SOLAPUR UNIVERSITY, SOLAPUR

Revised Semester Pattern Syllabus

Master of Computer Applications
(Under Faculty of Commerce)

MCA (Part I)   From Academic Year 2013-2014
MCA (Part II) From Academic Year 2014-2015
MCA (Part III) From Academic Year 2015-2016

I. Introduction

1. The name of the programme shall be **Master of Computer Applications** (MCA) Integrated.

2. The knowledge and skills required planning; designing and to build Complex Application Software Systems which are highly valued in all industry sectors including business, health, education and the arts. The basic objective of the education in Masters Programme as Computer Applications (MCA) 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. **Job Opportunities:** Many graduates begin their career as a junior programmer and, after some experience, are promoted as system analysts. Other seek entrepreneurial role in the Information Technology 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, 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 and needs of the user systems in the region in which the educational institution is located.

5. The MCA programme is a mixture of computer-related and general business courses. The computer related courses includes standard techniques of programming, the use of software packages, databases and 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. Inclusion of projects in each semester (Except Sem-I) improves student's technical orientation, understanding of IT environment and domain knowledge. It will build right platform for students to become a successful Software professional. 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. Inclusion of Business Management Labs will help students to acquire thorough knowledge of management practices in organization. Subjects such as ERP, Information Security and Business Intelligence will work as new application domains. Major focus is also given on Mobile technologies so that student can choose Mobile Technologies as their career options.

   Also, exposure to microcomputer technology, micro-based systems design and micro applications software, including network and graphical user interface systems is also provided.

   Advanced Internet and Web technology includes variety of new technologies. Soft skills techniques are covered in first four semesters, which will lead to overall personality development of the student and that will help them in their placement activities and to sustain in the organization successfully.

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

7. The inclusion of projects at each semester (except Sem-I) ensures the focus on applying the skill learnt at respective levels. It will enhance student's capability to work on various technologies. It will make appropriate platform for students to work in IT Industry. It will also improve documentation, Coding and Design standards in students. Inclusion of project for subject such as Mobile Computing will definitely improve student's innovativeness and creativity. Student's technical orientation, eagerness will be enhanced.

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

9. At the end of the syllabus various certifications possible for each Semester is given in the list. Students should try to do maximum certifications in their learning phase only to make their resume rich.

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

II. Duration of the Course

The MCA is integrated programme and will be a **full-time three years** i.e. 6 semesters. Pattern of examination will be Semester System.

III. Medium of Instruction

The medium of Instruction will be English only.

IV. Admission Procedure

(A) Eligibility

The eligibility criteria for appearing to MAH-MCA-CET conducted by DTE and CET conducted by Management Association of MCA Institutions (MAMI), and admission for the MCA course will be as decided by the Competent Authority (Directorate of Technical Education Maharashtra State, Mumbai &/or AICTE, New Delhi) every year.

(B) Reservation of Seats

The percentage of seat reserved for candidates belonging to backward classes only from Maharashtra State is as given below:

Sr. No.	Type of Reservation	Percentage
(a)	Scheduled caste and Scheduled caste convert to Buddhism(SC)	13.0%
(b)	Scheduled Tribes including those living outside specified areas(ST)	07.0%
(c)	Vimukta Jati and Denotified Tribes (VJ/DT) i.e. NT(A)	03.0%
(d)	Nomadic Tribes-1 (NT-B)	02.5%
(e)	Nomadic Tribes-2 (NT-C)	03.5%
(f)	Nomadic Tribes-3 (NT-D)	02.0%
(g)	Other Backward Class (OBC)	19.0%
	Total→	**50.0%**

1. Candidate claiming belongs 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 Directorate of Technical Education Maharashtra State time to time.

V. Course Structure

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

Master of Computer Applications
(Under Faculty of Commerce)
Course Structure

Semester - I						
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks	Workload per Week	
					T	P
1	IT 11	Computer Organization and Architecture	30	70	4	-
2	IT 12	C Programming	30	70	4	-
3	IT 13	Database Management System	30	70	4	-
4	MT 11	Discrete Mathematics	30	70	4	-
5	BM 11	Principles of Management	30	70	4	-
6	BM 12	Financial and Cost Accounting	70		4	-
7	IT 11L	C Programming LAB	50		-	4
8	IT 12L	DBMS LAB	50		-	4
9	SS 1	Soft Skills-I	30		2	2
		Total	**350**	**350**	**26**	**10**

Semester – II						
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks	Workload per Week	
					T	P
10	IT 21	Object Oriented Programming with C++	30	70	4	-
11	IT 22	Operating System Concepts	30	70	4	-
12	IT 23	Web Technology	30	70	4	-
13	IT 24	Software Engineering	30	70	4	-
14	BM 21	Management Information System and Enterprise Resource Planning	30	70	4	-
15	BM 22	Business Process Domains	70		4	-
16	IT 21L	C++ Programming LAB	50		-	4
17	IT 22L	Mini Project based on Web Technology	50		-	4
18	SS 2	Soft Skills-II	30		2	2
		Total	**350**	**350**	**26**	**10**

		Semester – III				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks	Workload per Week	
					T	P
19	IT 31	Data Structure using C++	30	70	4	-
20	IT 32	Core Java Programming	30	70	4	-
21	IT 33	Data Communication and Networks	30	70	4	-
22	IT 34	Software Project Management	30	70	4	-
23	IT 35	Advanced Database Management System	30	70	4	-
24	MT 31	Research Methodology and Statistical Tools	70		4	-
25	IT 31L	JAVA Programming LAB	50		-	4
26	IT 32L	Mini Project based on Data Structure	50		-	4
27	SS 3	Soft Skills-III	30		2	2
		Total	350	350	26	10

		Semester – IV				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks	Workload per Week	
					T	P
28	IT 41	Advanced Java Programming	30	70	4	-
29	IT 42	Advanced Development Technology	30	70	4	-
30	IT 43	Data warehousing and Data Mining	30	70	4	-
31	IT 44	Design and Analysis of Algorithm	30	70	4	-
32	MT 41	Optimization Techniques	30	70	4	-
33	BME 41	Business Scenario – Elective	70		4	-
34	IT 41L	Advanced JAVA Programming LAB	50		-	4
35	IT 42L	Mini Project based on ADT	50		-	4
36	SS 4	Soft Skills-IV	30		2	2
		Total	350	350	26	10

		Semester – V				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**	**Workload per Week**	
					T	**P**
37	IT 51	Advanced Internet Technology	30	70	4	-
38	IT 52	Software Testing and Quality Assurance	30	70	4	-
39	IT 53	Emerging Trends in Information Technology	30	70	4	-
40	IT 54	Artificial Intelligence and Its Applications	30	70	4	-
41	IT 55	Object Oriented Analysis and Design	30	70	4	-
42	ITE51	Advanced Technology – Elective	70		4	-
43	IT 51L	Software Testing & CASE Tool LAB	50		-	4
44	IT 52L	Mini Project based on AIT	50		-	4
45	SM5L	Seminar	30		2	2
		Total	**350**	**350**	**26**	**10**

		Semester – VI		
Sr. No.	**Subject Code**	**Subject Title**	**Internal**	**External**
46	IT 61P	Project Work	200	300

Elective Subjects

Students can select any one of the elective subject from following list for respective semester.

Advanced Technology - Electives		Business Scenario – Electives	
Sr. No.	**Subject Title**	**Sr. No.**	**Subject Title**
1	Cyber Law and IT Security	1	Information System Audit and Governance
2	Programming Language Paradigms	2	Decision Support System
3	Unix Internals	3	Knowledge Management
4	Distributed Database	4	Customer Relationship Management
5	Cloud and Green Computing	5	IT for Management

VI. Teaching and Practical Scheme

1. Period for teaching or practical should be of 60 minutes each.
2. Minimum 60 periods should be conducted for each subject of 70 Marks and 25 periods for each subject of 30 marks.
3. One Practical Batch should be of 30 students.
4. Practical evaluation should be conducted before the commencement of University examination.

VII. Seminar

Student should give a seminar in Sem-V based on a topic related to recent trends in Computer Science and Information Technology. Every Student should submit a copy of seminar report to the Institute and present the seminar as per schedule given by respective Institute.

VIII. 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.

3. The Project Report 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 should 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 of the Institute to the University.

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 panel of minimum of three external examiners out of which one will be the Chairman of the panel. 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.

IX. 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 theory paper, 30% marks will be based on internal assessment and 70% marks for semester examination (external assessment), unless otherwise stated.

2. The division of the 30 marks allotted to internal assessment of theory papers is as follows –

Sr. No.	Internal Marks Distribution (30)	
1	Attendance	10
2	Mid Test	5
3	Preliminary Examination	10
4	Assessment by the Subject faculty (Presentation /Group Activity/ Assignments)	5
	Total→	30

3. The marks of the mini project would be given on the basis of internal assessment of the project as given below.

Sr. No.	Mini Project Marks Distribution (50)	
1	SRS / Synopsis	5
2	Diagrams	5
3	Database Design	10
4	Input-Output Design (Forms / Reports)	20
5	Project Report / Viva / Final Presentation	10
	Total→	50

4. The marks of the practical would be given on internal practical exam & oral as follows.

Sr. No.	Practical Marks Distribution (50)	
1	Paper Work	10
2	Coding and Execution of Program	30
3	Viva-voce	5
4	Journal	5
	Total→	50

5. The marks of the Seminar would be given as per following guidelines.

Sr. No.	Seminar Marks Distribution (30)	
1	Topic Selection	5
2	Seminar Report	10
3	Presentation of Seminar	15
	Total→	30

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

X. 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.

XI. 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.

XII. Backlog

Candidate is Allowed To Keep Term (A.T.K.T.) for any semester of MCA irrespective of the number of subjects in which he/she has failed in the previous MCA semester examinations.

