Solapur University Solapur

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:

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

2. The knowledge and skills required planning; designing 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.

3. The Job Opportunities are:
    1. Many graduates begin their career as a junior programmer and, after some experience, are promoted as system analysts. 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.
    2. 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.

4. 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

5. 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 software packages including word processors, spreadsheets and 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 areas, 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 user interface systems is provided.

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

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

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

9. 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.

10. 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)

1. 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.
2. 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 practical 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 practical 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:

A Student has to clear all the heads of passing of I & II Semester to be eligible for the admission to the 5^{th} semester.

(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	Front-end 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 IS Security	30	70
6	*MT31	Research Methodology and Tools	100	
7	IT31P	Mini Project based on Web Technologies and ADBMS	50	
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	BM 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 IT Project 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	IT51L	Mini Project using Advanced internet technology Lab & HCI	50	
8	IT52L	ADT 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 Databases	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 and Governance	30	70
4	Collaborative Management	30	70
5	Decision Support System	30	70
6	ERP	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	Sessions/ week/subject	Total sessions	%
Information Technology	18	1	3	54	29.1
Business Management	5	1	3	15	8.1
Mathematical Techniques	4	-	3	12	6.4
Laboratory	10	-	5	50	27.0
Project	7	-	6	42	22.7
Seminar	3	-	3	9	4.8
Industrial Lecture	2	-	2	4	2.1
Total				185	100

Semester I

IT11 – Computer Organization

Objective : To provide basic knowledge of microprocessor its architecture, components, terminologies. This will make the student aware about the digital components of the computer hardware.

Sr. No	Chapter Details	Nos. of Session	Reference Books
1	**1 Introduction to Digital Computer** 1.1 Functions and Block Diagram of Computer 1.2 Types of Software – System software / Application software / Utility Software. 1.3 Compilers, Interpreters, Assemblers, Linker, Loader & Programming Language Paradigm.	5	1, 4, 5, 7
2	**Data Representation and Boolean Algebra** 2.1 Binary, Octal, HEX 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	**2 Combinational Circuits** 3.1 Half Adder, Full Adder, Binary Adder and Subtracter. 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: Synchronous as well as Asynchronous Counter (one example of Each)	6	6, 14
4	**3 Memory System** 4.1 Memory Hierarchy 4.2 Primary Memory – DRAM, SDRAM, DDR, RDRAM. ROM, PROM, EPROM, EEPROM	5	2, 15

	4.3 Concepts of Auxiliary, Associative, Cache And Virtual Memory 4.4 DMA DMA Transfer modes should be covered		
5	**4 CPU Organization** 5.1 CPU Building Blocks 5.2 CPU Registers and BUS Characteristics Registers & **System Bus** Characteristics. Interface Basics (Only Block Diagram) + Local Bus features & Types should be covered. 5.3 Addressing Modes 5.4 Interrupts: Concepts and types 5.5 Instruction and Execution Interrupt cycle 5.6 Hardwired and Micro Program control 5.7 RISC and CISC 5.8 Pipelining – Data Path, Time Space Diagram, Hazards. Instruction + Arithmetic Pipelining + RISC Pipelining	7	2, 3, 8, 12, 13
6	**5 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	**6 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 References:

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	Refer-ence 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
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, Bit wise, Assignment, Conditional 2.8 Precedence & Associability of Operators.	3	1,2,3
3	**Console I/O** 3.1 Introduction 3.2 Character input & Output 3.3 String Input & Output. 3.4 Formatted Input/Output (scanf/printf) 3.5 sprintf & sscanf	2	1,2,3
4	**Control Statement** 4.1. Introduction 4.2. Selection Statements If, Nested if, if-else-if, The? Alternative,	4	1,2,3

	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		
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
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
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
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

Sr. No	**Chapter Details**	**Nos. of Session**	**Refer-ence Books**
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
10	**C Preprocessor** 10.1. Introduction 10.2. Preprocessor Directive Macro Substitution, File Inclusion directive, Conditional Compilation	1	1,2,3
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
12	**Bitwise Operator** 12.1. Introduction 12.2. Applications Masking, Internal Representation of Date 12.3. Bit Fields	2	1,2,3
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**	1	1,2,3

Text Books and References:

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

Note : Topic wise list of books is given.

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 1.1Logical View 1.2User View System Calls 1.3Concept of Virtual Machine 1.4Interrupt Concept	2	5 , 2.
2	Process Management 2.1Process Concept 2.2Process Control Block 2.3Process Schedule Algorithms 2.4Process operations 2.5Interprocess Communication 2.6Communication in Client-Server	8	2.
3	CPU Scheduling 3.1Scheduling Concept 3.2Scheduling Criteria 3.3Scheduling algorithms 3.4Scheduling Evaluation 3.5Simulation Concept	5	2.
4	Process Synchronization & Deadlock 4.1.Synchronization concept 4.2.SychronizationRequirement 4.3Critical Section Problem 4.4Monitors 4.5Deadlock concepts 4.6Deadlock prevention & avoidance 4.7Deadlock Detection 4.8Deadlock Recovery	7	2.
5	Memory Management 5.1Concept 5.2Memory Management Techniques 5.3Contiguous & Non	7	5, 2.

