

Solapur University, Solapur

Revised New Syllabus

MCA-II

Name of the Paper - IT-31: Web Programming

No. of Lectures: per week 4hrs

Course No. IT-31

Total Lectures: 40

Total Marks : 100

Semester- III

Objectives: It enables students to understand web site development, management and maintenance.

Contents of the course

Unit No.	Name of the Topic	Details	Lectures/Period
1	HTML & Forms	Introduction To HTML, WWW, W3C, web publishing, Common HTML, Tags Physical & Logical, Some basic tags like <body> , changing background color of page, text color etc., Text formatting tags, <p> , <hr> tags, Ordered & Unordered Lists Tags, Inserting image, Links: text, image links, image mapping , Tables , Frames, Form Introduction with text box, text area, buttons, List box, radio, checkbox etc.Introduction to DHTML	8
2	CSS	Introduction To Style sheet, types of style sheets- Inline, External, Embedded CSS, text formatting properties, CSS Border, margin properties, Positioning Use of classes in CSS, color properties, use of <div> & etc.	4
3	JavaScript	Intro to script, types, intro of JavaScript, JavaScript identifiers, operators, control & Looping structure, Intro of Array, Array with methods, Math, String, Date Objects with methods ,User defined & Predefined functions, DOM objects, Windows Navigator, History, Location, Event handling, Validations On Forms	8
4	VBScript	Intro. To VB Script, Variables, Data types, Control Structures & Loops, Functions in VB Script, Client side web scripting, Validating forms, DOM, Handling errors	5
5	XML	Intro & features of XML, XML writing elements, attributes etc. XML with CSS, DSO, XML Namespaces XML DTD, XML Schemas, Writing Simple sheets using XSLT, SAX & DOM Parsers, SOAP Intro.	6
6	ASP	Introduction of ASP, Working with ASP page, Request & Response object, Application & Session, Role of Global.asa file, Server Object, Error Handling in ASP Database Handling: Connection, Recordset, Command Object	7

Nature of Question Paper :

- a) 20% marks - Objectives questions
40% marks – Short notes/ Short answers type questions
40% marks – Descriptive type questions
out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc.however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions

Reference Books:

- | | |
|--|-------------------|
| 1. Complete reference HTML | |
| 2. Java Script Bible | |
| 3. HTML, DHTML, JavaScript, Perl & CGI | Ivan Bayross |
| 4. VBScript Programmers reference | wrox Press |
| 5. VBScript in Nutshell | |
| 6. Internet Technology at work | Hofstetter fred |
| 7. Beginning XML | Wrox Press |
| 8. XML how to program | Deitel & Deitel. |
| 9. Programming the World Wide Web | Robert W. Sebesta |
| 10. Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI | Ivan Bayross. |
| 11. Programming ASP | Ivan Bayross |
| 12. Beginning ASP 3.0 | Wrox press |

Reference Sites:

- 1. www.w3schools.com
- 2. www.devguru.com

Note: Any editor like front page or Visual Interdev will be taught to the students.
For HTML as well as ASP, It will be taught for practical purpose only and will not be considered for the exams.

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MCA-II

Name of the Paper - Data Communication and Computer Network

No. of Lectures: per week 4hrs

Course No. IT-32

Total Lectures : 40

Total Marks : 100

Semester- III

Objective : This subject enable to students to learn computer networks, technologies , application protocols, e-mail and communication protocols.

Contents of the course

Unit No.	Name of the Topic	Details	Lectures/ Period
1.	Introduction to Networking	Hardware Architecture, Topologies, Media, devices Transmission Techniques, Twisted Pair, Coaxial Cable, Fiber optics, Wireless Transmission Switching, Circuit Switching, Message Switching, Packet Switching	2
2.	Common Network Architecture	Connection oriented N/Ws Connectionless N/Ws Example of N/Ws-P2P, X.25, ATM, Ethernet, Wireless LANs - 802.11, 802.11x, Gigabit	5
3.	The OSI Reference Model	Protocol Layering, TCP/IP Model, OSI vs. TCP/IP	2
4.	Local Area Networks	Components & Technology, Access Techniques, Transmission Protocol & Media	2
5.	Broad Band Networks	Integrated Service Digital Networks (ISDN), Broad Band ISDN, ATM, ATM Traffic Mgmt, Introduction to Very Small Aperture Terminal (VSAT).	2
6.	IP Addressing & Routing	IP addresses – Network part and Host Part Network Masks, Network addresses and Broadcast addresses, Address Classes, Loop back address, IP routing concepts, Routing Tables, Stream & Packets What IP does? , What TCP does? Sliding Windows, TCP – a reliable pipe, TCP connection – Multiple conversations, Port Numbers, Multiple Connection from many hosts and one host IPV6: The next generation Protocol	8
7.	Domain Network Services (DNS)	Domain Names, Authoritative Hosts, Delegating Authority, Resource Records, SOA records, DNS protocol, DHCP & Scope Resolution	4
8.	Network Applications	(HTTP, Email, etc) Hyper Text Transfer Protocol (HTTP) HTTP communications - HTTP request, Request Headers, Responses, Status Code, Error Status Code , Email- Sending & Receiving Emails, Email Addressing, Message Structure MIME–Multipurpose Internet Mail Extensions SMTP–Simple Mail Transfer Protocol with Examples : Mail Exchangers – Delivering a message, Mail Boxes	8

		POP – Post Office Protocol IMAP – Internet Message Access Protocol FTP – File Transfer Protocol Telnet – Remote Communication Protocol Proxy Server, Proxy Web Servers	
9.	SNMP	An IP Management Protocol Network Management protocols SNMP the Simple Network Management Protocol, Agents & Managers, SNMP organization, Object Identifiers, Problem with SNMP	2
10.	Cryptography & Network Security	Threats, Packet-filtering firewalls, Fire wall policies and rules, Common Problem with Packet Filtering, SSL – Secure Socket Layer, IPSec (Internet Protocol Security), Virtual Private Networks, Symmetric Key Signatures, Public key Signatures, The Birthday Attack	5

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Reference:

- | | |
|---|------------------------|
| 1. Computer Networks | Andrew S. Tanenbaum 4e |
| 2. Network Essential Notes | GSW MCSE Study Notes |
| 3. Internetworking Technology Handbook | CISCO System |
| 4. Introduction to Networking and Data Communications | Eugene Blanchard |
| 5. Computer Networks and Internets with Internet Applications | Douglas E. Comer |
| 6. Firewalls and Internet Security | William R. Cheswick |

