University Of Pune

Syllabus for Master Of Computer Applications (M.C.A)

MCA (Part I) From Academic Year 2008-2009
MCA (Part II) From Academic Year 2009-2010
MCA (Part III) From Academic Year 2010-2011

(I) Introduction:

The name of the programme shall be Master Of Computer Application (M.C.A) Integrated.

The knowledge and skills required to plan, design and build Complex Application Software Systems are highly valued in all industry sectors including business, health, education and the arts. The basic objective of the education of the Masters programme in Computer Application (M.C.A) is to provide to the country a steady stream of the necessary knowledge, skills and foundation for acquiring a wide range of rewarding careers into the rapidly expanding world of the Information Technology.

The Job Opportunities are:

Many graduates begin their career as a junior programmer and, after some experience, are promoted to programmer, system analyst, and programmer/analyst. Other seek entrepreneurial role in the computer world as independent business owners, software authors, consultants, or suppliers of systems and equipments. Career opportunities exist in such areas as management software and hardware sales, technical writing, training others on computer, consulting, software development and technical support.

Application areas include transaction processing (such as order processing, airline reservations, banking system), accounting functions, sales analysis, games, forecasting and simulation, database management, decision support and data communications.

Specific elective courses to be offered in functional areas have to depend on student preferences, faculty availability and needs of the user systems in the region in which the educational institution is located

The M.C.A program is a mix of computer-related and general business courses. The computer related courses use microcomputers to introduce standard techniques of programming; the use of programming languages and software packages including C/C++/JAVA, IDEs, databases; system analysis and design Tools. The general business courses include the functional areas of management like accounting, sales, purchase, inventory, and production. The course would emphasis the study and creation of business applications, rather than more programming. This would emphasize on domain knowledge

of various area, which would help the students to build software applications on it. The students are exposed to system development in the information-processing environment, with special emphasis on Management Information Systems and Software Engineering for small and medium computer systems. Also, exposure to microcomputer technology, micro-based systems design and micro applications software, including network and graphical wear interface systems is provided.

The M.C.A. Integrated programme will be a full-time three years Master's Degree Course of Computer Applications.

The new Curricula would focus on learning aspect from three dimensions viz. Conceptual Learning, Skills Learning and Practical / Hands on.

The inclusion of projects at three levels ensures the focus on applying the skill learnt at respective levels.

The Institutes should organize placement programme for the M.C.A students, by interacting with the industries and software consultancy houses in and around the region in which the educational Institution is located.

Ordinarily, in each class, not more than 60 students will be admitted.

(II) (A) Eligibility for Admission:

The eligibility criteria for admission for the MCA course will be as decided by the Competent Authority (Director, Technical Education-Government of Maharashtra, &/or AICTE, New Delhi)

A candidate who has either passed with minimum 45% of marks in the aggregate (40% in case of candidate who is domiciled in Maharashtra and belongs to the reserved categories i.e. S.C., S.T., D.T., N.T., O.B.C., S.B.C.) or

appeared at the final year examination of a post 10+2 course of minimum three years duration leading to an award of Bachelor's Degree, in any discipline by the Association of Indian Universities or has passed with minimum 45% of marks in the aggregate (45% in case of candidate who is domiciled in Maharashtra and belongs to the reserved categories) or

appeared at an examination considered equivalent there to would be treated as eligible for Common Entrance Test(CET). Also the candidate must have passed mathematics/Business Mathematics & Statistics paper for 10+2 or graduation Level and

Passed the CET conducted by Director of Technical Education MS with non-zero score for that year OR Passed the CET conducted by State level MCA Association with non-zero score for that year, Or Passed the AIMCET exam for that year.

However, a candidate would not be treated as eligible for admission to the MCA programme unless he/she passes his/her qualifying examination with requisite percentage on or before 30th September of the concerned academic year and also passes in the CET.

Generally, candidate passing all the papers that are generally covered over a period of minimum three years in one sitting are not considered eligible. Likewise, candidates possessing the qualifying degree although with requisite percentage of marks, whose duration is less than three years, are not considered eligible.

(B) Reservation of Seat:

The percentage of seat reserved for candidates belonging to backward classes only from Maharashtra State in all the Government Aided, Un-aided Institutions/Colleges and University Departments is as given below:

A) Scheduled caste and Scheduled caste convert to Buddhism	13.0%
B) Scheduled Tribes including those living outside specified areas	10.5%
C) Vimukta Jain	(14 as specified)
D) Nomadic Tribes(NT1)(28 before 1990 as specified)	2.5%
E) Nomadic Tribes(NT2)(Dhangar as specified)	2.5%
F) Nomadic Tribes(NT3)(Vanjari as specified)	2.5%
G) Other Backward Class	19.0%
Total	50.0%

1. Candidate claiming to belong to categories mentioned against (e),(f) and (g) above will have to furnish certificate from appropriate authority that the candidate's parents do not belong to Creamy Layer as per the relevant orders of the Government.
2. If any of the (a) to (g) categories mentioned above does not get the required number of candidates for the percentage laid down in a University area, the seats so remaining vacant shall be filled in from among the candidates of remaining reserved categories with reference to the inter-se-merit of all candidates belonging to the reserved categories from the same University area. However, the total reservation shall not exceed 50%. After doing so the seats remaining vacant shall be filled in with reference to inter-se-merit of all the candidates from the same University area.

(C) Selection Basis:

The selection would be done as per the guidelines given by the Director of Technical Education Maharashtra State time to time.

(III) Number of Lectures and Practical:

Lectures and Practical should be conducted as per the scheme of lectures and practicals indicated in the course structure.

(IV) Practical Training and Project Work:

At the end of the sixth semester of study, a student will be examined in the course" Project Work".

1. Project work may be done individually or in groups in case of bigger projects. However if project is done in groups, each student must be

given a responsibility for a distinct module and care should be taken to see the progress of individual modules is independent of others.

2. Students should take guidance from an internal guide and prepare a Project Report on “Project Work” in 2 copies to be submitted to the Director of the Institute by 30th April. Whenever possible, a separate file containing source-code listings should also be submitted. Every student should also submit at least 4 typed copies of their project synopsis. Their respective Institutes should forward one copy of this synopsis to each of the external panel members, in advance of the project viva dates.
3. The Project Synopsis should contain an Introduction to Project, which should clearly explain the project scope in detail. Also, Data Dictionary, DFDs, ERDs, File designs and a list of output reports should be included.
4. The project Work should be of such a nature that it could prove useful or be relevant from the commercial/management angle.
5. The project report will be duly accessed by the internal guide of the subject and marks will be communicated by the Director to the University along with the marks of the internal credit for theory and practical to be communicated for all other courses.
6. The project report should be prepared in a format prescribed by the University, which also specifies the contents and methods of presentation.
7. The major project work carry 200 marks for internal assessment and 300 marks for external viva. The external viva shall be conducted by a minimum of two external examiners. The mini project work would be departmental.
8. Project work can be carried out in the Institute or outside with prior permission of the Institute.
9. Project viva-voce by the University panel will be conducted in the month of April-May.

(V) Assessment:

The final total assessment of the candidate is made in terms of an internal assessment and an external assessment for each course.

1. For each paper, 30% marks will be based on internal assessment and 70% marks for semester and examination (external assessment), unless otherwise stated.
2. The division of the 30marks allotted to internal assessment of theory papers is on the basis of tutorial paper of 15 marks and seminars, presentations and attendance of 15 marks.
3. The marks of the mini project would be given on the basis of internal assessment of the project, project viva and project report.
4. The marks of the practicals would be given on internal practical exam & oral.

5. The internal marks will be communicated to the University at the end of each semester, but before the semester and examinations. These marks will be considered for the declaration of the results.

(VI) Examination:

Examinations shall be conducted at the end of the semester i.e. during November and in May. However supplementary examinations will also be held in November and May.

(VII) Standard of Passing:

1. Internal as well as external examination will be held in November and May. Every candidate must secure 40% marks in internal as well as external Examination.
2. Reassessment of Internal Marks:
   In case of those who have secured less than passing percentage of marks in internal i.e. less than 40% , the institute will administer a separate internal test.
   The results of which may be conveyed to the University as the Revised Internal Marks.
   In case the result of the revised internal test is lower than the original marks then the original marks will prevail. In short, the rule is higher of the two figures should be considered.
   However, the institute will not administer any internal test, for any subject for those candidates who have already secured 40% or more marks in the internal examination.

(VIII) Backlog:

Candidates can keep terms for any semester of M.C.A., irrespective of the number of subjects in which he/she has failed in the previous MCA semester examinations.

(IX) Board of Paper Setters /Examiners:

For each Semester and examination there will be one board of Paper setters and examiners for every course. While appointing paper setter /examiners, care should be taken to see that there is at least one person specialized in each unit course.

(X) Class:

There shall be numerical marking for each question .At the time of declaration of the result, the marks obtained by a candidate is converted into classes as shown below:

Class	Total Marks
First Class with Distinction	2800 and above
First class	2400 to 2799
Higher Second Class	2200 to 2399

Second Class	2000 to 2199
Pass Class	1600 to 1999
Fail	1599 and below

(XI) Medium of Instruction:

The medium of Instruction will be English.

(XII) Clarification of Syllabus:

It may be necessary to clarify certain points regarding the course. The syllabus Committee should meet at least once in a year to study and clarify any difficulties from the Institutes.

(XIII) Revision of Syllabus:

As the computer technology is changing very fast, revision of the syllabus should be considered every 3 years.

(XIV)Teaching and Practical Scheme:

Each session for teaching or practical should be of 90 minutes each.

Masters of Computer Application
Syllabus
For Academic Year 2008-2009

Semester I

Sr. No.	Subject Code	Subject Title	Internal	External
1	IT11	Computer Organization	30	70
2	IT12	C Programming	30	70
3	BM11	Principles & Practices of Management and Organizational Behavior	30	70
4	IT13	Operating System Concepts	30	70
5	*BM12	Cost and Financial Accounting	100	
6	MT11	Discrete Mathematics	30	70
7	IT11L	Visual Basic Lab	50	
8	IT12L	C Programming Lab	50	

Semester II

Sr. No.	Subject Code	Subject Title	Internal	External
1	IT21	Data Structures using C	30	70
2	IT22	Database Management System	30	70
3	IT23	Software Engineering	30	70
4	BM21	Soft Skills	30	70
5	*BM22	Business Process Domains	100	
6	MT21	Probability and Combinatorics	30	70
7	IT21L	Data Structure Lab	50	
8	IT22L	DBMS Lab	50	

Semester III

Sr. No.	Subject Code	Subject Title	Internal	External
1	IT31	Web Technologies	30	70
2	IT32	Data Communication and Computer Networks	30	70
3	IT33	Object Oriented Programming Using C++	30	70
4	IT34	Advanced Database Management Systems	30	70
5	BM31	Management Support Systems and Information System Security	30	70
6	*MT31	Research Methodology and Statistical Tools	100	
7	IT31P	Mini Project based on Web	50	

		Technologies and ADBMS		
8	IT31L	C++ Lab	50	

Semester IV

Sr. No.	Subject Code	Subject Title	Internal	External
1	IT41	Java Programming	30	70
2	IT42	Software Testing and Quality Assurance	30	70
3	IT43	Object Oriented Analysis and Design	30	70
4	*IT44	Design and Analysis of Algorithms	100	
5	MT41	Optimization Techniques	30	70
6	BME1	Management Elective	30	70
7	IT41L	Java programming lab	50	
8	IT42L	CASE Tools Lab	50	

Semester V

Sr. No.	Subject Code	Subject Title	Internal	External
1	IT51	Human Computer Interface	30	70
2	IT52	Software Project IT Management	30	70
3	IT53	Emerging Trends in Information Technology	30	70
4	*IT54	Application Development Technology	100	
5	ITE1	IT Elective	30	70
6	IT55	Advanced Internet Technology	30	70
7	IT51P	Mini Project (using Advanced internet technology Lab & HCI)	50	
8	IT52L	Application Development Technology Lab	50	

Semester VI

Sr. No.	Subject Code	Subject Title	Internal	External
1	IT61P	Project	200	300

List of IT Elective Subjects:

Sr. No.	Subject Title	Internal	External
1	Cyber Law and IT Security	30	70
2	Programming Language paradigms	30	70
3	Advanced Unix	30	70
4	Mobile wireless computing	30	70
5	Distributed Database Management System	30	70

List of BM Elective Subjects:

Sr. No.	Subject Title	Internal	External
1	MIS Framework & Implementation	30	70
2	Foundations of decision Process	30	70
3	Information System Audit & Governance	30	70
4	Collaborative Management	30	70
5	Decision Support System	30	70
6	Enterprise Resource Planning	30	70

Rules of framing syllabus and Implementation:

1.Unitization of syllabus and allotment of marks accordingly.

2.Course material along with comprehensive worksheet should be prepared.

Note:

* Departmental Subject
* **Each session is of 1 ½ Hrs.**

Description	Number of Core subjects	Number of Elective subjects
Information Technology	20	1
Business Management	5	1
Mathematical Techniques	4	-
Laboratory	8	-
Project	2 Mini, 1 Major	-
Seminar	3	-
Industrial Lecture	2	-

Semester I

IT11 – Computer Organization

Objective : To give basic knowledge of microprocessor its architecture, components, terminologies. This will aware student about the hardware used behind the computer they use.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Introduction to Digital Computer** Functions and Block Diagram of Computer Types of Software – System software / Application software / Utility Software. Compilers, Interpreters, Assemblers, Linker, Loader & Programming Language Paradigm.	5	1, 4, 5, 7
2	**Data Representation and Boolean Algebra** 2.1 Binary, Octal, Hexadecimal and their inter-conversion 2.2 1's and 2's complement. 2.3 Binary Arithmetic. Number Systems – BCD, EBCDIC, ASCII, De-Morgan's Theorem, Duality Theorem, Algebra Rules, Laws, Logic Circuits, NOT, AND, OR, NAND, NOR, XOR, XNOR	3	2, 5, 7, 14
3	**Combinational Circuits** 3.1 Half / Full Adder 3.2 Decoder / Encoder 3.3 Multiplexer / Demultiplexer, Sequential Circuits 3.4 Flip Flops - SR, D, JK, Master – Slave, Edge Triggered 3.5 Shift Registers (Any one type) 3.6 Introduction to Counters (Any One)	6	6, 14
4	**Memory System** 4.1 Memory Hierarchy 4.2 Primary Memory – DRAM, SDRAM, DDR, RDRAM. ROM, PROM, EPROM, EEPROM 4.3 Concepts of Auxiliary, Associative, Cache and Virtual Memory 4.4 DMA	5	2, 15

5	**CPU Organization** 5.1 CPU Building Blocks 5.2 CPU Registers and BUS Characteristics 5.3 Addressing Modes 5.4 Interrupts 5.5 Instruction and Execution cycle 5.6 Hardwired and Micro Program control 5.7 RISC and CISC 5.8 Pipelining – Data Path, Time Space Diagram, Hazards	9	2, 3, 8, 12, 13
6	**Processor Architecture** 6.1 Components of Microprocessor, I/O Ports 6.2 16-Bit (80286) Architecture 6.3 32-Bit (80486) Architecture 6.4 Super scalar Architecture in Pentium Processors 6.5 64-Bit (Pentium Dual-Core) Architecture	7	9, 16
7	**Multi-Processor Organization** 7.1 Parallel Processing 7.2 Concept and Block Diagram 7.3 Types (SISD,SIMD,MIMD,MISD) 7.4 Future Directions for Parallel Processors 7.5 Performance of Processors	5	2, 8, 9, 10

Text Books and Reference Books:

