzner (John Wiley & Sons, Inc)
3. *A Guide to the Project Management Body of Knowledge (3rd Edition)-* Newtown Square, PA, Project Management Institute, 2005.

Note:
- Microsoft Project 2007 (120-day trial available from http://www.microsoft.com).

5) ELECTIVE-I

b. 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 isObscene 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

6) PROJECT-I

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) Sem – VIII

1) DISTRIBUTED COMPUTING

Lectures   : 4 Hrs/week   **Theory: 100 Marks**
Practical   : 2 Hrs/week   **TW   : 25 Marks**
                                                      OE   : 25 Marks

SECTION –I

1. **Introduction:** Definition, goals, types of distributed system, architecture, architectural styles, system architectures, Client-server model and examples of distributed system.

   5 hrs

2. **Processes, communication & Synchronization:** Threads, virtualization, clients, servers, remote procedure calls, distributed shared memory, synchronization, clock synchronization, logical clock, mutual exclusion   **6 hrs**

3. **Cluster, grid computing:** A typical cluster computing environment, single system image, cluster RMS architecture,
   Grid computing : definition, goals, architecture, case study – GOGRID   **5 hrs**

4. **Cloud computing – Introduction:** Cloud computing -Definition, elasticity and scalability, self service provisioning, application program interfaces (APIs), performance monitoring and measuring, comparing cloud providers with traditional IT service providers, addressing problems   **6 hrs**

SECTION –II

5. **Cloud computing -Getting inside the cloud:** SAAS, PAAS, IAAS, Deciding on a cloud strategy, administrating cloud services, SLA'S and monitoring, Case study: Amazon EC2

   4 hrs

6. **Looking at the cloud technical details:** API's and data transformations, data and application architectures, managing cloud resources, IT security, performance measurement, provisioning, service management   **4 hrs**

7. **Virtualization in cloud:** Visualizing virtualization, characteristics, using hypervisor in virtualization, managing virtualization, foundational issues, abstraction layer, provisioning s/w, virtualizing storage, hardware provisioning, security issues, taking virtualization into the cloud, virtualizing desktop and managing desktops in the cloud, security issues, characteristics of SOA, SOA & the cloud.   **9 hrs**

8. **Data security and security management, storage in the cloud:** Need for data security, data security mitigation, provider data and security, security management standards, SAAS, PAAS, IAAS availability management, security vulnerability management. **6 hrs**

Text Books :
1. Distributed system - A S Tanenbaum (2nd edition) (chapter 1 and 2).
2. Hadoop: the definite guide –White [O' Reilly] (chapter 3)
3. Cloud computing for dummies - Judith Hurwitz, Robin Bloor, Marcia Kaufman [Wiley India Edition] (Chapter 4,5,6,7)
4. Cloud security and privacy - Tim Mather, Subra kumarswamy, Shahed latif [O"relly publications] (chapter 8)

References :
1. Distributed operating systems - Dr. P. K. Sinha (PHI)
2. Distributed system , concepts and design ,4th edition - Coulouirs, Dollimore, Kindberg (Addison Wesley)
3. Cloud Application Architectures -1st edition-George Reese (O'Reilly)

Term Work:
It should consist of 10-12 experiments based on the following topics, appropriate simulator can be downloaded and may be used for conduction of 1 or 2 experiments.
1. Assignment on client server program.
2. Assignment on 3-tier architecture.
3. Program on RPC (sun rpc is available in linux)
4. Program on clock synchronization algorithm
5. Program on mutual exclusion algorithm.
6. A small project on cluster / grid computing area.
7. Assignment /Implementation of cloud computing environment.
8. Case study : Hadoop clusters.
9. Case study : gogrid.
10. Case study : Amazon web services, Amazon EC2.