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MCA-II

Name of the Paper - IT-33: Object Oriented Programming Using C++

No. of Lectures: per week 4hrs

Course No. IT-33

Total Lectures : 40

Total Marks : 100

Semester- III

Objectives: It enables to students to learn C++ programs using the Object oriented design, and use the standard C++ library

Contents of the course

Unit No.	Name of the Topic	Details	Lectures/ Period
1.	Introduction of OOP's	Introduction, Procedural Vs Object Oriented Programming, Classes, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism Dynamic Binding, Message Passing , Object Oriented Languages Vs Object Based languages	3
2.	Concept of C++	History of C & C++ , C Vs C++ , A basic C++ Program , Application of C++ , Structure & Class , Compiling & Linking	1
3.	Expression	Tokens, Keywords, Identifiers & Constants, Basic Data Types, User-Defined Data Types, Symbolic Constant, Type Compatibility, Reference Variables, Operator in C++, Scope Resolution Operator, Member De-referencing Operators, Memory Management Operators-New Manipulators, Type Cast Operator	2
4.	Functions In C++	The Main Function, Function Prototyping ,Call by value,Call by Reference, Call by Address, Return by Reference, Inline Function, Default Arguments ,Const Arguments, Function Overloading, Friend Function	2
5.	Classes & Object	A C++ Program with class , Defining Member Functions , Making an Outside Function Inline , Nesting of Member Functions , Private Member Functions , Arrays within a Class, Memory Allocation for Objects , Static Data Members, Static Member Functions, Arrays of Objects , Object as Function Arguments Friend Functions, Returning Objects,	5

		Const member functions , Pointer to Members, Local Classes	
6.	Constructor & Destructor	Constructor , Parameterized Constructor , Multiple Constructor in a Class , Constructors with Default Arguments , Dynamic Initialization of Objects , Copy Constructor , Dynamic Constructor , Const Object ,Destructor	2
7.	Operator Overloading	Defining operator Overloading , Overloading Unary Operator , Overloading Binary Operator , Overloading Binary Operator Using Friends , Manipulating of String Using Operators ,Type Conversion , Rules for Overloading Operators	3
8.	Inheritance	Defining Derived Classes ,Single Inheritance ,Making a Private Member Inheritable ,Multilevel Inheritance ,Hierarchical Inheritance ,Multiple Inheritance, Hybrid Inheritance ,Virtual Base Classes, Abstract Classes ,Constructor in Derived Classes , Nesting of Classes	3
9.	Pointer, Virtual Function & Polymorphism	Introduction ,Pointer to Object, this pointer , Dynamic Memory management – new and delete,Pointer to Derived Class, Virtual Function, Pure Virtual Function, Early Vs Late Binding	4
10.	The C++ I/O System	C++ Streams, C++ Stream Classes . Unformatted I/O Operation ,Formatted I/O Operation ,Managing Output with Manipulators	2
11.	Files	Introduction ,Classes for File Stream Operation ,Opening & Closing Files Detection of End of File ,More about Open() : File modes ,File pointer & manipulator ,Sequential Input & output Operation ,Updating a File : Random Access ,Command Line Arguments	3
12.	Template	Generic Function, A function with Two Generic Data Types, Explicitly Overloading a Generic Function, Overloading a Function Template, Using Standard Parameter with Template Functions, Generic Function Restriction, Applying Generic Function : Generic Sort, Generic Classes, An Example with Two Generic Data Types Using Non-Type Arguments with Generic Class, Using Default Arguments With Template Classes, Explicit Class Specification,	4

		The type name & export keywords	
13.	Exception handling	Exception Handling Fundamentals , The try Block, the catch Exception Handler, The throw Statements , The try/throw/catch sequence, Exception Specification ,Unexpected Exception , Catch – All Exception Handlers ,Throwing an exception from handler ,Uncaught Exception	2
14.	Template Library	STL Programming Model, Sequence Container Adapter, Integrator Algorithms, Predicates, Allocators	2
15.	Namespace	Introducing Namespaces , Referring to Members of a Namespace ,The using namespace Statement , Defining A Namespaces , Nested Namespaces ,Unnamed Namespaces ,Namespace Aliases	2

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- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions

Reference:

- | | |
|--|-----------------------------|
| 1.C++: The Complete Reference | Herbert Schildt |
| 2.Let us C++ | Kanetkar |
| 3.Object Oriented Programming with C++ | E. Balagurusamy |
| 4.C++ Primer | Stanley Lippman & Lajoi |
| 5.C++ Programming Language | Bjarne Stroustrup |
| 6.C++ Programming Bible | Al Stevens & Clayton Walnum |

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MCA-II

Name of the Paper - Advance Database Management System

No. of Lectures: per week 4hrs

Course No. IT-34

Total Lectures : 40

Total Marks : 100

Semester- III

Objectives:. At the end of the course students should be able to: gain an awareness of the basic issues in objected oriented data models, learn about the Web-DBMS integration technology and XML for Internet database applications, familiarize with the data-warehousing and data-mining techniques and other advanced topics

Contents of the course

Unit No.	Name of the Topic	Details	Lectures/Period
1.	OODBMS & ORDBMS	Overview of Object-Oriented concepts & Characteristics, Objects, OIDs and reference types, Database design for ORDBMS, Comparing RDBMS, OODBMS & ORDBMS	4
2.	Advance Database Management System – Concepts & Architecture	Spatial data management , Web based systems, Overview of client server architecture, Databases and web architecture, N-tier, Architecture, Business logic – SOAP , Multimedia databases ,Mobile database	8
3.	Parallel databases	Introduction , Parallel database architecture,I/O parallelism,Inter-query and Intra-query parallelism, Inter- operational and Intra-operational parallelism , Design of parallel systems	4
4.	Distributed Databases	Introduction, DDBMS architectures , Homogeneous and Heterogeneous, Databases , Distributed data storage, Distributed transactions, Commit protocols ,Availability, Concurrency control & recovery in distributed , databases, Directory systems	4
5.	Knowledge base Systems	Integration of expert in database ,application & object database overview	4
6.	Data Warehousing	Introduction to Data warehousing, Architecture, Dimensional data modeling- star, snowflake schemas, fact constellation , OLAP and data cubes,	8

