REGULATIONS SPECIFIC TO

INTEGRATED B.C.A. - M.C.A. PROGRAM

Department of Management Science

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

(With Effect from Academic Year 2019-20)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

INTEGRATED BCA-MCA PROGRAM

(Choice Based Credit & Grade System)

Integrated B.C.A.- M.C.A is a dual degree program which 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 Integrated 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 Integrated Bachelor of Computer Applications - Master of Computer Application (BCA-MCA) should have passed 10+2 (HSC or Equivalent) Standard Examination and Obtained at least 50% marks (45% in case of a candidate belonging to reserved category).

AND

Passed the CET conducted by Department of Management Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad with nonzero score for only that year.

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

2. Duration

Duration of the Integrated BCA- MCA PROGRAM shall be5 years/10 semesters. The entire period of the tenth semester shall be devote for the Industry Internship Project.

3. Admission/Promotion Criteria

If candidate get selected for Integrated BCA-MCA Program through University Admission Process, he/she have to apply on the application form of the University Department provided with the prospectus. Once the candidate is admitted to the Integrated BCA-MCA Program, he/she will be promoted to next semester with full carryon (till Sixth Semester only) to obtain BCA degree. Further, to get admission for MCA program candidate must have successfully secured the required credits without backlog. Once the candidate is admitted to the MCA after successful completion of BCA, he/she will be promoted to next semester with full carryon. (The registration of candidate in every successive semester is mandatory in BCA and MCA) However, Admission through lateral entry to MCA at any stage is not allowed.

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 Integrated BCA-MCA course from the date of first registration at Institute. The admission of concern candidate will automatically get cancelled if he/she fails to complete the course in maximum period.

4. Credits and Degrees

i. A candidate who has successfully completed all the Foundation, Core, Elective courses, Summer Internship, Mini-Major Project Work as prescribed for the Integrated BCA-MCA Program 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 Integrated BCA-MCA PROGRAM 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 U.G.-P.G. PROGRAM must successfully complete to receive the degree.

iii. Elective Course: Elective courses identified and offered by the University. 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.

iv. Service Course: There shall be one/two service courses. The service courses will be offered in Ninth and/or Tenth semesters only.

v. 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.

vi. Each course shall have a unique alphanumerical code.

For eg.

MANI401 Computer Organization

Here,	**MAN**	means Management Science	**C**	means MCA course	**401**	means Subject Code

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 Director/ 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 – IX or Semester – X. Student will be allowed to appear for only one service course in either of the semesters.

ii. The student will register the service course of his interest after the start of semester in the respective institute on official registration form. The faculty in-charge of the respective course will keep the record of the students registered.

iii. No student shall be permitted to register for more than one service course in semester.

iv. The Department 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 Department Website.

v. The Student shall have to pay the prescribed fee per course per semester/year for the registration as decided by the University.

7. Grievance Redressal Scheme

University will provide the separate guidelines for Grievance Redressal Scheme.

8. 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	*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.

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.

9. 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 perforMANIe 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.

10. Evaluation Scheme

Theory course of 100 Marks will be divided in to Internal Examination (Sessional) of 40 Marks and Semester End Examination of 60 Marks **except Papers with Full Internal Assessment**.

Theory course of 50 marks will be divided in to internal Examination of 20 marks and semester end examination of 30 marks. (20+30=50).

Each Practical Course will be of 50 Marks (Internal + External) = (20 + 30=50).

Mini Project Work from Sem – IV, V, IX will be Internal 50 marks

Project Work from Sem – VI, and VIII will be 100 marks (Internal + External) = (40+60=100).

As well as Summer Internship from Sem – VII will be of Internal 50 marks.

Major Project in the Sem –X will be of 500 marks (Internal + External) = (200+300=500).

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 40/20 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 University.

