

REGULATIONS SPECIFIC TO
M.C.A. PROGRAMME
IN
UNIVERSITY DEPARTMENT OF MANAGEMENT
SCIENCE



Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad.
(With Effect from Academic Year 2016-17)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Department of Management Science,

**Master of Computer Applications
(Choice Based Credit & Grade System)**

OBJECTIVE OF MCA COURSE

M.C.A program prepares students to take up positions as systems analysts, system designers, programmers and managers in any field related to information technology. The program, therefore, aims at imparting comprehensive knowledge with equal emphasis on theory and practice. The M.C.A. students are encouraged to spend a full semester working in the industry in the institute giving them insight into the workings of the IT world.

Rules and Regulations

1. Eligibility and Selection Criteria

- a) "A candidate seeking admission to Master of Computer Application (MCA) should have passed Bachelor's Degree examination of any faculty with at least 50% of marks, of Dr. Babasaheb Ambedkar Marathwada University or any other degree equivalent thereto and have Mathematics/Statistics as one of the subject at Degree level or HSC level. However in case of students belonging to Backward Classes, a relaxation of 5% shall be available for admission."

OR

Appeared at the final year examination of a post 10+2 course of minimum three years duration leading to an award of Bachelor's Degree, in any discipline by the Association of Indian Universities or has passed with minimum 50% of marks in the aggregate (45% in case of candidate who is domiciled in Maharashtra and belongs to the reserved categories) or appeared at an examination considered equivalent there to would be treated as eligible. Also the candidate must have passed mathematics/Business Mathematics & Statistics paper for 10+2 or graduation Level.

AND

Passed the CET conducted by Director of Technical Education Maharashtra State with nonzero score for that year.

- b) The Department reserves the right to cancel the admissions of any student and ask him to discontinue his studies at any stage of his/her carrier on the grounds of unsatisfactory academic performance, indiscipline or any misconduct.

2. Duration

Duration of the MCA programme shall be a minimum of 3 years/6 semesters and maximum of 6 years from date of admission. The entire period of the sixth semester shall be devoted for the Major Project work.

3. Admission/Promotion Criteria

If candidate gets selected for UDMS MCA course through DTE admission process, he/she have to apply on the application form of the University provided with the prospectus. Once the candidate is admitted to the MCA course, he/she will be promoted to next semester with full carryon; subject to the registration of candidate in every consecutive semester. Dropout candidate will be allowed

to register for respective semester in which he/she has failed, subject to the condition that his/her tenure should not exceed more than twice the duration of MCA course from the date of first registration at UDMS. The admission of concern candidate will automatically get cancelled if he/she fails to complete the course in maximum period. (Six years)

4. Credits and Degrees

- i. A candidate who has successfully completed all the Foundation, Core, Elective courses and Project Work as prescribed for the MCA Course and Service courses as approved by the University with prescribed CGPA shall be eligible to receive the degree.
- ii. One Credit shall mean one teaching period of one hour per week for one semester (of 15 weeks) for theory courses and two hours/week of practical for one semester.

5. Courses

The MCA programme comprises of

- i. Foundation Course: It may be of two kinds Compulsory Foundation Course for Knowledge Enhancement and Elective Foundation Course for value based education.
- ii. Core Course: A core course is course that a candidate admitted to particular P.G. programme must successfully complete to receive the degree. Elective Course: Elective courses identified by the Departmental Committee of the department offering the programme. Means these courses given to the candidate as optional from which he/she has to opt for specialization. Whereas no elective course shall be offered unless a minimum of 10 students are registered.
- iii. Service Course: There shall be one/two service courses, one amongst the department of the School of Professional Studies and one amongst all university departments. The service courses will be offered in third and fourth semesters only.
- iv. Each course shall include lectures/tutorials/laboratory of field work/ seminar/practical training/assignments /mid-term and term end examinations/paper/report writing or review of literature and any other innovative practice etc., to meet effective teaching and learning needs.
- v. Each course shall have a unique alphanumeric code.
For eg.
MANC401 Computer Organization
Here, **MAN** means Management Science
 C means MCA course
 401 means Subject Code
- vi. The departmental committee shall design the course structure including the detailed syllabus for this MCA programme offered by the department. The department committee shall have the freedom to introduce new courses and / or to modify / redesign existing courses and replace any existing course with a new course to facilitate better exposure and training for the candidates.
- vii. **Attendance:** A student must have 75% of mandatory attendance in each Course for appearing in the examination. In the event of Non-Compliance of Attendance criteria(75%), students will have to seek admission next year so as to complete the course. However Student having 65% attendances with medical certificate can apply to the H.O.D. for condonation of attendance.

6. Registration for Service Course

- i. The Student has to complete at least one service course of four credits in either Semester – III or Semester – IV and at a time student will be allowed to appear for only one service course.
- ii. The student will register the service course of his interest after the start of semester in the concerned department on official registration form. The teacher incharge of the respective course will keep the record of the students registered. Maximum 15 days period will be given from the date of admission for completion of registration procedure. The departmental committee shall follow a selection procedure to avoid overcrowding to particular course(s)
- iii. No student shall be permitted to register for more than one service course in semester.
- iv. University shall prescribe the maximum number of students in each course taking into account the teachers and physical facilities available in the department.
- v. The University may make available to all students a listing of all the courses offered in every semester specifying the credits, the prerequisites, a brief description or list of topics the course intends to cover, the instructor who is giving the courses, the time and place of the classes for the course. This information shall be made available on the University Website.
- vi. Normally no service course shall be offered unless a minimum of 10 students are registered.
- vii. The Student shall have to pay the prescribed fee per course per semester/year for the registration as decided by the University.

7. Departmental Committee

As an autonomous department, MCA course is monitored by Departmental Committee. The Committee consists of H.O.D. (Director) as Chairman and some/all Respective Faculty of the Department as its members.

8. Grievance Redressal Scheme

The University shall form a Grievance Redressal Committee for this course in UDMS with the course teacher and HOD, which shall solve all grievances relating to the Assessment of the student.

9. Grade Awards

- i. In order to pass the examination following choice based credit and grading system (CBC&GS) will be followed. Ten point rating scale shall be used for evaluation of performance of the student to provide Letter Grade for each course and overall grade for this course. Grade points are based on the total number of marks obtained by him / her in all the heads of the examination of the course. These grade points and their equivalent range of the marks are shown separately in following:

Table – I: Ten Point grades and grade description

Sr.No.	Equivalent Percentage	Grade points for SGPA and CGPA	Grade	Grade Description
1.	90 – 100	9.00 – 10	O	Outstanding
2.	80 – 89.99	8.00 – 8.99	A++	Excellent
3.	70 – 79.99	7.00 – 7.99	A+	Exceptional
4.	60 – 69.99	6.00 – 6.99	A	Very Good
5.	55 – 59.99	5.50 – 5.99	B+	Good
6.	50 – 54.99	5.00 – 5.49	B	Fair
7.	45 – 49.99	4.50 – 4.99	C+	Average
8.	40.01 – 44.99	4.01 – 4.49	C	Below Average
9.	40	4.00	D	Pass
10.	Below 40	0.00	F	Fail

ii. **Table – II: Classification for the degree is given as follows**

Classification	Overall letter grade
First Class with distinction	<i>A+ and above</i>
First Class	<i>A</i>
Higher Second Class	<i>B+</i>
Second Class	<i>B</i>
Pass	<i>C+ to D</i>
Fail	<i>F</i>

- iii. In the event of student registered for the examination (i.e. Internal Tests/End Semester Examination/Practical/Seminar/Project Viva-voce), non-appearance shall be treated as the student deemed to be absent in the respective course.
- iv. Minimum D grade shall be the limit to clear /pass the course/subject. A student with F grade will be considered as 'failed' in the concerned course and he/she has to clear the course by reappearing in the next successive semester examinations. There will be no revaluation or recounting scheme under this system.
- v. Using table – I, Semester Grade Point Average (SGPA) and then Cumulative Grade Point Average (CGPA) shall be computed. Results will be announced at the end of each semester and Cumulative Grade Card with CGPA will be given on completion of the course.