2) INFORMATION TECHNOLOGY & BUSINESS METHODOLOGY

Lectures   : 4hrs/week   **Theory: 100 Mark**
Tutorial   : 1hr/week   **TW   : 25 Mark**

SECTION-I

1. **Introduction ERP:** Overview, accommodating variety, integrated management information, integration, supply chain and resource management, integrated data model scope, Technology and benefits of ERP & the modern enterprise.   **4 hrs**

2. **Business modeling for ERP:** 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.   **7 hrs.**

3. **ERP implementation:** Overview, role of consultants vendors and users, customization, precautions, post implementation, option, ERP implementation methodology and

guidelines for ERP implementation, Mercedes Bens, Keethin Industire, Bull Electronics Angers Plant manufactures, Twentieth Centaury companies, A meritech Essar steel, jindal Iron and steel company Ltd. Goderaj soaps and associate companies, IREDA, comparison and conclusions. **7 hrs**

4. **Getting started on Basic SAP R/3 Elements :** 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 A SAP roadmap. **6 hrs**

SECTION -II

5. **Introduction to CRM :** Definition of CRM technology, CRM technology components, customer life style, customer interaction, Introduction to eCRM: difference between CRM & eCRM, features of eCRM. **3 hrs**

6. **Sales Force Automation (SFA) :** Definition & need of SFA, barriers to successful SFA, SFA: functionality, technological aspect of SFA: data synchronization, flexibility & performance, reporting tools. **4 hrs**

7. **Enterprise Marketing automation (EMA) :** Components of EMA, marketing camping, camping, planning & management, business analytic tools. , EMA components (promotions, events, loyalty & retention programs), response management. **4 hrs**

8. **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. **5 hrs**

9. **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. **5 hrs**

10. **Introduction to ASP (application service provider) :** Who are ASP's? , their role & fuction, advantage & disadvantage of implementing ASP. **3 hrs**

Text Books:-
1. Enterprise resource planning - Vinod Kumar Garg & N. K. Venkita Krishna ,2nd edition [PHI] (for 1st section)

2. CRM at the Speed of Light- Greenberg, Paul, (4th Edition): Social CRM Strategies, Tools, and Technologies for Engaging Your Customers. [McGraw Hill] (2nd section)

Reference Books

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

Term work:

It should consist of 10-12 assignments based on the following topics:

1. Make report of 2-3 pages on Supply chain management
2. Briefly describe the different business processes in manufacturing or any other industry
3. Make survey report of 3-5 pages on different ERP packages in the market
4. You have decided to implement ERP modules in your company/Organization. Prepare pre and post implementation strategies.
5. Go through the different case studies of companies/Organizations and make conclusion based upon your analysis.
6. Prepare brief report on SAP R/3
7. Brief the SFA and EMA.
8. Make survey report on different CRM products in the market.
9. Prepare brief report on pre and post implementation strategies of CRM model in organization.
10. Each student/team 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.

3) STORAGE NETWORKS

Lectures	**: 3 hr/week**	**Theory: 100 M**	
Tutorial	**: 1hr/week**	**TW**	**: 25 M**

Objectives
1. To Study storage system architectures
2. To study business needs of storage management
3. To study importance of backup and replication

Section –I

1. **Introduction to information storage and Storage System Environment :** 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. **4 hrs**

2. **Intelligent Storage System and Direct Attached Storage:** 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. **4 hrs**

3. **Storage Area Network :** SAN – Evolution, Components of SAN, Fibre Channel Protocol Stack- Links, ports and topologies, FC-0: Cables, plugs and Signal Encoding, FC-1: 8b/10b encoding, ordered sets and link control protocol, FC-2: data Transfer, FC-3: common Services, FC-4 and ULPs, Fibre Channel SAN – point-to- point topology, Fabric topology, Arbitrated loop topology, Hardware components of Fibre channel SAN. IP SAN – iSCSI – components, connectivity, topology, protocol stack, discovery, names, session, PDU **6 hrs**

4. **Data Protection : RAID** Implementation of RAID, RAID array components, RAID levels, Comparison, RAID Impact on disk performance, Hot Spares. **2 hrs**

Section –II

5. **Network -Attached Storage :** 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 **6 hrs**

6. **Storage Virtualization:** Introduction, Virtualization in the I/O path, Limitations and requirements, Definition of Storage Virtualization, Implementation considerations,

Storage Virtualization on block level, File level Virtualization, Storage Virtualization on various levels of the storage network, Symmetric and Asymmetric Storage Virtualization

5 hrs

7. **Business Continuity, Backup and Recovery :** 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, Backup in NAS environment, Backup Technologies,   **5 hrs**

8. **Replication :** Local Replication, Use Local Replicas, Data Consistency, Local Replication Technologies, Restore and Restart Considerations   **2 hrs**

Text Books:

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

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

Term work :
It should consist of minimum 10-12 assignments based on the above topics.