		Operations on cubes Data preprocessing -need for preprocessing, data cleaning, data integration & transformation, data reduction	
7	Data Mining	Introduction to data mining, Introduction to machine learning, Descriptive and predictive data mining, outlier analysis, clustering – k means algorithm, Classification - decision tree, association rules - apriori algorithm, Introduction to text mining, Bayesian classifiers.	8

Nature of Question Paper :

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- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions

Reference Books

1. Database system concepts*, 5th Edition –by Abraham Silberschatz, Henry Korth, S, Sudarshan, (McGraw Hill International)
2. Data Mining: Concepts and systems*, by Jiawei nan, Micheline Kamber, (Morgan Kaufmann publishers)
3. Database systems : "Design implementation and management", by Rob Coronel, 4th Edition, (Thomson Learning Press)
4. Database Management Systems by Raghu Ramkrishnan, Johannes Gehrke Second Edition, (McGraw Hill International)
5. Database Management System by Alexis Leon, Mathews Leon, (leon press)
6. Fundamentals of Database Systems by Ramez Elmasri , Shamkant Navathe

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Name of the Paper - Management Support Systems and IS security

No. of Lectures: per week 4hrs

Course No. BM-31

Total Lectures : 40

Total Marks : 100

Semester- III

Objectives:. In this subject student able to learn the foundations of Management Information System along with modern information system to support management functions.

Contents of the course

Unit No.	Name of the Topic	Details	Lectures/Period
1.	System Concept	General Model ,Types of systems ,Subsystems ,Organizational structure and functions, Systems approach to organization, Dynamics to Decision Making, Control by exception , Feedback control , Law of requisite variety , Cases related to Feedback Control	5
2.	Information Concepts	Definition, Types of Information , Quality of information, Value of information, Information needs of managers at different levels , Cases related to Information system	5
3.	Management Information Systems	Definitions ,Integrated system , MIS Vs Data processing , MIS and other academic disciplines ,Structure of MIS based on management activity and function, Systems concepts to MIS	5
4.	Humans As Information Processors	Newell-Simon model , Limits on Human Information Processing, Characteristics of Human Information Processing System	5
5.	Information Systems for Functional Areas	Information for financial system, Information for Marketing system, Inventory control system,Human Resource Information system Cases related to information requirement for above functional areas.	5
6.	Decision Making Systems and Modeling	Modeling process, Information needed for different phases & decision making, Sensitivity analysis , Static and dynamic models , Simulation Modeling, Case studies	4
7.	Decision support	Decision making phases	3

	systems-Overview	Concept of decision making Differences between MIS and DSS	
8.	Executive Information and Support Systems	Need, Characteristics, Integrated EIS and DSS, EIS implementation	3
9.	Expert Systems	Basic concept of Expert Systems, Comparison of conventional & Expert Systems , Structure of Expert Systems.	2
10.	Control audit & security of Information Systems (IS)	Objectives and types of control, Techniques. Need for Auditing of IS, Security of IS	3

Nature of Question Paper :

- a) 20% marks - Objectives questions
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- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions

References :

1. Management Information System -Gordan Devis, Margrethe H. Oison.
2. Information Systems for Modern Management (Ch. 6) -Robert Murdick, Joel e. Ross.
3. ecision Support & Expert System(Ch. 1, 2, 3, 4, 8, 10) -Efraim Turban

4. PPM and OB, Nirali Publication – Dr. Nandavadekar Vilas
5. Analysis and Design of Information System -V.Rajaraman.
6. Reference book- Information System Control and Audit - Ron Weber.
- 7 CISA Review Manual : Published by ISACA USA

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Name of the Paper - RESEARCH METHODOLOGY & STATISTICAL TOOLS

No. of Lectures: per week 4hrs

Course No. MT-31

Total Lectures : 40

Total Marks : 100

Semester- III

Objectives:. Research is a tool which helps the student to identify, understand and solve management problems in future organization

Contents of the course

Unit No.	Name of the Topic	Details	Lectures/Period
1.	Research Process	Meaning, Objectives and Motivation in Research, types of Research, Research Approaches, Research Process, Validity and Reliability in Research, Obstacles in accepting research.	2
2.	Hypothesis	Problem Formulation, Hypothesis Formulation, types of Hypothesis, characteristics of Good Hypothesis	2
3.	Research Design	Meaning and Significance of Research Designs, Features of a good research design, types of research design, contents of research design	2
4.	Sample Design	Census Vs. Sample. Steps in Sample Design. Determining the size of Sample. Sampling methods - Simple Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling, Selective Sampling.	3
5.	Data Collection	Types of Data, Sources of Data – Primary and Secondary Data. Methods of collecting the data. Testing the validity of the data.	2
6.	Measurement of Data	Measurement and scaling techniques, errors in measurement, tests of sound measurement, scaling and scale construction techniques	1

7.	Tools for data Collection	Steps in Questionnaire design, characteristics of a good questionnaire	1
8.	Data Presentation	Presentation, Processing & Analysis and interpretation of Data.	2
9.	Report Writing	Report Writing – layout of a Research Report, Characteristics of a good research report.	2
10.	<i>Statistical Tools</i>	Measures of Central Tendencies and Dispersions – Simple Numerical Calculations	4
11.	Sample Test	Correlation and Regression – 2 variable Association of Attributes – 2 Attributes Only Testing of Hypothesis, Large Sample Tests, Small Sample Tests – t, F test tests.	12
14.	Case Study – field work research	To conduct a small research project in group and apply the knowledge about research methodology	7

Note: Use of EXCEL, SPSS, MATLAB-Statistical Tool Box, etc. for Data Analysis is recommended.