10. Computation of SGPA (Semester Grade Point Average) & CGPA (Cumulative Grade Point Average)

The computation of SGPA and CGPA will be as below:

- i. Semester Grade Point Average (SGPA) is the weighted average of points obtained by a student in a semester and will be computed as follows:

$$\text{SGPA} = \frac{\text{Sum}(\text{Course Credit} * \text{Number of Points in concern course gained by the student})}{\text{Sum (Course Credit)}}$$

The SGPA for all the six semesters will be mentioned at the end of every semester.

- ii. The Cumulative Grade Point Average (**CGPA**) will be used to describe the overall performance of a student in all semesters of the course and will be computed as follows:

$$\text{CGPA} = \frac{\text{Sum(All Six semester SGPA)}}{\text{Total number of semesters}}$$

The SGPA and CGPA shall be rounded off to the second place of decimal.

11. Evaluation Scheme

Each theory course will be of 100 Marks and be divided into Internal Examination (Sessional) of 20 Marks and Semester End Examination of 80 Marks. (20+80=100)

Each Practical Course will be of 50 Marks (Internal + External) = (10 + 40=50).

Project Work from Sem – I, II, and IV will be 100 marks (Internal + External) = (20+80=100).

Project Work from Sem – III and V will be 50 marks (Internal + External) = (10+40=50).

As well as In-plant Training Project from Sem – III and V will be 50 marks (Internal).

Major Project in the Sem –VI will be of 350 marks (Internal + External) = (70+280=350).

a) For Theory Course

i. Internal Evaluation Scheme

There shall be weekly assessment in the form of Test/Assignment/Tutorials/seminars/Presentations/laboratory work/Field work/Project Work throughout the semester. Aggregation of these marks will be considered for the internal evaluation of 20 marks.

ii. Semester End Examination Evaluation Scheme

- English shall be the medium of instruction and examination.
- Examination shall be conducted at the end of each semester as per the academic calendar notified by department itself.
- The Semester End Examination theory question paper will have two parts **(20 + 60 = 80)Marks**
PART A will carry short question (fill in the blanks/multiple choice questions/match the columns/state true or false/answer in one sentence) as compulsory questions and it should cover entire syllabus (20 Marks).
PART B will carry 7 questions out of which there shall be at least one question from each unit, student will have to answer any 5 questions out of 7.

b) For Practical Course

i. Internal Evaluation Scheme

A student should complete lab assignments practically given by course teacher. However, in addition teacher can allot a mini project to students for better evaluation but assignments are compulsory. Internal evaluation for the practical will be considered for 10 Marks.

ii. External Evaluation Scheme

Under this roof, a student has to face practical examinations in which he/she has to complete the task on computer system (It may computer program or testing) given by External Examiner. Also student has to present seminar or viva-voce in front of External Examiner. External evaluation for the practical will be considered for 40 Marks.

c) For In-plant Training Project-

- a)** At the end of second & Fourth semester, all students will have to undergo Summer Training (MANC554 & MANC756) of 6-8 weeks with an industrial, business, service organization or department. The condition of successfully completing the programme shall not be deemed to have been satisfied unless a student undergoes summer training under the supervision of the department in organization as approved by the Departmental/Faculty from time to time. Each student will be required to submit the inplant training report to the Department/faculty for the work undertaken during this period within three weeks of the commencement of the third & Fifth semester respectively for the purpose of evaluation in the third & Fifth semester respectively.
- b)** A candidate shall not be allowed to appear for III semester & V semester Examination of Full Time 3 years Course unless he/she completes the Inplant Training and submit the reports to the concerned teacher.

c) Internal Evaluation -

Internal Evaluation for the Inplant Training Project will be of 50 marks that will be evaluated by the respective faculty/ guide depending upon presentation/review/performance during project/ report writing/field work/seminars etc.

d) For Project -

i. Internal Evaluation -

All the students are divided among different teams & work under the guidance of the Faculty/guide. Internal Evaluation for the project will be of 20% marks that will be evaluated by the respective faculty/ guide depending upon presentation/review/performance during project/ report writing/field work/seminars etc.

ii. External Evaluation Scheme

Student has to present seminar/viva-voce/ demonstration of project in front of External Examiner. External evaluation for the project will be considered for 80% Marks.

- e)** At the end of each semester the Committee of Department shall assign grades to the students and will prepare the result. Also, the Department will display the grade points and grades for the notice of students.
- f)** Every student shall have the right to scrutinize answer sheets of mid semester/semester end examinations and seek clarifications from the teacher regarding evaluation of the sheets as per Grievance Schedule.

g) Sixth Semester Project Evaluation Scheme

The Major project work should be carried out over the entire period of the final semester in an Industry. If the project is carried out in an Industry organization outside the campus, then a co-guide shall be there from Industry. Every student should do the Major Project individually. However students can opt for project in groups based on merits/requirements of the project and in consultation with the project guide. A guide will review the project periodically. At the end of the semester the candidate shall submit the Project report (two bound copies) duly approved by the guide and H.O.D. of the department. The department will appoint external examiner for assessment of the project. The project will be assessed by the external examiner and the guide separately on the basis of the following criteria tentatively.

- Innovative Idea 15%
- Content 15%
- Preparation of Project Report 30%
- Presentation/Viva- voce 40%

If student failed to complete the project within scheduled time then he/she has to reappear and register freshly with new project topic after paying required fees for that semester.

12. Grade Card

The university under its seal shall issue to the students a grade card on completion of each semester.

Grade card shall contain the following:

- a. Title of the courses along with code taken by the student.
- b. The credits associated with and grades awarded for each course.
 - c. The number of grade and grade point secured by the student.
- d. The total credits earned by the student in that semester.
- e. The SGPA of the student.
- f. The total credits earned by the student till that semester.
- g. The CGPA of the student (At the end of the VIth semester).

Cumulative Grade Card

The grade card issued on completion of the programme shall contain the name of the programme, the department /school offered the programme, the titles of the courses taken, the credits associated with each course, grades awarded, the total credits earned by the student, the CGPA and the class in which the student is placed.

13. General Clause

It may be noted that beside the above specified rules and regulations all the other rules and regulations in force and applicable to semester system in Post-Graduate courses in Dr. Babasaheb Ambedkar Marathwada University will be applicable as amended from time to time by the University. The students shall abide by all such Rules and Regulations.

MCA Course Structure

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Minm Assessment/ Tutorial	Exam Hrs.	Marks		Total	
							Internal	End Sem Exam		
I	Generic Foundation Course	MANC401	Computer Organization & Architecture	4	60 - 05	3	20	80	100	
		MANC402	Information System Analysis & Design Methodology	4	60 - 05	3	20	80	100	
		MANC403	Mathematics – I	4	60 - 05	3	20	80	100	
		MANC404	Basic of Web technology	4	60 – 05	3	20	80	100	
		MANC405	Constitution of India	2	30	1.5	10	40	50	
		MANC406	Research Methodology	2	30	1.5	10	40	50	
	Skill Based Foundation Course	MANC451	Practical Based on MANC404	2	30	1.5	10	40	50	
	Core Course	MANC407	Object Oriented Programming using C++	4	60 – 05	3	20	80	100	
		MANC452	Practical Based on MANC407	2	30	1.5	10	40	50	
		MANC453	Project	4	60	--	20	80	100	
				Total	32	480		160	640	800

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Minm Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
II	Generic Foundation Course	MANC408	Operating System	4	60 – 05	3	20	80	100
		MANC409	Database Management System	4	60 – 05	3	20	80	100
		MANC410	Mathematics – II	4	60 – 05	3	20	80	100
	Skill Based Foundation Course	MANC454	Practical Based on MANC409	2	30	1.5	10	40	50
	Core Course	MANC411	Software Engineering	4	60 – 05	3	20	80	100
		MANC412	Data Structure Using C++	4	60 – 05	3	20	80	100
		MANC413	ASP.NET	4	60 - 05	3	20	80	100
		MANC455	Practical Based on MANC412	2	30	1.5	10	40	50
		MANC456	Practical Based on MANC413	2	30	1.5	10	40	50
		MANC457	Project	4	60	--	20	80	100
			Total	34	510		170	680	850