- The Semester End Examination theory question paper of 60 marks will have two parts **(10 + 50 = 60)**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 (10 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.
- The Semester End Examination theory question paper of 30 marks will have two parts **(05 + 25 = 30)**Marks

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 20 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 30 Marks.

c) For Summer Internship–

i. At the end of Sixth semester, all students will have to undergo Summer Internship (MANI453) of 6-8 weeks with industry/business/service organization/govt. organization/institutes. The condition of successfully completing the Summer Internship shall not be deemed to have been satisfied unless a student undergoes summer training under the supervision of the faculty in organization. The student may undergo for a certification course as a part of Summer Internship. Each student will be required to submit the Summer Internship report to the faculty for the work undertaken during this period within three weeks of the commencement of the Seventh semester respectively for the purpose of evaluation in the Seventh semester respectively.

ii. Internal Evaluation –

Internal Evaluation for the Summer Internship will be evaluated by the respective faculty/ guide depending upon presentation/review/performance during project/ report writing/field work/seminars etc. Internal evaluation for the Summer Internship will be considered for 40% Marks.

iii. External Evaluation Scheme

Student has to present seminar/viva-voce/ demonstration of project in front of External Examiner. External evaluation for the Summer Internship will be considered for 60% Marks.

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 40% 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 60% Marks.

e) Tenth 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 Director/H.O.D. of the Department. The University 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.

11. Exit Regulations

i. The students are permitted to exercise Exit Option any time after successful completion of required 152 credits for BCA program in min 3 years / 6 semesters or max 6 years / 12 semesters from the date of admission.

ii. The student must give a written declaration to avail the Exit Option. The format of declaration form is enclosed.

iii. It is proposed to award "BCA" degree only on successful completion of min 3 years/ max 6 years with required credits and “MCA” degree on successful completion of following 2 years (min)/ 4 years (max) with required credits.

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:

i. Title of the courses along with code taken by the student.
ii. The credits associated with and grades awarded for each course.
iii. The number of grade and grade point secured by the student.
iv. The total credits earned by the student in that semester.
v. The SGPA of the student.
vi. The total credits earned by the student till that semester.
vii. The CGPA of the student (At the end of the VIth semester for 3 Years and Xth Semester for 5 Years).

Cumulative Grade Card

The grade card issued on completion of the PROGRAM shall contain the name of the PROGRAM, the Institute offered the PROGRAM, 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. Transcript Certificates and degrees will be provided to all admitted students on successful completion of 3 years/6 semesters for BCA and 5 years/10 semesters for MCA.

14. 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.

Integrated BCA-MCA Program Structure

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Min Assessment/ Tutorial	Exam Hrs	Marks		Total
							Internal	End Sem Exam	
BCA- I	Generic Foundation Course	IC0001	Constitution of India	2	30	1.5	20	30	50
		MANI101	Fundamentals of Computer	4	60 – 05	3	40	60	100
		MANI102	Mathematics – I	4	60 – 05	3	40	60	100
		MANI103	Basics of Web Technology	4	60 – 05	3	40	60	100
		MANI104	Fundamentals of C Programming	4	60 – 05	3	40	60	100
	Skill Based Foundation Course	MANI105	Human Values & Life Skills	2	30	1.5	50	--	50
	Core Course	MANI151	Practical Based on BWT	2	30	1.5	20	30	50
		MANI152	Practical Based on C Programming	2	30	1.5	20	30	50
			Total	**24**	**360**	**--**	**270**	**330**	**600**

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Min Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
BCA- II	Generic Foundation Course	MANI106	Digital Electronics	4	60 – 05	3	40	60	100
		MANI107	ISADM	4	60 – 05	3	40	60	100
		MANI108	Basics of DBMS	4	60 – 05	3	40	60	100
		MANI109	Advanced C Programming	4	60 – 05	3	40	60	100
	Skill Based Foundation Course	MANI110	Yoga and Meditation	2	30	1.5	50	--	50
		MANI111	Communication Skills – I	2	30	1.5	50	--	50
	Core Course	MANI153	Practical Based on Basics of DBMS	2	30	1.5	20	30	50
		MANI154	Practical Based on Advanced C Programming	2	30	1.5	20	30	50
			Total	**24**	**360**	**--**	**300**	**300**	**600**

Note: The Program is dynamic in nature, hence the courses mentioned in the program are subject to changes due to evolving requirements from the industry.