Nature of Question Paper :

- a) 20% marks - Objectives questions
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40% marks – Descriptive type questions
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- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.
- c) The Components of the Examination will be
 - i) Written Examination for 70%
 - ii) Small Project for 30% with viva-voce

References:

- 1) Research Methodology Methods & Techniques
C.R.Kothari, New Age International
- 2) Statistical Methods
S.P.Gupta, Sultan Chand, NewDelhi
- 3) Business Research Methods
William G.Zikmund, Thomson South-Western
- 4) Introduction to Quantitative Research Methods
Mark Balnaves and Peter Caputi, Sage Publications

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Name of the Paper - **Mini Project Based Web Programming**

No. of Lectures: per week 4hrs

Course No. **IT 31P**

Total Practical : 40

Total Marks : 50

Semester- III

Objective : To make practice of students to develop a good web application using the techniques and scripting students have learnt during the semester, a small project will be done by the student as an assignment

Project Work:

This Mini Project is based on the subject, Web Support Technologies in the Sem-III. Simple projects such as static web site development, shopping carts application based on HTML, DHTML, JavaScript / VBScript and ASP, that will give the students some idea about project concept. Documentation need not be stressed in this mini project.

Nature of Evaluation For Lab work :

- a) 30% marks – The marks of project will be based on Screens, Forms, Validations
- b) 30% marks - Database handling, creating dynamic pages:
- c) 40% marks – based on project report and presentation work.

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Name of the Paper - C++ LAB

No. of Lectures: per week 4hrs

Course No. IT 31L

Total Practical : 40

Total Marks : 50

Semester- III

Objective : This lab work provides hands-on for OOP and C++ language learnt in theory session.

Lab Work:

C++ Programming practicals - minimum 20 based on Class, inheritance, abstraction, encapsulation, dynamic binding, polymorphism, I/O systems, exception handling should be covered .

Nature of Evaluation For Lab work :

- d) 20% marks – Based on laboratory work
- 40% marks – Programming questions and actual practical exam
- 40% marks – viva voce exam based on lab assignments

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Name of the Paper - Java Programming

No. of Lectures: per week 4hrs

Course No. IT-41

Total Lectures : 40

Total Marks : 100

Semester- IV

Objectives: To enable the students to understand the core principles of the Java Language and use visual tools to produce well designed, effective applications and applets.

Contents of the course

Unit. No.	Name of Topic	Details	Lectores/periods
1.	Introduction to Core Java	Class and Object , Object Oriented concepts with respect to Java , Interfaces, Packages , Static block, Instacnce initialization block, Wrapper classes, Autoboxing , Exception Handling & Assertion	6
2.	Applet As Java Applications	Applets specific methods & Related HTML references , Creating an Applet , Displaying it using Web Browser with appletviewer.exe , Advantages and Disadvantages of Applet Vs Applications	3
3.	Multithreading	Multithreading concepts , Thread Life cycle , Creating multithreaded application , Thread priorities , Thread synchronization	4
4.	Abstract Windows Toolkit	Components and Graphics, Containers, Frames and Panels, Layout Managers,	6

		<p>Border layout, Flow layout , Grid layout, Card layout, AWT all components , Event delegation Model, Event source and handler Event categories, Listeners, interfaces, Anonymous classes, Swing Libraries, Model view Controller design pattern, Different layout, menus dialog boxes,Text input</p>	
5.	Strings, Java Input Output	<p>String, StringBuffer, StringBuilder classes, Java IO package , Byte/Character Stream, Buffered reader / writer, File reader / writer Print writer, File Sequential / Random</p>	4
6.	Networking with Java	<p>Networking basics Sockets, port , Proxy servers , Internet addressing 7 URL , java.net – networking classes and interfaces , Implementing TCP/IP based Server and Client , Datagrams – Datagram packet,Datagram server and client , URL connections</p>	4
7.	JDBC	<p>Java database connectivity, Types of JDBC drivers , Writing first JDBC applications, Types of statement objects (Statement, PreparedStatement and CallableStatement) Types of resultset, ResultSetMetadata, Inserting and updating records, JDBC and AWT, Connection pooling</p>	4

8.	RMI	Introduction & Architecture of RMI , Java rmi classes and interfaces ,Writing simple RMI application ,Parameter passing in remote methods (marshalling and unmarshalling), Introduction to STURTS	4
9.	Java Beans	Java Beans introduction, design pattern Writing simple bean , Beans persistence and introspection , EJB ,Architecture , Container classes, Interfaces EJB types- Session, Entity, Message Driven	5

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References:

- | | |
|------------------------------------|-----------------------------------|
| 1. Core Java 2 Volume - I | Cay S Horstmann, Fary Cornell |
| 2. Core Java 2 Volume - II | Cay S Horstmann, Fary Cornell |
| 3. Programming with Java, A Primer | E.Balguruswami |
| 4. Inside Servlets | Dustine R Callway |
| 5. Developing Java Servlets | James Goodwill |
| 6. Complete Reference- J2EE | Jim Keogh |
| 7. Java 2 Complete Reference | Patric Naughton, Herbert Schildt |
| 8. Beginning Java Networking | Chad Darby, John Griffin & others |
| 9. Complete Reference – Sturts | Patric Naughton, Herbert Schildt |

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MCA-II

Name of the Paper - Software Testing & Quality Assurance

No. of Lectures: per week 4hrs

Course No. IT-42

Total Lectures : 40

Total Marks : 100

Semester- IV

Objectives: To enable student to learn Software Quality and Assurance practices and various software testing techniques through case studies

Course contents

Sr. No.	Name of topic	Details	Lectures/periods
I.	Software Quality Assurance		
1.		Quality Concept -Definition of Quality, QA, SQA , Quality factors , Software Quality Metrics, Process Improvement , Process and Product Quality ,The SEI Process Capability Maturity model, ISO, Six-Sigma , Process Classification	4
2.	Software Quality Assurance	Need for SQA , SQA Activities , Building blocks of SQA , SQA Planning & Standards	2
3.	Software Reliability	Reliability Measures , Reliability models	2
4.	Verification & Validation	Verification & Validation Planning , Software inspections, Automated static Analysis , Clean room Software Development	2
II	Software Testing		
5	Software Testing	Testing objectives,How test	4

	Fundamentals	information flows, Testing lifecycle , Test Cases – What it is?, Test Case, Designing(Concept & introduction should be covered here. Detailed techniques should be covered in Unit No. 2.4)	
6	Levels of Testing	Unit Testing , Integration Testing , System Testing , Acceptance Testing , Alpha testing & Beta testing , Static vs. Dynamic testing , Manual vs. Automatic testing , Testers workbench , 11-steps of testing process (Only steps should be covered)	5
7	Different types of Testing	Installation Testing , Usability testing , Regression testing, Performance Testing , Load Testing , stress testing , Security testing	2
8	Static & Dynamic Testing	Static Testing Techniques , Review types: Informal Review, Technical or peer review, Walkthrough, Inspection, static analysis , Review Meeting, Review Reporting & Record keeping, Review guidelines & Review checklist , Data flow analysis , Control flow analysis , Cyclometric Analysis , Dynamic testing – need & Advantages	4
9	Black Box & White	(Test Case Design	7