	Contiguous allocation 5.4Logical & Physical Memory 5.5Conversion of Logical to Physical address 5.6 Paging, Segmentation 5.7 Segment with paging 5.8 Virtual Memory Concept 5.9 Demand paging 5.9.1 Page Replacement algorithm 5.9.2Allocation of Frames 5.9.3Page 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: 1. Internal marks (20): should be based on Installation & Administration of Linux, WIN 2000/03.

Topic wise list of books is given.

BM11- Principles Of Management And Organizational Behavior

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

Sr. No	Chapter Details	Nos. of Session	Refer-ence 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	4	1,2,3,4

	3.2.4 Decision making under uncertainty 3.2.5 Decision making under risk 3.3 Decision Types /models 3.3.1 Structured decisions 3.3.2 Unstructured decisions 3.3.3 Programmable decisions Non programmable Decisions 3.3.5. Classical Model 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 6.2 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.

Books Recommended:

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

Note: Topic-wise list of books is given in the syllabus.

BM12- Cost and Financial Accounting

Objective : The financial aspect of business and management will be taught to student through 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	Refer-ence Books
1	**Financial Accounting**		
	1.1 Double Entry Accounting system, Concepts and conventions in accounting, Accounting process, Depreciation	5	2,3,4
	1.2 Journalisation Rules for Journalisation, posting in a Ledger, subsidiary books, preparation of Trial balance, Bank Reconciliation Statement.	5	2,3,4
	1.3 Final Accounts Preparation of Trading and profit and loss Account and Balance sheet of a Proprietary and partnership firms	6	2,3,4
2	**Cost Accounting**		
	2.1 Advantages of Cost Accounting, Comparison with financial accounting, Classification and elements of cost	5	1,2,3
	2.2 Methods of costing Techniques Marginal costing, Break-even chart, cost, Volume profit analysis, Standard costing, Advantages, Variance analysis	6	1,2,3
	2.3Budgetary 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.	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 2,3,4

Recommended 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

Note: Topic-wise list of books is given in the syllabus.

MT11-Discrete Mathematics

Objective : This is the first mathematics subject which revises the knowledge acquired previously by the student. Logic, Relations and Functions, Algebraic Functions and Graph Theory will be introduced in this course.

Sr. No	Chapter Details	Nos. of Session	Refer-ence Books
1	**Mathematical logic** Propositions (Statements) Logical connectivity's, N, A ,V, □,□, □ 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	1 1 1 1 1 2 1 1 1 1 1	

	functions, subjective control, injunctive (one-to-one) Inverse functions, left reverse, right inverse Bijection and cardinality of finite set Infinite sets and compatibility Properties of countable sets Non-denumerable sets.	1 2 2	
3	Algebraic structures: Operations on sets -Unary, binary, ternary definitions of algebraic systems (Restrict to binary operations) Properties – closure, idempotent, associative, communicative, associative, commutative, identity, inverse Semigroup, subsemigroup Monoid, submonoid group, abelian group, permutation group, multiplicatibe 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 2 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 gra[h, 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 11L- Front-End Lab

Objective: This will introduce visual programming and event driven programming practically. This will enhance applications development skill of the 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
	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 3.6 Timer 3.7 Dir, File, Drive list boxes 3.8 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 Fixed Dialog
    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 lap 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, and 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 entering 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.

Note: All the assignments are mentioned using Visual Basic as the front end tool. Institutes may use any other front-end tool as per availability.

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 Structure 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	Refer-ence 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	3	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	6	1,3,4,5

	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 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	4	1,3,4,5
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	2	1,3,4,5
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	4	1,3,4,5
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	6	

	7.2.3 deletion from B tree 7.2.4 introduction to B+, B* tree 7.3. Expression Tree 7.4. Threaded Binary Tree		
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

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

Note: Topic Wise list of books is given

IT22 - Database Management System

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

Sr. No	Chapter Details	Nos. of Session	Refer-ence 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 2.4 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 3.2.1Relational model concept 3.2.2Relational model constraints 3.2.3Relational 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	8	4 ,5, 2,10

	4.3 Normalization Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF) 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

Note: Case studies on ER diagram, Normalization and SQL should be covered

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 Systems — 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

N. B:

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.

IT23-Software Engineering

Objective: Software Systems Analysis and Design, Analysis and Design Models and Techniques, recent trends and methods will be taught to student . The repetition in previous syllabus is removed in this course, integrating ISAD and SE subject in one. This subject develops systematic approach for development of application in students.