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Min Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
BCA- III	Core Course	MANI201	Basics of Networking	4	60 – 05	3	40	60	100
		MANI202	Management Practices & Organizational Behavior	2	30	1.5	20	30	50
		MANI203	Mathematics – II	4	60 – 05	3	40	60	100
		MANI204	OOPS with C++	4	60 – 05	3	40	60	100
		MANI205	JavaScript, AJAX & JQuery	4	60 – 05	3	40	60	100
		MANI206	Social Networking	2	30	1.5	50	--	50
		MANI251	Practical Based on JS, AJAX, JQuery	2	30	1.5	20	30	50
		MANI252	Practical Based on OOPS with C++	2	30	1.5	20	30	50
			Total	**24**	**360**	**--**	**270**	**330**	**600**

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Min Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
BCA- IV	Skill Based Foundation Course	MANI207	Communication Skill – II	2	30	1.5	50	--	50
	Core Course	MANI208	Software Engineering	4	60 – 05	3	40	60	100
		MANI209	Operating System Concepts	4	60 – 05	3	40	60	100
		MANI210	DBMS with Oracle	4	60 – 05	3	40	60	100
		MANI211	Data Structure using C++	4	60 – 05	3	40	60	100
		MANI253	Practical Based on DBMS with Oracle	2	30	1.5	20	30	50
		MANI254	Practical Based on Data Structure using C++	2	30	1.5	20	30	50
		MANI255	Mini Project	2	30	1.5	50	--	50
			Total	**24**	**360**		**300**	**300**	**600**

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Min Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Interna	End Sem Exam	
BCA- V	Skill Based Foundation Course	MANI301	Quantitative Aptitude	2	30	1.5	50	--	50
		MANI302	Entrepreneurship Development	2	30	1.5	20	30	50
	Core Course	MANI303	Core Java	4	60 – 05	3	40	60	100
		MANI304	Software Testing	4	60 – 05	3	40	60	100
		MANI305	Design and Analysis of Algorithms	4	60 – 05	3	40	60	100
		MANI306	Angular JavaScript & XML	4	60 – 05	3	40	60	100
		MANI351	Practical Based on Core Java	2	30	1.5	20	30	50
		MANI352	Practical Based on DAA	2	30	1.5	20	30	50
		MANI353	Practical Based on Angular JS and XML	2	30	1.5	20	30	50
		MANI354	Mini Project	2	30	--	50	--	50
			Total	**28**	**420**	**--**	**340**	**360**	**700**

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Min Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Interna	End Sem Exam	
BCA- VI	Skill Based Foundation Course	MANI307	Resume Writing & Interview Techniques	2	30	1.5	50	--	50
	Core Course	MANI308	Linux Administration & Server Configuration	4	60 – 05	3	40	60	100
		MANI309	Web Programming Using PHP	4	60 – 05	3	40	60	100
		MANI310	ASP.NET	4	60 – 05	3	40	60	100
		MANI355	Practical Based on LASC	2	30	1.5	20	30	50
		MANI356	Practical Based on PHP	2	30	1.5	20	30	50
		MANI357	Practical Based on ASP.NET	2	30	1.5	20	30	50
		MANI358	Major Project	4	60	--	40	60	100
	pen Elective ourse	MANI32X	Group A	4	60 – 05	3	40	60	100
			Total	**28**	**420**		**310**	**390**	**700**

Open Elective Course: Group A

Elective Course	MANI321	Cyber Security	4	60 – 05	3	40	60	100
	MANI322	Artificial Intelligence						
	MANI323	nterprise Resource Mgt						

(FOR BCA Degree Only) Credits Total

Credit	No. of Hrs	Exam	Marks		Total Marks
			Internal	End Sem Exam	
152	**2280**	**--**	**1790**	**2010**	**3800**

Sem.	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem./Min Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem. Exam	
MCA- I	Generic Foundation Course	MANI401	Research Methodology	4	60 – 05	3	40	60	100
	Core Course	MANI402	Software Project Management	4	60 – 05	3	40	60	100
		MANI403	Object Oriented Analysis and Design	4	60 – 05	3	40	60	100
		MANI404	Basics of Android	4	60 – 05	3	40	60	100
		MANI451	Practical Based on OOAD	2	30	1.5	20	30	50
		MANI452	Practical Based on Basics of Android	2	30	1.5	20	30	50
		MANI457	Summer Internship	2	30	1.5	50	--	50
	Open Elective Course	MANI42X	Group B	4	60 – 05	3	40	60	100
		MANI45X	Practical Based on Group I	2	30	1.5	20	30	50
			Total	**28**	**420**	**--**	**310**	**390**	**700**