1. Computer Organization & Architecture — Carpinell
2. Computer System Architecture — Morris Mano
3. Ad. Computer Architecture — Kaithwang
4. Digital Computer Electronics — Malvino
5. Micro Computer Systems — Yu Cheng Liu & Glann Gibson
6. Digital Electronics — Bartee
7. Introduction to Digital Computer Design — V. Rajaraman & Radhakrishnan
8. Computer Organization and Architecture — W. Stalling
9. Intel Micro Processors — Barry Brey
10. Computer Organization & Design — Pal Chaudhary
11. Microprocessor Architecture — Ramesh Gaonkar
12. Computer Architecture & Organization — J.P. Hayes
13. Computer Organization — Hemchar
14. Digital Logic and Computer Design — Morris Mano
15. IBM PC and Clones — Govindarajulu
16. An Introduction to Intel Family of Processors -James Antonolcos

Websites:

1. www.intel.com
2. en.wikipedia.org
3. www.pcguide.com
4. www.netlib.org

IT12 - C Programming

Objective : This is the first programming language subject student will learn. This subject will teach them programming logic, use of programming instructions, syntax and program structure. This subject will also create foundation for student to learn other complex programming languages like C++, Java etc.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**An Overview of C** 1.1 A Brief History of C 1.2 C is middle-level Language 1.3 C is a Structured Language 1.4 Complier Vs Interpreters 1.5 The Form of a C Program. 1.6 Library & Linking. 1.7 Compilation & Execution of C. Program on DOS & Unix	2	1,2,3,5
2	**Variables, Data Types, Operator & Expression** 2.1 Character Set 2.2 C Token 2.3 Identifier & Keyword 2.4 Constant Integer, Floating Point, Character, String, Enumeration 2.5 Data Types in C 2.6 Data Declaration & Definition 2.7 Operator & Expression Arithmetic, Relational, Logical, Increment & Decrement, Bitwise, Assignment, Conditional 2.8 Precedence & Associativity of Operators.	3	1,2,3,5
3	**Console I/O** 3.1 Introduction 3.2 Character input & Output 3.3 String Input & Output. Formatted Input/Output (scanf/printf) sprintf & sscanf	2	1,2,3,5
4	**Control Statement** 4.1. Introduction 4.2. Selection Statements If, Nested if, if-else-if, The? Alternative, The Conditional Expression, switch, Nested switch 4.3. Iteration Statements - for loop, while loop, do-while loop 4.4 Jump Statements, goto & label, break & continue, exit() function	4	1,2,3,5

5	**Pointers** 5.1 Introduction 5.2 Memory Organization 5.3 The basics of Pointer 5.4 The Pointer operator 5.5 Application of Pointer 5.6 Pointer Expression Declaration of Pointer, Initializing Pointer, De-referencing Pointer 5.7 void Pointer 5.8 Pointer Arithmetic 5.9 Precedence of & , * operators 5.10 Pointer to Pointer 5.11 Constant Pointer	3	1,2,3,5
6	**Array & String** **6.1** Single Dimension Arrays Accessing array elements, Initializing an array 6.2 Multidimensional Arrays Initializing the arrays, Memory Representation Accessing array elements 6.3 Passing Single Dimension array to Function 6.4 Array & Pointer 6.5 Array of Pointer 6.6 String Manipulation Functions	5	1,2,3,5
7	**Function** 7.1. Introduction 7.2. Arguments & local variables 7.3. Returning Function Results by reference & Call by value 7.4. Recursion	4	1,2,3,5
8	**Storage Class & Scope** 8.1. Meaning of Terms 8.2. Scope - Block scope & file scope 8.3. Storage Classes Automatic Storage, Extern Storage, Static Storage, Register Storage	2	1,2,3,5
9	**Structure, Union, Enumeration & typedef** 9.1. Structures Declaration and Initializing Structure, Accessing Structure members, Structure Assignments, Arrays of Structure, Passing Structure to function, Structure Pointer 9.2. Unions	3	1,2,4,5
10	**C Preprocessor** 10.1. Introduction 10.2. Preprocessor Directive Macro Substitution, File Inclusion directive,	1	1,2,3,5

	Conditional Compilation		
11	**File handling** 11.1. Introduction 11.2. Defining & Opening a File 11.3. Closing a File 11.4. Input/Output Operations on Files 11.5 Error Handling During I/O Operation 11.6 Random Access To Files 11.7 Command Line Arguments.	3	1,2,3,5
12	**Bitwise Operator** 12.1. Introduction 12.2. Applications Masking, Internal Representation of Date 12.3 Bit Fields	2	1,2,3,5
13	**Graphics In C** 13.1. Introduction 13.2. Drawing Object in C Line, Circle, Rectangle, Ellipse 13.3. Changing Foreground & Background 13.4. Filling Object by Color	4	7
14	**Command Line Arguments**	2	1,2,3,5

Text Books and Reference Books:

1. C : The Complete Reference : Herbert Schildt
2. Let us C Solutions : Y.P. Kanetkar
3. Spirit Of “C” : Moolish Kooper.
4. Programming in C : S. Kochan.
5. C Programming Language : Kernighan & Ritchie.
6. Programming in C : R. Hutchison.
7. Graphics Under C : Y. Kanetkar

IT-13: Operating System Concepts

Objective : The core structure, functions and design principles of operating system will be introduced with this subject.

Sr. No.	Chapter Details	Sessions	Reference Books
1	**Introduction** 1.1 Logical View 1.2 User View, System Calls 1.3 Concept of Virtual Machine 1.4 Interrupt Concept	2	5 , 2.
2	**Process Management** 2.1 Process Concept 2.2 Process Control Block 2.3 Process Schedule algorithms 2.4 Process operations 2.5 Interprocess Communication 2.6 Communication in Client-Server	8	2.
3	**CPU Scheduling** 3.1 Scheduling Concept 3.2 Scheduling Criteria 3.3 Scheduling algorithms 3.4 Scheduling Evaluation 3.5 Simulation Concept	5	2.
4	**Process Synchronization & Deadlock** 4.1.Snchronisation concept 4.2.SychronisationRequirement 4.3 Critical Section Problem 4.4 Monitors 4.5 Deadlock concepts 4.6 Deadlock prevention & avoidance 4.7 Deadlock Detection 4.8 Deadlock Recovery	7	2.
5	**Memory Management** 5.1 Concept 5.2 Memory Management Techniques 5.3 Contiguous & Non Contiguous allocation 5.4 Logical & Physical Memory 5.5 Conversion of Logical to Physical address 5.6 Paging, Segmentation 5.7 Segment with paging 5.8 Virtual Memory Concept 5.9 Demand paging	7	5, 2.

	5.9.1 Page Replacement algorithm 5.9.2 Allocation of Frames 5.9.3 Page fault		
6	**File management** 6.1 File Structure 6.2 Protection 6.3 FILE system Implementation 6.4 Directory structure 6.5 Free Space Management 6.6 Allocation Methods 6.7 Efficiency & Performance 6.8 Recovery	6	1, 2 ,4.
7	**Disk Management** 7.1 Disk Structure 7.2 Disk Scheduling algorithm 7.3 Disk management 7.4 Swap Space concept and Management 7.5 RAID structure 7.6 Disk performance issues	4	2.
8	**Distributed Operating System** 8.1 Difference Between Distributed & Centralized OS 8.2 Advantages of Distributed OS 8.3 Types of Distributed OS 8.4 Concept of Global OS 8.5 NOS Architecture	8	1 , 2 ,3
9.	**Features of different OS** Integration of OS	2	Unleashed versions are useful.

Reference Books :

1. Operating System : Achyut Godbole
2. Operating System : Galvin
3. System Programming & OS : D.M. Dhamdhere
4. Red Hat Bible Core Fedora Linux : Christopher Negus (Wiley Pub.)
5. Operating System : Andrew Tanenbaum

Note : Internal marks (20) : should be based on Installation & Administration of Linux, WIN 2000/03.

BM11- Principles & Practices Of Management And Organizational Behavior

Objective : The basic management concepts and use of management principles in the organization will be introduced to student thru this elaborative subject.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Management** 1.1The need, scope 1.2 Meaning and Definition 1.3 The process of Management 1.4 Managerial levels/Hierarchy 1.5 Managerial functions 1.5.1 Planning 1.5.2 Organizing 1.5.3 Staffing 1.5.4 Directing 1.5.5 Controlling 1.6 Managerial skills 1.6.1 Technical 1.6.2 Conceptual 1.6.3 Human Resource 1.7 Types of managers 1.7.1 Functional 1.7.2 Specialize 1.7.3 Generalize 1.8 Line and staff managers	4	1,2,3,4
2	**Evolution of Management Thought** 2.1 Historical perspective 2.2 Classical Theories 2.2.1 Taylor 2.2.2 Fayol 2.3 Behavioral 2.3.1 HR Approach 2.3.2 Behavioral Science and Approach 2.4 Management Science Approach 2.2 System approach-with reference to management, organization and MIS Contingency approach	4	1,2,3,4
3	**Managerial Decision Making** 3.1 Introduction 3.2 Decision making environment 3.2.1 open Systems 3.2.2 Closed system 3.2.3 Decision making under certainty 3.2.4 Decision making under uncertainty 3.2.5 Decision making under risk	4	1,2,3,4

	3.3 Decision Types /models 3.3.1 Structured decisions 3.3.2 Unstructured decisions 3.3.3 Programmable decisions 3.3.4 Non programmable Decisions 3.3.5 Classical Model 3.3.6 Administrative model 3.4 Decision making tools 3.4.1 Autocratic 3.4.2 Participative 3.4.3 Consultative 3.5 Decision Making Tools 3.6 Herbert Simson's Model Principle of Rationality / Bounded Rationality		
4	**Organization** 4.1 Introduction –definition 4.2 Need for Organization 4.3 Process of Organizing 4.4 Organizational structure 4.4.1 Functional organization 4.4.1 Product Organization 4.4.2 Territorial Organization	4	5,6,7,8
5	**Organizational Behavior** 5.1 Definition / Concepts 5.2 Need /importance/ relevance 5.3 An overview	2	5,6,7,8
6	**Individual Behavior and Understanding Self** 6.1 Ego State 6.2 Transactional Analysis Johari Window	4	5,6,7,8
7	**Group and Group Dynamics**	4	5,6,7,8
8	**Team Building**	4	
9	**Leadership**	3	
10	**Conflict Management**	3	
11	**Theory X, Y and Z**	2	

Important Note: The topics in Units 3,4,5 and 6 should be covered with the help of at-least one exercise each. All topics in Organizational Behavior should be covered with the help of role plays, case studies, simulation, games etc.

Reference Books :

1. Principles and Practices of Management — Shejwalkar
2. Essential of management — Koontz H & Weitrich H
3. Management Today Principles And Practices — Burton & Thakur
4. Mgmt. Principles and Functions — Ivancevich & Gibson, Donnelly

5.	Organizational behavior	Stepheb Robbins
6.	Organizational behavior	Keith Davis
7.	Organizational behavior	Fred Luthans
8.	Organizational behavior	Dr.Ashwatthapa

BM12- Cost and Financial Accounting

Objective : The financial aspect of business and management will be taught to student thru this subject. This will benefit student in understanding and analysing financial statements of a business. Student will learn Financial Accounting, Managerial Accounting and Cost Accounting.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Financial Accounting** 1.1 Double Entry Accounting system, Concepts and conventions in accounting, Accounting process, Depreciation 1.2 Journalisation Rules for Journalisation, posting in a ledger, subsidiary books, preparation of trial balance, Bank Reconciliation statement. 1.3 Final Accounts Preparation of Trading and profit and loss Account and Balance sheet of a proprietary and partnership firms	5 5 6	2,3,4 2,3,4 2,3,4
2	**Cost Accounting** 2.1 Advantages of Cost Accounting, Comparison with financial accounting, Classification and elements of cost 2.2 Methods of costing Techniques Marginal costing, Break-even chart, cost, volume profit analysis, Standard costing, Advantages, Variance analysis 2.3 Budgetary Control –Types of budgets and Flexible Budget Vs Fixed Budget, Preparation of Simple cash budget & flexible budgets 2.4Cost Reduction and cost control, value analysis.	5 6 3	1,2,3 1,2,3 1,2,3
3.	**Management Accounting** 3.1Concept of Management Accounting, Objectives of Management Accounting, Comparison with financial and cost accounting 3.2 Ratio Analysis Objectives, Advantages and limitations, preparation of ratios from given information 3.3Funds flow analysis and cash flow analysis - understanding the concept	3 4 3	2,3,4 2,3,4

Reference books :

1. Cost and Management accounting — Satish Inamdar
2. Management Accounting — A.P. Rao
3. Management Accounting — Dr.Sanjay Patankar
4. Management Accounting — Khan and Jain
5. Management Accounting — Dr.Mahesh Kulkarni

MT11-Discrete Mathematics

Objective : This is first mathematics subject student will learn and revise his knowledge acquired previously. Logic, Relations and Functions, Algebric Functions and Graph Theory will be introduced in this course.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Mathematical logic** Propositions (Statements) Logical connectivities, NOT ¬, AND ∧ ,OR ∨ →,↔ Compound statements form, truth tables, tautology , implications and equivalence of statements forms logical identities Normal forms : disjunctive normal form and simplification. Conjunctive normal form, logical implications, valid arguments, methods of proof . Theory of inference of statement calculus, predicate calculus, qualifiers free and bound variables, theory of inference of predicate calculus.	2 2 2 2 2	1,2,3,4
2	**Relations and functions :** Relation defined as ordered n-tuple Unary , binary , ternary , n-ary Restrict to binary relations Complement of a relation , converse relation , compositions , matrix representation and its properties Graphical representation of relation – Digraphs Properties of binary relation – reflexive , irreflexive , symmetric , asymmetric , transitive equivalence , equivalence classes , partitions covering , compatible relation maximal compatibility block , transitive closure – Warshall's algorithm. Partial ordering relation – Hesse diagram, Chains and antichains. Lattice , maximal and minimal elements , upper bound , lower bound , definitions Functions – definitions : Partial function , hashing functions , characteristic functions , floor functions , ceiling functions , subjective control , injenctive (one-to-one)	1 1 1 1 1 2 1 1 1 1 1 1	

	Inverse functions, left inverse , right inverse Bijection and cardinality of finite set Infinite sets and compatibility Properties of countable sets Non-denumerable sets.	 2 2	
3	**Algebraic structures :** Operations on sets -unary , binary , ternary definitions of algebraic systems (restrict to binary operations) Properties – closure, idempotent , associative, commutative, identity , inverse, Semigroup , subsemigroup Monoid , submonoid group , abelian group , permutation group,multiplicative abelian group, cyclic group Subgroups : Cosets , right cosets , left cosets , normal subgroups , quotient groups , isomorphism , homomorphism , automorphism Group codes : Weight and Hamming distance , minimum distance of code , generation of codes using parity checks – even parity , odd parity , parity check matrix – Hamming code, for detection and correction errors , formation of encoding function, decoding Application of residue –arithmetic to computers group codes	1 1 1 1 1 2 1 1 1 1 1 1 2	
4	**Graph theory : trees** Basic terminology , simple and weighted graph , adjacency and incidence , hand-shaking lemma , underlying graph of a digraph , complete graph , regular graph , bipartrite graph , complete bipartrite Isomorphism, complement of graph , connected graphs , paths-simple , elementary , circuit – simple , elementary Edge connectivity , vertex connectivity Eulesian path and eulesian circuit , planner graph – regions Euler's formula Trees : Definition – leaf , root , branch node , internal node Rooted and binary trees , regular m-ary tree	2 1 1 1 1 1 2	

Reference books :

1. Discrete Mathematical Structures for Computer S Science by Kolman B and Bushy R

2. Discrete Mathematical Structures with applications to Computer Science by Tremblay and Manohar
3. Discrete Mathematics by C L Liu
4. Discrete Mathematics by Rosen

IT 11 L- Visual Basic Lab

Objective : This will introduce visual programming and event driven programming practically. This will enhance applications development skill of student.