XIII. 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.

XIV. Award of Class

There will be numerical marking on each question. At the time of declaration of the result the marks obtained by the candidate is converted into classes as shown below.

Sr. No.	Award of Class	
1	First Class with Distinction	2800 And Above
2	First class	2400 To 2799
3	Higher Second Class	2200 To 2399
4	Second Class	2000 to 2199
5	Pass Class	1600 to 1999
6	Fail	1599 And Below

XV. Clarification of Syllabus

The syllabus Committee should meet at least once in a year to study and clarify any difficulties from the Institutes.

XVI. Revision of Syllabus

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

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Semester - I				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
1	IT 11	Computer Organization and Architecture	30	70

Objective: To give basic knowledge of Electronics, Microprocessor, its architecture, components, and their organization. This will introduce the hardware and upcoming processor architecture and its evolution with change in working style.

UNIT	Unit Details
UNIT-1	**Introduction to Digital Computer:** Digital Computer, Computer Hardware, Software, Concept of Computer Organization and Concept of Computer Architecture
UNIT-2	**Data Representation Systems:** Binary, Octal, HEX number systems, Inter-conversion between number systems, 1's and 2's complement, Binary Arithmetic, Computer Codes– BCD, EBCDIC and ASCII
UNIT-3	**Combinational Circuits:** Logic Gates, Half Adder, Full Adder, Binary Adder and Subtractor, Decoder / Encoder, Multiplexer / De-multiplexer.
UNIT-4	**Sequential Circuits:** Flip Flops - SR, D, JK, Shift Registers – Serial In Serial Out, Serial in Parallel Out, Introduction to Counters: 4 bit Synchronous and 4 bit Asynchronous Counter.
UNIT-5	**Memory System:** Memory Hierarchy, Primary Memory – SRAM Memory cell, DRAM Memory cell, SDRAM, DDR, RDRAM. ROM using diode array, PROM, EPROM, EEPROM, Direct Memory Access (DMA) Controller, DMA transfer modes
UNIT-6	**CPU Organization:** CPU Building Blocks, CPU Organization –Accumulator based CPU Organization, Registers and BUS Characteristics, Addressing Modes, Instruction Types, Control Unit-Hardwired Control, Micro Programmed Control
UNIT-7	**Microprocessors:** Components of Microprocessor, Block diagram of 16-Bit (80286) Architecture, 32-Bit (80486) Architecture, 64-Bit (Pentium) Architecture
UNIT-8	**Parallel Processing:** Introduction to Parallel Processing, Concept and Block Diagram, Types (SISD, SIMD, MIMD, MISD), Future Directions for Parallel Processors, Performance of Processors

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Computer System Architecture	Morris Mano	Pearson	3rd
2	Digital Logic and Computer Design	Morris Mano	Pearson	11th
3	Digital Computer Electronics	Malvino	TMH	3rd
4	Computer Organization	Carl Hamacher, Zvonko and Zaky	MGH	5th
5	Computer Architecture & Organization	Murdocca	Wiley India	
6	Introduction to Digital Computer Design	V. Rajaraman & T.Radhakrishnan	PHI	1997
7	Computer Organization & Design	Pal Chaudhary	PHI	3rd
8	Computer Architecture & Organization	J. P. Hayes	MGH	3rd
9	Computer Fundamentals	P. K. Sinha	BPB	6th

Semester - I				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
2	IT 12	C Programming	30	70

Objective: This is the first programming language subject that 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.

UNIT	Unit Details
UNIT-1	**Introduction to Programming:** introduction to procedural programming, algorithm, flowchart, A Brief History of C, C is middle-level Language, Structured Language, Complier Vs Interpreters, The structure of C Program, Library & Linking, Compilation & Execution of C, Program on Dos & Unix
UNIT-2	**Variable and Data Types:** Character Set, C Token, Identifier & Keyword, Constant, Integer, Floating Point, Character, String, Enumeration, Data Types in C, Type Conversion, Data Declaration & Definition **Operators:** Operator & Expression, Arithmetic, Relational, Logical, Increment & Decrement, Bit wise, Assignment, Conditional, Precedence & Associability of Operators, bitwise operators. **Console I/O:** Introduction, Character input & Output, String Input & Output, Formatted Input/output (scanf/printf), sprintf & sscanf.
UNIT-3	**Branching and Looping Statements:** Introduction of If, Nested if, if-else-if, else if ladder, Conditional Expression, switch, Nested switch, Iteration Statements, for loop, while loop, do-while loop, Jump Statements, Goto & label, break & continue, exit() function.
UNIT-4	**Function:** Introduction, Arguments & local variables, Returning Function Results by reference & Call by value, Recursion, command line argument, Utility Functions. **Storage Classes:** Automatic Storage, Extern Storage, Static Storage, Register Storage **Array:** Single Dimension Arrays, Accessing array elements, Initializing an array, two dimensional and Multidimensional Arrays, Initializing the arrays, Memory Representation, Accessing array elements, Passing Single Dimension array to Function, Operations on array. **String:** Built in string functions, passing string to the function as argument.
UNIT-5	**Structure and Union:** Introduction to Structures, Declaration and Initializing Structure, Accessing Structure members, Structure Assignments, Arrays of Structure, Passing Structure to function, Structure Pointer Introduction to Union, accessing union members, application of union. **Preprocessors:** Introduction, Preprocessor Directive, Macro Substitution, File Inclusion directive, Conditional Compilation
UNIT-6	**Pointer:** Introduction to pointer, Memory Organization, The Pointer operator, Application of Pointer, Pointer Expression, Declaration of Pointer, Initializing Pointer, De-referencing Pointer, Void Pointer, Pointer Arithmetic, Precedence of & * operators, Pointer to Pointer, Constant Pointer, pointer

	to function, Array & Pointer, Array of Pointer
UNIT-7	**File Handling:** Introduction, Defining & Opening a File, Closing a File, Input/output Operations on Files, Sequential and Random Access To Files.
UNIT-8	**Computer Graphics**: Introduction, Drawing Object in C, Line, Circle, Rectangle, Ellipse, Changing Foreground & Background, Filling Object by Color, applying text styles, Moving the objects.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	C: The Complete Reference	Herbert Schildt	TMH	4th
2	C Programming Language	Kernighan & Ritchie	PHI	2nd
3	Programming In ANSI C	E. Balagurusamy	TMH	4th
4	Simplifying C	Arolkar	Wiley Dreamtech	1st
5	C test your aptitude	K. R. Venugopal and N Chandrakant	TMH	2007
6	Graphics Under C	Y. Kanetkar	BPB	1st
7	Magnifying C	Arpita Gopal	PHI	2009
8	Let us C Solutions	Y.P. Kanetkar	BPB	10th
9	Objective – C	Devoe	Wiley India	1st

Semester - I				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
3	IT 13	Database Management System	30	70

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 and database designs mechanisms.

Unit	Unit Details
UNIT –1	**Introduction to DBMS:** Database Concept, Characteristics and architecture of DBMS, Database users, 3-tier architecture of DBMS-its advantages over 2-tier, Views of data – Schemas and instances, Data independence. **Data models**: Conventional data models, NDM & HDM, Physical Data Organization-Hashed files, Indexed files, B-trees
UNIT -2	**Database Design and E-R Model:** Entities, Attributes, Relationships, Representation of entities, relationship set, Generalization, aggregation Structure of relational Database and different types of keys, E-R diagrams, E-R design Issues in Relational database design, Functional dependencies.
UNIT -3	**Normalization and Database Recovery systems:** Codd's rules, Normalization, Database Recovery System- Failure classification, storage structure, recovery and atomicity, log-based recovery. Role of DBA.
UNIT -4	**Introduction to Oracle:** History, Generations and characteristics, difference between DBMS & RDBMS. **SQL:** Introduction to SQL, Features of SQL, Basic data types, SQL statements, Set operations in SQL, Nested queries, GRANT and REVOKE, Commit, Rollback, Savepoint. **SQL functions:** MAX, MIN SORT, COUNT, AVERAGE, Numeric, String, Date Functions, Type conversion functions.
UNIT -5	**Table –** Constraints Definitions, Select with operators like arithmetic, comparison and logical, Order by and Group by clause. **Join concept**: Simple, Equi, non-equi, Self, Outer join. **View-** Introduction, Create, Update, Drop, Index.
UNIT -6	**PL/SQL:** Introduction, Difference between SQL AND PL/SQL, Block definition structure and Data types, Block Functions - %Type, %RowType, Control statements, Looping statements and sequential statement, Exception handling.
UNIT -7	**Procedures**-Definition, creating procedures, passing parameters. **Function**-Definition, syntax and calling methods, passing parameters.
UNIT -8	**Cursors**– Definition, syntax and types of cursor. **Triggers** – Definition, Syntax and parts of triggers, types of triggers, enabling and disabling triggers.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Introduction to database systems	C. J. Date	Pearsons Education	8th
2	Database system concept	Korth, Silberschatz and Sudarshan	MGH	5th
3	Fundamentals of Database Systems	Elmasri Navathe	Pearson Education	5th
4	SQL /PL SQL For Oracle 11G Black Book	Dr.Deshpande	Wiley Dreamtech	2012
5	ORACLE PL/SQL Programming	Scott Urman	TMH	9th
6	SQL, PL/SQL the programming language of Oracle	Ivan Bayross	BPB	4th
7	Advance Database Management System	Chakrabharati/ Dasgupta	Wiley Dreamtech	2011