	Box Testing	Techniques) Functional Testing (Black Box) Equivalence partitioning, BVA, Cause-Effect graphing, Syntax testing (Concept & Test case generation only) , Structural Testing (White Box) Coverage testing, Statement coverage, Branch & decision coverage, Path Coverage, Domain Testing , Non functional testing techniques, Validation testing Activities , Low level testing, High level testing , Black box vs. White Box	
10	Testing specialized Systems and Applications	Testing object oriented software , Testing Web based Applications , Computer Aided Software testing tools (CAST) (only type & their purpose should be covered)	8

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diagrammatical and numerical questions.

Reference:

1. Software Engineering R. Pressmen – 6th Ed
2. Software Engineering Sommerville
3. Introducing Software Testing Louise Tamres
4. Effective Methods for software Testing William Perry
5. Software Testing in Real World Edward Kit
6. Software Testing Techniques Boris Beizer
7. Software quality assurance: Principles and Practices by Nina Godbole,
Narosa Publishing

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MCA-II

Name of the Paper - **Object Oriented Analysis And Design** No. of Lectures: per week 4hrs

Course No. IT-43

Total Lectures : 40

Total Marks : 100

Semester- IV

Objectives: After completing this course students will be able to: Understand the issues involved in implementing an object-oriented design and Analyze requirements and produce an initial design, Develop the design to the point where it is ready for implementation , Design components to maximize their reuse , Learn to use the essential modeling elements in the most recent release of the Unified Modeling Language - UML 2.0

Course contents

Unit. No.	Name of the topic	Details	Lectures/ Periods
1.	Introduction	Two views of software Developments: SSAD and OOAD. Why Object –Orientation?	2
2.	The Object Paradigm	Object and classes , Abstraction and encapsulation , Methods and Message , Interfaces, Inheritance and Polymorphism , Access Control ,The Business case for OO Developments	2
3.	Object Oriented Methodologies	Some of the object Oriented Methodology:- Object Oriented Design -Booch Object Modeling Techniques - Rumbaugh , Object – Oriented Analysis - Cood Yourdon, Object – Oriented Software engineering – Ivar Jacobson Unified Approach , Diagramming and Notational Techniques using the UML , UML Notation , {Analysis	6

		<p>Diagramming Techniques.} == Introduction to all (ten) Diagram , { Design Diagramming Techniques} , Generalization / Specialization, Aggregation and composition , Association , Cardinality, Navigability Icons, relationships and adornments.</p>	
4.	Object-Oriented Systems Development process	<p>Rational Unified Process - Four Major phases:- Inception , Elaboration, Construction, Transition Requirements Engineering, Problem analysis. Understanding Stockholders need Type of requirements. Use-case Model: Writing Requirements</p>	4
5.	Analysis	<p>Behavioral Analysis , Domain Analysis or Business Object , Analysis , Use-case Driven Object Oriented analysis The UML approach. Develop use-case Model , Use-case Description , Documentation , Activity Diagram , Identify the classes. , Introduction to different approaches for identifying classes , “Noun Phrase” approach OR “Conman Class Pattern” approach Or CRC” approach Or Usecase Driven Approach. , Containment and Composition , Aggregation , Inheritance, SubTypes and IS-A Hierarchies. , Association and</p>	8

		Link Relationships., Diagramming System Events.	
6.	Design Phases	Translating Analysis Concept into Design. , Optimizing classes and Objects: The Multi-tiered Architecture View, Mapping System functions to objects., Object-to-Object Visibility., Collaboration Diagram , Sequential Diagram , Specification Class Diagram , Specifying Object Interfaces. , Designing the Data Access layer., Design User Interface layer , Designing System Interfaces, Controls and Security.	6
7.	Design Refinement	Designing for Extensibility ,Design for reusability. , Portioning class space , Checking Completeness and Correctness	2
8.	Persistent Object and Database Issues	The Cood Data Management Domain. , Object Persistence , Object-oriented Database Management System , Object-Oriented verses Relational Database. , Mapping object to Relational Data structure.	4
9.	Testing	Introduction to Testing Strategies. , Impact of Object Orientation on Testing, Testing Business Process, Design Matrix ,Discovering reusable pattern.	3
10	Patterns	Benefits of patterns. ,Using patterns During Analysis, Using Pattern During Design	3

Nature of Question Paper :

- a) 20% marks - Objectives questions
- 40% marks – Short notes/ Short answers type questions

40% marks – Descriptive type questions

out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks

- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.

References

- Object Oriented Analysis and Design with Applications
Grady Booch., Benjamin / Cummings , 1994.
2. Object – Oriented Modeling and Design
J Rumbaugh, M Blaha, W .Premerlani
3. Principles of Object- Oriented Software Development - Anton Eliens , Addison Wesley.
4. Object Oriented System Development
Ali Bahrami McGRAW-HILL International Edition.
5. Object-Oriented Software Engineering
Ivar Jacobson Pearson Education INC
6. Applying UML And Pattern
Craig Larman Pearson Education INC
7. UML Distilled
Martin Fowler Pearson Education INC
8. The Unified Modeling Language User Guide
Grady Booch, James Rumbaugh, Ivar Jacobson-Pearson Education INC
9. The Unified Modeling Language Reference Guide
Grady Booch, James Rumbaugh, Ivar Jacobson-Pearson Education INC
10. Design Object- Oriented Software
Rebecca Wrifs- Brock. Brian Wilkerson, Lauren Wiener
11. Object Oriented Analysis and Design
Bennett , Simon McGraw Hill.
12. Designing Flexible Object Oriented System with UML
Charless Richter, Techmedia
13. Instant UML – Muller – Apress LP
14. UML Instant – Thomas A Pendar – Wiley Publication
15. UML in Nutshell

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Revised New Syllabus

MCA-II

Name of the Paper - Design and Analysis of Algorithms

No. of Lectures: per week 4hrs

Course No. IT-44

Total Lectures : 40

Total Marks : 100

Semester- IV

Objectives: : To understand and learn advance algorithms and methods used in computer science to create strong logic and problem solving approach in student.