Each session will be of 1 and 1/2 hours.
Total number of Sessions – 40 , Marks – 50
All the topics has to be covered with Lab Demos

Sr. No	Topic
1	**Introduction** Event driven programming, Concept of GUI, Various VB- Editions, How to start with a project, Introduction of various windows : Properties Windows, Project Windows, Toolbox Windows, Menubar Windows
2.	**The language** 2.1 Variables Data Types, Types of variables Forcing variable declarations lifetime & scope, Converting variable types User defined data types 2.2 Constants 2.3 Arrays Declaring arrays, Multidimensional arrays 2.4 Inputbox() & Msgbox() functions 2.5 Control flow statements If…Then, If…Then…Else, Select 2.6 Loop statements Do….Loop, For…Next, While…wend Nested control structures, exit statement 2.7 Procedures Subroutines, Functions, With Arguments, With return values 2.8 Built In Functions - Date, String, Mathematical
3.	**Controls with main Properties, Methods & Events** 3.1 Label 3.2 Textbox, Basic properties , Text selection, Capturing key strokes 3.3 Command box 3.4 Option, Check box 3.5 Combo, list box, Indexing with a ListBox , Searching a sorted list 3.6 Scroll bars & slider controls 3.7 Timer 3.8 Dir, File, Drive list boxes 3.9 The remaining controls like shape, image, picture etc.

Sr No.	Topic
4	**Designing the user interface** Placing the controls on form Aligning & grouping controls Setting focus, writing code with code design window Saving & running the application
5	**Advanced ActiveX controls** 5.1 The common dialog controls Color, Font common dialog boxes The FileOpen & FileSave common dialog boxes The Print, Help common dialog boxes 5.2 The Tree & List view controls How tree structure works Using the Tree view, List view control 5.3 RichTextBox control 5.4 MSFlex-grid control - Basic properties
6	**The multiple document interface** 6.1 MDI Applications- the basic Built-in capabilities of MDI, Parent & Child menus 6.2 Accessing Child forms Adding, loading, unloading forms 6.3 Creating menus with Menu Editor, assigning the keys etc.
7	**Database programming & Error Handling** 7.1 Understanding Databases & Database Management Systems Record sets, Accessing fields in database Data Control – Properties, Methods Advanced Data bound controls 7.2 Using Visual Data Manager 7.3 Database Connectivity with controls ADO Establishing connection Executing SQL stmts. Cursor types & locking mechanisms Manipulating Record set object. Simple record adding & editing Database Connectivity using code Grid controls- Flex grid, Data grid 7.4 Handling errors
8.	**Reports** Data & Crystal reports , Simple reports with proper formatting, GroupWise reports
9.	**Introduction of Creating DLL in VB.**
10.	**Making EXE File**

Lab Exercises for VB

VB introduction

a. Start a new project
b. Open tools, properties & project explorer window
c. Change the name of project
d. Change name& title of form & save it.
e. Set the following, save the form & run it.
    i. Height & width
    ii. BorderStyle property to FixedDialog
    iii. WindowState property to maximized
    iv. StartUpPosition property to center
    v. Moveable property to false
    vi. Font & foreground color

VB-The language

a. Declare two variables. Accept the values using InputBox() & display the result on form.
b. Accept 10 numbers in array, display minimum & maximum number.
c. Display first odd numbers & store them in array.
d. Accept numbers in array, take a number to search in an array, find the number of times that number is occurred in array.

Inputbox() & Msgbox() functions

a. Accept a name from user & display hello in msgbox()
b. Accept one number using inputbox() & display its factorial in msgbox()

Control flow statements & loops

a. Accept a username & password using InputBox() check whether it is Scott & tiger resp., display valid user names else display proper error message.
b. Accept a number, display whether it is odd or even number
c. Accept a character, check whether it is a alphabet, number or special symbol.
d. Accept a number, display its Armstrong no.
e. Create a Fibonacci series for 10 numbers
e. Accept a number check, whether it is prime or not.

Built in functions

a. Display today's date with day, day name , month & year
b. Accept a date from user, check whether the year is leap or not.
c. Accept a date, check date validations.
d. Display the date after 45 days from current date.

Procedures

a. Write a procedure to display hello & welcome message when form loads
b. Write a procedure to display Thank you message when form unloads
c. Write a function max(a,b,c) which will return maximum of 3 numbers.

d. Write a function pyramid() which will accept a string & will display the string pyramid.
e. Write a function rev(a) to reverse a number
f. Write a function srev() to reverse a string.

VB basic controls with main properties, methods & events

a. Add the label, change its name as lblmsg, On the form load event , display the message on label as Welcome
b. Add a text box & a label in form, after selecting a text in textbox, display the selected text on label
c. Add a text box& label on form, display the ASCII values of character typed in a textbox on a label.
d. Accept a color name in text box. Display the forms background color as per the name of the color.
e. Accept a message, encrypt it by key 2, display.
g. Accept a String in text box, find out number of letters, numbers, special symbols in a string.

Command box

a. Add a command box with Caption OK. When user clicks on it change to KO and vice-versa
b. Display the command button with a File-save icon on it.
d. Create a calculator, which will perform basic arithmetic operations like add, subtract, multiply, divide etc.

Option, Check box

a. Develop a screen with 4 check boxes for hobbies & one button. After clicking on a button display the hobbies selected.
b. Design an application, with 9 checkboxes from 0 to 9 & one button Add. After clicking on Add, display the sum of digits selected.
c. Design a screen with 3 radio buttons for 3 different colors. If any one of them selected, change the background color as per the selected color.
e. Accept two numbers from user. Using radio buttons display options like calculate Minimum, Maximum, average

Combo, list box

a. Design an application with a text box & a Combo box, & some command buttons .
    1. On click of Add button, add text in text box to combo.
    2. On click of Delete button, the selected entry should get deleted from combo.
    3. on click of any above buttons display total number of final items in list.
b. Design an application with a list box having names of Operating Systems.
    1. Allow user to select multiple entries
    2. On click of Display button show os selected.

3. On click of delete, delete the selected names.

c. Design an application with 2 list boxes, with buttons Transfer one, all after clicking on buttons transfer either selected items or all items to 2nd list box & vice versa.

d. Design an application for formatting the Text entered in a text box. Add Combo for Font name & size. Add B, I, U command buttons. As per the font name, size & formatting options selected display the text. The buttons should be toggle. Once clicked effect should be enable or disable.

Scroll bars

a. Add a horizontal scroll bar for a font size, with minimum 10 & maximum 72 points size. As per the scroll movement increase/decrease the size of text font by one.

b. Create 3 scrollbars for colors Red, Green, Blue. The range of values be from 0 to 256. As per values of scrollbars change the color of label.

c. Add one scroll bar. Display the current value of the scroll bar in text box.

Timer

a. Design an application that will set timer interval as 10 And will display any one image of the 2 images.

b. Using timer design a traffic signal application.

c. Display a running clock in a text box.

Dir, File, Drive list boxes

a. Design an application with directory; File & Drive list boxes, as per the drive-selected display the names of directories & subdirectories in list box. After selecting directory display all files within that directory.

b. Display all files with extension .BMP.

Using all above controls designed applications for handling Employee data, Student Data, Books data.

Advanced Activex Controls

a. Design an application with 2 buttons File – Open & File –Save. As per the button click display the Dialog boxes & name of the file seleted.

b. Write a Notepad application using RichTextBox Control.

MDI forms

a. Create one MDI form, Add 3 child forms. Design a menu to arrange all the forms in Cascading, tile form.

b. Design a menu of Edit with Cut, Copy, Paste, select all options. Assign shortcut keys & hot keys.

c. Design an application for nested menus.

Database Programming

Using DAO

a. Display all records of Emp table in text boxes.

b. Create an application to Add, Delete, Modify employees (using code)
c. Display all the records of employees working in deptno 20.
d. Display all the records in Grid.
e. Create an application using Visual Data Manager.

Using ADO

a. Create an application, to scroll through the database records. use DSN with ADO control.
b. Write the same application using code.
c. Write an application for book entry,
   i. That allows to enter new book details like book name, author, publication, edition, price etc., will generate bookid auto. Adds the records in db
   ii. After selecting name of author display all the books with details having the same author.
   iii. Display the book details as per the price range entered by user.
   iv. Display all book details in MSFlex grid.

Create proper reports using Data/Crystal reports.

IT12L - C Programming Lab

Objective : This will give hands on practice to student about programming language C and will inculcate programming habit in them.

1. Find Area, Perimeter of Square & Rectangle.
2. Find max. Among 3 nos.
3. Check leap year
4. Factorial of Number
5. Calculate a^b
6. Prime Number.
7. Perfect Number.
8. Armstrong Number.
9. Floyd's Triangle
10. Fibonacci Series
11. Inter conversion of Decimal, Binary & Hexadecimal no.
12. LCM & GCD of numbers
13. Insert & Delete an element at given location in array.
14. Transpose of matrices
15. Multiplication of matrices
16. Display upper & lower diagonal of matrices
17. Array of Structure e.g. student result, Employee pay slip , Phone bill
18. Function with no parameter & no return values
19. Function with parameter & return values
20. Function with parameter & no return values
21. Function with call by reference
22. Recursion function e.g. sum of digit, reverse of digit
23. String manipulation function e.g. string copy, concatenation, compare, string length, reverse
24. Pointer Arithmetic
25. File handling e.g. Read / Write file, copy file, merging file
26. Random access of file
27. File handling with command line arguments
28. Drawing line, rectangle, circle, ellipse by using graph
29. Changing foreground/ background color
30. Changing color & font of text
31. Swapping of numbers by using bit wise operator.
32. Macro expansion
33. File Inclusion
34. IO interfacing & Device Driver using C.

Semester II

IT21 - Data Structures Using C

Objective : The basic algorithms related to handling data like stack, lists, queue, trees and graphs are introduced in this subject. The implementation of these algorithms will be taught using previously learned C programming language.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Introduction To Data Structure** 1.1. Introduction 1.2. Data Definition 1.3. Data Object 1.4. Data Types 1.4.1.Built-in Data Type 1.4.2.Derived Data Type 1.5. Data Structure 1.6. Implementation of Data Structure	2	1,3,4
2	**Array** 2.1. Array as Data Structure 2.2. Storage Representation of Arrays 2.3. Applications of Arrays 2.4. Polynomial Representation Using Arrays 2.4.1.Addition of Two Polynomial 2.4.2. Multiplication of Two Polynomial 2.5. Sparse Matrices 2.5.1. Addition of Sparse Matrices 2.5.2. Transpose of a Sparse Matrix	5	1,3,4
3	**Linked List** 3.1.Introduction 3.2.Drawback of Sequential Storage 3.3.Concept of Linked List 3.4.Implementation of Linked List 3.5.Operation of Linked List 3.5.1.Creating a List 3.5.2.Displaying a List 3.5.3.Inserting an element in the List 3.5.4.Deleting an element 3.6.Other Operation & Applications 3.6.1.Reversing a Linked List 3.6.2.Concatenation of Two Lists 3.6.3.Representation of Polynomial 3.7.Circular Linked List & Operation 3.8. Doubly Linked List & Operation 3.9.Doubly Circular Linked List & Operation 3.10.Difference between an array and Linked	8	1,3,4,5,6

	list 3.11.Generalized Linked List 3.12. Header Linked List		
4	**Stack** 4.1.Introduction 4.2.Definition 4.3.Operation on Stack 4.4.Static & Dynamic Implementation of a Stack 4.5.Application of Stack 4.5.1.Recursion 4.5.2.Infix, Prefix & Postfix expression 4.5.3.Matching Parentheses in an expression	5	1,3,4,5,6
5	**Queue** 5.1.Introduction 5.2.Definition of a Queue 5.3.Operation on a Queue 5.4.Static & Dynamic Implementation of Queue 5.5.Types of Queue 5.5.1.Circular Queue 5.5.2.Priority Queue 5.5.3. DEQueue 5.6. Application of Queue 5.6.1.Job Scheduling 5.6.2. Reversing Stack using Queue	3	1,3,4,5,6
6	**Tree** 6.1.Tree Terminology 6.2.Binary Tree 6.3.Binary Tree Representation 6.4. Binary Search Tree (BST) 6.4.1.Creating a BST 6.4.2.Binary Search Tree Traversal 6.4.2.1.Preorder Traversal 6.4.2.2. Inorder Traversal 6.4.2.3.Postorder Traversal	5	1,3,4,5,6
7	**Binary Threaded Tree** 7.1.AVL tree 7.2.B tree 7.2.1 introduction to B tree 7.2.2 insertion in B tree 7.2.3 deletion from B tree 7.2.4 introduction to B+, B* tree 7.3. Expression Tree 7.4. Threaded Binary Tree	7	1,4,6

8	**Graph** 8.1. Introduction 8.2. Graph Representation 8.2.1. Adjacency Matrix 8.2.2. Adjacency List 8.3.Graph Traversals 8.3.1. Depth First Search 8.3.2. Breadth First Search 8.4. Applications of Graph	5	1,3,4,5,6

Reference Books:

1.C & Data Structure — Balagurusamy
2.Data structure and program design in c — R.L.Kruse
3.Data Structure through C — Y.P. Kanetkar
4.Data Structure through C in depth — Shrivastava & Shrivastava
5.Data Structure — Seymour Liptsuz
6.Data Structure — Tannebaum

IT22 - Database Management System

Objective : The concepts related to database, database techniques, SQLs and database operations are introduced in this subject. This create strong foundation for application data design.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Basic concepts** 1.1 Database and Need for DBMS 1.2 Characteristics of DBMS 1.3 Database Users 1.4 3-tier architecture of DBMS (its advantages over 2-tier) 1.5 Data Models 1.6 Views of data-schemas and instances 1.7 Data Independence 1.8 Conventional data models & systems 1.8.1 NDM & HDM- Expressing relationships, DBTG set	6	1, 2, 3, 8
2	**Database Design using ER model** 2.1 Entities 2.2 Relationships 2.3 Representation of entities, attributes, relationship attributes, relationship set 2.4 Generalization, aggregation 2.5 Structure of relational Database and different types of keys 2.6 Expressing M:N relation	8	1, 2, 4, 5, 8
3	**Relational Model** 3.1 Codd's rules 3.2 Relational data model & relational algebra 3.2.1 Relational model concept 3.2.2 Relational model constraints 3.2.3 Relational Algebra 3.3 Relational database language Data definition in SQL, Views and Queries in SQL, Specifying constraints and Indexes in SQL, Specifying constraints management systems, Oracle , Ingres	5	1,2,4,5,8,9, 10
4	**Relational Database design** 4.1 Database Design – ER to Relational 4.2 Functional dependencies 4.3 Normalization Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF)	8	4 ,5, 2,10

	4.4 Loss less joins and dependency preserving decomposition		
5	**Storage and File Structure** 5.1 Overview of physical storage media 5.2 Magnetic disk 5.3 RAID 5.4 Tertiary storage 5.5 Storage access 5.6 File organization 5.7 Organization of records in files 5.8 Data dictionary storage	3	1, 2, 5,8
6	**Transaction And Concurrency control** 6.1 Concept of transaction, ACID properties 6.2 Serializibility 6.3 States of transaction, 6.4 Concurrency control 6.3.1 Locking techniques 6.3.2 Time stamp based protocols 6.3.3 Granularity of data items 6.3.4 Deadlock	4	6 ,7
7	**Crash Recovery and Backup** 7.1 Failure classifications 7.2 storage structure 7.3 Recovery & atomicity 7.4 Log base recovery 7.5 Recovery with concurrent transactions 7.6 Failure with loss of Non-Volatile storage 7.8 Database backup & recovery from catastrophic failure 7.9 Remote Backup System	4	2,5
8	**Security and privacy** 8.1 Database security issues 8.2 Discretionary access control based on grant & revoking privilege 8.3 Mandatory access control and role based access control for multilevel security 8.4 Encryption & public key infrastructures	2	1,5