Semester - I				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
4	MT 11	Discrete Mathematics	30	70

Objective: This is the first mathematics subject which revises the knowledge acquired previously by the student. Logic, Relations and Functions, Permutations and Combinations, probability, Algebraic structure and Graph Theory will be introduced

UNIT	Unit Details
UNIT-1	**Mathematical Logic:** Propositions (Statements), Logical connectives, Compound statements form, truth tables, tautology and Contradiction, implications and equivalence of statements, Normal forms: disjunctive normal form and simplification. Conjunctive normal form, logical implications, valid arguments, methods of proof.
UNIT-2	**Theory of Inference**: Theory of inference of statement calculus, predicate calculus, quantifiers, free and bound variables, theory of inference of predicate calculus.
UNIT-3	**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, transitive closure– Warshall's algorithm. Functions: definitions and only bijection.
UNIT-4	**Graph Theory:** Basic terminology, simple and weighted graph, adjacency and incidence, hand-shaking lemma, underlying graph of a digraph, complete graph, regular graph, bipartite graph, complete bipartite, Isomorphism, complement of graph, connected graphs, paths-simple, elementary, circuit – simple, elementary, Edge connectivity, vertex connectivity, Eulerian path and Eulerian circuit, planner graph – regions Euler's formula, Trees: Definition – leaf, root, branch node, internal node, Rooted and binary trees
UNIT-5	**Algebraic Structures**: Operations on sets-Unary, binary, ternary, definitions of algebraic systems (Restrict to binary operations), Properties – closure, idempotent, associative, commutative, identity, inverse, Semi group, Monoid, abelian group, permutation group, multiplicative abelian group, cyclic group, Subgroups: Cosets, right cosets, left cosets, normal subgroups.
UNIT-6	**Elements of Coding Theory**: 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, encoding and decoding method.
UNIT-7	**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- Distinct objects in distinct cells, Indistinguishable objects in distinct Cells.
UNIT-8	**Probability:** Introduction, Random experiment, Sample space, Set notations, Probability of events, compound event, conditional probability, Bay's rule, random variable, discrete probability distribution – Binomial distribution**.**

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Discrete Mathematical Structure	J. P. Tremblay and R. Manohar	TMH	2008 Print
2	Elements of Discrete Mathematics	C. L. Liu	TMH	3rd
3	Discrete Mathematics with graph theory and combinatorics	T. Veerarajan	TMH	10th
4	Discrete Mathematics with proof	Eric Gossett	Wiley	2nd
5	Discrete Mathematics Structure	Singh	Wiley	1st
6	Discrete Mathematical Structure for Computer Science	Bernard Kolman and Robert C. Busby	PHI	6th

Semester – I				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
5	BM11	Principles of Management	30	70

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

UNIT	Unit Details
UNIT-1	**Nature of Management:** Meaning & definition of Management, Importance of management, levels of management **Managerial Skills-** Technical, Conceptual & Human resource, Functions of Management.
UNIT-2	**Development of Management Thought:** Scientific Management- F.W. Taylor. Administrative Management- Henry Fayol, Hawthorne experiment &human relation, system approach, contingency approach, contribution of C.K. Pralhad.
UNIT-3	**Planning:** Meaning, definition and importance of planning, steps in planning process, types of planning. **MBO:** Meaning, process of MBO.
UNIT-4	**Organising:** Meaning, definition, formal &informal organisation, functions of organistion, types of organization. **Authority and Responsibility:** Meaning of authority and responsibility, Delegation of authority, Sources of authority.
UNIT-5	**Staffing and Directing:** Concept of staffing, Process of staffing. **Directing-** Meaning, types of leadership, monetary and nonmonetary motivation.
UNIT-6	**Controlling:** meaning, relation between planning and controlling, process of controlling.
UNIT-7	**Decision Making:** meaning, process of decision making, types of decision, Decision making environment- certainty, risk, uncertainty, ambiguity.
UNIT-8	**Organisation Behaviour:** meaning, definition, foundation of Organisation Behaviour. **Individual Behaviour:** foundation of individual behaviour, meaning of personality, factors affecting on personality. **Group Behaviour:** meaning, types of group, reasons for joining the group, Types of Team, difference between team and group.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Management	Heinz Weihrich, Mark Cannice and Harold Koontz	TMH	12th
2	Principles of Management	T. Ramasamy	HPH	8th
3	Principles & Practices of Management	L. M. Prasad	SC & S	7th
4	Management Theory and Practice	J. S. Chandan	VPH	2nd
5	Organizational Behaviour	K. Aswathappa	HPH	9th
6	Principles and Practices of Management(With CD)	Dr. Kiran Nerker, Dr. Vilas Chopade	Wiley	2011
7	Organizational Behaviour	Supreet Ahluwalia Joshi	Wiley	2011

		Semester - I		
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
6	BM12	Financial and Cost Accounting	70	-
Objective: The financial aspect of business and management will be taught to student through this subject. This will benefit to student in understanding and analyzing financial statements of a business. Student will learn Financial Accounting, Cost Accounting and Management Accounting.				

UNIT	Unit Details
UNIT-1	**Financial Accounting:** Meaning, definition of Accounting, Double Entry Accounting system, Concepts and conventions in accounting.
UNIT-2	**Journalisation:** Rules for Journalisation, posting in a Ledger, subsidiary books and preparation of Trial balance.
UNIT-3	**Final Account:** Preparation of Trading, profit and loss Account and Balance sheet of a Proprietary firm. **Depreciation:** Meaning, Causes, SLM & DLM.
UNIT-4	**Cost Accounting:** Meaning of Cost Accounting, Advantages of Cost Accounting, Comparison with financial accounting, Classification and elements of cost.
UNIT-5	**Budgetary Control:** Meaning of Budget, Types of budgets, Preparation of cash budget. **Cost Volume Profit Analysis:** Break Even Point, Marginal costing, standard Costing.
UNIT-6	**Management Accounting:** Meaning of Management Accounting, Objectives of Management Accounting, Comparison with financial and cost accounting.
UNIT-7	**Financial Statement Analysis:** Meaning of financial statement, techniques of financial statement analysis- Common size statement, Comparative statement, trend analysis, ratio analysis.
UNIT-8	**Use of IT in Accounting:** Introduction of accounting package –Tally.

Note: *problems on- Journal, Ledger, Final Account, Cash Budget and simple problems on CVP analysis.*

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Advance Accounts Vol 2	M. C. Shukla, T. S. Grewal & S. C. Gupta	SCPH	2008
2	Financial Accounting	Dr. Guruprasad Murthy	HPH	-
3	Advance Accountancy Vol 2	S. N. Maheshwari & S.K. Maheshwari	VPH	10th
4	Cost and Management Accounting	S. M. Inamdar	EPH	-
5	Cost Accounting	Jawahar Lal & Seema Srivastava	TMH	4th
6	Financial Accounting	Kimmel	Wiley India	5th
7	Principles and Practice of Cost Accounting	Ashish K. Bhattacharya	PHI	3rd
8	Management Accounting	Khan & Jain	TMH	3rd
9	Management Accounting	Dr. A. P. Rao	EPH	-

Semester - I				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
7	IT 11 L	C Programming LAB	50	-

Objective: The students will get hands on experience of programming Concepts, Logic and Implementation in C Language.

Lab Exercise

The following are the some examples of the problems to be implemented in Laboratory.

No	Title
1.	Write a program that demonstrates precedence of operators.
2.	Find the given year is leap or not by using ternary operator.
3.	Perform arithmetic operation on number by using switch.
4.	Find even and odd number
5.	Check prime number.
6.	Find given character is vowel or not.
7.	Find the sum $s=1+x+x^2+x^3$ and print the same format.
8.	Write a program to check whether given number is palindrome or not?
9.	Write a program to calculate the percentage of marks entered by the student by using else if ladder.
10.	Calculate sum of digit of entered number using while loop.
11.	Find the Fibonacci series using do while loop.
12.	Find Armstrong number using for loop.
13.	Plot the Floyd's triangle using nested loop.
14.	Find factorial of given number.
15.	Write a program for sprint and sscanf.
16.	Convert the binary number into hexadecimal.
17.	Convert the decimal number into binary, hexadecimal, octal depend on user request. Use appropriate control statement.
18.	Convert the temperature given in Celsius to Fahrenheit
19.	Find the ASCII value of given character and display.
20.	Demonstration on local, extern, static and register variable.
21.	Print the multiplication table of entered number.
22.	Write a program to demonstrate the simple array.
23.	Check the palindrome string.
24.	Write a menu driven program to demonstrate the operations on one dimensional array. a) insert b) delete c) searching d) sorting e) merging
25.	Write a program to reverse the array.

26.	Write a menu driven program to demonstrate the operations on two dimensional arrays.
	     a) addition
	     b) subtraction
	     c) multiplication
	     d) print sum of diagonal elements
	     e) transpose
	Take appropriate input elements from user.

27.	Print pascal's triangle.
28.	Perform multiplication of two dimensional array.
29.	Write a program to add upper triangular elements of two dimensional array

30.	Perform following operation using function---
	     a) Find binary digit.
	     b) Find octet
	     c) Find odd digit places ------in given four digit number.