Sr. No	Chapter Details	Nos. of Session	Refer-ence 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 Data Flow Diagrams 3.4 Entity Relationship Diagram: Identify Entity &Relationships 3.5 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 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	10	1,4,8
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** **6.1 Introduction to CASE tools,** **6.2 Types of CASE tools** **6.2.1 Project Management Tools.** **6.2.2 Analysis tools,** **6.2.3 Design tools,** **6.2.4 Programming tools,** **6.2.5 Prototyping tools,** **6.2.6 Maintenance tools,** 6.3 Advantages and disadvantages of CASE tools	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

References

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 Modeling & 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: Topic wise list of books is given

BM 21-Soft Skills

Objectives:

1. To encourage the all round development of students by focusing on soft skills.
2. To make student aware about the importance, the role and the content of soft skills through instruction, knowledge acquisition, and practice.
3. 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	References
1	Self Development and Assessment 1.1 Self-Assessment 1.2 Self-Awareness, 1.3 Perception and Attitudes 1.4 Values and Belief System 1.5 Personal Goal Setting 1.6 Career Planning, 1.7 Self-Esteem, 1.8 Building of Self-Confidence	15	
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 a. Public speaking b. Group Discussion c. Oral Presentation skills, Perfect Interview d. Listening and observation skills, Body language 2.4 Use of Presentation graphics, 2.5 Use of Presentation aids, Study of communication.	15	

3	Written Communication 3.1 Technical Writing–Technical Reports 3.2 Project Proposals, 3.3 Brochures, 3.4 Newsletters, 3.5 Technical Articles 3.6 Technical Manuals 3.7 Official/Business Correspondence a. Business letters b. Memos c. Progress report, Minutes of meeting, Event reporting, Use of style, Grammar and Vocabulary for effective technical writing, d. Use of: Tools, Guidelines for technical writing, Publishing	18	
4	Ethics and Etiquettes 4.1 Business Ethics 4.2 Etiquettes in social as well as Office settings 4.3 Email etiquettes 4.4 Telephone Etiquettes 4.5 Engineering ethics and ethics as an IT professional, Civic Sense.	6	
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	

References for students for self-improvement by self-study

Topic 1 : Any good book like

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

Topic 2 and 3

1. John Collin, “Perfect Presentation”, Video Arts MARSHAL
2. Jenny Rogers “ Effective Interviews”, Video Arts MARSHAL
3. Raman Sharma, “ Technical Communications”, OXFORD
4. Sharon Gerson, Steven Gerson “Technical writing process and product”, Pearson Education Asia, LPE third edition.
5. R. Sharma, K. Mohan, Business correspondence and report writing”, TAG McGraw Hill ISBN 0-07-044555-9
6. Video for technical education catalog, National education and Information Films Ltd. Mumbai.
7. Management training and development catalog, National education and Information Films Ltd. Mumbai.
8. XEBEC, “Presentation Book 1,2,3”, Tata McGraw-Hill, 2000,ISBN 0-40221-3

Topic 4 and 5

1. Tim Hindle, “Reducing Stress”, Essential Manager series Dk Publishing
2. Sheila Cameron, “Business student Handbook”, Pitman Publishing
3. Dr. R. L. Bhatia, “ Managing time for competitive edge”
4. Lorayne Lucas “Memory Book”
5. Robert Heller, “Effective leadership”, Essential Manager series Dk Publishing
9. 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: Marks 50

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 Student 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 Student 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 Student will submit one technical document from the following:
   - Project proposal
   - Product brochure
   - Literature survey on any one topic
   - User Manual
   - Technical Help

6 Student 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 20 marks
   - Students could submit for example
   - Personal resume, essay
   - Technical document or business document
2. Spoken communication 20 marks
   - 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 10 marks
   - 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

   (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 Processes 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 computerized business applications with better understanding.

Sr. No	Chapter Details	Nos. of Session	Refer-ence 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**	6	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 **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,	12	6

	Different modules of ERP, How ERP Works? Pre-requisites for implementing ERPBPR/BPM, ERP Implementation-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 4.7Customer 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

References:

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	Refer-ence 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 distinguishable cells	10	1,2
2	Number of non-negative integer solutions of linear equations with conditions Binomial identities	4	1,2
3	**Principle of Inclusion & Exclusion** Formula Derangement- restrictions on relative positions Generating functions for discrete numeric functions, for combinations	4	1,2
4	**Recurrence Relations-Linear** Homogeneous, non-homogeneous, Pigeonhole principle	5	1,2
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, zeta	15	1,2

	Distributions 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	1,2,3
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	
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	

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

Note: Topic wise list of books is given

IT21L-Data Structure Using C Lab

Objective : The practical implementation of data structure will be done by students through 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 : Through this lab work will enhance database handling, data manipulation and data processing skills through 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)

Sr. No.	Topic
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
	Total sessions: 40

Recommended 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 field's onum, odate, snum, amt
3. Customers table with field's 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 4th 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 customer's 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 customer's 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 customer's 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.