Reference books:

1. Introduction to database systems — C.J.Date
2. Database system concept — Korth
3. Principles of Database Management — James Martin
4. Computer Database organization — James Martin
5. Fundamentals of Database Sysems — Elmasri Navathe
6. Object-oriented modeling and design — Rumbaugh and Blaha
7. Object-oriented analysis and design — Grady Booch

8. Database Management Systems — Bipin Desai
9. Database system practical Approach to design, implementation & management — Connoly & Begg
10. Database Management systems — Ramakrishnan & Gehrke

Note:

1. PL/SQL to be covered as lab sessions
2. Oracle Lab will be covered as Lab demo sessions.
3. Relational Calculus need not be covered in depth.
4. Case studies on ER diagram, Normalization and SQL should be covered

IT23-Software Engineering

Objective : Software System Analysis and Design, Analysis and Design Models and Techniques, recent trends and methods will be taught to student . This subject develops systematic approach for development of application in students.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1.	**Overview of Systems Analysis and design** 1.1 Basic System Development Life Cycle 1.2 Different approaches and models for System Development: 1.2.1. Waterfall 1.2.2. Prototyping 1.2.3. Spiral (including WIN-WIN Spiral) 1.2.4. RAD 1.2.5. Group Based Approach: JAD 1.2.6. Object Oriented methodology 1.3 Role & Skills of System Analyst	6	1,5,6,9
2.	**Activities in Requirements Determination.** 2.1 Requirements Anticipation 2.2 Requirements Investigation Fact finding methods 2.3 Requirements Specifications Software requirement Specification(SRS) Structure and contents of the requirements specification analysis modeling, types of requirements - functional and non-functional , Quality criteria, Requirements definition, SRS format, Fundamental problems in defining requirements	10	1,2,10
3.	**Information requirement Analysis**: 3.1 Decision Analysis Tools: Decision Tree, Decision Table, Structured English 3.2 Functional Decomposition Diagram 3.3 Process modeling with physical and logical 3.4 Data Flow Diagrams 3.5 Entity Relationship Diagram: Identify Entity &Relationships 3.6 Data Dictionary Case Studies on Decision analysis tools FDDs, DFDs should be covered	12	1,5,6,8
4.	**Systems Design:** 4.1 Design of input & Control, Objectives of Input Design, Data Capture Guidelines Design of Source Document, Input Validations	10	1,4,8

	4.2 Design of output, Objectives of Output Design Types Of Output 4.3 User Interface design: Elements of good design, design issues, features of modern GUI, Menus, Scroll bars, windows, buttons, icons, panels, error messages etc. 4.4 Design of program Specification 4.5 Code Design Case studies should be covered on the Topic		
5.	**Maintenance** 5.1 Types of Maintenance 5.2 Maintenance Cost 5.3 Reverse Engineering 5.4 Introduction to legacy systems 5.5 Role of documentation in maintenance and types of documentation	3	1,3,8,10
6.	**CASE TOOLS** CASE tools, types – project mgt., analysis, designing, programming, prototyping, maintenance, advantages of using CASE tools, I-CASE, future of CASE	3	1,4,5,9
7.	**Current trends in Software Engineering** 7.1Software Engineering for projects & products. 7.2 Introduction to Web Engineering and Agile process	3	1,8,9

Reference Books :

1. Software Engineering	Pressman
2. System Analysis and Design	Jalote
3. Software Engineering	Sommerville
4. Software Engineering	W S Jawadekar
5. System Analysis & Design methods	Whiten, Bentley
6. System Analysis & Design	Elias Awad
7. Object Oriented Modelling & Design	James Rumbaugh
8. Analysis & Design of Information System	James Senn
9. Analysis & Design of Information System	V. Rajaraman
10. Software Engineering Concepts	Richard Fairley

Note:

ERDs will be covered in depth in DBMS in Sem II.

BM 21-Soft Skills

Objectives:

To encourage the all round development of students by focusing on soft skills.

To make student aware about the importance, the role and the content of soft skills through instruction, knowledge acquisition, and practice.

To develop and nurture the soft skills that help develop student as a team member, leader, and all round professional in long run have been identified and listed here for references. As the time professional in long run have been identified and listed here for references the time allotment for the soft skill laboratory as small and the fact that the skills are nurtured over years, students are encouraged to follow these skills as self study and self driven process.

Sr. No	Chapter Details	Sessions	Reference Books
1	Self Development and Assessment Self-Assessment Self-Awareness, Perception and Attitudes Values and Belief System Personal Goal Setting Career Planning, Self-Esteem, Building of Self-Confidence	15	1,2,3,4
2	Components of communication , Principles of communication barriers , listening skills Verbal Communication 2.1 Includes Planning 2.2 Preparation 2.3 Delivery, Feedback and Assessment of activities like Public speaking Group Discussion Oral Presentation skills, Perfect Interview Listening and observation skills, Body language 2.4 Use of Presentation graphics, 2.5 Use of Presentation aids, Study of communication.	15	5,6,7,8,9,10,11,12
3	Written Communication 3.1 Technical Writing–Technical Reports 3.2 Project Proposals, 3.3 Brochures,	18	5,6,7,8,9,10,11,12

	3.4 Newsletters, 3.5 Technical Articles 3.6 Technical Manuals 3.7 Official/Business Correspondence Business letters Memos Progress report, Minutes of meeting, Event reporting, Use of style, Grammar and Vocabulary for effective technical writing, Use of : Tools, Guidelines for technical writing, Publishing		
4	Ethics and Etiquettes 4.1 Business Ethics 4.2 Etiquettes in social as well as Office settings Email etiquettes Telephone Etiquettes Engineering ethics and ethics as an IT professional, Civic Sense.	6	13,14,15,16,18
5	Other Skills 5.1 Managing time 5.2 Meditation 5.3 Understanding roles of Engineer and their Responsibility 5.4 Exposure to work environment And culture in today's job Places 5.5 Improving Personal Memory, Study skills that include Rapid reading, Notes taking, Complex problem solving, creativity.	8	13,14,15,16,18

References Books

1. You Can Win – Shiv Khera – Macmillan Books – 2003 Revised Edition
2. 7 Habits of Highly effective people – Stephen Covey
3. Business Communication - Asha Kaul
4. Business Communication - M. Balasubramanyam
5. John Collin, "Perfect Presentation", Video Arts MARSHAL
6. Jenny Rogers " Effective Interviews", Video Arts MARSHAL
7. Raman Sharma, " Technical Communications", OXFORD
8. Sharon Gerson, Steven Gerson "Technical writing process and product", Pearson Education Asia, LPE third edition.

9. R. Sharma, K. Mohan, Business correspondence and report writing", TAG McGraw Hill ISBN 0-07-044555-9
10. Video for technical education catalog, National education and Information Films Ltd. Mumbai.
11. Management training and development catalog, National education and Information Films Ltd. Mumbai.
12, XEBEC, "Presentation Book 1,2,3", Tata McGraw-Hill, 2000,ISBN 0-40221-3

13. Tim Hindle, "Reducing Stress", Essential Manager series Dk Publishing
14. Sheila Cameron, "Business student Handbook", Pitman Publishing
15. Dr. R. L. Bhatia, " Managing time for competitive edge"
16. Lorayne Lucas "Memory Book"
17. Robert Heller, "Effective leadership", Essential Manager series Dk Publishing
18. Newstrom Keith Davis," Organizational Behavior", Tata McGraw-Hill, 0-07-460358-2

It is proposed that expert from industry be invited to conduct lectures and workshops to understand the industry soft-skill requirement.

Guidelines for term-work

List Of Possible Assignments:

1. Write a personal essay and or resume or statement of purpose which may include:
   - Who am I (family background, past achievements, past activities of significance)
   - Strength and weakness (how to tackle them) (SWOT analysis)
   - Personal Short-term Goals, long term goals and action plan to achieve them
   - Self assessment on soft-skills
2. Student could review and present to a group from the following ideas
   - Book review
   - Biographical Sketch
   - Any topic such as an inspirational story/personal values/beliefs/current topic
   - Ethics and etiquettes and social responsibilities as professional.
3 Students will present to a group from the following ideas
   - Multimedia based oral presentation on any topic of choice (Business/Technical)
   - Public speaking exercise in the form of debate or elocution on any topic of choice
4 Students will undergo two activities related to verbal/non-verbal skills from following
   - Appearing for mock personal interviews
   - Participating in group discussion on current affairs/Social Issue/ethics and etiquettes
   -Participating in games, role-playing exercises to highlight nonverbal skills.
5 Students will submit one technical document from the following:
   - Project proposal

- Product brochure
- Literature survey on any one topic
- User Manual
- Technical Help

6 Students will submit one business document from the following
- A representative official correspondence
- Minutes of meeting
- Work progress report

7 Students will participate in one or two activities from following:
-Team games for team building
-Situational games fro role playing as leaders, members
-Organizing mock events
-Conducting meetings

8 Faculty may arrange one or more sessions from following :
-Yoga and mediation
-Stress management, relaxation exercises and fitness exercises
-Time management and personal planning sessions
-Improving memory skills
-Improving leadership skills
-Improving English conversation skills
-Reading comprehension skills & notes taking skills

9. Students' own SWOT Analysis

Students are expected to keep a personal record of any six activities that they conduct in the soft skill laboratory in the form of a journal. All students need note to do the same assignments. Institute having a freedom within the framework to customize set of activities to be followed.

Assessment Guidelines for term-work assessment

1. Written Communications
   Students could submit for example
   Personal resume, essay
   Technical document or business document
2. Spoken communication
   One elocution event of say 8-10 minutes individually
   One group discussion or group presentation event
3. Overall participation in soft skills based lab activities
   Attendance and enthusiasm
   Participation and contribution in event management, organizing
   Group games, group exercises, interpersonal skills observed
   Quality of journal for soft skills laboratory indicating personal progress, participation.

Guidelines for batch wise Time management for laboratory sessions (Two hour session at a time)

1. Batches could be of size 25 to 30 students.

2. Written communication exercises could be done for whole batch at same time. (3 sessions)
3. Spoken communications exercises can be done with around 10-15 students covered in one two hour slot so total need for exercises. (2 sessions).
4. Group discussions could be done for groups of 5-8 students at a time for half so total need for two group discussions for each student of the batch will be required. (2 sessions)
5. Sessions could be organized for trainers to give directions, knowledge, experience sharing or common viewing of training material on Video etc. (4 sessions)
6. Group exercises for team building, role playing and interaction with professional. (3 sessions)

BM 22- Business Process Domains

Objective : The processes and practices in business and their applications are taught in subject. The advance business applications like ERP, CRM and SCM are also introduced to student. This helps student in design computerised business applications with better understanding.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Sales & Distribution** 1.1 Sales Budgeting-Market Segments/Customers/Products 1.2 Pending Customer Order's follow up 1.3 Sales Analysis While explaining this application consider an organization manufacturing multiple products with sales outlets spread across the country Retail Marketing- New trends – Growth		4
2	**Human Resource** 2.1. Employee Database 2.2 Recruitment – Techniques 2.3. Employee Appraisal – Performance-efficiency 2.4 Employee Training- multiple training 2.5 Leave Accounting and Payroll: Salary calculation and reporting, Income Tax, Calculation and Reporting, Loan Accounting, PF and gratuity, Bonus, Ex-Gratia, Incentive, Super-annuation, Arrears Calculation 2.6 E-HR Software	8	2
3	**Banking and Healthcare** Saving Bank Accounting – Real time, ATM and E-Banking, Biotech Industry & Scope	4	4
4	**Advanced Business Systems** 4.1 Enterprise Resource Planning Evolution, Scope, What is ERP? Why ERP? Package ERP solution Vs Custom development Features of ER, Different modules of ERP, How ERP works? Pre-requisites for implementing ERPBPR/BPM, ERP Implementation-	12	6

	Issues methodologies, Selection of ERP Software 4.2 Supply chain Management(SCM) 4.3 Demand forecasting and Planning 4.4 Distribution inventory planning and plant capacity, planning and scheduling 4.5 Integration with ERP 4.6 Technologies used such as EDI, Web 4.7 Customer Relationship Management (CRM): CRM covers marketing, Sales and service functions of a company 4.7.1 CRM Process customer Acquisition / Development 4.7.2 Retention 4.7.3 Call center/ Knowledge Center 4.8 International Business Management – Basic concept 4.8.1 Market potential & opportunities. 4.8.2 Competitive advantage. 4.9 Introduction to exchange		
5	Birds eye view of Multinational Companies and Indian Comp in software industry: like TCS, Wipro, Infosys, Microsoft, Oracle, Vodafone	6	6

Reference Books :

1. Production and Operation Management — Mayer
2. Personnel Management — C B Mammoria
3. Enterprise Resource Planning and Business Process — M M Sahikh
4. Business Applications — Dr. Milind Oka
5. Website of the said companies in Chapter 5 for general information
6. Business India, India Today Magazines.

MT21-Probability & Combinatorics

Objective : Permutations and Combinations, Principle of Inclusion & Exclusion, Recurrence Relations-Linear, Probability & various distributions and exclusion will help student to know statistical techniques much better.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Permutations & Combinations** Addition principle, multiplication principle, Bijection principle, r-permutations of n-elements, r-combination of n-elements, binomial coefficients, circular permutations, permutations with repetitions, Multinomial theorem, combinations with repetitions, Distribution of objects- 1. Distinct objects in distinct cells 2. Indistinguishable objects in distinct cells 3. Distinct objects in, indistinguishable cells 4. Indistinguishable objects in Indistinguishable cells	10	3,4,5
2	Number of non-negative integer solutions of linear equations with conditions Binomial identities	4	3,4,5
3	**Principle of Inclusion & Exclusion** Formula Dearrangement- restrictions on relative positions Generating functions for discrete numeric functions, for combinations	4	3,4,5
4	**Recurrence Relations-Linear** Homogeneous, non-homogeneous, Pigeonhole principle	5	3,4,5
5	**Probability** Sample space, events, different approaches, conditional probability, Baye's rule, Random variables, univariate & bivariate Discrete Distributions Binomial, Poisson, Negative Binomial, Geometric, hyper geometric, beta distributions	15	3,4,5

	Continuous Distributions Uniform, normal, Erlanggamma, exponential, Ray Leigh laplace, cauchy, marginal & conditional distributions For the above discrete distribution definition of r.v and derivation of its p.m.f. is expected. For the continuous distributions p.d.f. should be defined.		
6	Special properties of the distribution (if any) should be tested.	2	1,2,4
7	**Expectation** Expectation of R.V, expectation of a function of a r.v. should be defined For all the above distributions using these definitions mean & variance should be obtained.	5	1,2,4
8	Moment generating function & its properties. Finding mean & variance using m.g.f. cumulant generating function, cumulants properties, finding mean & variance using cumulants, characteristic function-properties, finding mean & variance	5	5,1,2

References:

For Probability

1. A first course in Probability — Ross S.
2. Probability & Random Process — T.Veerarajan

For Combinatories

3 Discrete Mathematics — Modak Andor Boxwala(BSC Computer) Munot

4 Combinations — Modak Andor Boxwala

5 Discrete Mathematics — C.L. Liu

IT21L-Data Structure Lab

Objective : The practical implementation of data structure will be done by students thru this lab work, which will built efficient programming skills in students.

1. Addition and Multiplication of Two Polynomials.
2. Addition and Transpose of Sparse Matrices.
3. Singly Linked List: Create, Display, Insertion, Deletion, Search, Reverse
4. Singly Circular Linked List: Create, Display, Insertion, Deletion, Search,
5. Doubly Linked List: Create, Display, Insertion, Deletion, Search, Reverse
6. Stack Implementation
7. Stack Application: Inter conversion of Infix, Prefix & Postfix
8. Stack Application: Palindrome & Matching Parenthesis.
9. Queue Implementation
10. Queue Application: Job Scheduling.
11. Binary Search Tree Implementation: Creation, Insertion, Deletion, Copy, Mirror, Traversal (Preorder, Post order, In order).
12. Graph Application: Depth First Search, Breadth First Search, And Shortest Path Algorithm.