31.	Demonstrate the function by passing array using pass value.
32.	Write a program to create a simple and scientific calculator.
33.	Perform string operation using pass by address.
34.	Find Fibonacci series using function.
35.	Write a menu driven program for taking employee details and insert, delete, display, update employee details using dynamic memory allocation.
36.	Perform string function on given string by user.
37.	Find biggest and lowest number using pointer.
38.	Addition of array elements by passing array of pointer to function
39.	Counting occurrence of character by passing string to function.
40.	Swap number using pointer(without using third variable).
41.	Arithmetic operation on pointer.
42.	Perform simple program for structure and union.
43.	Insert 5 students record using structure and display them.
44.	Demonstrate the getc() and putc() function using file.
45.	Write program for command line argument to count number of inputs.
46.	Count the the number of tabs, number of lines and character as well as blank spaces and insert this information into another file.
47.	Perform menu driven program for online examination using file and structure.
48.	Write program for structure within structure.
49.	Write a program for array of structure.
50.	Write program for enumerator data type.
51.	Write the program which uses the following function: fprintf() fscanf() fseek() fread()
52.	Write a program to demonstrate modes of file handling.
53.	Find the sum of numbers between 10 to 100 using macros
54.	Calculate area of rectangle and circle using macros
55.	Write the program for checking the even and odd number using bitwise operator.
56.	Write a program to create a file fact.h and calculate factorial of given number.
57.	Write a program to demonstrate the left shift and right shift bitwise operators.
58.	Draw the shapes (circle, rectangle, arc, ellipse, square) using graphics
59.	Draw a car and move it using graphics.
60.	Write a program to demonstrate a random access file.

Semester - I				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
8	IT 12L	DBMS Lab	50	--

Objective: This lab work will enhance database handling, data manipulation and data processing skills through SQL & PL/SQL, which will help the students in developing data centric computer applications.

Lab demonstrations are expected on following topics –

Sr. No.	Title
1.	SQL-create table. Insert rows and update.
2.	Alter existing table structure (ALTER-ADD, MODIFY, DELETE).
3.	Simple queries based on single table to view rows.
4.	Simple queries based on multi table.
5.	Complex queries based on single and multi table.
6.	Working of View and Index
7.	Use of PL / SQL Block.
8.	Use of IF....ELSE.
9.	Use of FOR-LOOP and WHILE-LOOP.
10.	Use of Cursors.
11.	Use of – (% type, & row type)
12.	Use of Triggers.
13.	Use of Functions and Procedures

The following are the some examples of the problems to be implemented in Laboratory.

Exercise 1	
1.	Create table Salespeople with field's snum, sname, city, commission Order table with field's onum, odate, snum, amt Customer table with field's cnum, cname, city, rating, snum
Exercise 2	
1.	Add at least 10 ideal records in each table.
2.	Display all the records with all sales people's information.
3.	Display the details of Salesman as snum, sname and 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 "Solapur"
7.	Display all details of customer where rating is 100.
8.	Display all details from customer table where salespersons number is 1001 or name is "Shivam".
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 'Kolhapur' rating is more than 100.
12.	Display all customers where city is either 'Solapur' or 'Kolhapur'
13.	List all customers not having city 'Solapur' or rating more than 100

14.	List all orders between order dates 01/01/2012 to 30/3/2012
15.	Display all orders more than amt 1000.
16.	Display names & cities of all salespeople in 'Solapur' 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 begin 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 descending 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 Feb 12
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 5-2-2012
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 "Shivam".
Exercise 6	
1.	Write a query that uses a sub-query to obtain all orders for the customer named 'Shivani'. 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 & 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 rise 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 an item_id & returns a flag as per the id exist or not.
5.	Application using database triggers –
6.	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.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Understanding SQL	Martin Gruber	BPB	2nd
2	SQL	Scott Urman	TMH	4th
3	ORACLE PL/SQL Programming	Scott Urman	TMH	9th
4	SQL, PL/SQL the programming language of Oracle	Ivan Bayross	BPB	4th
5	SQL & PL/ SQL For Oracle Black book	Dr. Deshpande	Wiley Dreamtech	2012

	Semester - I			
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
9	SS 1	Soft Skills-I	30	--

Objective: Integrating theory and lab course to enable students 'good' English, to help, comprehend, appreciate and essential for personality growth & professional competence. To improve the vocabulary of English and comfort ability with business English. Use of language lab is also encouraged and lot of hearing practice, reading and understanding exposure should be given to the students

UNIT	Unit Details
UNIT-1	**Sentence formation:** Seven main clause types (Single main clause), Five elements (Subject, Verb, Object, Complement, Adverbial -**Predicate group** with exercise).
UNIT-2	**Functional English:** Have a problem?, Aim for accuracy, Dialogues for practice, Relationships, Increasing word power with the help of dictionary reading, News paper reading with exercise.
UNIT-3	**Vocabulary Building:** Synonyms and Antonyms (exercise) One-Word substitution (exercise), Prefixes and Suffixes, Negative Prefixes, Negative Suffixes, Other Prefixes (exercise), Other Suffixes (exercise).
UNIT-4	**Idioms and Phrases:** Verb phrases-I, Verb phrases-II, Idioms, Analogy with exercise.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Advanced English communication skills lab	Prof. K. R. Lakshminarayan an	SCITECH	2nd
2	Oxford Advanced Dictionary of current English.	A. S. Hornby	Oxford University Press	8th
3	Contemporary Business Communication	Ober	Wiley-Biztantra	5th
4	Business Communication	P. D. Chaturvedi, Mukesh Chaturvedi,	Pearson	2006
5	Business Standard 'India 2011'	T. N. Ninan	BS Books	2011
6	Contemporary Business English	Ober	Wiley bztantra	
7	Chambers 21st Century Dictionary	Mairi Robinson	Allied	2001

Semester – II				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
10	IT 21	Object Oriented Programming Using C++	30	70
Objective: By the end of the course students will be able to write C++ programs using more esoteric language features, utilize OO techniques to design C++ programs, use the standard C++ library, exploit advanced C++ techniques				

UNIT	Unit Details
UNIT-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 Vs Object Based languages. **Concepts of C++:** A Brief History of C & C++,C Vs C++, A Simple C++ Program, Applications of C++, Structure of a Class, Compiling & Linking **C++ Basics:** 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.
UNIT-2	**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.
UNIT-3	**Classes & Objects:** A Sample C++ Program with class, Access specifiers, Defining Member Functions, Making an Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a Class, Memory Allocation for Objects, Static Data Members, Static Member, Functions, Arrays of Objects, Object as Function Arguments, Friend Functions, Returning Objects, Const member functions, Pointer to Members, Local Classes, Object composition & delegation. **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.
UNIT-4	**Operator Overloading & Type Conversion:** Defining operator Overloading, Overloading Unary Operator, Overloading Binary Operator, Overloading Binary Operator Using Friend function, Overloading Insertion & Extraction operators, Manipulating of String Using Operators, Type Conversion Rules for Overloading Operators.
UNIT-5	**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. **Pointer, Virtual Function & Polymorphism:** Introduction, Pointer to Object, This pointer, Pointer to Derived Class, Virtual Function, Pure Virtual Function, Early Vs Late Binding

UNIT-6	**The C++ I/O System Basics:** C++ Streams, C++ Stream Classes, Unformatted I/O Operation, Formatted I/O Operation, Managing Output with Manipulators **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.
UNIT-7	**Template:** Generic Function, A function with 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. **Namespace:** Introducing Namespaces, Referring to Members of a Namespace, The using namespace Statement, Defining A Namespaces, Nested Namespaces, Unnamed Namespaces, Namespace Aliases.
UNIT-*8*	**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 **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, type id Can be Applied to Template Classes.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Object Oriented Programming with C++	E. Balagurusamy	TMH	4th
2	Mastering C++	K. R. Venugopal, Rajkumar and T. Ravishankar	TMH	5th
3	C++: The Complete Reference	Herberst Schildt	TMH	5th
4	Object Oriented Programming in C++	Rajesh K. Shukla	Wiley	2008
5	Let us C++	Yashwant Kanetkar	BPB	2nd
6	C++ Programming Language	Bjarne Stroustrup	Pearson	3rd
7	Computer Programming in C++	Junaid Khateeb and Dr. G T. Thampi	Dreamtech	2010
8	Object Oriented Programming in-C++	Robert Lafore	Techmedia	4th
9	C++ Programming Bible	Al Stevens & Clayton Walnum	Wiley IDG	2000

Semester - II				
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
11	IT22	Operating System Concepts	30	70

Objective:-The core structure, functions and design principles of operating system, Basics of Distributed, Mobile Operating System and Fundamentals of Unix will be introduced with this subject.

UNIT	Unit Details
UNIT-1	**Introduction:** Operating system definition, Functions of Operating System, Logical View, System View, Types of operating System, System Calls, System Programs, Interrupt Concept, Concept of Virtual Machine.
UNIT-2	**Processes:** Process Concept, Thread Concept, Difference between Process and Thread, Process Control Block, Process operations, Inter-process Communication, Communication in Client-Server (RPC, RMI, Socket Programming).
UNIT-3	**CPU Scheduling** : Scheduling Concept, Scheduling Criteria, Scheduling algorithms, Scheduling Evaluation, Simulation Concept, Numerical Exercises Based on CPU Scheduling Algorithms.
UNIT-4	**Process Synchronization**: Synchronization concept, Need for Synchronization, Critical Section Problem, Semaphore, Monitor. **Deadlock** : Deadlock concepts, Necessary Conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance, Bankers Algorithm, Deadlock Detection, Deadlock Detection Algorithm for Single and Multiple Instance of Resources, Deadlock Recovery, Numerical Exercises Based on Bankers Algorithm and Deadlock Detection Algorithm.
UNIT-5	**Memory Management:** Concept, Memory Management Techniques, Contiguous & Non Contiguous allocation, Relocation, Compaction, Logical & Physical Memory, Conversion of Logical to Physical address, Paging, Segmentation, Segment with paging, Virtual Memory Concept, Demand paging, Page fault, Need for Page Replacement, Page Replacement algorithms, Thrashing, Numerical Exercises Based on Page Replacement Algorithms.
UNIT-6	**File Management**: File Structure, Protection, FILE system, Implementation, Directory structure, Free Space Management, File Access Methods, File Allocation Methods, Recovery. **Disk Management**: Disk Structure, Disk Scheduling algorithm, Disk management, Swap Space concept and Management, RAID structure, Disk performance issues, Numerical Exercises Based on Disk Scheduling Algorithms.
UNIT-7	**Distributed Operating System**: Difference Between Distributed & Centralized OS, Examples of Distributed Operating System- Chorus, Amoeba, Advantages of Distributed OS, Types of Distributed OS. **Mobile Operating System**: Introduction, Examples of Mobile OS (Palm, Symbian, Andriod, Apple iOS), Features.