4) WEB TECHNOLOGY-II

Lectures	**: 2 Hr/week**	**TW :50 M**
Practical	**: 4 Hr/week**	**POE: 50 M**

1. **Introduction to ASP.NET :** The Evolution of Web Development, Important facts about ASP.NET, The Code Model, Web Project.   **1 hrs**

2. **Web Forms :** Page Processing, Web Form Processing Stages, The Page as Control Container, The Page Class.   **2 hrs**

3. **Server Controls :** Types of Server Controls, HTML Server Controls, Web Controls, List Controls, Input Validation Controls, Rich Controls   **2 hrs**

4. **ASP.NET Application :** Anatomy of ASP.NET application, global.asax Application file, ASP.NET Configuration, .NET Components, Extending the HTTP Pipeline   **2 hrs**

5. **State Management :** ASP.NET State Management, View State, Transferring Information between pages, Cookies, Session State, Application State   **2 hrs**

6. **ADO.NET Fundamentals :** ADO.NET Architecture, The Connection Class, The Command and DataReader Classes   **2 hrs**

7. **Data Binding :** Basic Data binding, Data source Control, TheSqlDataSource.   **2 hrs**

8. **JavaScript and Ajax Techniques :** JavaScript Essentials, Basic JavaScript Example, Understanding Ajax, Using Ajax with client callbacks   **1 hrs**

9. **ASP.NET Ajax :** Introduction, Sever Callbacks, ASP.NET Ajax Server Controls, Deeper into the Client Libraries, Control Extenders   **2 hrs**

10. **Introduction to PHP scripting language:** Basics of PHP script, combining HTML and PHP, variables, data types, static and predefined (super-global) variables, operators, expressions, flow & looping control   **2 hrs**

11. **Functions and Arrays :** Structure of function, defining & calling function, returning values, arguments, scope of variables, static functions, include & require statements, Arrays, Associative arrays, multidimensional arrays, array related functions   **2 hrs**

12. **Advanced topics in PHP :** Object oriented programming in PHP, File & Directory handling in PHP, Database handling in PHP.   **2hrs**

13. **Managing State Information &Security :** Working with forms, cookies, sessions and security related issues

Text Books:
1. Professional ASP.NET 3.5 in C# 2008, Matthew MacDonald [Wiley-APRESS Publication]
2. Teach Yourself PHP, MYSQL, Apache - Julie C Meloni [SAMS Publication]
3. PHP5 and MySQL Bible Tim Converse, Joyce Park, Clark Morgan

Reference Books:
1. Beginning PHP5 [WROX]
2. PHP Bible-John [Wiley]
3. Professional ASP.NET 2.0 by Bill Evjen, Scott Hanselman [Wiley Wrox publication].
4. Debian New maintainers guide - http://www.debian.org/doc/maint-guide/
5. LaTeX: A document preparation system, User's guide and reference manual by Leslie
6. Getting started with Drupal - http://drupal.org/getting-started/

Term Work:
It should consist of 20-22 experiments based on the following topics.
1. Accepting and validating user entered data using ASP.NET.
2. Create a Web Application which detect capabilities of Browser and handle Page and Application level error.
3. Accepting and validating book catalog information using validating controls.

4. Create a Web Application which implement authentication and authorization features (Membership class).
5. Display database contents from SQL server or Oracle database using SQL Command class from ASP.NET.
6. Display parameterized data using SQLDataReader and GridView in ASP.NET.
7. Database access using DataSet in ASP.NET.
8. Displaying data using DataView in ASP.NET.
9. Create a setup web application for deployment of ASP.NET application.
10. Develop sample form with validation code using PHP.
11. Develop file up-loader form to upload a file using PHP.
12. Develop sample application for session management using PHP.
13. Develop sample application with database connectivity using PHP.
14. Create a form to send mail using PHP.
15. Use of Foss documentation tools – Latex
16. Introduction to packaging – Debian
17. Content Management Systems – Drupal

5) ELECTIVE-II
a. Business Intelligence System

Lectures **: 3 hrs/week**   **Theory: 100 Marks**
Tutorial **: 1 hr/week**   **TW   : 25 marks**

Section-I

1. **Introducing the Technical Architecture:** The value of architecture, Technical Architecture overview, Back room Architecture, Presentation Server Architecture, Front room Architecture, Infrastructure, Metadata, Security.   **7 hrs**