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Minm Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
III	Core Course	MANC501	Entrepreneurship Development	4	60 – 05	3	20	80	100
		MANC502	Artificial Intelligence	4	60 – 05	3	20	80	100
		MANC503	Java Programming	4	60 – 05	3	20	80	100
		MANC504	Design and Analysis of Algorithms	4	60 – 05	3	20	80	100
		MANC505	Advance Database Management System	4	60 – 05	3	20	80	100
		MANC551	Practical Based on MANC503	2	30	1.5	10	40	50
		MANC552	Practical Based on MANC504	2	30	1.5	10	40	50
		MANC553	Practical Based on MANC505	2	30	1.5	10	40	50
		MANC554	In-plant Training Project	2	30	--	50	-	50
	MANC555	Project	2	30	--	10	40	50	
	Open Elective Course	MANC52X	Group A	4	60 – 05	3	20	80	100
			Total	34	510		210	640	850

Open Elective Course: Group A

Elective Course	MANC521	Cloud Computing	4	60 – 05	3	20	80	100
	MANC522	Emerging Trends in Information Technology						
	MANC523	Cyber Laws						

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Minm Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
IV	Skill Based Foundation Course	MANC506	Verbal & Non- Verbal Aptitude	4	60 – 05	3	20	80	100
	Core Course	MANC507	Software Testing and Quality Assurance	4	60 – 05	3	20	80	100
		MANC508	Advanced Data Communication and Networks	4	60 – 05	3	20	80	100
		MANC509	Object Oriented Analysis and Design	4	60 – 05	3	20	80	100
		MANC510	Linux Administration and Server Configuration	4	60 – 05	3	20	80	100
		MANC556	Practical Based on MANC509	2	30	1.5	10	40	50
		MANC557	Practical Based on MANC510	2	30	1.5	10	40	50
		MANC561	Project	4	60	--	20	80	100
	Open Elective Course	MANC52X	Group B	4	60 – 05	3	20	80	100
		MANC55X	Practical Based on Group B	2	30	1.5	10	40	50
			Total	34	510		170	680	850

Open Elective Course: Group B

Elective Course	MANC524	Advanced JAVA	4	60 – 05	3	20	80	100
	MANC558	Practical Based on MANC524	2	30	1.5	10	40	50
	MANC525	C Sharp	4	60 – 05	3	20	80	100
	MANC559	Practical Based on MANC525	2	30	1.5	10	40	50
	MANC526	Data Mining	4	60 – 05	3	20	80	100
	MANC560	Practical Based on MANC526	2	30	1.5	10	40	50

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Minm Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
V	Generic Foundation Course	MANC701	Software Project Management	4	60 - 05	3	20	80	100
	Skill Based Foundation Course	MANC702	Quantitative Aptitude	4	60 - 05	3	20	80	100
	Core Course	MANC703	Ethical Hacking	4	60 - 05	3	20	80	100
		MANC704	Web Development using PHP	4	60 - 05	3	20	80	100
		MANC751	Practical Based on MANC704	2	30	1.5	10	40	50
		MANC705	JSP	4	60 - 05	3	20	80	100
		MANC752	Practical Based on MANC705	2	30	1.5	10	40	50
		MANC756	In-plant Training project	2	30	--	50	-	50
		MANC757	Project	2	30	--	10	40	50
	Open Elective Course	MANC72X	Group C	4	60 – 05	3	20	80	100
MANC75X		Practical Based on Group C	2	30	1.5	10	40	50	
			Total	34	510		210	640	850

Open Elective Course: Group C

Elective Course	MANC721	Android Development	4	60 – 05	3	20	80	100
	MANC753	Practical Based on MANC721	2	30	1.5	10	40	50
	MANC722	Image Processing	4	60 – 05	3	20	80	100
	MANC754	Practical Based on MANC722	2	30	1.5	10	40	50
	MANC723	Hadoop	4	60 – 05	3	20	80	100
	MANC755	Practical Based on MANC723	2	30	1.5	10	40	50

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Minm Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
VI	Core Course	MANC758	Major Project	14	210	--	70	280	350

			Course Total	182	2730	--	990	3560	4550
			Service Course	4	60	--	20	80	100
			Grand Total	186	2790	--	1010	3640	4650

MCA – I SEM

Subject Title	Computer Organization And Architecture	No. of Credits	4
Subject Ref. No.	MANC401	No. of Periods / Week	4
		Assignments / Sessional	20
		Semester Examination	80
Course Objective	It aims at introducing basic digital concepts and then uses them to explain details of computer organization. It covers topics such as basic digital electronics, cache hierarchies, memory systems, storage and IO systems etc.		
Pre Requisite	Internal Components of the CPU, Logic design and Boolean algebra		
Unit – I	Introduction to Digital Computer Functions and Block Diagram of Computer Types of Software – System software / Application software / Utility Software. Compilers, Interpreters, Assemblers, Linker, Loader Number System and Boolean Algebra Binary, Octal, HEX and their inter-conversion 1's and 2's complement, Logic Gates, Binary Arithmetic, Number Systems – BCD, EBCDIC, ASCII, De-Morgan's Theorem, Duality Theorem, Algebra Rules, Logic Circuits.		
Unit – II	Combinational Circuits Karnaugh Map Techniques, Half / Full Adder – Subtractor, Multiplexer / Demultiplexer, Digital Comparator, ALU		
Unit – III	Sequential Circuits Flip Flops - SR, D, JK, Master – Slave, Shift Register, Introduction to Counter		
Unit – IV	Memory System Memory Hierarchy, Primary Memory – DRAM, SDRAM, DDR, RDRAM. ROM, PROM, EPROM, EEPROM, Concepts of Auxiliary, Associative, Cache and Virtual Memory, DMA		
Unit – V	CPU Organization CPU Building Blocks, CPU Registers and BUS Characteristics, Addressing Modes, Interrupts, Instruction sets and Execution cycle, Assembly Programming, Pipelining – Data Path, Time Space Diagram. Processor Architecture Components of Microprocessor, I/O Ports, 16-Bit (80286) Architecture, 32-Bit (80486) Architecture, Super scalar Architecture in Pentium Processors, 64-Bit (Pentium Dual-Core) Architecture		
Text Books	1. R P Jain, “Modern Digital Electronics”, Tata McGraw Hill 3 rd Edition 2. Mano Morris, “Computer System and Architecture”, Pearson, 3rd Edition 3. Ramesh Gaonkar, “Microprocessor Architecture, Programming, and Applications”, Prentice Hall 5 th Edition		
Additional Reference Books	1. JP Hayes, “ Computer Architecture and Organization , McGraw Hill 2 nd Ed 2. Govindarajalu, B, “ IBM PC AND CLONES: Hardware, Troubleshooting and Maintenance”, McGraw-Hill 2 Edition		

Subject Title	Information System Analysis And Design Methodologies		
Subject Ref. No.	MANC - 402	No. of Credits	4
		No. of Periods / Week	4
		Assignments / Sessional	20
		Semester Examination	80

Objective : The objective of the course is to familiarize the participants with the Information System Analysis and design, security of information.

Prerequisite : The students should have basic knowledge of Information, software.

Unit –I : **Overview of systems Analysis and design System concepts :**

- 1) Types of systems: Information System
 - 2) System Development Life cycle
 - 3) Role & Skills of system Analyst
- Models:
- 1) Waterfall
 - 2) Prototyping
 - 3) Spiral (including WIN-WIN Spiral)
 - 4) RAD
 - 5) Group Based Approach: JAD
 - 6) Object Oriented methodology

Unit –II: **Activities in Requirements Determination**

- a) Requirements Anticipation
 - b) Requirements Investigation
 - c) Requirements Specifications
- Software requirement Specification (SRS)
- 1] 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
 - 2] Structure and standards followed for SRS
 - 3] characteristics of good SRS –
 - Unambiguous , complete , verifiable , consistent , modifiable , traceable , usable
- during maintenance

Unit –III: **Evaluation :**

- 1) Feasibility Study : economical,operational,social,technical
- 2) Evaluating Proposed Solution
- 3) Developing a System proposal
- 4) Software Acquisition

Unit –IV: **Systems Design:**

- Elements of Design
- 1) Design of input & Control, Objectives of Input Design Data Capture Guidelines ,Design of Source Document ,Input Validations
 - 2) Design of output, Objectives of Output Design, Types Of Output
 - 3) Design of File , Basic File Terminology , Data Structure Diagrams
- Types of Files ,Methods of File Organizations
- 4) Design of Procedure
 - 5) Design of program Specification

User Interface design:

Elements of good design , design issues ,features of modern GUI , Menus , Scroll bars, windows , buttons, icons ,panels , error messages etc.