UNIT-8	**Introduction to Unix**: History, Architecture, Features, Essential Commands (like ls, cat, cal,, file, mkdir, chdir, pwd, wc, grep etc), Introduction of VI editor

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Operating System	Silberschatz, Galvin, Gagne	Wiley	8th
2	Operating System Concepts and Design	Milan Milenkovic	MGH	2nd
3	Distributed Operating System	P.K. Sinha	PHI	6th
4	Operating System In Depth	Doeppner	Wiley India	1st
5	Unix Concept and Applications	Das Sumitabha	TMH	4th
6	Mobile Computing	Ashok Talukdar	TMH	2nd

	Semester - II			
Sr. No.	**Subject Code**	**Subject Title**	**Internal Marks**	**External Marks**
12	IT 23	Web Technology	30	70
Objective: This course enables students to understand website planning, management & maintenance. The course explains the concept of developing advanced HTML pages with the help of frames, scripting languages and evolving technologies				

UNIT	Unit Details
UNIT-1	**HTML:** Introduction To HTML, WWW, W3C, web Publishing, Common HTML tags, Physical & Logical tags, Some basic tags like <body>, background color of page, text color etc. Text formatting tags <p>, , <hr> tags, List tags: Ordered, Unordered & Definition Lists, Inserting image, Links: text, image links, image mapping, Tables, Frame & iframe.
UNIT-2	**HTML Forms:** Form Introduction, elements of form: text box, text area, buttons, List box, radio, check box etc.
UNIT-3	**CSS:** Introduction to DHTML, Introduction To Style sheet, Types of style sheets- Inline style Sheet, External style Sheet, Embedded style sheet, Text formatting properties, CSS Border properties, List properties, margin properties, Positioning properties, Use of classes & Id in CSS, color properties, use of <div> & <span>.
UNIT-4	**JavaScript:** Introduction to script, types, introduction of JavaScript, JavaScript identifiers, operators, control &Looping structure, JavaScript built-in objects with methods, Array, Math, String, Regular Expression, Date, Number. User defined & Predefined functions, DOM objects: Window, Navigator, History, Location & Screen, Document object, Event handling, Validations on Forms, Introduction to JQuery, sample programs.
UNIT-5	**Web Servers:** Introduction to web server, Installation & configuration of web server, web server Architecture, Demonstration of web servers with example: wamp server, xamp server, Apache HTTP, websphere server.
UNIT-6	**PHP:** Introduction of PHP, Overview of PHP Capabilities, PHP HTML embedding tags & syntax, Simple script exemples, PHP & HTTP Environment variables, 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.
UNIT-7	**Database Operations with PHP:** Built in functions Connecting to My-SQL (or any other database) Selecting a db, building & Sending Query, retrieving, updating & inserting data. Introduction of Object- oriented PHP.
UNIT-8	**XML:** Introduction & features of XML, XML writing elements, attributes etc. XML with CSS DSO, XML Namespaces XML DTD, XML Schemas, and Writing Simple sheets using XSLT.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Complete Reference HTML	Thomas A. Powell	TMH	5th
2	HTML, DHTML, JavaScript, Perl & CGI	Ivan Bayross	BPB	3rd
3	Beginning XML	Joe Fawcett, Danny Ayers, Liam R. E. Quin	Wrox Press	5th
4	Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI	Ivan Bayross	BPB	4th
5	Learning JQuery	Jonathan Chaffer and Karl Swedberg	PACKT	3rd
6	Sams Teach Yourself PHP in 24 Hrs.	Matt Zandastra	Sams	2nd
7	Beginning PHP6, Apache, MySql web development	Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K	Wrox Press	5th
8	Programming the World Wide Web	Robert W. Sebesta	Pearson	4th
8	*www.w3schools.com*	-	-	-
9	*www.devguru.com*	-	-	-
10	*www.tutorials.com*	-	-	-
11	Beginning HTML,XHTML, CSS & Java Script	Ducket	Wiley India	

Semester - II				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
13	IT24	Software Engineering	30	70

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.

UNIT	Unit Details
UNIT-1	**Introduction to Software Engineering:** Basic System Development Life Cycle, Different approaches and models for System Development- Waterfall, Prototyping, Spiral, RAD, Group Based Approach: JAD, Role & Skills of system Analyst.
UNIT-2	**Activities in Requirements Determination:** Fact finding methods, Requirements Specifications, Software requirement Specification, (SRS) Characteristics of 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.
UNIT-3	**Information Requirement Analysis:** Decision Analysis Tools: Decision Tree, Decision Table, Structured English, Process modeling with physical and logical Data Flow Diagrams, Entity Relationship Diagram: Identify Entity & Relationships, Data Dictionary, DFDs.
UNIT-4	**Systems Design:** Design of input & Control, Objectives of Input Design, Data Capture Guidelines Design of Source Document, Input Validations, Design of output, Objectives of Output Design Types Of Output, coupling & cohesion, User Interface design: Elements of good design, design issues, features of modern GUI, Menus, Scroll bars, windows, buttons, icons, panels, error messages etc., Design of program Specification, Code Design,
UNIT-5	**Implementation Issues:** Standard coding techniques, single entry single exit, constructs, efficiency construct, violation of single entry and single exit, data encapsulation, the GOTO Statement, recursion, coding style, standards and guidelines.
UNIT-6	**Maintenance:** Types of Maintenance, Maintenance Cost, Reverse Engineering, Introduction to legacy systems, Role of documentation in maintenance and types of documentation.
UNIT-7	**Current trends in Software Engineering:** software engineering for projects and products, Introduction to web engineering and Agile Process, Introduction to CASE Tools.
UNIT-8	**Case Studies:** Airline reservation System, Tours & Travels management System, Sales & Purchase Management System, Library Management System, Hospital Management System.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Software Engineering	Pressman	MGH	7th
2	Software Engineering	Sommerville	Pearson	8th
3	Software Engineering Concepts	Richard Fairley	TMH	-
4	Software Engineering	Vliet	Wiley India	3rd
5	Software Engineering	Jawadekar	TMH	-
6	Software Engineering	Pankaj Jalote	Wiley	1st

		Semester – II		
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
14	BM 21	Management Information System and Enterprise Resource Planning	30	70

Objective: To learn the foundations of Management Information System along with modern information system to support management functions and to learn ERP systems its structure, modules, benefits, implementation and post implementation issues through real-life cases.

UNIT	Unit Details
UNIT-1	**Information Concepts:** Definition, Types of Information, Quality of information, Value of information, Information needs of managers at different levels **Management Information Systems:** Definitions, Role of MIS, MIS and other academic disciplines, Structure of MIS based on management activity and functions.
UNIT-2	**Decision Support System:** Decision Making Definition and Concept, Phases of Decision Making Process, DSS Definition, Characteristics and Capabilities of DSS. **Information Systems for Functional Areas:** Information for financial system, Information for Marketing system, Inventory control system, Human Resource Information system Cases related to information requirement for above functional areas.
UNIT-3	**Executive Information and Support Systems:** Enterprise & Executive Information System Concept and Definition, Enterprise & Executive Support System Concept and Definition, Comparing and Integrating EIS and DSS. **Expert Systems :** Basic concept of Expert Systems, Comparison of conventional & Expert Systems, Structure of Expert Systems.
UNIT-4	**Control Audit and Security of Information System**: Objectives and types of control, Techniques, Need for auditing of information system, Security of Information system.
UNIT-5	**ERP Introduction:** What Is ERP?, Need of ERP, Advantage & Growth of ERP.
UNIT-6	**ERP Modules:** Finance, Production Planning, Control and Management, Sales and Distribution, Human Resource Management, Inventory Control System, Quality Management. **ERP market** **ERP Technologies:** Supply Chain Management, Customer Relationship Management.
UNIT-7	**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 **Future directive in ERP**: Web Enabled ERP, Service Oriented Architecture (SOA) and ERP, Introduction to SAP.

UNIT-8	Case Studies (At least two for each)
	Cases related to MIS,
	Cases related to DSS,
	Cases related to ERP.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Management Information System	Gordan Devis, Margrethe H. Oisonm	TMH	2nd
2	Management Information System: Text and Cases	Jawadekar	TMH	3rd
3	Management Information System	Shubhalaxmi Joshi	Wiley Biztantra	1st
4	Desicion Support & Business Intelligence Systems	Efraim Turban, J.E. Aronson, Liang and RAmesh Sharda	Pearson	8th
5	Enterprise Resource Planning	Alexis Leon	TMH	2nd
6	ERP Concepts & Planning	V. K. Garg and N. K. Venkitakrishnan	PHI	2nd
7	ERP in Practice	Jagan Nathan Vaman	TMH	2nd
8	Into To Information System	Rainer	Wiley India	3rd

Semester - II				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
15	BM 22	Business Process Domains	70	-

Objective: to help students in better understanding of business processes and practices for designing computerized business applications.