2. **Introducing Dimensional Modeling:** Making the Case for Dimensional Modeling, Dimensional Modeling primer, Enterprise Data Warehouse Bus Architecture, More on Dimensions & Facts.   **6 hrs**

3. **Designing the Dimensional Modeling:** Modeling Process overview, Getting Organized, Four Step Modeling Process, Design the Dimensional Model.   **5 hrs**

Section-II

4. **Introducing Extract, Transformation & Load:** Round up the requirements, the 34 subsystems of ETL, Extracting Data, Cleaning & Conforming data.   **6 hrs**

5. **Introducing Business Intelligence Applications:** Importance of B.I. Applications, Analytical cycle for B.I., Types of B.I. Applications, Navigating Applications via the B.I portal.   **6 hrs**

6. **Designing & Developing B.I Applications:** B.I. Application resource planning, B.I. Application Specification, B.I. Application Development, B.I. Application maintenance

6 hrs

Text Book:
1. The Data Warehouse Lifecycle Toolkit By Raiph Kimball,Ross, 2nd edition, Wiley Publication

Reference Books:
1. Data Warehousing in the Real World – Anahory & Murray, Pearson Edt.
2. Data Warehousing Fundamentals – Ponniah [Wiley Publication]

Term Work:
It should consist of 10-12 assignments with emphasis on configuration and development of Business Intelligence applications using tools –
1. ETL
2. Reporting tools - Infomatica, Datastage, Abitinio, Microstrategy and Business Objects, Cognos, PowerAnalyzer, Hyperion
3. Relational Database management Systems - Oracle, Terradata, MS SQL
4. Non-relational databases - delimited flat files, Poeplesoft data, XML data.

The assignments must include installation and testing of BI applications, setting up user security, and study process of maintenance of BI applications.

5) ELECTIVE-II

b. Artificial Neural Network & Genetic Algorithm

Lectures	**: 3 hrs week**	**Theory : 100 Marks**
Tutorial	**: 1 hr/week**	**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 bipartioning, 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.   **3 hrs**

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.

6) PROJECT-II

Practical: 4 Hrs/week   **TW: 50 M**
                                                                                                                                 OE: 75 M

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

Discrete Event System Simulations

Theory : 100 Marks

Section – I

1. **Introduction to simulation :** Need of simulation, Advantages and disadvantages, Applications of simulation, Generic structure of simulation models.   **5 hrs**

2. **General Principles of simulation and simulation softwares :** Concepts in discrete event simulation, list processing. Examples of simulation : queuing system, inventory system, Historical review of simulation softwares, simulation in C++, Simulation in GPSS, Simulation in CSIM, Simulation packages, current trends in simulation softwares.
                    7 hrs

3. **Input and Output modeling :** Collecting data and identifying, parameter estimation, goodness of-fit tests, Input models and their selection, stochastic nature of output data, performance measures and estimation, termination of simulation, Output analysis for steady state simulations.   **5 hrs**

Section – II

4. **Simulation models :** a) Statistical models Terminology and concepts, useful statistical models, Discrete and continuous distributions poisson processes. b) Queuing Models

Characteristics of queuing systems, Notations, performances measuring parameters of queuing systems, steady state behavior of infinite and finite population Markov models, Networks of queues. **9 hrs**

5. **Simulation of computer systems :** Simulation tools: process orientation, Event orientation, Modeling the input, High level computer system simulation, CPU simulation, Memory simulation. **8 hrs**

Text Book
1. Discrete Event System Simulation By Jerry Banks, John Carson Etc, Pearson Education Asia, Low price edition, Third edition

Ref Books
1) Simulation, Modeling and analysis by Law and Kelton , 2nd edition , MGH Publication

Multimedia Storage

Theory : 100 Marks

Section – I

1. **Introduction :** Types of media, introduction to making multimedia, applications of multimedia. **2hrs**

2. **Audio :** Basic sound concept, Multimedia system sound, MIDI versus digital audio, Audio file formats, Adding sound to multimedia project, professional sound, National interchange file formats. **4 hrs**

3. **Image and Animation :** Still images, Image file formats, Image synthesis, Image analysis , Principals of animation, computer based animation, JPEG, & MPEG standards. **6 hrs**

4. **Video :** Using video, Video signal representation, different video broadcasting standards, shooting & video editing tools video recording formats, Digital video. **6 hrs**