Case studies should be covered on the topic

Unit –V : **Introduction to Information Security :**

Definition of Information Security ,Computer Crimes and virus, Internal Control , Need for IS , Types of Security –
 Physical Security
 Logical Security

Text Books :

- 1. Analysis & Design of Information System – V. Rajaraman
- 2. Software Engineering by Pressman

Reference Books :

- 1. Analysis & Design of Information System – James Senn

2. Software Engineering – Pressman
3. System Analysis & Design – Hawryszkiewicz
4. Software Engineering - Jawadekar
5. System Analysis & Design methods – Whiten, Bentley
6. System Analysis & Design – Elias Awad
7. Computer Security for Dummies
8. Internet Security by Derek Atkins et al.
9. Computer Viruses – From an Annoyance to a Serious Threat White Paper September 2001

Web References :

1. <http://en.wikipedia.org>
2. <http://www.tutorialspoint.com>
3. http://www.chris-kimble.com/Courses/World_Med_MBA/Types-of-Information-System.html
4. <http://www.freetutes.com/systemanalysis/sa2-object-oriented-methodology.html>
5. <http://www.biometricsinstitute.org/pages/types-of-biometrics.html>

Subject Title	Mathematics - I	No. of Credits	4
Subject Ref. No.	MANC403	No. of Periods / Week	4
		Assignments / Sessional	20
		Semester Examination	80
Course Objective	In this subject student will learn Logic, Relations and Functions, Algebraic Functions, Graph Theory and Trees will be introduced in this course.		
Pre Requisite	Basic knowledge of mathematics like set theory.		
Unit – I	Mathematical logic: Propositions (Statements) Logical connectivities, N, A, V, Compound statements form, truth tables, tautology, implications and equivalence of statements forms logical identities Normal forms : disjunctive normal form and simplification. Conjunctive normal form, logical implications, valid arguments, methods of proof. Theory of inference of statement calculus, predicate calculus, qualifiers free and bound variables, theory of inference of predicate calculus.		
Unit – II	Relations and Functions: Relation defined as ordered n-tuple Unary, binary, ternary, n-ary Restrict to binary relations Complement of a relation, converse relation, compositions, matrix representation and its properties Graphical representation of relation – Digraphs Properties of binary relation – reflexive, irreflexive, symmetric, asymmetric, transitive equivalence, equivalence classes, partitions covering, compatible relation maximal compatibility block, transitive closure – Warshall's algorithm. Partial ordering relation – Hasse diagram, Chains and antichains. Lattice, maximal and minimal elements, upper bound, lower bound, definitions Functions – definitions : Partial function, hashing functions, characteristic functions, floor functions, ceiling functions, subjective control, injective (one-to-one) Inverse functions, left reverse, right inverse Bijection and cardinality of finite set Infinite sets and compatibility, Properties of countable sets Non-denumerable sets.		
Unit – III	Algebraic Structures: Operations on sets -unary, binary, ternary definitions of algebraic systems (restrict to binary operations) Properties – closure, idempotent, associative, commutative, identity, inverse, Semigroup, subsemigroup Monoid, submonoid group, abelian group, permutation group, multiplicative abelian group, cyclic group Subgroups : Cosets, right cosets, left cosets, normal subgroups, quotient groups, isomorphism, homomorphism, automorphism Group codes: Weight and Hamming distance, minimum distance of code, generation of codes using parity checks – even parity, odd parity, parity check matrix – Hamming code, for detection and correction errors, formation of encoding function, decoding Application of residue – arithmetic to computers group codes		
Unit – IV	Graph theory & Trees: Basic terminology, simple and weighted graph, adjacency and incidence, handshaking 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, regular m-ary tree		
Unit – V	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, Distinct objects in, indistinguishable cells, Indistinguishable objects in distinguishable cells. Probability: Sample space, events, different approaches, conditional probability, Baye's rule, Random variables, univariate & bivariate Discrete Distributions Binomial, Poisson, Negative Binomial, Geometric, hyper geometric, zeta distributions Continuous Distributions Uniform, normal, Erlanggamma, exponential, Rayleigh Laplace, Cauchy, marginal & conditional distributions For the above discrete distribution definition of r.v and derivation of its p.m.f. is expected. For the continuous distributions p.d.f. should be defined. 6 Special properties of the distribution (if any) should be tested. Generating Functions and Recurrence Relations: Principle of Inclusion & Exclusion, Formula Derangement- restrictions on relative positions Generating functions for discrete numeric functions, for combinations, Homogeneous, non-homogeneous, Pigeonhole principle		
Text Books	<ol style="list-style-type: none"> 1. Swapan Kumar Sarker, "A text book of Discrete Mathematics", S. Chand Publication 2. Discrete Mathematical Structures for Computer Science by Kolman B and Bushy R, Prentice – Hall of India 1998 3. S.C. Gupta and V K Kapoor, "Mathematical Statistics", Publication Sultan chand and sons 2002 		
Additional Reference Books	:	<ol style="list-style-type: none"> 1. Discrete Mathematics by C L Liu- Tata McGraw Hill Publishing house 2000 2. Discrete Mathematical Structures with applications to Computer Science by Tremblay and Manohar, Prentice – Hall of India 1997 3. S P Gupta, "Statistical Methods", Publications sultan chand and sons 2008 4. Elhance D.N., Elhance Veena, Agrawal B.M. Fundamentals of Statistics 2012 	

Subject Title	Basics of Web Technology	No. of Credits	4
Subject Ref. No.	MANC404	No. of Periods / Week	4
		Assignments / Sessional	20
		Semester Examination	80

Course Objective This course assumes that students are aware of basic programming structure. In this course student will learn web programming languages such as HTML, JavaScript and VBScript
After completion of this course students can write good application based on basic web technology using HTML, JavaScript and VBScript. Students can develop their own web sites.

Prerequisites Student should know the basic programming concepts.

HTML & Forms

Unit I Introduction To HTML, WWW, W3C, web publishing, Common HTML, Tags Physical & Logical, Some basic tags like <body> , changing background color of page, text color etc., Text formatting tags, <p>
, <hr> tags, Ordered & Unordered Lists Tags, Inserting image, Links: text, image links, image mapping , Tables , Frames, Form Introduction with text box, text area, buttons, List box, radio, checkbox etc.

CSS

Unit II Introduction To Style sheet, types of style sheets- Inline, External, Embedded CSS, text formatting properties, CSS Border, margin properties, Positioning Use of classes in CSS, color properties, use of <div>&

JavaScript

Unit III : Intro to script, types, intro of JavaScript, JavaScript identifiers, operators, control & Looping structure, Intro of Array, Array with methods, Math, String, Date Objects with methods User defined & Predefined functions, DOM objects, Window Navigator, History, Location.

Event handling & Validations on Forms – JavaScript

Unit IV : Handling Events on Button, Textbox, radio button, checkbox, drop down box, text area etc.
Form Validation – numeric, alphanumeric, alphabets and any combination of these.
Disabling the keys on the keyboard, regular expression

VBScript

Unit V Introduction to VBScript, Variables, Data types, Control Structures & Loops, Functions in VBScript, Client side web scripting, validating forms, DOM, Handling errors

1. HTML, DHTML, JavaScript, Perl & CGI Ivan Bayross
2. HTML & CSS : The Complete reference, Fifth Edition By Thomas Powell

Text Books

1. [Html, Xhtml, And Css Bible \(English\) 5th Edition \(paperback\)](#) by Schafer, Steven
2. [HEAD FIRST HTML AND CSS, 2/ED \(UPDATED FOR HTML\)](#) by ROBSON
3. [Beginning HTML and CSS \(English\) \(Paperback\)](#) by Rob Larsen
4. [Learn to Code HTML and CSS \(English\) \(Paperback\)](#) by Howe
5. Javascript Bible (English) 7th Edition by [Danny Goodman Michael Morrison Paul Novitski Tia GustaffRayl](#)
6. Javascript Programming: Pushing the Limits (English) 1st Edition By (2013)Jon Raasch
7. Head First JavaScript (2007) By michael Morrison
8. [JavaScript: The Definitive Guide](#) (2011) by Flanagan, David
9. VBScript Programmers reference wrox Press
10. [VBScript in a Nutshell \(English\) \(Paperback\)](#) by Petrusha, Childs, Lomax

Reference books

Web References

1. www.w3school.com
2. www.tutorialpoint.com

Subject Title	: Practical Based on MANC404	No. of Credits	: 2
Subject Ref. No.	: MANC451	No. of Periods / Week	: 2
		Internal	: 10
		External	: 40

Course Objective : Students will be in a position to design the website.
Content : Assignment based on the HTML, JAVASCRIPT, VBSCRIPT will be covered.