IT22L-DBMS Lab

Objective : Thru this lab work will enhance database handling, data manipulation and data processing skills thru SQL & PL/SQL, which will help them in developing data centric computer applications.

Sr. No.	Chapter Details
1	Overview of RDBMS, Oracle introduction
2	Introduction of SQL DDL, DML, DTL Basic Data Types Char, varchar/varchar2, long, number, Fixed & floating point Date, CLOB, BLOB
3	Table Constraint definition Commands to create table
4	Commands for table handling Alter table, Drop table, Insert records
5	Commands for record handling Update, Delete Select with operators like arithmetic, comparison, logical Query Expression operators Ordering the records with orderby Grouping the records
6	SQL functions Date, Numeric, Character, conversion Group functions avg, max, min, sum, count
7	Set operations Union, Union all, intersect, minus
8	Join concept Simple, equi, non equi, self, outer join
9	Query & sub queries
10	Synonym introduction, object type Create, synonym as alias for table & view, drop
11	Sequence Introduction, alter sequence, drop
12	View Intro, create, update, drop
13	Index Introduction, create
14	Primary introduction to DBA User create, granting privileges (Grant, Revoke, Commit, Rollback, Savepoint)

15	Report writer using SQL Title, Btitle, skip, pause, column, SQL, Break on, computer sum
16	Introduction of PL/SQL Advantages of PL/SQL Support of SQL Executing PL/SQL
17	PL/SQL character set & Data Types Character, row, rowed, Boolean, binary integer, number Variable, constant
18	PL/SQL blocks Attribute % type, %rowtype, operators, function comparison numeric, character, date Control structure Condition – if Interactive- loop, for, while Sequential – goto
19	Composite data types Record- declaration, refer, record assignment Table- Declaration, table attributes (Count, delete, exists, first, last, next, prior)
20	Database Triggers Definition, syntax, parts of triggers Types of triggers, enabling & disabling triggers
21	Sub programs Definition Features Cursors
22	Procedures Definition, creating, Parameter
23	Function Definition & implementation

Reference Books:

1. Understanding ORACLE Perry J. & Later J.
2. Understanding SQL Martin Gruber, BPB publication
3. SQL Scott Urman
4. ORACLE PL/SQL Programming Scott Urman
5. SQL, PL/SQL the programming language of Oracle Ivan Bayross

Lab Exercises

Exercise1

1. Create table Salespeople with fields snum, sname, city, commission
2. Orders table with fields onum, odate, snum, amt
3. Customers table with fields cnum, cname, city, rating, snum

Exercise 2

1. Add at least 10 records
2. Display all the records with all sales peoples information.
3. Display the details of fields sname, commission
4. Display the odate, snum, onum, amt from orders table.
5. Display snum from orders table without duplications.
6. Display name & city of salesman where city is “Pune
7. Display all details of customer where rating is 100.
8. Display all details from customer table where salespersons number is 1001.
9. Display the numbers of sales persons, with orders currently in the orders table without any repeats.
10. Display all customers where rating is more than 200
11. Display all customers where city is ‘Mumbai’ rating is more than 100.
12. Display all customers where city is either ‘Pune’ or ‘Mumbai’
13. List all customers not having city ‘Pune’ or rating more than 100
14. List all orders between order dates 10/03/05 to 30/3/05
15. Display all orders more that 1000 amt.
16. Display names & cities of all salespeople in ‘Pune’ with a commission above 10.
17. Display all customers excluding those, with rating less than equal to 100, unless they are located in ‘Nagar’
18. Display all sales persons names starting with character ‘G’
19. Display all sales persons names starting with character ‘G’, the 4^{th} character is ‘A’ & the rest of characters will be any.
20. Find all records from customers table where city is not known i.e. NULL.
21. Display all the customers names begins with a letter A to G.
22. Assume each salesperson has a 12% commission on order amt. Display orderno, snum, commission for that order.

Exercise 3

1. Display all the customers records, arranged on name.
2. Display all customers records arranged on rating in desc. Order.
3. Display all sales persons records arranged on snum
4. Display the count for total number of customers in customers table.
5. Display the count of snum in order table without duplication of snum.
6. Display the counts of all orders for Feb05
7. Display the count of different non-NULL city values in the customers table.
8. Display the maximum outstanding amount as blnc+amt
9. Display the minimum rating within customers table.
10. Display average of amt.
11. Display sales persons number wise maximum amt from order table.
12. Display the largest order taken by each salesperson on each date.

13. Display the details of maximum orders above 3000.
14. Display details of orders order number & date wise
15. Display customers highest ratings in each city.
16. Write a query that totals the orders for each day & places the results in descending order.

Exercise 4

1. Add a column curr_bal in orders table for current balance
2. Increase commission of all sales persons by 200.
3. Delete all orders where odate is less than 5-2-05

Exercise 5

1. Display names of all customers matched with the salespeople serving them.
2. Find all orders by customers not located in same cities as their salespersons.
3. Display each order number followed by the name of customer who made it.
4. Calculate the amount of salespersons commissions on each order by a customer with a rating above 100.
5. Display the pairs of salespeople who are living in the same city. Exclude combinations of sales people with themselves as well as duplicate rows with the order reversed.
6. Display the names & cities of all customers with same rating as Hoffman.

Exercise 6

1. Write a query that uses a sub-query to obtain all orders for the customer named ‘Gopal’. Assume you do not know the customer number.
2. Write a query that produces the names & ratings of all customers who have above-average orders.
3. Write a query that selects the total amt in orders for each salesperson for whom this total is greater than the amount of the largest order in table.

Exercise 7

1. Create a union of two queries that shows the names, cities 7 ratings of all customers. Those with a rating of 200 or greater will also have ratings “high rating”, while the others will have the words “low rating”.
2. Write a command that produces the name & number of each salesperson & each customer with more than one current order. Put results in alphabetical order.

Exercise 8

1. Create an index that would permit each salesperson to retrieve his or her orders grouped by date quickly.
2. Create a view that shows all of the customers who have highest ratings.
3. Create a view that shows number of salespeople in each city.

Exercise 9

1. Write a PL/SQL block of code that first inserts a record in an ‘emp’ table. Update the salary by Rs. 2000. then check to see that the total salary does not exceed 20000. if so, undo the updates made to the salaries.
2. HRD manager has decided to raise the salary of employees by 0.15. Write a PL/SQL block to accept the employee number & update the salary of that emp. Display message based on the existence of record in employee table.
3. When any such raise in salary, a record for the same is maintained in emp_raise table. It includes the employee no, the date of raise & the actual raise.
4. Create a stored function to perform item_id check operation. Which accepts a item_id & returns a flag as per the id exist or not.
5. Application using database triggers –
   Create a transparent audit system for a table Client_master. The system must keep track of the records that are being deleted or updated. When the record is deleted or modified the original record details & date of operation are stored in audit table & then the delete & update is allowed to go.

Semester III

IT-31: Web Technologies

Objectives:
This course enables students to understand web page site planning, management and maintenance. The course explains the concepts of developing advanced HTML pages with the help of frames, scripting languages, and evolving technologies like DHTML, and XML.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
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.	8	1, 3, 9, 10
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 &	4	1, 3, 9, 10
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, Window Navigator, History, Location, Event handling, Validations On Forms	10	2,3,9, 10
4	**VBScript** Intro. To VBSCript, Variables, Data types, Control Structures & Loops, Functions in VBSCript, Client side web scripting, Validating forms, DOM, Handling errors	4	4, 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	7	6,7,8,9

	using XSLT, SAX & DOM Parsers, SOAP Intro.		
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	11, 12

Reference Books:

1. Complete reference HTML.
2. JavaScript 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.

IT32 – Data Communication and Computer Networks

Objective : Various computer networks, technologies behind networks and application protocols, e-mail and communication protocols will be introduced to students thru this subject.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Introduction to Networking** Hardware Architecture, Topologies, Media, Devices Transmission Technique , Twisted Pair, Coaxial Cable, Fiber optics, Wireless Transmission Switching Circuit Switching, Message Switching, Packet Switching	2	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	1
3	**The OSI Reference Model** Protocol Layering, TCP/IP Model, OSI vs. TCP/IP	2	2
4	**Local Area Networks** Components & Technology, Access Technique, Transmission Protocol & Media	2	5
5	**Broad Band Networks** Integrated Service Digital Networks (ISDN), Broad Band ISDN, ATM, ATM Traffic Mgmt, Introduction to very small Aperture Terminal (VSAT)	2	4
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	5
7	**Domain Network Services (DNS)** Domain Names, Authoritative Hosts, Delegating	4	5

	Authority, Resource Records, SOA records, DNS protocol, DHCP & Scope Resolution		
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 POP – Post Office Protocol IMAP – Internet Message Access Protocol FTP – File Transfer Protocol Telnet – Remote Communication Protocol Proxy Server, Proxy Web Servers	10	5
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	3
10	**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	6

Reference Books:

1. Computer Networks — Abndrew 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

IT33-Object Oriented Programming Using C++

Objectives:
By the end of the course students will be able to write C++ programs using the more esoteric language features, utilize OO techniques to design C++ programs, use the standard C++ library, exploit advanced C++ techniques

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Principle of OOP's** Introduction Procedural Vs Object Oriented Programming Classes, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism Dynamic Binding, Message Passing Object Oriented Languages Object Based languages	2	1,3
2	**Basics of C++** A Brief History of C & C++ C Vs C++ A Simple C++ Program Application of C++ Structure & Class Compiling & Linking	1	1,3
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, Manipulators, Type Cast Operator	2	1,3
4	**Functions In C++** The Main Function, Function Prototyping Call by Reference, Call by Address, Call by Value, Return by Reference Inline Function, Default Arguments Const Arguments, Function Overloading, Friend Function	2	1,2,3

5	**Classes & Object** A Sample 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 Friendly Functions, Returning Objects, Const member functions Pointer to Members, Local Classes	4	1,3
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	1,3
7	**Operator Overloading & Type Conversion** 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	1,3
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	1,3

9	**Pointer, Virtual Function & Polymorphism** Introduction Pointer to Object, This pointer Pointer to Derived Class, Virtual Function, Pure Virtual Function, Early Vs Late Binding	3	1,3,5
10	**The C++ I/O System Basics** C++ Streams, C++ Stream Classes Unformatted I/O Operation Formatted I/O Operation Managing Output with Manipulators	2	1,3,5
11	**Working with 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	1,3,5
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, The typename & export keywords	2	1,3,5

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	1,3,5
14	**Introduction to Standard Template Library** STL Programming Model, Sequence Container Adapter, Integrator Algorithms, Predicates, Allocators	2	1,6,3,5
15	**Namespace** Introducing Namespaces Referring to Members of a Namespace The using namespace Statement Defining A Namespaces Nested Namespaces Unnamed Namespaces Namespace Aliases	2	1,6,3,5
16	**New Style Casts & RTTI** New-Style Casts, dynamic_cast static_cast ,reinterpret_cast const_cast, Runtime Type Information (RTTI), A Simple Application of Run-Time Type ID, Ttypeid Can be Applied to Template Classes	2	1,6,3,5

Reference Books :

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

IT34 - Advanced Database Management Systems

Objective:
To study the further database techniques beyond which covered in the second year, and thus to acquaint the students with some relatively advanced issues. 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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**OODBMS & ORDBMS** 1.1Overview of Object-Oriented concepts & characteristics 1.2 Objects, OIDs and reference types 1.3 Database design for ORDBMS 1.4 Comparing RDBMS, OODBMS & ORDBMS	4	1,4,5,.6
2	**Advance Database Management System – Concepts & Architecture** 2.1 Spatial data management 2.2 Web based systems Overview of client server architecture, Databases and web architecture, N-tier Architecture, Business logic – SOAP 2.3 Multimedia databases 2.4 Mobile database	8	1,4
3	**Parallel databases** 3.1 Introduction 3.2 Parallel database architecture 3.3 I/O parallelism Inter-query and Intra-query parallelism, Inter-operational and Intra-operational parallelism 3.5 Design of parallel systems	4	1,4
4	**Distributed Databases** 4.1 Introduction, 4.2 DDBMS architectures 4.3 Homogeneous and Heterogeneous Databases 4.4 Distributed data storage, 4.5 Distributed transactions 4.6 Commit protocols 4.7 Availability 4.7 Concurrency control & recovery in distributed databases,	4	1,4

	4.8 Directory systems		
5	**Knowledge base Systems** Integration of expert in database application & object database overview	4	2, 5
6	**Data Warehousing** 6.1 Introduction to Data warehousing, 6.2 Architecture Dimensional data modeling- star, snowflake schemas, fact constellation 6.4 OLAP and data cubes Operations on cubes 6.5 Data preprocessing -need for preprocessing, data cleaning, data integration and transformation, data reduction	8	2
7	**Data Mining** 7.1 Introduction to data mining 7.2 Introduction to machine learning, 7.3 Descriptive and predictive data mining, 6.4 outlier analysis, clustering – 7.5 k means algorithm, 7.6 Classification - decision tree, association rules - apriori algorithm, 7.7 Introduction to text rnh.mg, Bayesian classifiers.	8	2, 4,5
8	**Information Retrieval & XML data** 8.1 Introduction to information retrival 8.2 Indexing for Text search 8.3 Web search engines 8.4 Managing text in DBMS 8.5 Data model for XML 8.6 XML DTD's, 8.7 Domain specific DTD's 8.8 Querying XML data	8	1

Reference Books

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

BM 31 : Management Support Systems and Information System Security

Objective : This subject will teach student foundations of Management Information System along with modern information system to support management functions.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1.	**System Concept** 1.1 General Model 1.2 Types of systems 1.3 Subsystems 1.4 Organizational structure and functions 1.5 Systems approach to organization 1.6 Dynamics to Decision Making, 1.7 Control by exception 1.8 Feedback control 1.9 Law of requisite variety 1.10 Cases related to Feedback Control	5	1,4
2.	**Information Concepts** 2.1 Definition 2.2 Types of Information 2.3 Quality of information 2.4 Value of information, 2.5 Information needs of managers at different levels 2.6 Cases related to Information	5	3,2
3	**Management Information Systems** 3.1 Definitions 3.2 Integrated system 3.3 MIS Vs Data processing 3.4 MIS and other academic disciplines 3.5 Structure of MIS based on management activity and functions 3.6 Systems concepts to MIS	6	3,2
4	**Humans As Information Processors** 4.1 Newell-Simon model 4.2 Limits on Human Information Processing 4.3 Characteristics of Human Information Processing performance	5	3,2

5	**Information Systems for Functional Areas** 5.1 Information for financial 5.2 Information for Marketing 5.3 Information for Inventory control 5.4 Information for Production function 5.5 Information for Personnel function Cases related to information requirement for above functional areas.	8	2
6	**Decision Making Systems and Modeling** 6.1 Modeling process 6.2 Information needed for different phases & decision making 6.3 Sensitivity analysis 6.4 Static and dynamic models 6.5 Simulation 6.6 Operations Research Techniques 6.7 Heuristic programming 6.8 Case studies	4	1,2,3
7	**Management support systems-Overview** 7.1 Decision making phases 7.2 Concept of decision making 7.3 Decision Support Systems 7.4 Differences between MIS and DSS	4	3,1
8	**Executive Information and Support Systems** 8.1 Needs 8.2 Characteristics 8.3 Software and Hardware requirements 8.4 Integrated EIS and DSS 8.5 EIS implementation	3	3,1
9	**Expert Systems** 9.1 Basic concepts of Expert Systems 9.2 Comparison of conventional & Expert Systems 9.3 Structure of Expert Systems.	2	3,1
10	**Control audit & Security of Information Systems (IS)** 10.1 Objectives and types of Control , Techniques 10.2 Need for auditing of IS 10.3 Security of IS	3	3,5,6