Sr. No.	Name of topic	Details	Periods
1.	Introduction	Algorithm, analysis, time complexity and space complexity, O-notation, Omega notation and Theta notation, Heaps and Heap sort, Sets and disjoint set, union and find algorithms. Sorting in linear time.	7
2.	Divide And Conquer	Divide and Conquer: General Strategy, Exponentiation. Binary Search, Quick Sort and Merge Sort	5
3.	Greedy Method	General Strategy, Knapsack problem, Job sequencing with Deadlines, Optimal merge patterns, Minimal Spanning Trees and Dijkstra's algorithm.	5
4.	Dynamic Programming	General Strategy, Multistage graphs, OBST, 0/1 Knapsack, Traveling Salesperson Problem, Flow Shop Scheduling	6

5.	Backtracking	Backtracking: General Strategy, 8 Queen's problem, Graph Coloring, Hamiltonian Cycles, 0/1 Knapsack	6
6.	Branch and Bound	General Strategy, 0/1 Knapsack, Traveling Salesperson Problem	5
7.	NP-HARD AND NP-COMPLETE PROBLEMS	Basic concepts, non-deterministics algorithms, NP-HARD and NP-COMPLETE classes, COOKS theorem	6

Nature of Question Paper :

- a) 20% marks - Objectives questions
40% marks – Short notes/ Short answers type questions
40% marks – Descriptive type questions
out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.

Reference

1. Bressard, "Fundamental of Algorithm." PHI
2. Horowitz/Sahani, "Fundamentals of computer Algorithms", Galgotia.
3. Thomas H Cormen and Charles E.L Leiserson, "Introduction to Algorithm" PHI
4. A. V. Aho and J.D. Ullman, "Design and Analysis of Algorithms", Addison Wesley

Note: Topic Wise list of books is given

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MCA-II

Name of the Paper - **Optimisation Techniques**

No. of Lectures: per week 4hrs

Course No. MT-41

Total Lectures : 40

Total Marks : 100

Semester- IV

Objectives: : Objective : To introduce linear programming, dynamic programming and related optimization theories to solve real life / simulated problems.

Course contents

Sr. No.	Name of topic	Details	Periods
1	Linear Programming	Various definitions, statements of basic theorems and properties, Advantages, Limitations and Application areas of Linear Programming Linear Programming – The Graphical method – Graphical Solution methods of Linear Programming problem, Maximization Linear Programming Problem, Minimization problem Linear Programming – Simplex Method – Phase I and Phase II of the Simplex Method, The Revised Simplex method, Primal and Dual Simplex Method, Simplex Algorithm for maximization case, Simplex Algorithm for minimization case – Two phase method and the Big –M method. Transportation Problem and its solution, Assignment Problem and its solutions by Hungarian Method	14
2	Integer Programming	Gomory Cutting Plane Methods – Branch and Bound Method	4

3.	Queuing Theory	<p>Characteristics of Queuing Models. Transient and Steady states of the System.</p> <p>Model – I [(M/M/1) : (FCFS / ρ)]</p> <p>Model II – Generalization of Model [(M/M/N) : (FCFS / ρ)] (Birth- Death Process)</p> <p>[(M/M/1) : (FCFS / N/ ρ)] (Finite Queue Length Model)</p>	7
4.	Decision Tree Analysis	<p>Concept of Tree, Decision tree, decision making under certainty, uncertainty and risk</p>	4
5.	INVENTORY THEORY	<p>Inventory Model Building, Single item deterministic Model, Inventory Control Models without shortages and Inventory Control Models with shortages.</p>	5
6.	PERT & CPM	<p>Basic differences between PERT and CPM. Arrow Networks, time estimates, earliest expected time, latest – allowable occurrences time, Forward Pass Computation, Backward Pass Computation, Representation in Tabular Form Critical Path, Probability of meeting scheduled date of completion, Various floats for activities, Critical path updating projects. Operation time cost tradeoff Curve project, Selection of schedule based on Cost Analysis, Crashing the network</p>	6

Nature of Question Paper :

- a) 20% marks - Objectives questions
40% marks – Short notes/ Short answers type questions
40% marks – Descriptive type questions
out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.

References :

1. Introduction to Operation Research-A Computer Oriented Algorithm Approach
Filet B. E.
2. Fundamental of Queuing Theory
Gross D. and Ilaris C.M.
3. Introduction to Operation Research
Hiller F and Lieberman G. J.
4. Mathematical Programming technique
Kambo N.S.
5. Operations Research
KantiSwarup, Gupta P.K. and ManMohan.
6. Optimization Methods in Operations Research and System Analysis
Mital K.V.
7. The Critical Path Method
Saffer L.R., Fitter J.B. and Meyer W.L.
8. Operation Research
J.K. Sharma
9. Operation Research
Taha H.A.

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MCA-II

Name of the Paper - MIS Framework And Implementation

No. of Lectures: per week 4hrs

Course No. BM-E1

Total Lectures : 40

Total Marks : 100

Semester- IV

Objective : To know MIS framework and methodologies, socio-economic environment and MIS impact, critical success factors and implementation aspects of MIS.

Course contents

Sr. No.	Name of topic	Details	Periods
1	Information System	Framework for identifying, information technology applications. The scope of IT applications - Decision Support System, Executive Information System and Expert System.	8
2	Information Technology Applications	Information technology applications - transaction processing, management and operational control decision support system, office automation, organizational communications and group work support.	10
3.	MIS Framework	Socio-economic environment and Information systems in organization and the impact., impact of Information systems on Organization's markets, frameworks of Information systems planning, information system and competitive advantage , The new strategic role of Information systems , methodologies for evaluating investments in IT	12
4.	MIS Application	Critical success factor in implementing IT applications	10

		including the lead for managing it process of change, illustrated through case studies , Study of successful / failed IT projects, Critical role of security in implementing IT application should be discussed	
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Nature of Question Paper :

- a) 20% marks - Objectives questions
40% marks – Short notes/ Short answers type questions
40% marks – Descriptive type questions
out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.