Section – II

5. **Multimedia Storage Devices :** Compact Disc, construction details, recording and reproducing data from CD, CDROM, DVD technology, specifications of DVD, comparison between CD and DVD. **6 hrs**

6. **Multimedia Application :** Introduction, Media preparation, Media composition, Media integration, Media communication, Media entertainment. **4 hrs**

7. **Multimedia on web :** Multimedia for the web, plugins and delivery vehicles, VRML, Text, images, sound and animation for web. **6 hrs**

Text Books :

1. Multimedia – Making it work 5th edition by Tag Vaughan (TMGH)
2. Multimedia Communication – Pearson Education Fred Halsall.
3. VRML exploring Virtual worlds on internet – Walter Goralski, Mathew Poli.
4. Multimedia Computing communication & Application

GIS and Remote Sensing concepts

Theory : 100 Marks

Section – I

1. **Map Language :** Map as a model, classification of maps, spatial referencing system, map projections, commonly used map projections, grid systems, computer in map production, digital database in a GIS, linkage of GIS to remote sensing.   **4 hrs**

2. **Remote sensing – basic principles :** Electromagnetic remote sensing, Energy sources, atmospheric interactions with electromagnetic radiations, energy interactions with Earth, surface materials, The radar principle, factors affecting microwave measurements, Radar wavebands, SLAR systems, Sar, Interpreting Sar images, Geometrical characteristics, Satellite system parameters, sensor parameters, imaging sensor systems, Earth resources satellite, Meteorological satellites, satellites carrying Microwave sensors, OCEANSAT-1 (IRS-P4), IKONOS satellite series. Types of pictorial data products.   **7 hrs**

3. **Fundamentals of GIS :** Roots of GIS, Overview of Information system, the four Ms, GIS definition and terminology, GIS queries, GIS architecture, Models of GIS, framework for GIS, GIS categories, levels/scales of measurement.   **5 hrs**

Section – II

4. **GIS data management :** Database management systems, GIS data file management, database models, storage of GIS data object based data models, temporal topology, organizational strategy of DBMS in GIS.   **4 hrs**

5. **data input and editing :** The data stream, data input models, data input methods, GPS for GIS data capture, data editing.   **4 hrs**

6. **Data quality issues :** Components of data quality, accuracy, precision and resolution, consistency completeness, sources of error in GIS, GIS output, modeling errors and error evaluation.   **4 hrs**

7. **Data analysis and modeling :** Format conversion, Data medium conversion, spatial measurement methods, buffering techniques, overlay analysis, modeling surfaces, modeling networks, Integration of remote sensing and GIS, Urban & Municipal applications.   **4 hrs**

References :

1. Remote sensing & Geographical Information System - M. Anji Reddi. (B S Publications) second edition.
2. The GIS Book - George B. Korte, Onward Press Thomson learning 5th edition.

3. Principles of Geographical Information Systems - Peter A. Burrough and MeDonell (Oxford University Press, 1998).

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.	Object Oriented Modeling and Design (OOMD)	Object Oriented Modeling and Design (OOMD) of T.E. (IT) Sem - V
2.	Advanced Database System	Advanced Database System of B.E. (IT) Sem-VII
3.	Information system security	Information system security of T.E (IT) Sem- VI
4.	Network Engineering	Network Engineering of B.E.(IT) Sem-VII
5.	Elective-I	
	a. Embedded & Real Time System b. ANN c. Discrete Event System Simulator & Modeling	Real Time Systems of B.E.(IT) Sem –VII ANN & GA of B.E.(IT) Sem – VIII Discrete Event System Simulations

BE (IT) Sem.-VIII

Sr. No.	BE (IT) –I (Pre-Revised)	Equivalent / Replacement subject (Revised)
1.	Software testing & quality assurance	Software testing & quality assurance of T.E(IT) Sem - VI
2.	IT Business Methodology	IT Business Methodology of B.E.(IT) Sem-VIII
3.	Mobile Technology	Mobile Technology of B.E.(IT) Sem - VII
4.	Web Technology	Web Technology of B.E.(IT) Sem - VIII
5.	Elective –II	
	a. Intelligent Systems b. Multimedia Storage & Communication c. GIS & Remote Sensing	Business Intelligence System of B.E(IT) Sem-VII Multimedia Storage GIS & Remote Sensing Concepts