Reference Books :

1. Management Information System - Gordan Devis, Margrethe H. Oison.

2. Information Systems for Modern Management - Robert Murdick, Joel e. Ross.
3. Decision Support & Expert System - Efraim Turban
4. MIS – Javadekar
5. Analysis and Design of Information system – V.Rajaraman
6. Information System Control and Audit – Ron Weber

MT 31-Research Methodologies & Statistical Tools

Objective:
Research is a tool which helps the manager to identify, understand and solve management problems. Research improves the decision making ability of the manager. The objective of the subject is to create scientific attitude towards solving a management problem and impart knowledge about tools available for carrying out research.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
	Section I: Research Methodology		
1	Meaning, Objectives and Motivation in Research, types of Research, Research Approaches, Research Process, Validity and Reliability in Research, Obstacles in accepting research.	2	1,3,4
2	Problem Formulation, Hypothesis Formulation, types of Hypothesis, characteristics of Good Hypothesis	2	1,3,4
3	Meaning and Significance of Research Designs, Features of a good research design, types of research design, contents of research design	2	1,3,4
4	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	1,3,4
5	Types of Data, Sources of Data – Primary and Secondary Data. Methods of collecting the data. Testing the validity of the data.	2	1,3,4
6	Measurement and scaling techniques, errors in measurement, tests of sound measurement, scaling and scale construction techniques	1	1,3,4
7	Steps in Questionnaire design, characteristics of a good questionnaire	1	1,3,4
8	Presentation, Processing & Analysis and Interpretation of Data.	2	1,3,4
9	Report Writing – layout of a Research Report, Characteristics of a good research report.	2	1,3,4
	Section II : Statistical Tools		
10	Measures of Central Tendencies and	4	2

	Dispersions – Simple Numerical Calculations for understanding the characteristic values		
11	Linear Correlation and Linear Regression – 2 Variables	4	2
12	Association of Attributes – 2 Attributes Only	2	2
13	Testing of Hypothesis, Large Sample Tests, Small Sample Tests – t, F tests. χ^2 tests.	6	2
14	Simulation Techniques To conduct a small research project in group and apply the knowledge about research methodology	7	2

Reference Books:

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

Evaluation Format:

The Components of the Examination will be
i) Written Examination for 70%
ii) Small Project for 30% with viva-voce

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

IT 31P- Mini Project Based On Web Technologies & ADBMS

Objective : To make practice of developing 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.

1. This Mini Project is based on the subject, Web Support Technologies in the SemIII. 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.

2. The marks of project will be based on following:

Screens, Forms, Validations	30 marks
Database handling, creating dynamic pages:	20 marks

IT 31L -C++ LAB

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

C++ Programming assignments based on class, inheritance, abstraction, encapsulation, dynamic binding, polymorphism, I/IO systems, exception handling should be covered .

Semester IV
IT 41 - Java Programming

Objective:
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.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Introduction to Core Java** 1.1 Class and Object 1.2 Object Oriented concepts with respect to Java 1.3 Interfaces, Packages 1.4 Exception Handling	3	1,2,3,7
2	**Applet As Java Applications** 2.1 Applets specific methods & Related HTML references 2.2 Creating an Applet 2.3 Displaying it using Web Browser with appletwiewer.exe 2.4 Advantages and Disadvantages of Applet Vs Applications	3	1,2,7
3	**Multithreading** 3.1 Multithreading concepts 3.2 Thread Life cycle 3.3 Creating multithreaded application 3.4 Thread priorities 3.5 Thread synchronization	4	1,2,3,7
4	**Abstract Windows Toolkit** 4.1 Components and Graphics 4.2 Containers, Frames and Panels 4.3 Layout Managers Border layout, Flow layout Grid layout, Card layout 4.4 AWT all components 4.4.1 Event delegation Model Event source and handler Event categories, Listeners, interfaces Anonymous classes 4.4.2 Swing Libraries Model view Controller design pattern Different layout, menus dialog boxes, text input	6	1,2,7
5	**Java Input Output** 5.1 Java IO package 5.2 Byte/Character Stream	4	1,2,3,7

	5.3 Buffered reader / writer 5.4 File reader / writer 5.5 Print writer 5.6 File Sequential / Random		
6	**Networking with Java** 6.1 Networking basics 6.1.1 Sockets, port 6.1.2 Proxy servers 6.1.3 Internet addressing & URL 6.2 java.net – networking classes and interfaces 6.3 Implementing TCP/IP based Server and Client 6.4 Datagrams – Datagram packet, Datagram server and client 6.5 URL connections	4	7,8
7	**JDBC** 7.1 Java database connectivity, Tpes of JDBC drivers 7.2 Writing first JDBC applications 7.3 Types of statement objects (Statement, PreparedStatement and CallableStatement) 7.4 Types of resultset, ResultSetMetadata 7.5 Inserting and updating records 7.6 JDBC and AWT 7.7 Connection pooling	4	6
8	**RMI** 8.1 Introduction & Architecture of RMI 8.2 Java rmi classes and interfaces 8.3 Writing simple RMI application 8.4 Parameter passing in remote methods (marshalling and unmarshalling) 8.5 Introduction to CORBA	4	6,8
9	**Java Beans** 9.1 Java Beans introduction, design pattern 9.2 Writing simple bean 9.3 Beans persistence and introspection 9.4 EJB 9.4.1 Architecture 9.4.2 Container classes, Interfaces 9.4.3 EJB types- Session, Entity, Message Driven	4	6

Reference Books:

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

IT42: Software Testing & Quality Assurance

Objective : To enable student to lean Software Quality and Assurance practices and various software testing techniques through case studies.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
I	**Software Quality Assurance**	10	
1	Quality Concept 1.1Definition of Quality, QA, SQA 1.2 Quality factors 1.3 Software Quality Metrics 1.4 Process Improvement 1.4.1 Process and Product Quality 1.4.2 The SEI Process Capability Maturity model, ISO, Six-Sigma 1.4.3 Process Classification	4	1,2
2	**Software Quality Assurance** 2.1 Need for SQA 2.2 SQA Activities 2.3 Building blocks of SQA 2.4 SQA Planning & Standards	2	1
3	**Software Reliability** 3.1 Reliability Measures 3.2 Reliability models	2	1
4	**Verification & Validation** 4.1 Verification & Validation Planning 4.2 Software inspections 4.3 Automated static Analysis 4.4 Clean room Software Development	2	1,2
II	**Software Testing**		
5	**Software Testing Fundamentals** 5.1 Testing objectives 5.2.How test information flows 5.3 Testing lifecycle 5.4 Test Cases – What it is?, Test Case Designing(Concept & introduction should be covered here. Detailed techniques should be covered in Unit No. 9)	4	1, 5,4
6	**Levels of Testing** 6.1 Unit Testing 6.2 Integration Testing 6.3 System Testing 6.4 Acceptance Testing 6.4.1 Alpha testing & Beta testing 6.5 Static vs. Dynamic testing 6.6 Manual vs. Automatic testing	5	3, 4, 5

	6.7 Testers workbench, 11-steps of testing process (Only briefing of steps should be covered)		
7	**Different types of Testing** 7.1 Installation Testing 7.2 Usability testing 7.3 Regression testing 7.4 Performance Testing 7.4.1 Load Testing 7.4.2 stress testing 7.5 Security testing	2	1,5
8	**Static & Dynamic Testing** 8.1 Static Testing Techniques 8.2 Review types: Informal Review, Technical or peer review, Walkthrough, Inspection, static analysis 8.3 Review Meeting, 8.4 Review Reporting & Record keeping, Review guidelines & Review checklist 8.5 Data flow analysis 8.6 Control flow analysis 8.7 Cyclometric Analysis 8.8 Dynamic testing – need & Advantages	4	1,5,6
9	**Black Box & White Box Testing** (Test Case Design Techniques) 9.1 Functional Testing (Black Box) Equivalence partitioning, BVA, Cause-Effect graphing, Syntax testing (Concept & Test case generation only) 9.2 Structural Testing (White Box) Coverage testing, Statement coverage, Branch & decision coverage, Path coverage 9.3 Domain Testing 9.4 Non functional testing techniques 9.5Validation testing Activities Low level testing, High level testing 9.6 Black box vs. White Box	8	1, 5,6
10	**Testing specialized Systems and Applications** 10.1 Testing object oriented software 10.2 Testing Web based Applications 10.3 Computer Aided Software testing tools (CAST - only type & their purpose should be covered)	8	3, 4

Reference Books:

1. Software Engineering , 6th Edition — R. Pressmen
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 — Nina Godbole, Narosa Publishing

IT-43 Object Oriented Analysis And Design

Objectives:

After completing this course students will be able to:

- Understand the issues involved in implementing an object-oriented design
- 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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Introduction** 1.1 Two views of software Developments: SSAD and OOAD. Why Object –Orientation?	2	1,2,3
2	**The Object Paradigm** 2.1 Object and classes 2.2 Abstraction and encapsulation 2.3 Methods and Message 2.4 Interfaces, Inheritance and Polymorphism 2.5 Access Control The Business case for OO Developments	3	1,2,3,4,5
3	**Object Oriented Methodologies** 3.1 Some of the object Oriented Methodology:- Object Oriented Design -Booch Object Modeling Techniques - Rumbaugh Object – Oriented Analysis - Coad-Yourdan Object – Oriented Software engineering – Ivar acbson Unified Approach 3.2 Diagramming and Notational Techniques using the UML 3.2.1 UML Notation 3.2.2 Analysis Diagramming Techniques. Introduction to all ten Diagram 3.2.3 Design Diagramming Techniques 3.2.4 Generalization / Specialization. 3.2.5 Aggregation and composition 3.2.6 Association , Cardinality, Navigability Icons, relationships and adornments.	6	4,5,6,7,8

4	**Object-Oriented Systems Development Process** 4.1 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	4	3,4,5
5	**Analysis** 5.1 Behavioral Analysis 5.2 Domain Analysis or Business Object Analysis 5.3 Use-case Driven Object Oriented analysis The UML approach. 5.3.1 Develop use-case Model 5.3.2 Use-case Description 5.3.3 Documentation 5.3.4 Activity Diagram 5.4 Identify the classes. 5.4.1 Introduction to different approaches for identifying classes 5.4.2 “Noun Phrase” approach OR 5.4.3 “Conman Class Pattern” approach Or 5.4.4 “CRC” approach Or 5.4.5 Usecase Driven Approach. 5.5 Containment and Composition 5.6 Aggregation 5.7 Inheritance, SubTypes and IS-A Hierarchies. 5.8 Association and Link Relationships. 5.9 Diagramming System Events.	8	3,4,5
6	**Design Phases** 6.1 Translating Analysis Concept into Design. 6.2 Optimizing classes and Objects: The Multi-tiered Architecture View 6.3 Mapping System functions to objects. 6.4 Object-to-Object Visibility. 6.5 Collaboration Diagram 6.6 Sequential Diagram 6.7 Specification Class Diagram 6.8 Specifying Object Interfaces. 6.9 Designing the Data Access layer. 6.10 Design User Interface layer 6.11 Designing System Interfaces, Controls and Security.	6	4,5,10

7	**Design Refinement** 7.1 Designing for Extensibility 7.2 Design for reusability. 7.3 Portioning class space 7.4 Checking Completeness and correctness.	2	10
8	**Persistent Object and Database Issues** 8.1 The Cood Data Management Domain. 8.2 Object Persistence 8.3 Object-oriented Database Management System 8.4 Object- Oriented verses Relational Database. 8.5 Mapping object to Relational Data structure.	3	4,5,10
9	**Testing** 9.1 Introduction to Testing Strategies. 9.2 Impact of Object Orientation on Testing. 9.3 Testing Business Process. 9.4 Design Matrix 9.5 Discovering reusable pattern.	2	4,5
10	**Patterns** 10.1 Benefits of patterns. 10.2 Using patterns During Analysis. 10.3 Using Pattern During Design	2	6

Reference Books

1. 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 flowler 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
    Rebecea 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

IT44 Design And Analysis of Algorithms

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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
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.	6	1,2
2	**Divide And Conquer** Divide and Conquer: General Strategy, Exponentiation. Binary Search, Quick Sort and Merge Sort	4	1,2
3	**Greedy Method** General Strategy, Knapsack problem, Job sequencing with Deadlines, Optimal merge patterns, Minimal Spanning Trees and Dijkstra's algorithm.	5	1,2
4	**Dynamic Programming** General Strategy, Multistage graphs, OBST, 0/1 Knapsack, Traveling Salesperson Problem, Flow Shop Scheduling	5	1,2
5	**Backtracking** Backtracking: General Strategy, 8 Queen's problem, Graph Coloring, Hamiltonian Cycles, 0/1 Knapsack	6	1,2
6	**Branch and Bound** General Strategy, 0/1 Knapsack, Traveling Salesperson Problem	5	1,2
7	**NP-HARD AND NP-COMPLETE PROBLEMS** Basic concepts, non-deterministics algorithms, NP-HARD and NP-COMPLETE classes, COOKS theorem	5	1,2

Reference Books

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

MT41-Optimization Techniques

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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
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 Linear Programming 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	15	5,8,6
2	**Integer Programming** Gomory 's Cutting Plan Methods – Branch and Bound Method	5	2,5
3	**Queuing Theory** Characteristics of Queuing Models. Transient and Steady states of the System. Model – I [(M/M/1) : (FCFS / ∞ /∞)] Model II – Generalization of Model [(M/M/1) : (FCFS / ∞ / ∞)] (Birth- Death Process) [(M/M/1) : (FCFC / N/ ∞) (Finite Queue Length Model)	8	2,5
4	**Replacement Theory** Replacement of items that deteriorates with time , Replacement of items that fails suddenly, Individuals and Group Replacement- Policy	04	3,1

5	**Inventory Theory** Inventory Model Building, Single item deterministic Model, Inventory Control Models without shortages and Inventory Control Models with shortages.	5	10	4,8
6	**PERT & CPM** 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, Calculation on CPM network. Various floats for activities, Critical path updating projects. Operation time cost tradeoff Curve project, Time cost – tradeoff Curve- Selection of schedule based on Cost Analysis, Crashing the network	10	30	5,6,7,8

References Books :

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.

BM E1 – Management Elective

Objectives : To prepare student with different management practices and applications various electives viz. MIS Framework & Implementation, Foundations of decision Process, Information System Audit and Governance, Collaborative Management, Decision Support System, ERP. Student will choose subject of his choice and interest.