Subject Title	: Constitution of India	No. of Credits	: 2
Subject Ref. No.	: MANC405	No. of Periods / Week	: 2
		Internal	: 10
		External	: 40

Syllabus will be provided by the authorities.

Subject Title	Research Methodology	No. of Credits	: 2
Subject Ref. No.	MANC406	No. of Periods / Week	: 2
		Assignments / Sessional	: 10
		Semester Examination	: 40

Course Objective To equip the students with the basic understanding of the research methodology and to provide an insight into the application of modern analytical tools and techniques for the purpose of management decision making.

Pre Requisite

Unit – I

NA.
Nature and Scope of Research Methodology; Research Problem identification; Types of Problems; Problem solving process; Problem Formulation and Statement of Research Objectives; Research Applications.

Unit – II

Research process; Research designs-exploratory, descriptive & experimental research designs

Unit – III

Methods of Data Collection – Observational and Survey methods; Questionnaire Design; Attitude measurement Techniques; Motivational Research Techniques; Administration of Surveys;

Unit – IV

Sample Design; Selecting an Appropriate Statistical Technique; Field Work and Tabulation of Data;

Unit – V

Analysis of Data-; Use of SPSS and other Statistical Software Packages; Advanced Techniques for Data Analysis – ANOVA, Discriminant Analysis, Factor Analysis, Conjoint Analysis, Multidimensional Scaling and Clustering Methods; Organization structure of research; Research Proposal; Purpose and types of Research Proposal.

Text Books

Research methodology methods & techniques by C.R. kothari
Statistical methods: Dr.S.P. Gupta-sultan Chand & sons New Delhi.
Research methodology by gupta
Research methodology in social science by Giridhari
Management Research Methodology by K.N. Krishnaswamy, AppaIyersivakumar and M. Mathirajan.
Management Research by Andrews, F.M. and S.B. Withey
Social Indicators of Well Being. Plenum Press. NY, Bennet, Roger
Survey Methods by Fowler, Floyd J.Jr.,
Exploring Research by Salkind, Neil J.,

Subject Title	: Object Oriented Programming using C++	No. of Credits	: 4
Subject Ref. No.	: MANC407	No. of Periods / Week	: 4
		Assignments / Sessional	: 20
		Semester Examination	: 80
Course Objective	: This subject helps to clarify the OOPs concept of Programming languages. This subject covers all the basic techniques of OOPs programming, structure of C++ programming, basic statements , logical statement , graphics and file handing concepts using C++ programming, Exception Handling, Template , JST Library and Namespace.		
Pre Requisite	: Basics of Computer Fundamentals , OS and C programming		
Unit – I	: An Overview of C A Brief History of C, C is middle-level Language, C is a Structured Language, Compiler Vs Interpreters, The Form of a C Program, Library & Linking, Compilation & Execution of C. Program on, Dos & Unix, Variables, Data Types, Operator & Expression , Character Set, C Token, Identifier & Keyword, Constant, Integer, Floating Point, Character, String, Enumeration , Data Types in C, Data Declaration & Definition, Operator & Expression, Arithmetic, Relational, Logical, Increment &Decrement, Bitwise, Assignment, Conditional ,2.8 Precedence & Associativity of Operators. Console I/O Introduction, Character input & Output, String Input & Output, Formatted Input/Output (scanf/printf printf&sscan. Control Statement :Introduction, Selection Statements If, Nested if, if-else-if, The? Alternative, The Conditional Expression, switch, Nested switch, Iteration Statements , for loop, while loop, do-while loop , Jump Statements goto& label, break & continue, exit() function Command Line Arguments : Storage Class & Scope : Meaning of Terms, Scope - Block scope & file scope, Storage Classes, Automatic Storage, Extern Storage, Static, Storage, Register Storage, Bitwise Operator : Introduction, Applications Masking, Internal Representation of Date, Bit Fields		
Unit – II	: Principle of OOP's : Introduction Procedural Vs Object Oriented Programming Classes, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism Dynamic Binding, Message Passing Object Oriented Languages Object Based languages Array & String : Single Dimension Arrays , Accessing array elements, Initializing an array, Multidimensional Arrays, Initializing the arrays, Memory Representation Accessing array elements, Passing Single Dimension array to Function, Array & Pointer, Array of Pointer, String Manipulation Functions. Pointers : Introduction, Memory Organization, The basics of Pointer, 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 . Function :Introduction, Arguments & local variables, Returning Function Results by reference & Call by value, Recursion. Structure, Union, Enumeration & typedef :Structures Declaration and Initializing Structure, Accessing Structure members, Structure Assignments, Arrays of Structure, Passing Structure to function, Structure Pointer, Unions		
Unit – III	Classes & Object : A Sample C++ Program with class Defining Member Functions Making an Outside Function Inline Nesting of Member Functions Private Member Functions Arrays within a Class Memory Allocation for Objects Static Data Members, Static Member Functions, Arrays of Objects Object as Function Arguments Friendly Functions, Returning Objects, Const member functions Pointer to Members, Local Classes Constructor & Destructor : Constructor, Parameterized Constructor, Multiple Constructor in a Class Constructors with Default Arguments, Dynamic Initialization of Objects ,Copy Constructor Operator Overloading & Type Conversion : Defining operator Overloading ,Overloading Unary Operator, Overloading Binary Operator , Type Conversion , Rules for Overloading Operators : C++ Preprocessor : Introduction, Preprocessor Directive Macro Substitution, File Inclusion directive, Conditional Compilation File handling : Introduction, Defining & Opening a File, Closing a File, Input/Output Operations on Files, Error Handling During I/O Operation, Random Access To Files, Command Line Arguments. Graphics In C : Introduction, Drawing Object in C Line, Circle, Rectangle, Ellipse, Changing Foreground & Background, Filling Object by Color		
Unit – IV	: 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 Virtual Function ; Virtual Function, Pure Virtual Function, Early Vs Late Binding, concept of pointers, Pointer to Object, This pointer Introduction to exception handling and working with files.		
Unit – V	: Exception Handling, Namespace in C++ , Template in C++		
Text Books	: 1. C : The Complete Reference : Herbert Schildt ,		

Additional Reference Books :

2. OOPs Using C++ : Balgurusamy,
3. Graphics under C : YashwantKanetkar ,
4. Let us C : YashwantKanetkar
5. Let us C++ : YashwantKanetkar
1. Programming with C : Bryon Gottfried, Graphics Under C : Y. Kanetkar
2. Let us C Solutions : Y.P. Kanetkar, 3. Spirit Of “C” : MoolishKoooper.
3. The Complete Reference C++ by Herbert Schildt
4. C++ and Active learning approach by Randal Albert, Todd Bredlove
5. Advanced C primal ++ by Stephen prata

Subject Title : Practical Based on MANC407
Subject Ref. No. : MANC452

No. of Credits	:	2
No. of Periods / Week	:	2
Internal	:	10
External	:	40

Course Objective Content :

- : Students will be in a position to write program using C & C++.
- : Assignment based on the Object Oriented programming will be covered.
- : A mini project based of website designing can be covered.

Subject Title : Project
Subject Ref. No. : MANC453

No. of Credits	:	4
No. of Periods / Week	:	4
Internal	:	20
External	:	80

A Collaborative approach is taken in which all the students of MCA – I, II & III year are divided into several teams. Social requirement will be fulfilled by these teams using different technologies under the guidance of faculty or guide.