References :

1. Business Information Systems
2. MIS by Javadekar
3. Software Engineering by Pressman
4. Website links : www.misframework.com

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Name of the Paper - Foundations Of Decision Processes

No. of Lectures: per week 4hrs

Course No. BM E1

Total Lectures : 40

Total Marks : 100

Semester- IV

Objective : To learn decision framework, theories and simulation, systematic problem analysis and decision making through case studies.

Course contents

Unit. No.	Name of topic	Details	Lectures /Periods
1	Decision Making	Role of decision making in management , Framework , Criteria under conditions of certainty, risk and uncertainty Bay's Theorem, Sequential decision making - decision tree analysis.	10
2	Theory of utility and Game Theory	Theory of utility, Utility function curve, Competitive strategies, game theory, Single Channel ,Single phase waiting line model with Poisson. ,Distributed arrival rates and exponentially distributed service times. , Markov models.	10
3.	Simulations	Monte Carlo, Application to queuing and inventory models. , Applications in functional areas of marketing, production, finance, Behavioral aspects in decision making, Quantitative Techniques for Business Decisions By Johnson R. D.	10
4.	Problem analysis and decision making	Systematic problem analysis and decision making, Decision making in functional areas– case studies	10

Nature of Question Paper :

- a) 20% marks - Objectives questions
40% marks – Short notes/ Short answers type questions
40% marks – Descriptive type questions
out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.

Reference:

1. Decision Analysis by Gregory G.
2. PPM and OB By Nandavadekar Vilas and Ujagare S. P.
3. Quantitative Techniques for Business Decisions By Johnson R. D.

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MCA-II

Name of the Paper - **Information System Audit and Governance**

No. of Lectures: per week 4hrs

Course No. **BM E1**

Total Lectures : **40**

Total Marks : **100**

Semester- IV

Objective : To learn IS audit methods, controls, IS strategies through case studies.

(Prerequisites: IT fundamentals , Computer operations , Network concepts , and Internet concepts, Exposure to programming languages , Exposure to SSAD and Database concepts, Commercial Applications, Management Concepts and Practice)

Course contents

Unit. No.	Name of topic	Details	Periods
1	Information Audit	Auditing concepts ISA need, concept, standards, performance, steps , techniques, methodologies , around and through computer.	3
2	Controls	Concept objectives, types, risk, exposure	2
3.	IT Environment	IT environment – hardware, system software, OS, DBMS, Infrastructure, network concepts, Personnel, documentation, review of performance, procurement, and other controls	3
4	Network concepts	Network concepts, LAN, WAN, Client-Server architecture, Internet, EDI, e-mail, encryption, digital signatures – review of performance, procurement and other controls.	5
4	Software procurement and development	SDLC – Meaning and IS auditor's role- traditional SSAD , OOM , prototyping , 4GL , project management , testing , implementation review.	4

5	IS Operations	Is-operations -planning, Organizing, scheduling, SCM, problem management , record management, QA and QC , review and controls	3
6	Access controls	Controls – Input , process , validation , output, logical access, physical access , database , network , environment , BCP	8
7	Evidence collection	Evidence collection, evaluation and reporting methodologies	2
8	IS strategies and management	organization structure , long term and short term plans , steering and other committees , HR policies , segregation of duties	2
9	Cyber Crimes	IT crimes , viruses , security , privacy issues	2
10	E-Commerce	Broad introduction to concepts and practice of e-commerce and legal framework for e-commerce	2
11	Case studies	Case study based on ISA only	4

Note :

- Two case studies and two assignments need also be covered.
- The syllabus is expected to be completed within approx 40 sessions of 90 minutes each. Session-wise suggested contents are enclosed
- Many topics will have to be covered at a broad level only.
- Role of IS auditor and relation of each topic to ISA controls and review should be part of all lectures. Emphasis should be on Audit , security, control, review and documentation aspects and usage of relevant standards as relevant to all the IT facets.

Nature of Question Paper :

a) 20% marks - Objectives questions

40% marks – Short notes/ Short answers type questions

40% marks – Descriptive type questions

out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of

- questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.

References :

1. Names of ISA related material is given. For all other IT related topics, e.g. EIT , SSAD , DBMS , Network etc various standard books are available in the market and also recommended by the University.
2. "EDP Auditing Conceptual Foundations And Practices" by Ron Weber – McGraw-Hill publication
3. Latest CISA review manual by ISACA , USA – This may be procured by individual institutes and made available to students on library basis
4. IS audit standards and control objectives of ISAXA which are non-copyrighted and relevant , refer www.isaca.org
5. IS control journals from ISACA

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Name of the Paper - Collaborative Management No. of Lectures: per week 4hrs

Course No. BM E1

Total Lectures : 40

Total Marks : 100

Semester- IV

Objective : To learn planning, strategic management, social responsibilities and collaborations.

Course contents

Unit No.	Name of topic	Details	Lectures/ Periods
1.	Significance of Planning :	Types, Needs, Requisites, Corporate Planning, System approach, Role of the Planner, Corporate Planning and Budgeting	8
2.	Strategic Management :	An introduction, Concept and characteristics of strategic management, stakeholders in business, Strategy formulation ? Analysis of Environmental opportunities and threats, formation of organizational vision, mission and objectives, Strategic Analysis and choice ? Corporate Portfolio analysis, SWOT analysis and GAP analysis, Porter's 5 forces model of competition, Mc Kinsey's 7s framework, GE 9 cell model, Distinctive competitiveness, Selection of matrix Design of strategic business units, Strategy Implementation, Resource allocation, Strategy Evaluation	15
3.	Social Responsibilities	: Scope, Contents, Cooperation and Society, Consumers, Cooperation and Democracy and Government. Social responsibility Vs. Profitability and Productivity, Professionalism as means of Social Behaviour	7
4	Means of Collaboration :	Merger and Acquisition, Joint Ventures,	10

		Strategic Alliances, Lease Financing, Venture Capital, Outsourcing	
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Nature of Question Paper :

- a) 20% marks - Objectives questions
40% marks – Short notes/ Short answers type questions
40% marks – Descriptive type questions
out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate Words limit for short note/short answer type questions except diagrammatical and numerical questions.