Open Elective Course: Group B

Elective Course	MANI421	Advanced Java	4	60 – 05	3	40	60	100
	MANI453	Practical Based on Advanced Java	2	30	1.5	20	30	50
	MANI422	C Sharp	4	60 – 05	3	40	60	100
	MANI454	Practical Based on C Sharp	2	30	1.5	20	30	50
	MANI423	Programming with Arduino	4	60 – 05	3	40	60	100
	MANI455	Practical Based on Arduino	2	30	1.5	20	30	50
	MANI424	PHP Framework (Laravel & Codeigniter)	4	60 – 05	3	40	60	100
	MANI456	Practical Based on PHP Framework (Laravel & Codeigniter)	2	30	1.5	20	30	50

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Min Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
MCA- II	Core Course	MANI405	Operation Research	4	60 – 05	3	40	60	100
		MANI406	Advanced DBMS	4	60 – 05	3	40	60	100
		MANI407	Advanced Data Communication and Networks	4	60 – 05	3	40	60	100
		MANI408	Xamarin Framework	2	30	1.5	20	30	50
		MANI458	Practical Based on ADBMS	2	30	1.5	20	30	50
		MANI459	Practical Based on ADCN	2	30	1.5	20	30	50
		MANI464	Major Project	4	60	--	40	60	100
	Open Elective Course	MANI42X	Group C	4	60 – 05	3	40	60	100
		MANI45X	Practical Based on Group C	2	30	1.5	20	30	50
			Total	**28**	**420**		**280**	**420**	**700**

Open Elective Course: Group C

Elective Course	MANI425	Java Server Pages	4	60 – 05	3	40	60	100
	MANI460	Practical Based on Java Server Pages	2	30	1.5	20	30	50
	MANI426	MVC with C#	4	60 – 05	3	40	60	100
	MANI461	Practical Based on MVC with C#	2	30	1.5	20	30	50
	MANI427	Advanced Testing	4	60 – 05	3	40	60	100
	MANI462	Practical Based on Advanced Testing	2	30	1.5	20	30	50
	MANI428	IOT with Raspberry PI	4	60 – 05	3	40	60	100
	MANI463	Practical Based on IOT with Raspberry PI	2	30	1.5	20	30	50

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs. per Sem/Min Assessment/ Tutorial	Exam Hrs.	Marks		Total
							Internal	End Sem Exam	
MCA- III	Skill Based Foundation Course	MANI501	Digital Marketing	4	60 – 05	3	40	60	100
	Core Course	MANI502	Ethical Hacking	4	60 – 05	3	40	60	100
		MANI503	Python Programming	4	60 – 05	3	40	60	100
		MANI504	Cloud Computing	4	60 – 05	3	40	60	100
		MANI551	Practical Based on Digital Marketing	2	30	1.5	20	30	50
		MANI552	Practical Based on Python Programming	2	30	1.5	20	30	50
		MANI556	Mini Project	2	30	1.5	50	--	50
	Open Elective Course	MANI52X	Group D	4	60 – 05	3	40	60	100
		MANI55X	Practical Based on Group I	2	30	1.5	20	30	50
			Total	**28**	**420**		**310**	**390**	**700**

Open Elective Course: Group D

Elective Course	MANI521	Spring & Hibernate	4	60 – 05	3	40	60	100
	MANI553	Practical Based on Spring & Hibernate	2	30	1.5	20	30	50
	MANI522	Selenium	4	60 – 05	3	30	60	100
	MANI554	Practical Based on Selenium	2	30	1.5	20	30	50
	MANI523	I-OS Apps Development	4	60 – 05	3	40	60	100
	MANI555	Practical Based on I-OS Apps Development	2	30	1.5	20	30	50

Sem	Course	Ref. No	Subject Title	Credit	No. of Hrs	Exam Hrs.	Marks		Total
							Internal	End	
MCA- IV	Core Course	MANI557	**Major Project**	20	300	--	200	300	500