MCA – II SEM

Subject Title	:	Operating System		
Subject Ref. No.	:	MANC408	No. of Credits	: 4
			No. of Periods / Week	: 4
			Assignments Sessional	: 20
			Semester Examination	: 80
Course Objective	:	The objectives of this course are to understand fundamental concepts of operating system, to understand recognizing operating systems features and issues. .And sufficient understanding of operating system design and how it impacts application systems design and performance		
Pre Requisite	:	Fundamentals of Computer System Fundamentals of C programming		
Unit – I	:	Introduction: Logical View, User View System Calls, Concept of Virtual Machine, Interrupt Concept		
Unit – II	:	ProcessManagement: Process Concept, Process Control Block, Process Schedule , Process operations, Inter-process Communication, Communication in Client-Server CPUScheduling: Scheduling Concept, Scheduling Criteria, Scheduling algorithms, Scheduling Evaluation, Simulation Concept		
Unit – III	:	ProcessSynchronization&Deadlock: Synchronization concept, Synchronization Requirement, Critical Section Problem, Monitors, Deadlock concepts, Deadlock prevention & avoidance, Deadlock Detection, Deadlock Recovery		
Unit – IV	:	Memory Management: Memory Management Techniques, Contiguous & Non Contiguous allocation, Logical & Physical Memory, Conversion of Logical to Physical address, Paging, Segmentation, Segment with paging Virtual Memory Concept, Demand paging, Page Replacement algorithm, Allocation of Frames, Page fault. File management: File Structure, Protection, FILE system Implementation, Directory structure, Free Space Management, Allocation Methods, Efficiency & Performance, and Recovery.		
Unit – V	:	DiskManagement: Disk Structure, Disk Scheduling algorithm, Disk management, Swap Space concept and Management, Disk performance issues Android OS structure & ios structure DistributedOperatingSystem: Difference Between Distributed & Centralized OS ,Advantages of Distributed OS, Types of Distributed OS, Concept of Global OS, NOS Architecture.		
Text Books	:	1. Silberschatz , Galvin, and Gagne “Operating System Concepts”, John Wiley, 8th Ed., 2009. 2. D. M. DhamdhareOperating Systems--A Concept Based Apparoach, McGraw-Hill, 2008		
Additional Reference Books	:	1. Tannenbaum, “Operating Systems”, PHI, 4th Ed., 2000. 2. William Stallings, “Operating Systems Internals & Design Principles”, Pearson Education, 6th Ed., 2009.		

Subject Title	:	Database Management System		
Subject Ref. No.	:	MANC409	No. of Credits	: 4
			No. of Periods / Week	: 4
			Assignments Sessional	: 20
			Semester Examination	: 80
Course Objective	:	The course introduces the basic concepts of database systems and also gives the in depth knowledge of various principles of DBMS.		
Pre Requisite	:	NA		
Unit – I	:	Basic concepts: Database and Need for DBMS : ,Characteristics of DBMS, Database Users, 3-tier architecture of DBMS (its advantages over 2-tier), Data Models, Views of data-schemas and instances, Data Independence,Conventional data models & systems, NDM & HDM Expressing relationships, DBTG set Entities: Relationships, Representation of entities, attributes, relationship attributes, relationship set , Generalization, aggregation,Structure of relational Database and different types of keys,Expressing M:N relation		
Unit – II	:	Relational Model and Relational Database design Codd's rules, Relational data model & relational algebra, Relational model concept, Relational model constraints, Relational Algebra, Relational database language Data definition in SQL, Views and Queries in SQL, Specifying constraints and Indexes in SQL, Specifying constraints management systems, Oracle , Ingres Database Design – ER to Relational Functional dependencies, Normalization Normal forms based on primary keys , (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF), Loss less joins and dependency preserving decomposition		
Unit – III	:	Storage and File Structure : Overview of physical storage media : Magnetic disk, RAID, Tertiary storage, Storage access, File organization, Organization of records in files, Data dictionary storage		
Unit – IV	:	Transaction And Concurrency control : Concept of transaction, ACID properties , Serializability, States of transaction, Concurrency control, Locking techniques , Time stamp based protocols, Granularity of data items, Deadlock		
Unit – V	:	Crash Recovery and Backup : Failure classifications, storage structure, Recovery & atomicity, Log base recovery, Recovery with concurrent transactions, Failure with loss of Non-Volatile storage, Database backup & recovery from catastrophic failure, Remote Backup System Security and privacy : Database security issues, Discretionary access control based on grant & revoking privilege, Mandatory access control and role based access control for multilevel security, Encryption & public key infrastructures		
Text Books	:	<ol style="list-style-type: none"> 1. Database system concept Korth 2. Fundamentals of Database SysemsElmasriNavathe 3. Database Management Systems Bipin Desai 		
Additional Reference Books	:	<ol style="list-style-type: none"> 1. Introduction to database systems C.J.Date 2. Principles of Database Management James Martin 3. Computer Database organization James Martin 4. Database system practical Approach to design, implementation & management Connoly&Begg 5. Database Management systems Ramakrishnan&Gehrke 		

Subject Name	:	Practical Based on MANC409		
Subject ref. No.	:	MANC454		
			No. of credits	: 2
			No. of periods per week	: 2
			Internal	: 10
			External	: 40
Course Objectives	:	The objective of the course is to make student equipped with the latest DBMS software.		
Pre Requisite	:	Knowledge of MS-Access will be preferred.		
Software Used	:	Oracle 9i/Oracle 10g/ Oracle 11g		
Assignment I	:	1	Overview of RDBMS, Oracle introduction	
			Introduction of SQL DDL, DML, DTL Basic Data Types Char, varchar/varchar2, long, number, Fixed & floating point Date, CLOB, BLOB	
		3	Table Constraint definition Commands to create table	
Assignment II	:	1	Commands for table handling Alter table, Drop table, Insert records	
			Commands for record handling Update, Delete Select with operators like arithmetic, comparison, logical Query Expression operators Ordering the records with orderby Grouping the records	
			SQL functions : Date, Numeric, Character, conversion Group functions avg, max, min, sum, count	
Assignment III	:	7	Set operations Union, Union all, intersect, minus	
		8	Join concept Simple, equi, non equi, self, outer join	
		9	Query & sub queries	
Assignment IV	:		Synonym introduction, object type Create, synonym as alias for table & view, drop	
		11	Sequence : Introduction, alter sequence, drop	
		12	View : Intro, create, update, drop	
Assignment V	:	13	Index : Introduction, create	
		14	Primary introduction to DBA	
			User create, granting privileges (Grant, Revoke, Commit, Rollback, Savepoint)	
			Report writer using SQL Title, Btitle, skip, pause, column, SQL, Break on, computer sum	
Assignment VI	:	16	Introduction of PL/SQL Advantages of PL/SQL Support of SQL Executing PL/SQL	
			PL/SQL character set & Data Types Character, row, rowed, Boolean, binary integer, number Variable, constant	
Assignment VII	:	18	PL/SQL blocks	
			Attribute % type, %rowtype, operators, function comparison numeric, character, date Control structure Condition – if Interactive- loop, for, while Sequential – goto	
		19	Composite data types Record- declaration, refer, record assignment Table-Declaration, table attributes (Count, delete, exists, first, last, next, prior)	
Assignment VIII	:		Database Triggers Definition, syntax, parts of triggers Types of triggers, enabling & disabling triggers	
Assignment IX	:	21	Sub programs : Definition Features Cursors	
Assignment X	:	22	Procedures : Definition, creating, Parameter	
		23	Function Definition & implementation	
Assignment XI	:		Exercise1	
			1. Create table Salespeople with fields snum, sname, city, commission	
			2. Orders table with fields onum, odate, snum, amt	
			3. Customers table with fields cnum, cname, city, rating, snum	