Reference:

1. Business policy by A. Kazmi
2. Exploring corporate Strategy by Johnson G.
3. Business policy and Strategic management by Nair
4. Business policy and Strategic management by Ghosh
5. Lease Financing in India by Naidu
6. Lease Financing theory and practice by Brahmaiah
7. Financial Management by Khan and Jain
8. Financial Management by Prasanna Chandra

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Name of the Paper - **Decision Support Systems** No. of Lectures: per week 4hrs

Course No. **BM E1**

Total Lectures : 40

Total Marks : 100

Semester- IV

Objective : To learn DSS, DSS Tools, DSS implementation and impacts and Enterprise DSS.

Course contents

Sr. No.	Name of topic	Details	Periods
1	Decision Support Systems-	An Overview - Decision Support Systems (DSS) Concept , DSS : Deterministic Systems , Artificial Intelligence , Knowledge Based Expert Systems , MIS and Role of DSS	5
2	Data warehouse	Access, Analysis, Mining and Visualization for DSS Data warehousing , access ,analysis and Visualization ,Data collection problems and quality , Internet and commercial database service , Database Mgt System for DSS , Database organization structure for DSS , Data warehousing , OLAP , Data mining , Data Visualization , GIS and virtual reality , Business Intelligence	8
3.	DSS Development	Introduction to DSS development ,Traditional system development life cycle , Alternate development methodologies , Prototyping :DSS Methodology	8
4	Tools for DSS development	DSS Technology levels and tools , DSS development platform ,DSS development tools selection , Team – developed DSS , End user Developed DSS , Development of DSS : Putting system together , DSS future	9
5	Enterprise Decision Support System	Enterprise system : Concept and definition ,Evolution of executive and	5

		enterprise information system , Characteristics and capabilities of ESS , Comparing and integrating EIS and DSS , EIS , data access, data warehousing, OLAP , multidimensional analysis, presentation , Including soft information in enterprise systems, Organizational DSS ,7 Supply and value chain and decision support ,Computerized systems – MRP , ERP , SCM , Frontline DSS ,Future of DSS and EIS	
6	Implementation , integration and impacts	Implementation : an overview , The major issues of implementation , Implementation strategies , System Integration: What and Why? , Generic models of MSS integration , Models of ES and DSS integration , Integration of EIS , DSS and ES , Intelligent DSS , Intelligent modeling , Examples of integrated systems	5

Nature of Question Paper :

- a) 20% marks - Objectives questions
40% marks – Short notes/ Short answers type questions
40% marks – Descriptive type questions
out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.

References :

1. Decision Support Systems and Intelligent systems by Efrain Turbon
2. Management Information Systems by W S Jawadekar

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Name of the Paper - **Enterprise Resource Management**

No. of Lectures: per week 4hrs

Course No. **BM E1**

Total Lectures : 40

Total Marks : 100

Semester- IV

Objective : To learn ERP systems its structure, modules, benefits, implementation and post implementation issues through real-life cases

Course contents

Unit. No.	Name of topic	Details	Lectures /Periods
1	Enterprise Resource Planning	Introduction - What Is ERP? Need of ERP. , Advantage of ERP , Growth of ERP	4
2	ERP and related technologies	Business Process Re-engineering Management Information System (MIS), Decision Support System (DSS), Executive Support System (ESS), Data Warehousing, Data Mining On-Line Analytical Processing (OLAP) Supply Chain Management Customer Relationship Manage	20
3.	ERP Modules and Vendors	Finance Production Planning, Control and Management, ales and Distribution, Human Resource Management ,Inventory Control System, Quality Management, ERP market	6
4	ERP Implementation Life Cycle	Evaluation and selection of ERP package Project planning, Implementation, Team Training and Testing End User Training and Going Live Post Evaluation and Maintenance	5
5	ERP Case Studies	Post Implementation review of ERP packages in manufacturing, Services and Others, Organizations	5

Nature of Question Paper :

- a) 20% marks - Objectives questions
40% marks – Short notes/ Short answers type questions
40% marks – Descriptive type questions
out of 20% marks for objectives questions 10% marks should be assigned to multiple choice questions and remaining 10% be assign to fill in the blanks or answer in one sentence etc. however each faculty may decide nature and type of questions to be set subject to distribution of above percentage of marks
- b) One descriptive type question will be compulsory. Paper setter should mention approximate words limit for short note/short answer type questions except diagrammatical and numerical questions.

Reference:

1. Enterprise Resource Planning Alexis Leon
2. ERP Ware: ERP Implementation Framework
V.K. Garg &N.K. Venkita Krishnan
3. ERP Concepts & Planning V.K. Garg &N.K. Venkita Krishnan

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Name of the Paper - **Java Programming Lab**

No. of Lectures: per week 4hrs

Course No. **IT 41L**

Total Practical : 40

Total Marks : 50

Semester- IV

Objective : This lab work will provide hands on practice to student to enhance their Java Programming Skills.

Lab Work -

At least 20 lab assignments on Java concepts such as Interfaces, Packages, Exception Handling, Applet, multithreading, Abstract Windows Toolkit, Java Input Output, Networking, JDBC, RMI ,Java Beans can be included.

Nature of Evaluation For Lab work :

- a) 20% marks – Based on laboratory work
- 40% marks – Programming questions and actual practical exam
- 40% marks – viva voce exam based on lab assignments

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MCA-II

Name of the Paper - Case Tools Laboratory

No. of Lectures: per week 4hrs

Course No. IT 42L

Total Practical : 40

Total Marks : 50

Semester- IV

Objective : To make student accustom with various automated tools used for Software Design and Development, Testing, Project Management etc

Lab Work :

1. Use of diagramming tools for system analysis
Preparing Data Flow Diagrams & Entity Relationship Diagrams
2. Use of Tools
To design User Interfaces
Report generation
(Using VB /Oracle Developer)
3. MS – project
Its use in project scheduling
4. Use of any Automated Testing Tools
5. Win Runner
 - a) Record Context Sensitive
 - b)Record Analog
 - c)Database check point
 - d)Bit map Check Point
 - e) Synchronization point
6. S/W Configuration Management Tools
 - a) Source Code Control System (SCCS)
 - b) make in UNIX

Note: Student has to check there own developed software through win runner

Nature of Evaluation For Lab work :

- e) 20% marks – Based on laboratory work
- 40% marks – Programming questions and actual practical exam
- 40% marks – viva voce exam based on lab assignments