UNIT	Unit Details
UNIT-1	**Marketing:-** Introduction to Marketing, Selling: Introduction to Selling Difference between marketing and Selling. **Market Segmentation.** **4 P's of Marketing**: Product, Price, Place and Promotion. **Introduction to Market Research Process:** While explaining market research process considers a case study on IT company launching a new product in the market.
UNIT-2	**Human Resource Management:** Meaning, Definition of HRM **Functions of HRM**: Recruitment, Training, Performance Appraisal **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 **Introduction to E-HR Software.**
UNIT-3	**Banking:** Introduction to Banking, types of bank accounts: current, savings, fixed and recurring accounts **E-Banking**: Definition, Advantages, disadvantages, components of E-banking, Applications of E-banking, **Introduction to E-banking Services.** **Plastic Money:** Credit card, Debit card, smart card, ATM **Mobile banking**: Introduction, Advantages, disadvantages, Real time Gross Settlement (RTGS) & National Electronic funds Transfer (NEFT).
UNIT-4	**Introduction to Insurance**: Meaning, Definition, Advantages, disadvantages, Types of Insurance.
UNIT-5	**E-Commerce:-** Introduction, E-commerce as business need, types, advantages, disadvantages, Internet Payment Systems:- E-Cash, E-cheque, E-commerce security, Need for security.
UNIT-6	**Introduction to Capability Maturity Model (CMM) and its levels.**
UNIT-7	**Introduction to Business Process Outsourcing (BPO).** **Introduction to Knowledge Process Outsourcing (KPO).**
UNIT-8	**Multinational Companies:-** Introduction to MNC, Nature and Scope of MNC, Contribution of MNC's to host countries, future of MNC's.

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Marketing Management (Analysis, Planning, Implementation and Control)	Philip Kotler	Pearson	12th
2	Personnel and Human Resource Management	P. Subbarao	HPH	4th
3	Personnel Management	C B Mammoria		
4	E-Commerce Fundamentals and Applications	Henry Chan, Raymond Lee, Tharam Dillion, and Elizabeth Chang	Wiley	2008
5	Information Technology for Management- Transforming organizations in Digital Economy	Efraih Turban, Doruthy Leidner, Ephraim Mclean, James Wetherbe	Wiley	6th
6	Software Engineering	Pressman	MGH	7th
7	E-Commerce (concepts - Models – Strategies)	C. V. S. Murty	HPH	3rd
8	Investment Management	Preeti Singh	HPH	-
9	NCFM Banking Module: (http://www.nseindia.com/ education/content/module _ncfm.htm)	-	-	-

Semester – II				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
16	IT 21L	C++ Programming LAB	50	-
Objective: To impart practical implementation of the C++ concepts learned.				

Lab demonstrations are expected on following topics –

Sr. No	Title
1.	Assignment based on control structures, structures, functions.
2.	Assignment based on Arrays and String.
3.	Assignment based on Operator Overloading, Object and Classes.
4.	Assignment based on Inheritance.
5.	Assignment based on Pointer.
6.	Assignment based on Virtual Function and Polymorphism.
7.	Assignment based on Streams and Files.
8.	Assignment based on Templates and Exceptions.

The following are the some examples of the problems to be implemented in Laboratory.

Sr. No	Title
1.	Write a Program to find lowest of three numbers by using class.
2.	Write a Program to find Odd Number in Given Range by using class.
3.	Write a Program to check whether given Number is Prime or Not by using class.
4.	Write a Program to check a Number is Armstrong or Not by using class.
5.	Write a Program to find out Fibonacci Series by using class.
6.	Write a Program to determine the Perfect Number in Given Range by using class.
7.	Write a Program to find Factorial of given Number by using class.
8.	Write a Program to find Prime Factors of Given Number by using class.
9.	Write a Program to Check number is Palindrome or not by using class.
10.	Write a Program to calculate Power of Given Number by using class.
11.	Write a Program to Find Area & Perimeter of Square and Rectangle by using class.
12.	Write a Program to find square and Cube of given Number by using class.
13.	Write a Program to Find Twin Prime Number of the given Range by using class.
14.	Write a Program to convert a number into Single Digit by using class.
15.	Write a program with 2 same functions as calculate area. The 1st function calculatearea calculate area of circle and 2nd calculatearea function calculates area of rectangle. (Use function overloading).
16.	Write a square and cube function as inline functions which calculates square and cube respectively of the given no and returns result.
17.	Write a function power to raise a number m to a power n. The function takes a double value for m and int value for n and return the result correctly. Use a default value if 2 for n to make the function to calculate square when this argument is omitted. Write a main that gets the value of m and n from the user to test the function.

18.	Write a Function that perform a same operation as that of example 4 but takes an int value for m. Both the function should have the same name. Write a main that calls both the function. (By using function overloading).
19.	Define a class student having Data Members name of student, Roll no, Marks of 5 subjects. Define Member functions 1.to initialize data members of the class 2.to display name, roll no and percentage of marks.
20.	Define a class to represent bank a/c and in that class include the following data members:- Name of the customer, Account number, type of a/c, balance amount also define member functions 1.to assign values to data members of class 2.to deposit a money 3.to withdraw an amount 4.to display name of customer and his balance.
21.	Define a class taxpayer whose class description is as follows Private members:- int pan to store personal a/c number, character name [20]-to store the name, float taxableinc to store the total annual taxable income, float tax- to store the tax i.e. calculated, calculatetax()-a function to compute tax from following rule.

<table>
<thead>
<tr><th>Total annual taxable income</th><th>Rate of Taxation</th></tr>
</thead>
<tbody>
<tr><td>Up to 60,000</td><td>0%</td></tr>
<tr><td>Greater than 60,000 and less than 1,50,000</td><td>5%</td></tr>
<tr><td>Above 1,50,000 upto50,00,000</td><td>10%</td></tr>
<tr><td>Above 50,00,000</td><td>15%</td></tr>
</tbody>
</table>

	Public members:- 1. Inputdata()- A function to enter the data and call the computetax(). 2. Display()- to display the data.
22.	Define one class which contains two data members and define one member function with name GetData() to input values for these data members and in that class declare one friend function with name sum() and call that Sum function from main function. Pass the object of class to friend function and in that friend function access the data members of object and add them.
23.	Define two classes with name demo1 & demo2. Demo1 class is having data members data1 & demo2 having data2. Declare friend function Max in both classes. Call that friend function from main & pass objects of two classes demo1 and demo2 to max function. Find the maximum of variables of two objects.
24.	Write a program which have default constructor which will initialize member variable with some values and write display function to display the member variable.
25.	Write a program for creating class Student with the parameterized constructor for initialization of member variable in the class.
26.	Write a program for creating the class addition which contains 3 constructors Default, parameterized, copy constructor.
27.	Write a program to demonstrate use of destructor.
28.	Consider class income with data member as salary and bonus. Write a program to create object of a class and invoke default constructor, parameterized Constructor and copy constructor that are defined in income class.
29.	Write a program to access n records from user which consist of book no, book name, author & price of the book. i) Display Book Details ii) Search book according to number iii) Modify the record according to book.

30.	Write a program to overload prefix increment operator.
31.	Create a class float that contains one float data member; overload all arithmetic operators so that they operate on object of the float class. (Using Friend Function).
32.	Create a class to overload Comparison operator <,>,==.
33.	Consider a class string that contains two data members as length & name. Write a program to Concatenate a string by using operator overloading.

34.	Write a string class with proper operator overloading function for the following main.
	
	int main()
	{
	    String s1("abc");
	    String s2("pqr");
	    String s3;
	    clrscr();
	    s3=s1+s2;
	    cout<<endl<<"The first string is: ";
	    Display(s1);
	    cout<<endl<<"The second String is: ";
	    Display(s2);
	    cout<<"\n The Third String is: ";
	    Display(s3);
	    s3="SIBM"+s1;
	    cout<<"\n String after concatenation using friend function: ";
	    Display(s3);
	    s3=s1+"SIBM";
	    cout<<"\n String after concatenation: ";
	    Display(s3);
	    getch();
	    return 0;
	}

35.	Write a matrix class with one two dimensional array. Overload insertion, extraction,+,-,* operators.
36.	Write a distance class with attributes as hrs & mins. Overload insertion & extraction operators to initialize distance object & to display distance object. Also overload == operator & > operator to compare two distance objects.
37.	Define a class with name furniture, having data member's height, width, color and derive table class from the furniture class. Table class having the attributes no of legs etc derive one more class with the name bookshelf from furniture class having the attribute no of shelf's etc. Define getdata() & putdata() member function in the furniture class & define accept & display member function in table & bookshelf classes. Write a program to model this relationship. Table & bookshelf classes override the member function of furniture getdata() and putdata() in all class.
38.	Define a class with the name publication having the attributes title, price etc. create another class with the name sales that hold or contains array of size 3 to record sales of particular publication for last 3 months. From this 2 classes derive a new class called book that contain data member of attribute number of pages. Each of these classes should have member function getdata() & putdata(). Write a program to model this relationship.
39.	Declare two classes with the name window and door. Derive a class called house from these two classes. Window and door have the attribute which reflect happy home. All classes must have member function for accepting