- Assignment XII** : Exercise 2
1. Add at least 10 records
 2. Display all the records with all sales people's information.
 3. Display the details of fields sname, commission
 4. Display the odate, snum, onum, amt from orders table.
 5. Display snum from orders table without duplications.
 6. Display name & city of salesman where city is "Pune"
 7. Display all details of customer where rating is 100.
 8. Display all details from customer table where salespersons number is 1001.
 9. Display the numbers of sales persons, with orders currently in the ordersTable without any repeats.
 10. Display all customers where rating is more than 200
- Assignment XIII** : Exercise 3 (cont.)
11. Display all customers where city is 'Mumbai' rating is more than 100.
 12. Display all customers where city is either 'Pune' or 'Mumbai'
 13. List all customers not having city 'Pune' or rating more than 100
 14. List all orders between order dates 10/03/05 to 30/3/05
 15. Display all orders more than 1000 amt.
 16. Display names & cities of all salespeople in 'Pune' with a commission above 10.
 17. Display all customers excluding those, with rating less than equal to 100, unless they are located in 'Nagar'
 18. Display all sales persons names starting with character 'G'
 19. Display all sales persons names starting with character 'G', the 4th character is 'A' & the rest of characters will be any.
 20. Find all records from customers table where city is not known i.e. NULL.
 21. Display all the customers names begin with a letter A to G.
 22. Assume each salesperson has a 12% commission on order amt. Display order no, snum, commission for that order.
- Assignment XIV** : Exercise 3
1. Display all the customers' records, arranged on name.
 2. Display all customers records arranged on rating in desc. Order.
 3. Display all sales persons records arranged on snum
 4. Display the count for total number of customers in customers table.
 5. Display the count of snum in order table without duplication of snum.
 6. Display the counts of all orders for Feb05
 7. Display the count of different non-NULL city values in the customers table.
 8. Display the maximum outstanding amount as blnc+amt
 9. Display the minimum rating within customers table.
 10. Display average of amt.
 11. Display sales persons number wise maximum amt from order table.
 12. Display the largest order taken by each salesperson on each date.
 13. Display the details of maximum orders above 3000.
 14. Display details of orders order number & date wise
 15. Display customers highest ratings in each city.
 16. Write a query that totals the orders for each day & places the results in descending order.
- Assignment XV** : Exercise 4
1. Add a column curr_bal in orders table for current balance
 2. Increase commission of all sales persons by 200.
 3. Delete all orders where odate is less than 5-2-05
- Assignment XVI** : Exercise 5
1. Display names of all customers matched with the salespeople serving them.
 2. Find all orders by customers not located in same cities as their salespersons.
 3. Display each order number followed by the name of customer who made it.
 4. Calculate the amount of salespersons commissions on each order by a customer with a rating above 100.
 5. Display the pairs of salespeople who are living in the same city. Exclude combinations of

sales people with themselves as well as duplicate rows with the order reversed.
6. Display the names & cities of all customers with same rating as Hoffman.

- Assignment XVII** : Exercise 6
1. Write a query that uses a sub-query to obtain all orders for the customer named 'Gopal'. Assume you do not know the customer number.
 2. Write a query that produces the names & ratings of all customers who have above-average orders.
 3. Write a query that selects the total amt in orders for each salesperson for whom this total is greater than the amount of the largest order in table.
- Assignment XVIII** : 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.
- Assignment XIX** : 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.
- Assignment XX** : Exercise 9
1. Write a PL/SQL block of code that first inserts a record in an 'emp' table. Update the salary by Rs. 2000. then check to see that the total salary does not exceed 20000. if so, undo the updates made to the salaries.
 2. HRD manager has decided to raise the salary of employees by 0.15. Write a PL/SQL block to accept the employee number & update the salary of that emp. Display message based on the existence of record in employee table.
 3. When any such raise in salary, a record for the same is maintained in emp_raise table. It includes the employee no, the date of raise & the actual raise.
 4. Create a stored function to perform item_id check operation. Which accepts a item_id & returns a flag as per the id exist or not.
 5. Application using database triggers –
Create a transparent audit system for a table Client_master. The system must keep track of the records that are being deleted or updated. When the record is deleted or modified the original record details & date of operation are stored in audit table & then the delete & update is allowed to go.
- Text Books** : 1. SQL, PL/SQL the programming language of Oracle Ivan Bayross
- Additional Reference Books** :
1. Understanding ORACLE Perry J. & Later J.
 2. Understanding SQL Martin Gruber, BPB publication
 3. SQL Scott Urman
 4. ORACLE PL/SQL Programming Scott Urman

Subject Title	: Mathematics-II	No. of Credits	: 4
Subject Ref. No.	: MANC410	No. of Periods / Week	: 4
		Assignments / Sessional	: 20
		Semester Examination	: 80
Course Objective	: The main objective of this course to learn research methodologies, defining hypothesis and its analytical methods. The content also help to solve many real-time problems of operation research such as assignment, transportation, queuing, Linear programming and network problems also.		
Pre Requisite	: Statistical Basic, discrete Mathematics and Data Structure		
Unit – I	: Statistical Tools for Research Methodology, Measures of Central Tendency or Average, Measures of Dispersion, Correlation Analysis. Regression Analysis, Statistical Inference – Test of Significance		
Unit – II	: Linear Programming Various definitions, statements of basic theorems and properties, Advantages, Limitations and Application areas of Linear Programming Linear Programming – The Graphical method – Graphical Solution methods of Linear Programming problem, Maximization Linear Programming problem, Maximization Problem. Linear Programming – Simplex Method – Phase I and Phase II of the Simplex Method, The Revised Simplex method, Primal and Dual Simplex Method, Simplex Algorithm for maximization case, Simplex Algorithm for minimization case – Two phase method and the Big –M method. Transportation Problem and its solution, Assignment Problem and its solutions by Hungarian Method		
Unit – III	PERT & CPM Basic differences between PERT and CPM. , Arrow Networks, time estimates, earliest, expected time, latest – allowable, occurrences time, Forward Pass Computation, Backward Pass Computation, Representation in Tabular Form Critical Path, Probability of meeting scheduled date of completion, Calculation on CPM network. Various floats for activities, Critical path updating projects. Operation time cost tradeoff Curve project, Time cost – tradeoff Curve- Selection of schedule based on Cost Analysis, Crashing the network		
Unit – IV	: Integer Programming , Gomory Cutting Plan Methods – Branch and Bound , Queuing Theory.		
Unit – V	: Replacement of items that deteriorates. Replacement of items that fails suddenly, Individuals and Group Replacement- Policy, INVENTORY THEORY: Inventory Model Building, Single item deterministic Model, Inventory Control Models without strategies and Inventory, Control Models with shortages.		
Text Books	: 1. Research Methodology methods and Techniques by C.R. Kothari 2. Operation Research J.K. Sharma 3. Operations Research KantiSwarup, Gupta P.K. and ManMohan.		
Additional Reference Books	: Comprehensive Statistical Methods, P.N. Arora, SummetArora, S. Arora Operation Research , A.M. Nataranjan , P. BalaSubramani, A. Tamilaraji		

Subject Title : Software Engineering

Subject Ref. No.	MANC411	No. of Credits	:	04
		No. of Periods/Week	:	04
		Assignments/Sessional	:	20
		Semester Exam.	:	80

Course Objective The purpose of this course is to understand the Software Engineering process, DFD, ERD, Software Inspection process, different design methods, maintenance, CASE TOOLS.

Prerequisite : Emergence of Software Engineering, Different software life cycle models.

Unit –I :

1A) Current trends in Software Engineering
1.1 Software Engineering for projects & products.
1.2 Introduction to Web Engineering and Agile process

1B) Information requirement Analysis:
1) Decision Analysis Tools: Decision Tree, Decision Table, Structured English
2) Functional Decomposition Diagram
3) Process modeling with physical and logical Data Flow Diagrams
4) Entity Relationship Diagram : Identify Entity & Relationships
4) Data Dictionary
Case Studies on Decision analysis tools FDDs, DFDs should be covered

Unit –II : Software Inspection
Inspection team, members, process, steps, documents, checklist, defect recording and recommendation format, evaluation of inspection process, benefits.