BM E1- MIS Framework And Implementation

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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	1.1 Discuss a variety of framework for identifying IT applications. The scope of IT applications would cover Management Information System,. Decision Support System. Executive Information System and Expert System.	8	1,2
2	2.1 Provide broad understanding of the types of the benefits information technology applications can provide in an organization through transaction processing, management and operational control decision support system, office automation, organizational communications and group work support.	10	1,2
3	3.1 Socio-economic environment and information systems in organization and the impact. And impact of Information systems on Organization's markets, frameworks of Information systems planning information system and competitive advantage 3.2 The new strategic role of Information systems , methodologies for evaluating investments in IT 3.3 Framework and methodologies should be discussed and illustrated with case Studies	12	1,2

4	4.1 Critical success factor in implementing IT applications including the lead for managing IT process of change, illustrated through case studies 4.2 Study of successful / failed IT projects. 4.3 Critical role of security in implementing IT application should be discussed.	10	1,2

References Books :

1.BusinessInformation Systems
2. Website links : www.misframework.com

BM E1 – Foundations Of Decision Processes

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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	1.1 Role of decision making in management 1.2 Framework 1.3 Criteria under conditions of certainty, risk and uncertainty Bytes Theorem. Sequential decision making decision tree analysis.	10	1,2
2	2.1 Theory of utility, Utility function curve. 2.2 Competitive strategies, game theory. 2.3 Single Channel 2.4 Single phase waiting line model with Poisson. 2.5 Distributed arrival rates and exponentially distributed service times. 2.6 Markov models.	10	1,2
3	3.1 Simulations: Monte Carlo, Application to queuing and inventory models. 3.2 Applications in functional areas of marketing, production, finance, Behavioral aspects in decision making. 3.3 Open and Closed models of decisions	10	1,2
4	4.1 Systematic problem analysis and decision making. 4.2 Decision making in functional areas–case studies.	10	1,2

Reference Books :

1. Decision analysis By Gregory G.
2. Quantitative Techniques for Business Decisions By Johnson R. D.

BM E1 – Information System Audit and Governance

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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	Auditing concepts ISA need, concept, standards, performance, steps , techniques , methodologies , around and through computer	3	1,2,3
2	Controls – Concept objectives, types, risk, exposure	2	2,3
3	IT environment – hardware, system software, OS, DBMS, Infrastructure, network concepts, Personnel, documentation, review of performance, procurement, and other controls	3	2,4
	Network concepts, LAN, WAN, Client-Server architecture, Internet, EDI, e-mail, encryption, digital signatures –review of performance, procurement and other controls.	5	2,3,4
4	Software procurement and development – SDLC – Meaning and IS auditor's role-traditional SSAD , OOM , prototyping , 4GL , project management , testing , implementation review.	4	2,1
5	IS-operations -planning, organizing, scheduling, SCM, problem management , record management, QA and QC , review and controls	3	2,3
6	Controls – Input , process , validation , output, logical access, physical access , database , network , environment , BCP	8	2,4
7	Evidence collection, evaluation and reporting methodologies	2	2,5,1
8	IS strategies and management – organization structure , long term and short term plans , steering and other committees , HR policies , segregation of duties	2	2,4
9	IT crimes , viruses , security , privacy issues	2	2,3
10	Broad introduction to concepts and practice of e-commerce and legal framework for e-commerce	2	

11	Case studies and assignments	4	2,3

Reference Books :

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

Note :

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

BME1-Collaborative Management

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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Significance of Planning** : Types, Needs, Requisites, Corporate Planning, System approach, Role of the Planner, Corporate Planning and Budgeting	5	
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	4	
4	**Means of Collaboration** : Merger and Acquisition, Joint Ventures, Strategic Alliances, Lease Financing, Venture Capital, Outsourcing	8	

Reference Books

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

BME1 – Decision Support Systems

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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Decision Support Systems**-An Overview 1.1 Decision Support Systems (DSS) Concept 1.2 DSS : Deterministic Systems 1.3 Artificial Intelligence 1.4 Knowledge Based Expert Systems 1.5 MIS and Role of DSS	5	1,2
2	**Data warehouse , Access , Analysis , Mining and Visualization for DSS** 2.1 Data warehousing , access ,analysis and visualization 2.2 Data collection problems and quality 2.3 Internet and commercial database service 2.4 Database Mgt System for DSS 2.5 Database organization structure for DSS 2.6 Data warehousing 2.7 OLAP 2.8 Data mining 2.9 Data Visualization 2.10 GIS and virtual reality 2.11 Business Intelligence	10	1,2
3	**DSS Development** 3.1 Introduction to DSS development 3.2 Traditional system development life cycle 3.3 Alternate development methodologies 3.4 Prototyping :DSS Methodology	8	1,2
4	**Tools for DSS development** 4.1 DSS Technology levels and tools 4.2 DSS development platform 4.3 DSS development tools selection 4.4 Team – developed DSS 4.5 End user Developed DSS 4.6 Development of DSS : Putting system together 4.7 DSS future	10	1,2
5	**Enterprise Decision Support System** 5.1 Enterprise system : Concept and definition 5.2 Evolution of executive and enterprise information system	5	1,2

	5.3 Characteristics and capabilities of ESS 5.4 Comparing and integrating EIS and DSS 5.5 EIS , data access, data warehousing, OLAP , multidimensional analysis, presentation 5.6 Including soft information in enterprise systems 5.7 Organizational DSS 5.8 Supply and value chain and decision support 5.9 Computerized systems – MRP , ERP , SCM 5.10 Frontline DSS 5.11 Future of DSS and EIS		
6	**Implementation , integration and impacts** 6.1 Implementation : an overview 6.2 The major issues of implementation 6.3 Implementation strategies 6.4 System Integration: What and Why? 6.5 Generic models of MSS integration 6.6 Models of ES and DSS integration 6.7 Integration of EIS , DSS and ES 6.8 Intelligent DSS 6.9 Intelligent modeling 6.10 Examples of integrated systems	5	1,2

Reference Books :

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

BME1-Enterprise Resource Planning

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

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Enterprise Resource Planning** Introduction What Is ERP? Need of ERP. Advantage of ERP Growth of ERP	4	1
2	**ERP and related technologies** Business Process Re-Engineering (BPR) 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 Management	20	2
3	**ERP Modules and Vendors** Finance Production Planning, Control and Management Sales and Distribution Human Resource Management Inventory Control System Quality Management ERP market	6	2
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	3
5	**ERP Case Studies** Post Implementation review of ERP packages in manufacturing, Services and Others Organizations	5	3

Reference Books :

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

IT 41L Java Programming Lab

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

IT 42L Case Tools Laboratory

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

1. Use of diagramming tools for system analysis
    a. Preparing Data Flow Diagrams & Entity Relationship Diagrams
2. Use of Tools
    a. To design User Interfaces
    b. Report generation
    c. (Using VB /Oracle Developer)
3. MS – project
    a. 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

Semester V

IT51 -Human Computer Interface

Objective : To learn various aspects and design consideration and practices used in modern systems while developing an application interface between user (Human) and Computer.

Sr. No.	Chapter Details	Nos. of Session	Refer-ence Books
1	**Introduction** Human factors of interactive software, goods of system engineering, user interface design, motivation human factors in design.	3	3
2	**Principles and Guidelines** Usability paradigms, object action interface principles and rules, guidelines for data entry and display	4	3
3	**Design Process** Managing design process, design methodologies, participatory design. Usability and tests, Acceptability tests, Software tools, specification methods	5	1,4
4	**Dialog Notation Design** Visual thinking and icons, direct manipulation programming, virtual; environments, item presentation sequence, layout, form fill-in dialog boxes	5	1,4
5	**Implementation Support** Individual window design, multiple window design, coordination, image browsing, command organization, command menus, natural languages in compiling, window manages and user interfaces	5	2
6	**Interactive Device** Keyboards, Speech recognition, image & video displays, Response time and Display Rate	2	1
7	**Documentation** Presentation styles, balancing function, error interactions handling, errors, printed manuals, online facilities	3	2,3
8	**Computer Supported Co-operation** Goals of Co-operation, asynchronous interactions, synchronous distributed, application to education, and social uses	2	2

9	**Information search and Visualization** Database query and phase search in documents, multimedia document searches, information visualization, advanced filtering, hypertext and hypermedia, users and their tasks, object action interface model for website design	5	1,3

Reference Books

1. Designing the user interface - Ben shnelderman, Pearson Education Asia.
2. Human Computer interaction, 2/e - Alan J Dix, Janet E. Finlay, G.D. Abowd & Rusell Beale,Prentice Hall.
3. Elements of User interface design - Theo Mandel, JW and Son.
4. Essential Guide To User Interface Design - Willbert Galitz, JW.

IT52- Software IT Project Management

Objective : To lean process of software projects management, estimations, use of project management tools, configuration management, quality and testing and software teams.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1.	**Project Management Framework** 1.1 Overview of project Management 1.2 Project Organization 1.3 Planning a s/w project 1.4 Project management life cycle 1.5 Risk management 1.5.1 Identification of Risks 1.5.2 Risk Analysis 1.5.3 Risk Planning & Monitoring	6	2,3,6
2	**S/w Project Estimation** 2.1 Project Estimation 2.2 Different methods of estimation (COCOMO model, Delphi cost estimation etc.) 2.3 Function point analysis	6	2,3,4
3.	**Project Management Tools & Techniques** 3.1 PERT & Gantt Charts 3.2 Introduction to Microsoft Project	5	6
4.	**Software Quality Management & Testing** 4.1 Quality Assurance & Standards 4.2 Quality Planning 4.3 Quality control 4.4 Role of testing in Software development 4.5 Testing Procedure 4.6 Defect Management	6	5,6
5.	**Configuration Management(CM)** 5.1 CM planning 5.2 Change Management 5.3. Version and Release Management 5.4 Configuration Management Tools	6	2, 3,4,5

6.	**S/W Team Management** 6.1 Characteristics of Performance management 6.2 High performance Directive and collaborative styles 6.3 Team Structure 6.4 Team Communication 6.5 Managing customer expectations 6.6 Group Behavior	5	4
7.	**Role of User in Projects** 7.1 User role in project management 7.2 User role in various stages of S/W Development 7.3 User role in System implementation	4	4

Reference Books:

1. Software Project management — Edwin Bennatan
2. Software Engineering — Roger S. Pressman
3. Software Engineering concepts — Richard Fairley
4. Software Project Management — S.A. Kelkar
5. Software Engineering — IAN Sommerville
6. System Analysis and Design Methods — Whitten, Bentley and Dittman

IT 53 – Emerging Trends In Information Technology

Objective : To make aware student the changes in technologies, applications and systems around us.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**E-Commerce** Model of E-Commerce, Application with respect to models, BPR & E-Commerce, Creation of E-Commerce sites (ethics): com/edu/org sites, Introduction to ERP Packages	6	
2	**CRM** Sales, Marketing and Service Management, What is BPO/BCP, Why it is required? Guidelines, Merits/De-Merits, Call Center – brief perspective technology wise, Functioning, Ethics, Disaster Recovery Management, Case Study	4	
3	**E-Banking** Transactions : Inter Banking, Intra Banking, Electronic Payments, (Payment – Gateway Example) Securities in E-banking (SSL, Digital Signatures – Examples) Services Provided : ATM, Smart Card ECS(Electronic Clearing System) e.g. Telephone, Electricity Bills	5	
4	**Content Management And Disseminations** E-learning – Models WBT, CBT, Virtual Campus, LMS & LCMS, Video Conferencing, Chatting Bulleting, Building Online Community, Asynchronous/ Synchronous Learning, Case Study	3	
5	**E – Logistics** Logistics & Supplier Chain Management, Warehousing Management, Transportation/ Distribution Management	3	
6	**E – Governance & E – Agriculture** E –Governance Models : (G2B,G2C,C2G,G2G), Challenges to E – Governance, Strategies and tactics for implementation of E – Governance, Types of Agriculture information (Soil, Water, Seeds, Market rate) & Technique dissemination , Future trade marketing, Corp Management,	6	

	Query redresses System, (Information Kiosk, IVR etc), Case Study		
7	**Knowledge management** What is KM? (Components and Type of Knowledge), Knowledge Building Models, KM Cycle & KM architecture, KM tools, KM approaches	3	
8	**GIS / GPS** What is GIS? Nature of Geographic data, Spatial Objects & Data Models, Getting map on Computers, GIS standards & Standardization Process of GIS development, Implementation and Deployment phases	3	
9	**Biometric Technologies** RFID, Retina Scanning, Facial Reorganization, Finger Print scanning, hand geometry , DNA (Working principles) Application area :Case Study	3	
10	**Embedded Systems** Features and Type of Embedded Systems, Components of Embedded System, Application of Embedded System, Palm Devices	3	

References Books :

1. Management Information System — Jawadekar
2. Management Information System — Laudon & Laudon
3. E – Commerce — Milind Oka
4. E – Commerce — C.V.S. Murty
5. Fire Wall and Internet Security — William Cheswick, Stevens, Aviel Rubin
6. The Essential Guide to Knowledge management — Ambrit Tiwana
7. The GIS Book — George B. Karte.
8. Internet (Use of Search Engines Google & yahoo etc)

IT 54- Application Development Technology

Objective : To teach student application development technology currently available viz. .NET, JAVA etc.

GUIDELINES FOR SUBJECT :

A. Study of Application framework
   - Traditional Applications
   - Business Applications
   - Web Applications

B. Application Development components
   - Form
   - Reports
   - Menus
   - Reusable components – COM / DCOM / Interface , packages and assemblies

C. Application Deployment strategies
   - Run time environments – JUM , VBRUN , Tomcat / strut / Ant
   - Application packaging – Instashield , Windows Installer , Rpmbuild etc

Various application development environment such as

1. Visual Studio . Net
2. Oracle Application Server , HTMLDB
3. Struts
4. NetBeans
5. PowerBuilder

Can be used. The faculty / Institutes can decide the suitable development environment.

ITE1 – IT Elective

Objective：To provide additional IT skills to students by offering various electives viz. Cyber Law and IT Security, Programming Language Paradigms, Advanced Unix, Mobile wireless computing, Distributed Database Management System. Student will choose subject of his choice and interest.

IE1-Programming Language Paradigms

Objective : To lean programming languages structures, components, syntaxes.

Sr. No.	Chapter Details	Nos. of Session	Refer-ence Books
1	**Language Design Issue** 1.1 Short History 1.1.1 Development of early languages 1.1.2 Evolution of software architecture 1.2 Role of Programming languages 1.2.1 Attributes of language 1.2.2 Language paradigms 1.2.3 Language standardization 1.3 Programming Environment 1.3.1 Effects on language design Environment framework	5	1
2	**Impact of machine architecture** 2.1 Operation of Computer 2.1.1 Computer Hardware 2.1.2 Firmware Computers 2.1.3 Translator and Virtual Machines	3	1
3	**Virtual computers & Binding times** 3.1 Language Implementation 3.2 Hierarchies of virtual machines 3.3 Binding & Binding times 3.4 Language Translation Issue 3.5 General syntactic Criteria 3.6 Syntactic Element of language 3.7 Stages in translation 3.7.1 Analysis of source program 3.7.2 Synthesis of object program	4	1
4	**Elementary Data Types** 4.1 Properties of types and Object 4.2 Scalar data types 4.3. Composite data types	6	1
5	**Sequence Control** 5.1 Implicit & Explicit Sequence control	4	1

	5.2 Sequencing with Arithmetic Expression 5.2.1 Tree structure representation 5.2.2 Execution time representation 5.3 Sequence control between statements 5.3.1 Basic statements 5.3.2 Structured sequence control		
6	**Subprogram Control** 6.1 Subprogram Sequence Control 6.1.1 Simple call return subprograms 6.1.2 Recursive sub program 6.1.3 Examples in C & C++ 6.2 Attributes Of Data Control 6.2.1 Name & referencing environments 6.2.2 Static and dynamic scope 6.2.3 Block structure 6.2.4 Local data & local referencing Env. 6.3 Parameter Transmission 6.3.1 Actual and Formal Parameters Methods for Transmitting Parameters 6.4 Explicit Common Environments 6.4.1 Dynamic Scope State Scope and Block Structure	6	1
7	**Storage Management** 7.1 Element requiring storage 7.2 Programmer and system controlled storage 7.3 Static storage management 7.4 Heap storage management	6	1
8	**Language Summaries** 8.1 Language summaries of C++ & JAVA	6	1

Reference Books

1. Programming Languages Design & Implementation **Terrence W. Pratt** Pearson Education

ITE1- Advanced Unix

Objective : To learn Unix Operating system calls and processes and understand them thru small programs.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Introduction to UNIX** Evolution of Unix, Features, System structure, File System	3	1,2
2	**File I/O** System calls for file I/O, File Sharing, Concept of File descriptor duplication, File Control	3	1,2
3	**Files and Directories** File status, File types, Permission, ownership and related System call. File system, Links, File times Directory related functions	4	1,2
4	**Standard I/O Library** Streams, Buffering, open, read & write on streams, Binary I/O, Formatted I/O Temporary Files	4	1,2
5	**Environment of Unix Process** Process invocation and termination, Environment variables & List Memory Layout of C program & memory management routines	3	1,2
6	**Process control** Process identifiers, system calls related to Multitasking, Race condition Zombie & Orphan process, system	5	1,2
7	**Process relationship** Sessions, Controlling Terminal, Job Control Sharing data among parent & Child using Files	3	1,2
8	**Signals** Signal Concepts, Signal handling, Important signals: kill, raise, alarm, pause, and abort	3	1,2
9	**Advanced I/O** Record Locking , Streams, I/O Multiplexing, Memory Mapped I/O, various Read and write	4	1,2
10	**Inter Process Communication** Pipes, FIFO, System V IPC (Message Queue, Semaphore, Shared Memory)	5	1,2

Reference Books

1. Advanced Programming in the UNIX environment W.R.Stevens
2. The C Odyssey UNIX Meeta Gandhi

ITE1 - Mobile Wireless Computing

Objective : To introduce network, system, techniques and applications in mobile computing.