	& displaying attributes. Wap for above relationship.(multiple inheritance)
40.	Consider an e.g. of declaring the examination result. Design 3 classes with the name student, result and exam. In the student class declare the data member such as r_no, age, name etc. In the exam class declare data member for storing the marks of 6 subjects. Make the exam class as a subclass of student class. Derive result class from exam class. It has it`s own data members total marks. Write a program to model this relationship.
41.	Define a class with name employee having data members name, salary, bdate etc. Define member function getdata() & putdata() for accepting & displaying value of these data members. Derive manager class from employee class, manager class having attributes dept_name, car allowances etc. Define member function with name getdata() & putdata() in manager class. Derive engineer class from employee class, it having data members proj_name, team_name etc. define getdata() and putdata().
42.	Write a program to implement multipath inheritance.
43.	Write a program to implement hybrid inheritance.
44.	Write a program to demonstrate virtual function. Define Shape as a base class which has attributes as area & one pure virtual function for calculating area. Derive 3 classes circle, triangle & rectangle from the shape class. Circle class has attribute radius & method calculateArea().Rectangle class has attribute as height, base & calculateArea(). Triangle class has attributes base, height & calculate Area(). Intialized data members of each class by using parameterized constructor. In main() declare pointer of the base class & calculate the area of each object created for derived classes.
45.	Derive 2 classes Book & Tape which has data members as no_of_pages & playing time respectively from the Media class. The base class media has 2 data member as title & publication. Also have 2 virtual function as read() & show(). Write a program to read data from Book & Tape from the user & show the same.
46.	Define Student as an Abstract base class which has 2 data member as roll & name. It has 2 member function one is virtual accept() & another is pure virtual show(). Derive 3 classes Engineering, Science & medical from the student class which has 2 data members per & subject. Write a menu driven program in main() & display contents of each object in the order of entered by the user.
47.	Write a Vehical class which as attributes as v_no & cost. It also has 3 pure virtual function Start(),Stop() & show() for showing information of the vehical. Derive Light_vehical & Heavy_vehical classes from the Vehical class which has 2 data members no_of_wheels & name of the vehical. Override all the 3 pure virtual methods & take one more method getdata() in each derived class to initialize the data members of the classes. In main() declare a base class pointer & invoke all the derived class method by using base pointer.
48.	Write a Student class with attributes roll,name & per. Create 3 objects of a Student class s1,s2 & s3. Initialize s1 & s2 by using constructor & compair them by the following statement. s3 = s1. max(s2). The object s1 & s2 which is having larger percentage will be assigned to s3(Use this pointer).
49.	Write a furniture class with attribute as height & width & virtual function as getdata() & putdata(). Inherit the chair & Bookshelf from the furniture class. The Chair class will attribute no_of_legs & methods are getdata() & putdata(). The BookShelf attribute as no_of_shelf & methods are getdata() & putdata().In main() write menu driven program & give as give chair order & execute. On exit display all the details in the order entered by the user.
50.	Write a program to store a sentence including blank spaces into the file and recover it to display on a screen.

51.	Write a program to store item details in the file. Item details include itno, name and price.
52.	Write a string into the file string.txt by using put function and read the same file by using get function.
53.	Write a program to read and write contents of the file by using class which contains file name as it's data member and write data and read data are the member function which are used to write the data into the file to read the data from the file respectively
54.	Write a program to accept two file from the user and then copy the contents of 1st file into second file (Handle the file opening error..)
55.	Write a program which reads the data from file1 and copy every alternate character into the file2. Take file1 and file2 as command line arguments.
56.	Write a program which read the int number from the file and write even number into the even.txt file and odd number into the odd.txt file.
57.	Write a menu driven program which has following file operation 1. Concatinate the contents of first file into second file. 2. Swap the file 3. Merge 2 files into the 3 file. 4. Compare 2 files.
58.	Write a program to save an array of float numbers into the file and then Recover it for display purpose (use read write method..).
59.	Write a menu driven prog to handle book oprations such as add, display, Search by bookid, search by name, search by position, modify by name, Delete a book record by book number and sort the book records according to it's number. Book details are bookid, bname, authorname, price (Use read, write, seekg, seekp, tellg, tellp functions).
60.	Write a program for function template.
61.	Write a program for overloading template function.
62.	Write a program to demonstrate class template.
63.	Write a program containing a possible exception. Use a try to throw it and a Catch block to handle it properly.
64.	Write a program that illustrates the application of multiple catch statements.
65.	Write a program to demonstrate the concept of rethrowing an exception.

Semester - II				
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
17	IT 22L	Mini Project based on Web Technology	50	-

Objective: To develop a web application using the technologies and scripting students have learnt during the semester.

Project Work:
This mini project is based on subject Web Technology in semester II. Simple projects such as Shopping Cart, Online Reservations, Social Networking based on HTML, JavaScript, and PHP, that will give some idea to the students about web application.
- Project must be done in a group of 2 to 4 students.
- Project must include at least 5 dynamic pages with database connectivity and validations
- Use MYSQL as a Database
- Final evaluation will be done by
1. Project Demonstration
2. Power Point Presentation
- The marks of the mini project would be given on the basis of internal assessment of the project as given in the Course Structure.

General Instruction Regarding Preparation Of Project Report For MCA-I Semester - II
Typing: (a) The typing should be standard 12 pts in 1 ½ spaced using black ink only (b) Margins must be Left 2 inches, Right 1.5 inches, Top 2 inches & Bottom 1.5 inches (c) Paper A4 size
Project Report Copies: Each project group should prepare N copies (N=1 Institute copy + m copies, where m indicates number of students in a group).
Format For Title Page: A PROJECT REPORT ON <TITLE OF THE PROJECT> BY <NAME OF STUDENT/S> UNDER THE GUIDANCE OF <NAME OF GUIDE> SUBMITTED TO < NAME OF THE INSTITUTE> FOR THE PARTIAL FULFILLMENT OF MCA-I, SEM-II <Year>

Project Report Contents:

- Title Page
- Project Completion Certificate
- Declaration
- Acknowledgement
- CONTENTS with printed Page Numbers

CHAPTER 1: INTRODUCTION
1.1 Existing System and Need for System
1.2 Scope of Work
1.3 Operating Environment – Hardware and Software
1.4 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 Data Dictionary
3.2 Table Specifications (Design)
3.3 Menu Tree(Web Site Map)
3.4 User interface Design (Screens etc.)
3.5 Report Formats(Optional)

CHAPTER 4: USER MANUAL
4.1 Operations Manual / Menu Explanation

DRAWBACKS AND LIMITATIONS

PROPOSED ENHANCEMENTS

CONCLUSION

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)

		Semester - II		
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks
18	SS 2	Soft Skills-II	30	--

Objective: To give students an exposure of demonstrating leadership qualities, use strategies for gaining control, & applying proper Group Discussion etiquettes.

UNIT	Unit Details
UNIT-1	Introduction: Concept, Importance, Application in Business dealing.
UNIT-2	Qualities: leadership qualities, knowledge of the subject matter, analytical ability, clarity of thought and convocation.
UNIT-3	Strategies: Proper GD etiquettes, DO's and Don'ts
UNIT-4	Body sport for GD's

Reference Books:

Sr. No.	Title	Author/s	Publication	Edition
1	Business Communication, Second edition	Asha Kaul	PHI	2nd
2	Managerial Communication	Urmila Rai, S. M. Rai	HPH	1st
3	Business Communication	K. K. Sinha	Galgotia	2009
4	Soft Skills	Rao	Wiley Biztantra	1st

	Recommended Certifications (MCA ++)
	End of Semester – I
1	**Business English – University of Cambridge** http://www.cambridgeesol.org/index.html
2	**Certified Software Development Associate** IEEE computer society certification http://www.computer.org/portal/web/certification/csda
3	**Relevant Oracle Certifications** http://education.oracle.com
	End of Semester – II
1	**QAI global Institute (Certification by Roger Pressman)** **Certified software Business Analyst** **Certified Associate Business Analyst** http://www.qaiglobalservices.com/qaiglobalinstitute/BA_Prep/csba.asp
2	**IBM-Rational Certifications** http://www-03.ibm.com/certify/certs/rl_index.shtml
	End of Semester – III
1	**CCNA/CCNP Wireless Certification** http://www.cisco.com/web/learning/le3/le2/le0/le9/learning_certification_type_home.html
2	**IBM Business Analytics: Cognos and SPSS** http://www-03.ibm.com/certify/certs/ba_index.shtml
3	**Red-Hat :** **Red Hat Certified System Administrator (RHCSA)** http://www.redhat.com/certification/rhct/ **Red Hat Certified Engineer (RHCE)** http://www.redhat.com/training/certifications/rhce/
4	**Microsoft certifications (MCSE)** http://www.microsoft.com/learning/en/us/certification/cert- overview.aspx
	End of Semester – IV
1	**Java Certifications** (SCJP/SCSA/SCNA) http://java.sun.com/new2java/articles/certification.html http://www.whizlabs.com/scja/scja.html
2	**Net Certifications** http://www.microsoft.com/learning/en/us/certification/mcsd.a
	End of Semester – V
1	**The Foundation Certificate in IT Service Management** (ITIL V3 Foundation Certification) http://www.itilfoundation.org/

2	**Testing Certifications :** **Certified Associate in Software Testing (CAST)** http://softwarecertifications.org/qai_cast.htm (Certified Information System Auditor (may not be for the students -) http://www.isaca.org/Certification/CISA-Certified-Information-Systems- Auditor/Pages/default.aspx **PMI Certifications**
3	**Java Certifications** (SCWCD) http://java.sun.com/new2java/articles/certification.html http://www.whizlabs.com/scja/scja.html
Other useful links for certification exams
1	http://www.certificationguru.co.in/
2	www.softwarecertifications.or
3	http://www.whizlabs.com/scjp/scjp.html
Reference Websites / Useful e-leaning sites for all subjects
1	**Free lectures on computer science subjects from** : IISc Bangalore, IIT Bombay, IIT Delhi, IIT Kanpur, IIT Kharagpur, IIT Madras, MIT Computer, Portland Community College, Stanford, The University of New South Wales, UC Berkeley, University of Washington, Harvard. http://freevideolectures.com/
2	Other e-learning sites: http://nptel.iitm.ac.in www.youtube.com