Unit –III:

Design Methods:
3.1 Data design
3.2 Architectural Design
3.3 Procedural Design
3.4 Interface Design
3.5 Code design

Unit – IV:

Maintenance
4.1 Types of Maintenance
4.2 Maintenance Cost
4.3 Reverse Engineering
4.4 Introduction to legacy systems

Documentation
4.5 Types
4.6 Role of documentation in maintenance

Unit – V :

CASE TOOLS
CASE tools , types – project management, analysis , designing , programming ,prototyping , maintenance , advantages of using CASE tools , I-CASE , future of CASE

Text Books:

1. Software Engineering by Pressman
2. DBMS Concepts – Korth

Reference Books :

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

Subject Title : Data Structure using C ++
Subject Ref. No. : MANC412

No. of Credits	: 4
No. of Periods / Week	: 4
Assignments / Sessional	: 20
Semester Examination	: 80

Course Objective : This subject helps to clarify the concepts of data structure which help to enhance programming techniques in procedure oriented and object oriented languages. This subject covers all the techniques of stack, queue, tree and graph theory and its implementation in normal programming languages i.e. in c or c++

Pre Requisite : C& C++ programming knowledge
Unit – I :

Introduction To Data Structure : Introduction, Data Definition, Data Object, Data Types, Built-in Data Type, Derived Data Type, Data Structure, Implementation of Data Structure
Array : Array as Data Structure, Storage Representation of Arrays, Applications of Arrays, Polynomial Representation Using Arrays, Addition of Two Polynomial, Multiplication of Two Polynomial, Sparse Matrices, Addition of Sparse Matrices, Transpose of a Sparse Matrix
Stack : Introduction, Definition, Operation on Stack, Static & Dynamic Implementation of a Stack, Application of Stack, Recursion, Infix, Prefix & Postfix expression, Matching Parentheses in an expression
Queue: Introduction, Definition of a Queue, Operation on a Queue, Static & Dynamic Implementation of Queue, Types of Queue, Circular Queue, Priority Queue, DEQueue, Application of Queue, Job Scheduling, Reversing Stack using Queue

Unit – II : **Linked List** : Introduction, Drawback of Sequential Storage, Concept of Linked List, Implementation of Linked List, Operation of Linked List, Creating a List, Displaying a List, Inserting an element in the List, Deleting an element, Other Operation & Applications, Reversing a Linked List, Concatenation of Two Lists, Representation of Polynomial, Circular Linked List & Operation, Doubly Linked List & Operation, Doubly Circular Linked List & Operation, Difference between an array and Linked list, Generalized Linked List, Header Linked List

Unit – III : **Tree** : Tree Terminology, Binary Tree, Binary Tree Representation, Binary Search Tree (BST), Creating a BST, Binary Search Tree Traversal, Preorder Traversal, Inorder Traversal, Postorder Traversal
Binary Threaded Tree : AVL tree, B tree, introduction to B tree, insertion in B tree, deletion from B tree, introduction to B+, B* tree, Expression Tree, Threaded Binary Tree

Unit – IV : **Graph** : Introduction, Graph Representation, Adjacency Matrix, Adjacency List, Graph Traversals, Depth First Search, Breadth First Search, Applications of Graph

Unit – V : **Searching and Sorting**
 Insertion Sorting , Selection Sorting , Bubble Sorting , Shell Sorting , Merge Sorting , Quick Sorting , Divide and Conquer Sorting, Radix sorting , Heap Sorting , Binary Tree Sort. Binary Search, Hashing and Rehashing , Extendible Hashing, Storage Management, Garbage Collection, Dynamic memory Management, Method to select free block, Freeing Memory, Boundary Tag Method, Buddy Systems

Text Books :

1. C & Data Structure Balagurusamy,
2. Data Structure through C in depth Shrivastava&Shrivastava ,
3. Data Structure through C Y.P. Kanetkar

Additional Reference Books :

1. Data Structure Seymour Liptsuz, Data Structure Tannebaum ,
2. Data structure and program design in c R.L.Kruse

Subject Title : Practical Based on MANC412
Subject Ref. No. : MANC455

No. of Credits	: 2
No. of Periods / Week	: 2
Internal	: 10
External	: 40

Assignments based on the concepts of data structure by using C++.

Subject Title : Advanced Web technology Using ASP.NET
Subject Ref. No. : MANC413

No. of Credits : 4

No. of Periods / Week : 4

Assignments / Sessional : 20

Semester Examination : 80

Course Objective : This course is intended for beginning Web developers who have knowledge of the Hypertext Markup Language (HTML) or dynamic HTML (DHTML), along with some knowledge of a scripting language, such as Visual Basic Scripting This course is also appropriate for Visual Basic 6.0 developers wanting to learn ASP.NET.

Pre Requisite : Before attending this course, students must have:
The ability to create HTML or DHTML, including:

- Tables
- Images
- Forms

Programming experience using Visual Basic .NET, including:

- Declaring variables
- Using loops
- Using conditional statements

Unit – I : Overview of the Microsoft .NET Framework, Using Microsoft Visual Studio .NET, Introduction to the .NET Framework, Overview of ASP.NET, Creating a Microsoft ASP.NET Web Form, Adding Code to a Microsoft ASP.NET Web Form Using Code-Behind Pages, Adding Event Procedures to Web Server Controls

Unit – II : Validating User Input Overview of User Input Validation, Using Validation Controls, Page Validation Creating User Controls Adding User Controls to an ASP.NET Web Form, Creating User Controls

Unit – III : Accessing Relational Data Using Microsoft Visual, Studio .NET Overview of ADO.NET, Creating a Connection to the Database, Displaying a DataSet in a List-Bound Control Accessing Data with Microsoft ADO.NET

Introduction to Using ADO.NET, Connecting to a Database, Accessing Data with DataSets, Using Multiple Tables, Accessing Data with DataReaders

Unit – IV : Calling Stored Procedures with Microsoft ADO.NET, Overview of Stored Procedures, Calling Stored Procedures, Reading and Writing XML Data Overview of XML Architecture in ASP.NET, XML and the DataSet Object, Working with XML Data, Using the XML Web Server Control

Unit – V : Securing a Microsoft ASP.NET Web Application,
Web Application Security Overview
Working with Windows-Based Authentication
Working with Forms-Based Authentication
Overview of Microsoft Passport Authentication

Text Books : 1. Programming ASP.NET By [Jesse Liberty, Dan Hurwitz](#), Publisher: O'Reilly Media
2. ASP. NET: a beginner's guide By [Dave Mercer](#),
Publisher [McGraw-Hill Companies](#)

Subject Title	: Practical Based on MANC413	No. of Credits	: 2
Subject Ref. No.	: MANC456	No. of Periods / Week	: 2
		Assignments / Sessional	: 10
		Semester Examination	: 40
Course Objective	: Hands on training course that will teach students how to create a simple ASP.NET application that delivers dynamic content to the web. The course is applicable for those using VB.NET with ASP.NET.		
Pre Requisite	: HTML and VB.net		
Assignment No.1	: Simple application using web controls A Finding factorial Value B Money Conversion C Quadratic Equation D Temperature Conversion E Login control		
Assignment No.2	: States of ASP.NET Pages		
Assignment No.3	: Adrotator Control		
Assignment No.4	: Calendar Control A Display messages in a calendar control B Display vacation in a calendar control C Selected day in a calendar control using style D Difference between two calendar dates		
Assignment No.5	: Treeview control A Treeview control and datalist B Treeview operations Validation controls		
Assignment No.6	: Query textbox and Displaying records		
Assignment No.7	: Display records by using database		
Assignment No.8	: Datalist link control		
Assignment No.9	: Databinding using dropdownlist control		
Assignment No.10	: Inserting record into a database		
Assignment No.11	: Deleting record into a database		
Assignment No.12	: Databinding using datalist control		
Assignment No.13	: Datalist control templates		
Assignment No.14	: Databinding using datagrid		
Assignment No.15	: Datagrid control template		
Assignment No.16	: Datagrid hyperlink		
Assignment No.17	: Datagrid button column		
Assignment No.18	: Datalist event		
Text Books	: Datagrid paging Creating own table format using datagrid		
	: 1. Programming ASP.NET By Jesse Liberty, Dan Hurwitz , Publisher: O'Reilly Media		
	: 2. Visual Basic .NET Programming Black Book By Steven Holzner Publisher: Dreamtech Press		
	: 3. ASP. NET: a beginner's guide By Dave Mercer , Publisher McGraw-Hill Companies		

Subject Title	: Project	No. of Credits	: 4
Subject Ref. No.	: MANC457	No. of Periods / Week	: 4
		Internal	: 10
		External	: 40

A Collaborative approach is taken in which all the students of MCA – I, II & III year are divided into several teams. Social requirement will be fulfilled by these teams using different technologies under the guidance of faculty or guide.

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