REGULATIONS SPECIFIC TO

M.C.A. PROGRAMME

IN

UNIVERSITY DEPARTMENT OF

MANAGEMENT SCIENCE

Dr. BabasahebAmbedkarMarathwada University, Aurangabad.

(With Effect from Academic Year 2016-17)

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 alphanumerical 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 in-charge of the respective course will keep the record of the students registered.

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

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

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:

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

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:

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

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 in to 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).

c) **Internal Evaluation –**

Internal Evaluation for the In-plant 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.

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 - 1	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
		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
	Core Course	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**

Open Elective Course: Group B

	Ref. No	Subject Title	Credit	No. of Hrs.	Exam Hrs.	Internal	End Sem	Total
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 Internal	Marks End Sem Exam	Total
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

	Ref. No	Subject Title	Credit	No. of Hrs.	Exam Hrs.	Internal	End Sem	Total
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 Internal	Marks End Sem Exam	Total
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

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 – Hawryszkiewycz
4. Software Engineering – Jawadekar
5. System Analysis & Design methods – Whiten, Bentley
6. System Analysis & Design – Elias Awad

7. Computer Security for Dummies

13

Subject Title	Mathematics - I		
Subject Ref. No.	MANC-403	**No. of Credits**	4
		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, tantology , 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 – Hesse diagram, Chains and antichains, Lattice , maximal and minimal elements , upper bound , lower bound , definitions Functions – definitions : Partial function , hashing functions , characteristic functions , floor functions , ceiling functions , subjective control , 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 , communicative , associative, commutative, identity , inverse, Semigroup , subsemigroupMonoid , submonoid group , abelian group , permutation group,multiplicatibeabelian 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 , bipartrite graph , complete bipartrite Isomorphism, complement of graph , connected graphs , paths-simple , elementary, circuit – simple , elementary Edge connectivity , vertex connectivity Eulesian path and eulesian circuit , planner graph – regions Euler's formula Trees : Definition – leaf , root , branch node , internal node, Rooted and binary trees , regular m-ary tree

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, Ray Leigh laplace, cauchy, marginal & conditional distributions For the above discrete distribution definition of r.v and derivation of its p.m.f. is expected. For the continuous distributions p.d.f. should be defined. 6 Special properties of the distribution (if any)should be tested.

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
1. Swapan Kumar Sarkar, "A text book of Discrete Mathematics", S. Chand Publication
2. Discrete Mathematical Structures for Computer S 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 :
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. , ElhanceVeena , Agrawal B.M. Fundamentals of Statistics 2012

Subject Title
Subject Ref. No.   : MANC405

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

Syllabus will be provided by the authorities.

Subject Title   Research Methodology
Subject Ref. No.   MANC406

No. of Credits	:	2
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   NA.

Unit – I   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, Appalyersivakumar and M. Mathirajan.
Management Research by Andrews, F.M. and S.B. WitheySocial Indicators of Well Being. Plenum Press. NY. Bennet. Roger
Survey Methods by Fowler. Floyd J.Jr..
Exploring Research by Salkind. Neil J..

Reference Books

2. Let us C Solutions : Y.P. Kanetkar, 3. Spirit Of "C" : MoolishKooper.
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 : Students will be in a position to write program using C & C++.

Content : 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.

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 . Serializibility, 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 :
1. Database system concept Korth
2. Fundamentals of Database SysemsElmasriNavathe
3. Database Management Systems Bipin Desai

Additional Reference Books :
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

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 that 1000 amt.
16. Display names & cities of all salespeople in 'Pune' with a commission above10.
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 characteris '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 customersnames begin with a letter A to G.
22. Assume each salesperson has a 12% commission on order amt. Displayorderno, 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 indescending 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 acustomer with a rating above 100.
5. Display the pairs of salespeople who are living in the same city. Excludecombinations of sales people with themselves as well as duplicate rowswith 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 haveabove average orders.
3. Write a query that selects the total amt in orders for each salesperson forwhom this total is greater than the amount of the largest order in table.

23

Subject Title	:	Mathematics-II			
Subject Ref. No.	:	MANC410	No. of Credits	:	4
			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	:	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, Budy 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	:	Practical Based on MANC413			
Subject Ref. No.	:	MANC456	**No. of Credits**	:	2
			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

Assignment No.6 Validation controls
Assignment No.7 Query textbox and Displaying records
Assignment No.8 Display records by using database
Assignment No.9 Datalist link control
Assignment No.10 Databinding using dropdownlist control
Assignment No.11 Inserting record into a database
Assignment No.12 Deleting record into a database
Assignment No.13 Databinding using datalist control
Assignment No.14 Datalist control templates
Assignment No.15 Databinding using datagrid
Assignment No.16 Datagrid control template
Datagrid hyperlink
Assignment No.17 Datagrid button column
Datalist event
Assignment No.18 : Datagrid paging
Creating own table format using datagrid

Text Books :
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			
Subject Ref. No.	:	MANC457	**No. of Credits**	:	4
			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.