						Marks		Total Mark
			Credit	No. of Hrs	Exam	Internal	End Sem Exam	
		Course Total	**104**	**1560**	**--**	**1100**	**1500**	**2600**
		One Service Course	**4**	**60**	**--**	**20**	**80**	**100**
		(FOR MCA Degree) Credits Total	**108**	**1620**		**1120**	**1580**	**2700**

PROGRAM OUTCOMES (POs)

Integrated BCA MCA graduates will be able to:

PO -1	**Domain Knowledge:** Apply the knowledge of software design & development, Testing and IT specialization for the solution of applications, IT and societal problems.
PO -2	**Problem Analysis:** Identify, formulate, research literature and analyze complex technological problems reaching substantiated conclusions using computer science, networking, and mathematics.
PO -3	**Conduct investigations of Complex Problems :** Design and conduct scientific & technological research and to analyze and interpret the resulting data.
PO -4	**Modern Tool Usage :** Use the techniques, skills & modern IT tools for technological practice.
PO -5	**The engineer and Society:** Understand ethical & professional engineering in the context of global, economic, environmental & societal realities as well as other contemporary issues
PO -6	**Environment and Sustainability:** Understand the impact of technological solution in societal & environmental contexts & demonstrate the knowledge of, and need for sustainable development.
PO -7	**Ethics:** Develop practical solution for technological problems under professional and ethical constraints.
PO -8	**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO -9	**Communication:** Communicate effectively on complex technical activities with the engineering community and with the society at large, such as, being able to comprehend & write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO -10	**Life-Long Learning:** Recognize the need for and have the ability to engage in, perpetual learning by working on projects for which they have no prior experience.

Program Educational Objectives (PEOs)

The objectives of Integrated BCA MCA program are to produce graduate who:

PEO - 1	Have a strong foundation in software design & development with an ability to solve important problems in a modern technological society as valuable, productive software engineer, Tester, consultant.
PEO - 2	Have a broad background to practice computer application in the areas of software engineering, networking, s/w Testing, Artificial intelligence, data mining in industry and government settings meeting the growing expectations of stake holders.
PEO - 3	Have an ability to pursue higher studies and succeed in academic and research careers.
PEO - 4	Have the ability to function and communicate effectively, both individually and within multidisciplinary teams using modern tools.
PEO - 5	Recognize the need for and possess the ability to engage in life-long learning.
PEO - 6	Will be sensitive to the consequences of their work, both ethically and professionally, for productive professional careers.

Program Articulation Matrix -

Only for core courses

Sr. no	Sem	Course	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
1	I	MANI101										
2		MANI102										
3		MANI103										
4		MANI104										
5		MANI105										
6		MANI151										
7		MANI152										
8	II	MANI106										
9		MANI107										
10		MANI108										
11		MANI109										
12		MANI110										
13		MANI111										
14		MANI153										
15		MANI154										

Semester - I

Subject Title		**Constitution of India**			
Subject Ref. No.		**IC001**	**No. of Credits**		2
			No. of Periods / Week		2
			Assignments / Sessional		20
			Semester Examination		30
Syllabus Will be provided by university.					

Subject Title		**Fundamentals of Computer**			
Subject Ref. No.		**MANI101**	**No. of Credits**		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	understand the fundamental hardware components that make up a computer's hardware and the role of each of these components
CO-2	understand the difference between an operating system and an application program, and what each is used for in a computer
CO-3	describe some examples of computers and state the effect that the use of computer technology has had on some common products

Mapping of Course Outcomes (COs) with Program Outcomes (POs)
(Course Articulation Matrix)

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1										
CO-2										
CO-3										
AVG										

Prerequisites	--
Unit I	**Computer Fundamentals:** Generations of Computers, Characteristics & Classification of computers, Limitations of Computers, Human-Being VS Computer.
Unit II	**Overview of operating system:** Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.
Unit III	**Computer hardware & software:** I/O devices, definition of software, relationship between hardware and software, types of software. **Computer Virus:** Definition, types of viruses, Characteristics of viruses, anti- virus software.
Unit IV	**Memory:** Concept of primary & secondary memory, RAM, ROM, types of ROM, Cache Memory, flash memory, Secondary storage devices: Sequential & direct access devices viz. magnetic tape, magnetic disk, optical disks i.e. CD, DVD, virtual memory.
Unit V	Variety of Computer Applications
Text Books	Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi. Chhillar, Rajender Singh: Application of IT to Business, Ramesh Publishers, Jaipur.