Sr. No.	Chapter Details	Nos. of Session	Referenc e Books
1	**Introduction** Cellular networks, wireless LANs, application adaption administrative	1	1
2	**Cellular Overview** Cellular concept, location management, handoffs	2	1
3	**Wireless LANs overview** Mac issues, mobile IP, ad-hoc networks, TCP issues	4	1
4	**Applications Overview** Wireless applications, disconnected operations, data bcasting, mobile agents	3	1
5	**GSM** Air-interface, channel structure, timing, architecture	4	2
6	**WAP** Architecture, protocol stack, application environment, application demo	3	3
7	**TCP** Asymmetric links, wireless errors, handoffs, i-tcp, snoop, link rxmit, m-top	4	4
8	**Ad-hoc Networks** Mac, routing, transport	3	4
9	**Routing** Virtual backbone, Kelpi, MobileIP	3	4
10	**Sensor Networks** SPIN, distributed computation	1	4
11	**Data Broadcasting** Push-pull, consistency	3	2
12	**Mobile agents** Design, applications frameworks: Aglets etc. Ajanta	5	2
13	**Location Management** HLR-VLR, hierarchical **File systems:** Bayou	1	2
14	**Access Technologies** Blue Tooth, GPRS, 802.11, CDMA	3	3
15	**QOS in Wireless**	1	-

Reference Books :

1. Mobile Communications J. Schiller, Addition Wesley Publication
2. GSM System Engineering A.Mehrotra, Addition Wesley Publication
3. Understanding WAP M. Heijden, M. Taylor, Artech House Publication
4. Mobile IP Charles Perkins, Addition Wesley Publication
5. Ad-hoc Networks Charles Perkins, Addition Wesley Publication

ITE1-Distributed Database Management System

Objective : To understand distributed databases, data fragmentation, data sites and other techniques used.

Sr. No.	Chapter Details	Nos. of Session	Reference Books
1	**Introduction** Distributed data processing, What is a DDBMS, Advantages and disadvantages of DDBMS, Problem areas, Overview of database and computer network concepts	3	3
2	**Distributed database Management System Architecture** Transparencies in a distributed DBMS, Distributed DBMS architecture Global directory issues	3	3
3	**Distributed Database Design** Alternative design strategies, Distributed design issues, Fragmentation, Data allocation	3	1,3
4	**Query Processing Issues** Objectives of query processing, Characterization of query processors, Layers of query processing, Query decomposition, Localization of distributed data	3	1,3
5	**Optimizing Distributed Queries** Factors governing query optimization, Centralized query optimization, Ordering of fragment queries, Distributed query optimization algorithms	3	3
6	**Distributed Object Management** Object model features, Fundamental object management issues, DOM architectures, Object caching, Object clustering, Object migration, Distributed object base systems	5	2,4,5
7	**Query Processing In Distributed Object base Systems** Problems in accessing distributed objects, Distributed object assembly problem, Strategies for distributed object assembly	3	4,5
8	**Transaction Management** The transaction concept, Goals of transaction management, Characteristics of transactions, Taxonomy of transaction models	3	3

9	**Concurrency Control** Concurrency control in centralized database systems, Concurrency control in DDBs, Distributed concurrency control algorithms, Deadlock management	3	3
10	**Reliability** Reliability issues in DDBs, Types of failures, Reliability techniques Commit protocols, Recovery protocols	3	5
11	**Transaction Management In Distributed Objectbase Systems** Additional demands of objectbase transactions, Transaction model extensions and alternatives, Classification of correctness criteria, Survey of objectbase transaction models	3	3
12	**Other Topic** Mobile database systems introduction/concept.	3	4,5

Reference Books:

1. Principles of Distributed Database Systems - M.T. Özsu and P. Valduriez. - Prentice-Hall
2. Distributed Object Management - M.T. Özsu, U. Dayal and P. Valduriez (editors) - Morgan-Kaufmann.S. Ceri and G. Pelagatti - McGraw Hill Book Company
3. Distributed Databases Principles and Systems - Dogac, M.T. Özsu, A. Billiris, and T. Sellis (editors) - Springer-Verlag
4. Advances in Object-Oriented Database Systems. - .
5. Modern Database Systems - The Object Model, Interoperability, and Beyond. ACM Press. W. Kim (editor).

Note

While teaching the subject and for evaluation the emphasis should be only on making the concepts clear as they do not have any practical for the paper.

IT E1 : Cyber Law and IT Security

Objective : To learn IT security – threats, detection and prevention and Cyber Laws and provisions.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**Object and Scope of the IT Act** 1.1 Genesis 1.2 Object 1.3 Scope of the Act	4	1,3
2	**Encryption** 2.1 Symmetric Cryptography 2.2 Asymmetric Cryptography 2.3 RSA Algorithm 2.4 Public Key Encryption	4	1,2
3	**Digital Signature** 3.1 Technology behind Digital Signature 3.2 Creating a Digital Signature 3.3 Verifying a Digital Signature 3.4 Digital Signature and PKI 3.5 Digital Signature and the Law	8	2,3,5,6
4	**E-Governance and IT Act 2000** 4.1 Legal recognition of electronic records 4.2 Legal recognition of digital signature 4.3 Use of electronic records and digital signatures in Government and its agencies	3	1,2
5	**Certifying Authorities** 5.1 Need of Certifying Authority and Power 5.2 Appointment, function of Controller 5.3 Who can be a Certifying Authority? 5.4 Digital Signature Certifications 5.5 Generation, Suspension and Revocation Of Digital Signature Certificate	4	1,2,3,6
6	**Domain Name Disputes and Trademark Law** 6.1 Concept of Domain Names 6.2 New Concepts in Trademark Jurisprudence 6.3 Cyber squatting, Reverse Hijacking, Meta tags, Framing, Spamming, 6.4 Jurisdiction in Trademark Dispute	4	1,2,4,5
7	**Cyber Regulations Appellate Tribunal** 7.1 Establishment & Composition Of Appellate Tribunal 7.2 Powers of Adjudicating officer to Award Compensation	4	1,2,5

	7.3 Powers of Adjudicating officer to Impose Penalty		
8	**The Cyber Crimes (S-65 to S-74)** 8.1 Tampering with Computer Source Documents(S-65) 8.2 Hacking with Computer System(S-66) 8.3 Publishing of Information Which is Obscene in Electronic Form(s-67) 8.4 Offences : Breanch of Confidentiality & Privacy (S-72) 8.5 Offences : Related to Digital Signature Certificate(S-73 & S-74)	8	1,2,4,5

Reference Books:

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.

IT55 - Advanced Internet Technology

Objective : To provide extension to web development skills acquired in 3rd semester, CGI-Perl, Servlets, JSP and PHP is introduced for student to enhance their skills.

Sr. No.	Chapter Details	Nos. of Session	Refer-ence Books
1.	**E-Commerce** 1.1 Introduction E-commerce as business need, types, advantages, disadvantages, E-commerce Architecture, 1.2 Internet Payment Systems Characteristics 4C payment methods SET protocol for Credit card payment E-Cash, E-check Overview of Smart Card 1.3 E-commerce security Need of security Encryption: Public, Private & Hybrid Digital signature Authentication	6	1
2	**Internet Basics** 2.1 Overview of Internet, history, web system architecture, Uniform Resource Locator 2.2 HTTP protocol basics, HTTP request & response, Cookies Basics	3	1
3	**PERL & CGI** 3.1 CGI architecture 3.2 Intro PERL with Features 3.3 Variable & operators 3.4 Control statements 3.5 Working with Strings & arrays 3.6 File Handling 3.7 Pattern matching & formatting 3.8 Creating & using subroutines 3.9 Using PERL for CGI scripting Note: Apache HTTP server is used at server side	6	2,3,4
4	**Servlets** 4.1 Introduction Servlet vs CGI	6	3, 5,6

	Servlet API Overview Servlet Life Cycle 4.2 Coding Writing & running simple servlet Generic servlet, HTTPServlet ServletConfig, ServletContest Writing servlet to handle Get & Post methods, reading use request data Session tracking in servlets, Servlets & JDBC. Writing threadsafe servlet Note: Apache HTTP server is used at server side.		
5	**JSP** Why JSP? JSP Directives Writing simple JSP page Scripting Elements Default Objects in JSP JSP Actions Managing Sessions using JSP JSP with beans JSP & Databases Error Handling in JSP Introduction to custom tag Note: Apache HTTP server is used at server side.	7	7,8,9
6	**PHP** Obtaining, Installing & Configuring PHP 6.1 Introduction PHP & web server Architecture Model Overview of PHP Capabilities PHP HTML embedding tags & syntax, Simple script examples PHP & HTTP Environment variables 6.2 PHP Language Core Variables, constants, data types PHP: operators, flow control & loops Arrays, string, functions Include & require statements Simple File & Directory access operations Error handling Processing HTML form using GET, POST, SESSION, COOKIE variables Sending E-mail Intro. Of Object-oriented PHP 6.3 Database Operations with PHP	12	3, 10, 11, 12

	Built in functions Connecting to My-SQL (or any other database) Selecting a db, building & Sending Query, retrieving, updating & inserting data Note: Apache HTTP server is used at server side.		

Reference Books:

1. E-Commerce Fundamentals & Application — Wiley publications
2. Teach Yourself PERL in 21 days — Pearson Education.
3. Programming the World Wide Web — Robert W. Sebesta
4. Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI — Ivan Bayross.
5. Inside Servlets — Dustine R. Callway
6. Developing Java Servlets — James Goodwill
7. Professional JSP — Wrox press
8. Complete reference JSP
9. Java Server Programming Vol-I — Wrox press.
10. Beginning PHP5
11. Complete Ref. PHP
12. Beginning PHP, Apache, MySql web development.

IT51P : Mini Project (Using AIT and HCI)

Objective : The objective of this mini project is to gear up student for preparation of final project in Semester-VI.

The objective of this mini project is to gear up student for preparation of final project in Semester-VI. Student will select individually Commercial or Technical project based on Application Development Technologies learnt in Semester IV. Each student will have to prepare proper documentation consisting of SRS, Modeling Techniques, Development Strategies and Implementation and Testing Strategies. Student may use any Design Methodologies such as SSAD, OOAD and UML etc. This is a documentation project only. The project work will be presented by student using Power Point Presentation Tool to the panel of internal teachers appointed by the Director of the concerned Institute/College. The Institute may appoint external expert from industry or academics if it feels so. The students will be assessed internally by such panel for this project.

IT52L – Application Development Technology Lab

Objective : To provide hands on practice of technologies learnt in ADT course.

Assignments on the concepts like PERL – CGI, ASP, JSP, PHP should be designed for the AIT Lab.

Semester VI

General Instruction Regarding Preparation Of Project Report For MCA-III SEM-VI

TYPING

The typing shall be standard 12 pts in double spaced using black ink only
Margins must be Left 2 inches Right 1.5 inches
Top 2 inches Bottom 1.5 inches
(c) Paper A4 size Bond Paper

COPIES

Two hard-bound copies (Black Rexine with Golden Embossing as per format displayed herewith) One original and one clean Xerox Copy.

FORMAT FOR TITLE PAGE AND FOR EMBOSSING

PROJECT REPORT
ON

NAME OF THE SYSTEM

NAME OF THE COMPANY

BY
NAME OF STUDENT

UNIVERSITY OF PUNE
MASTER IN COMPUTER APPLICATION
INSTITUTE……..
PUNE-4110..
2008-2009

The Guidelines regarding the documentation and scope of project are mentioned here below:

MCA-III SEM-VI (COMMERCIAL SYSTEM PROJECTS)

Project Report should be submitted in following format for Commercial Application Projects viz. Payroll, Sales, Purchase, Inventory, Book Shop, Examination system etc. where VB, Access, Oracle, ASP and Java is used.

2 Blank Pages at beginning
Title Page
Certificate from Company
Certificate from Guide
Acknowledgement
Index with printed Page Numbers
CHAPTER 1 : INTRODUCTION
1.1 Company Profile
1.2 Existing System and Need for System
1.3 Scope of Work
1.4 Operating Environment – Hardware and Software
CHAPTER 2 : PROPOSED SYSTEM
2.1 Proposed System
2.2 Objectives of System
2.3 User Requirements
CHAPTER 3 : ANALYSIS & DESIGN
3.1 Data Flow Diagram (DFD)
3.2 Functional Decomposition Diagram (FDD)
3.3 Entity Relationship Diagram (ERD)
3.4 Data Dictionary
3.5 Table Design
3.6 Code Design
3.7 Menu Tree
3.8 Menu Screens
3.9 Input Screens
3.10Report Formats
Test Procedures and Implementation
CHAPTER 4 : USER MANUAL
4.1 User Manual
4.2 Operations Manual / Menu Explanation
4.3 Forms and Report Specifications
Drawbacks and Limitations
Proposed Enhancements
Conclusions
Bibliography

ANNEXURES :

ANNEXURE 1 : INPUT FORMS WITH DATA

Project report should be submitted in following format for project using OOAD, Embeded System, WAP and other technologies and Web Deployed Systems where C, C++, J2EE, .NET, OOAD and JAVA, SDK's, API's are used.

ANNEXURE 2 : OUTPUT REPORTS WITH DATA

ANNEXURE 3 : SAMPLE CODE

2 Blank Pages at the end.

MCA-III SEM VI * TECHNICAL PROJECTS ********

2 Blank Pages at beginning
Title Page
Certificate from Company
Certificate from Guide
Acknowledgement
Index with printed Page Numbers

CHAPTER 1 : INTRODUCTION

1.1 Company Profile
1.2 Existing System and Need for System
1.3 Scope of Work
1.4 Operating Environment – Hardware and Software
1.5 Detail Description of Technology Used

CHAPTER 2 : PROPOSED SYSTEM

2.1 Proposed System
2.2 Objectives of System
2.3 User Requirements

CHAPTER 3 : ANALYSIS & DESIGN

3.1 Object Diagram
3.2 Class Diagram
3.3 Use Case Diagrams
3.4 Module Hierarchy Diagram
3.5 Component Diagram
3.6 Deployment Diagram (in case of Web Deployment)
3.7 Module Specifications
3.8 Interface Diagram (in case of WAP and Embedded Systems)
3.9 Web Site Map Diagram (in case of Web Site)
3.10 User Interface Design (Screens etc.)
3.11 Table specifications (in case back end is a database)
3.12 Test Procedures and Implementation

CHAPTER 4 : USER MANUAL

4.1 User Manual
4.2 Operations Manual / Menu Explanation

4.3 Program Specifications / Flow Charts
Drawbacks and Limitations
Proposed Enhancements
Conclusions
Bibliography
ANNEXURES :
ANNEXURE 1 : USER INTERFACE SCREENS
ANNEXURE 2 : OUTPUT REPORTS WITH DATA (if any)
ANNEXURE 3 : SAMPLE PROGRAM CODE (which will prove sufficient development is done by the student)

2 Blank Pages at the end.