Some Useful Websites

Semester I		
Code	**Subject Title**	**Useful Websites**
IT11	Computer Organization and Architecture	*www.intel.com* *www.intel.in* http://www.cs.iastate.edu/~prabhu/Tutorial/CACHE/mem_title.html http://www.cs.iastate.edu/~prabhu/Tutorial/title.html http://www.ece.eng.wayne.edu/~gchen/ece4680/lecture-notes/lecture-notes.html
IT12	C Programming	http://www.lysator.liu.se/c/bwk-tutor.html *www.mycplus.com* *www.cprogramming.com/* *www.cquestions.com*
IT13	Database management System	*www.oracle.com* *http://www.psexam.com/Database-Management-System-and-Design/* *http://unixspace.com/context/databases.html* *http://db.grussell.org/section005.html* *http://www.cse.ohio-state.edu/~gurari/course/cse670/cse670Ch2.xht* *http://www.databasteknik.se/webbkursen/relalg-lecture/index.html*
MT11	Discrete Mathematics	http://web.math.umt.edu/elias/ch2.pdf *http://rutherglen.science.mq.edu.au/wchen/lndmfolder/lndm.html* *http://www.mathwarehouse.com/algebra/relation/math-function.php* http://www.purplemath.com/modules/fcns.htm http://www.doctortang.com/PureMath10/Relations & Functions Notes (answers).pdf
BM11	Principles of Management	http://www.managementstudyguide.com http://catalog.flatworldknowledge.com/bookhub/reader/5?e=carpenter-ch01 http://www.cliffsnotes.com/Section/id-305261.html http://www.12manage.com/methods_fayol_14_principles_of_management.html
BM12	Financial and Cost accounting	http://simplestudies.com/introduction-to-accounting.html http://www.accountingcoach.com/ http://www.academictutorials.com/finance/

Semester II		
Code	**Subject Title**	**Useful Websites**
IT21	Object Oriented Programming with C++	*www.cplusplustutor.com* *www.learncpp.com* *en.**cpp**reference.com* *www.worldbestlearningcenter.com*

		www.cpp4u.com
IT22	Operating system Concepts	http://windows.microsoft.com http://www.linux.org/ http://www.redhat.com/ http://www.ibm.com/in/en/
IT23	Web Technology	http://www.php.net/ http://www.javascriptkit.com www.w3schools.com http://www.rspa.com http://struts.apache.org www.springsource.com/
IT24	Software Engineering	http://www.research.ibm.com/softeng http://www.wiziq.com/tutorials/ software-engineering http://realsearchgroup.com/ SEMaterials/tutorials/index.php http://www.cse.unr.edu/~sushil/ class/425/notes/
BM21	Management Information System And ERP	http://www.ibm.com/in/en/ http://www.sap.com/
BM22	Business Process Domains	http://www.managementstudyguide.com/

emester III		
Code	Subject Title	Useful Websites
IT31	Data Structure using C++	www.worldbestlearningcenter.com www.cpp4u.com
IT32	Core Java Programming	http://www.java.com http://www.oracle.com http://www.javaranch.com http://www.coderanch.com
IT33	Data Communication And Computer Networks	http://www.cisco.com/web/learning/le21/learning_events_home.html
IT34	Software project Management	http://www.pmi.org.in/ https://www.comp.glam.ac.uk/staff/dwfarthi/projman.htm
IT35	Advanced Database Management System	www.oracle.com www.nosqldatabases.com http://www.ibm.com/in/en/
MT31	Research Methodology and Statistical Tools	http://www-01.ibm.com/software/in/analytics/spss/ http://www.tutorsindia.com/research-methodology-help.html
SS3	Soft Skills	-

Semester IV		
Code	Subject Title	Useful Websites
IT41	Advanced Java Programming	http://www.java.com http://www.oracle.com http://www.javaranch.com http://www.coderanch.com
IT42	Advanced Development Technology	http://www.w3schools.com/ http://www.dotnetperls.com/ http://www.dnncreative.com/Tutorials/DNNTutorialsforBeginners/

Code	Subject Title	Useful Websites
		tabid/91/Default.aspx http://msdn.microsoft.com/ en-us/vstudio//
IT43	Data Warehousing and Data Mining	*http://www.docs.oracle.com/cdB10501_01/* server.920/a96520/concept.htm, www.cs.umn/edu˜kumar/dmbook/index.html
IT44	Design And Analysis of Algorithm	http://www.personal.kent.edu/˜ rmuhamma/algorithm http://www.seas.gwu.edu/˜ ayoussef/cs212
MT41	Optimization Technique	www.w3schools.com http://tutorial.math.lamar.edu /problemsns/calci/optimization.aspx http://www.nptel.iitm.ac.in/ courses/Webcourse-contents http://wps.pearsoned.co.uk/ emaukhesydsaeteressmath2/ 47/12193/3121584.cw/index.html
BME41	Information Security And Audit	*http://www.isaca.org*
BME41	Decision Support System	*http://www.scribd.com,* *http://www.informationbuilders.com/* *decision-support-systems-dss*
BME41	Knowledge Management	en.wikipedia.org/wiki/ Knowledge_management http://www.icmrindia.org/ casestudies/Management.asp? area=Knowledge%20Management
BME41	Customer Relationship Management	http://crm.knowledgehills.com/ http://www.iportinstant.com/ news/articles/crm-tutorial.asp http://www.knowthis.com/ principles-of-marketing-tutorials/ managing-customers/ customer-relationship-management/ http://www.saptechnical.com/ Tutorials/CRM/Index.htm
BME41	IT for Management	www.slideshare.net/mirabelo/ it-for-managers-organisations http://www.managementstudyguide.com/

Semester V		
Code	Subject Title	Useful Websites
IT51	Advanced Internet Technology	http://docs.oracle.com http://www.java2s.com http://www.iam.ubc.ca http://docs.oracle.com http://java.boot.by http://www.tutorialspoint.com http://java2s.com/ http://www.w3c.com
IT52	Software Testing And Quality Assurance	http://www.learnqtp.com
IT53	Emerging Trends in	http://users.cba.siu.edu/

	Information Technology	odom/AIS%20Educators%20cases/ introduction_to_artificial_intel.htm http://www.idsia.ch/NNcourse/
IT54	Artificial Intelligence and its Applications	*http://www-formal.stanford.edu/ jmc/whatisai/node3.html* *http://www.buzzle.com/articles/ applications-of-artificial-intelligence.html* *http://www.learnartificialneuralnetworks.com/ ai.html* *http://www.squidoo.com/ Artificial-Intelligence-Introduction*
IT55	Object Oriented Analysis And Design	*http://www-01.ibm.com/software/in/rational/* en.wikipedia.org www.omg.org http://www.agilemodeling.com www.cs.purdue.edu www.objectmentor.com
ITE51	Cyber Laws Andrew IT Security	http://www.cyberlawclinic.org/ cyberlaw.htm http://www.naavi.org/ importantlaws/itbill2000/ch2.html http://www.dateyvs.com/gener07.htm
ITE51	Programming Language Paradigms	*http://www.cs.clemson.edu/ ~turner/courses/cs428/current /webct/content/pz/ch2/ch2_6.html* *http://www.cs.bham.ac.uk/ research/projects/poplog/ paradigms_lectures/lecture1.html* *http://www.cs.bham.ac.uk/ research/projects/poplog/ paradigms_lectures/lecture2.html* *http://www.cs.bham.ac.uk/ research/projects/poplog/ paradigms_lectures/lecture3.html* *https://services.brics.dk/ java/courseadmin/dProgSprog/pages/ Programming+Languages*
ITE51	Unix Internals	http://perl.plover.com/ yak/commands/ http://www.softpanorama.org/ Internals/unix_system_calls.shtml http://www.cse.chalmers.se/ edu/course/EDA203/
ITE51	Distributed Database	http://www.stanford.edu/ dept/itss/docs/oracle/10g /server.101/b10739/ds_concepts.htm http://www.cs.wmich.edu/ ~yang/tlt/cs643/
ITE51	Cloud and green Computing	http://www.itworld.com/ saas/97423/cloud-computing-tutorial http://thefutureofthings.com/ articles/1003/green-computing.html

Abbreviations		
Sr. No.	Abbr.	Title
1	PHI	Prentice-Hall of India Pvt. Ltd.
2	HPH	Himilaya public Housing
3	Galgotia	Galgotia Publishing House
4	Wiley	Wiley India Ltd.
5	Pearson	Pearson Education
6	MGH	McGraw-Hill
7	TMH	Tata McGraw-Hill
8	Wrox Press	Wrox Press, Wiley India
9	Sams	Sams Publishing
10	PACKT	PACKT Publishing
11	BPB	BPB Publications
12	Techmedia	Techmedia Publication
13	Dreamtech	Dreamtech Publication
14	Allied	Allied Publishers Pvt. Ltd.
15	BS Books	BS Books Publishing
16	SCITECH	SCITECH Publishing
17	Oxford	Oxford University Press
18	EPH	Everest Publishing House
19	VPH	Vikas Publishing House
20	HPH	Himalaya Publishing House
21	SCPH SC & S	S. Chand & Company Ltd.