Subject Title		**Mathematics – I**			
Subject Ref. No.		**MANI102**	**No. of Credits**		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand a working knowledge of Mathematics and its use in Computer Applications.
CO-2	To help the students to develop an intuition and an interest for random phenomena and to introduce both theoretical issues and applications that is useful in Software Development.

Mapping of Course Outcomes (COs) with Program Outcomes (POs)
(Course Articulation Matrix)

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1										
CO-2										
AVG										

Prerequisites	--
Unit I	**Matrices**: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication, and Multiplication of Matrices, Adjoint, Inverse, solving system of linear equation Cramer's Rule.
Unit II	**Set Theory – I** **Basic Definitions:** Set, Finite set, Infinite set, Singleton Set, Empty set, Subset, Proper Subset, Universal set, Power set, Venn diagram. **Combinations of Sets:** Union of sets, Intersection of Sets, Complement of a set, Equality of two sets, Disjoint sets, Difference of two sets, Symmetric Difference, Cartesian Product; explanation of each using Venn-diagram and simple examples.
Unit III	**Set Theory – II** **Rules of Set Theory.** **Algebraic Properties of Set Operations:** Statement and proof of Commutative Laws, Associative Laws, Distributive Laws, Idempotent Laws, Properties of Compliment, Properties of Universal set, Properties of Empty set, Principal of Inclusion and Exclusion
Unit IV	**Relation and Function:** **Introduction**: Binary Relation, Tabular Form, Graphical Form, Ternary Relation, Quaternary Relation. **Properties of Binary Relations**: Reflexive Relation, Symmetric Relation, Antisymmetric Relation, Transitive Relation, Transitive Closure.
Unit V	**Limits & Continuity:** Limit at a Point, Properties of Limit, Computation of Limits

	of Various Types of Functions, Continuity of a function at a Point, Continuity Over an Interval, Sum, product and quotient of continuous functions, Intermediate Value Theorem, Type of Discontinuities.
Text Books	1. C.L.Liu: Elements of Discrete Mathematics, McGraw Hill. 2. Babu Ram: Discrete Mathematics, Vinayek Publishers, New Delhi.
Reference Books	1. Kenneth H. Rosen: Discrete Mathematics and its applications, TMH. 2. Doerr Alan & Levasseur Kenneth: Applied Discrete Structures for Computer Science, Galgotia Pub. Pvt. Ltd. 3. Gersting: Mathematical Structure for Computer Science, WH Freeman & Macmillan.

Subject Title		**Basics of Web Technology**		
Subject Ref. No.		**MANC103**	**No. of Credits**	4
			No. of Periods / Week	4
			Assignments / Sessional	40
			Semester Examination	60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Implement different HTML tags.
CO-2	Design WebPages using basic HTML tags & forms.
CO-3	Apply different CSS to WebPages.

Unit I	**Internet Basics** -Introduction to Internet, Internet Services, WWW, Working of Internet, Internet Connection Concepts, Introduction to Internet, Concepts, Web page: static, Dynamic, Active. Scripting languages: Server side, Client Side. Web site development Phases, Web: Designing, Development and Publishing, HTTP, URL registration, browsers, search engines, Web server, Proxy servers.
Unit II	**HTML Basics** Introduction To HTML, 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.
Unit III	**HTML & Form Handling** Frame, Form Introduction with text box, text area, buttons, List box, radio, checkbox, HTML input attributes, methods, Unicode Transformation Format (UTF), linking webpages.
Unit IV	**HTML 5** Introduction , form elements – date, dateTime, email, number, range, tel, color, URL, datetimelocal, month , week, time, placeholder attribute, autofocus attribute, required attributes HTML audio , video
Unit V	**CSS** Introduction To Style sheet, types of style sheets- Inline, External, Embedded CSS, text formatting properties, CSS Border, margin properties, Positioning Use of classes in CSS, color properties, use of &

Text Books	• HTML, DHTML, JavaScript, Perl & CGI Ivan Bayross • HTML & CSS : The Complete reference, Fifth Edition By Thomas Powell
Reference books	• Html, Xhtml, And Css Bible (English) 5th Edition (paperback) by Schafer, Steven • HEAD FIRST HTML AND CSS, 2/ED (UPDATED FOR HTML) by ROBSON • Beginning HTML and CSS (English) (Paperback) by Rob Larsen • Learn to Code HTML and CSS (English) (Paperback) by Howe • Head First HTML5 Programming by Elisabeth Freeman and Eric Freeman
Web references	1. www.w3school.com 2. www.tutorialpoint.com

Subject Title		**Fundamental of C Programming**		
Subject Ref. No.		**MANI104**	**No. of Credits**	4
			No. of Periods / Week	4
			Assignments / Sessional	20
			Semester Examination	80

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand the concept of programming
CO-2	Inscribe Algorithm & Draw Flowchart.
CO-3	Learn and develop logic for programming skill using C language
CO-4	Enhance the knowledge of basic flow of control using conditional and iterative statements
CO-5	Learn the concept of an Array with its implementation
CO-6	Exercise user defined data types using structure & union

Prerequisites	**:** Basics of Computer Fundamentals& OperatingSystem.
Unit I	History and Features of C , Importance of C , , About Procedural Language , Role of Compiler , Role of Interpreter , C is middle-level Language, C is a Structured Language, Complier Vs Interpreters, The Structure of a C Program , Writing C Programs , Building an Executable Version of a C Program , Debugging a C Program , ,Examining and Running a C Application Program, The Form of a C Program, Library & Linking, Compilation & Execution of C.
Unit II	**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, Precedence & Associatively of Operators. **Console I/O** Introduction, Character input & Output, String Input & Output, Formatted Input/Output (scanf/printf). Simple programs using scanf&printf
Unit III	**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
Unit IV	**Storage Class & Scope :** Meaning of Terms, Scope - Block scope & file scope, Storage Classes,Automatic Storage, Extern Storage, Static, Storage, Register Storage,

	Array & String : Single Dimension Arrays , Accessing array elements, Initializing an array, Multidimensional Arrays, Initializing the arrays, Memory Representation Accessing array elements,
Unit V	**Structure & Union:** Structures Declaration and Initializing Structure, Accessing Structure members, Structure Assignments, Arrays of Structure
Text Book	1. C : The Complete Reference : Herbert Schildt , 2. OOPs Using C++ : Balgurusamy, 3. Graphics under C : YashwantKanetkar , 4. Let us C : YashwantKanetkar 5. Let us C++ : YashwantKanetkar **Additional** 6. Programming with C : Bryon Gottfried, **7.** Graphics Under C : Y. Kanetkar
Reference Books	8. Let us C Solutions : Y.P. Kanetkar, 3. Spirit Of "C" : MoolishKooper. 9. The Complete Reference C++ by Herbert Schildt 10. C++ and Active learning approach by Randal Albert, Todd Bredlove 11. Advanced C primal ++ by Stephen prata
URL	https://fresh2refresh.com/c-programming/c-pointer/

Subject Title		Human values and life skills			
Subject Ref. No.		MANI105	No. of Credits		2
			No of Lectures/Week		2
			Assignments/Sessional		20
			Semester End Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	To create an awareness on professional ethics and Human Values
CO-2	To appreciate the rights of others
CO-3	To learn importance of life skills

Mapping of Course Outcomes (COs) with Program Outcomes (POs)
(Course Articulation Matrix)

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1										
CO-2										
CO-3										
AVG										

Prerequisites	--
Unit I	**Human Values:** Morals, Values, Integrity, ethics, work ethics, caring, sharing, honesty, empathy, challenges in the work place
Unit II	**Professional Ethics:** Profession, responsibility, variety of moral issues, IPR
Unit III	**Life Skills:** How to say No, How to accept rejection, How to ask for Help
Text Books	a) A textbook on Professional ethics and human values, R.S. Naagarazan, New Age International Publishers b) 10 Life Skills Never Taught But Totally Essential to Happy Living, Melanie Bates

Subject Title		Practical Based on BWT			
Subject Ref. No.		MANC151	No. of Credits		2
			No. of Periods / Week		2
			Assignments / Sessional		20
			Semester Examination		30
Assignment Based on HTML,HTML5, CSS, Form Handling will be covered.					

Subject Title		Practical Based on MANC407			
Subject Ref. No.		MANI152	No. of Credits		2
			No. of Periods / Week		2
			Assignments / Sessional		20
			Semester Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write, compile, and execute the programs in Cusing appropriate predefined functions in C+.
CO-2	Analysis problem, design , debug & Test code using C programming
CO-3	Develop various programs using various operators & predefined functions
CO-4	Implement the loops and decision making statements to solve the problem.
CO-5	Implement array concept using C programming.
CO-6	Design programs in C using Structure and Union

Prerequisites	**:**	Basics of Computer Fundamentals, OS and C programming.
		Programs using C Language
	1.	WAP to print int, float character and string data using specifies.
	2.	WAP perform arithmetic operations on int, float data.
	3.	WAP to perform all operators' i.e. arithmetic operator, relational operator, conditional operator, logical operator, ternary operator & Bit-wise operators.
	4.	WAP to find greater among three numbers using if-else & nested if statement.
	5.	WAP to find greater among four numbers using if-else & nested if statement.
	6.	WAP to find greater among five numbers using if-else & nested if statement.
	7.	WAP to find the grade of the students using if-else ladder
	8.	WAP to find factorial using while, do-while, for statements
	9.	WAP to print sum of first 10 numbers using while, do-while, for statements
	10.	WAP to print even & odd numbers from 1 to N using while, do-while, for statements

	11.	WAP to demonstrate application of switch statement. Arithmetic operation using operator
	12.	WAP to print different output pattern using while, do-while & for statement
	13.	WAP to demonstrate the real application of goto, break, continues & exit keywords
	14.	WAP to create single dimension array
	15.	WAP to create double dimension array
	16.	WAP to add two arrays
	17.	WAP to transpose the matrix
	18.	WAP to create a nested structure and access its member using object
	19.	WAP to create a union and access its member using object
	20.	WAP to create a structure & access it as an array of the object

Semester - II

Subject Title		**Digital Electronics**			
Subject Ref. No.		**MANI106**	**No. of Credits**		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	basic concepts of digital logic
CO-2	design of basic logic circuits using commonly used combinational and sequential circuits

Mapping of Course Outcomes (COs) with Program Outcomes (POs)
(Course Articulation Matrix)

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1										
CO-2										
AVG										

Prerequisites	--
Unit I	**Number Systems and Arithmetic:** Decimal Number System & Binary Number System, Decimal to Binary conversion, Binary to Decimal Conversion, Binary Arithmetic : Binary addition, subtraction, Hexadecimal number system, Hexadecimal to Binary, Binary to Hexadecimal, Hexadecimal to Decimal Conversion, 1' complement, 2's complement method
Unit II	**Boolean Algebra and Logic Gates:** Postulates of Boolean Algebra, Theorems of Boolean Algebra: Complementation, Commutative, AND, OR, Associative, Distributive, Absorption laws , De Morgan's theorems, Reducing Boolean expressions Logic Gates : AND, OR, NOT, Ex-OR, Ex-NOR NAND
Unit III	**Minimization Techniques:**Introduction , Minterms and Maxterms, K-Map, K-map for 2 variables, K-map for 3 variables, K-map for 4 variables
Unit IV	**Combinational and Arithmetic Logic Circuits**: Half Adder & Full Adder, Half Subtractor, Full Subtractor, Multiplexer, De-multiplexer
Unit V	**Flip Flops**: Introduction : RS FF, Clocked RS FF, D FF, Triggering, preset and clear JK FF
Text Books	1. Digital Electronics and Micro-Computers – R.K.Gaur , Dhanpat Rai Publication 2. Modern Digital Electronics – R. P. Jain McGraw HIll Publications 3. Digital Electronics and Logic Design – N.G.Palan, Technova Publication

Subject Title	**Information System Analysis And Design Methodologies**			
Subject Ref. No.	**MANI107**	**No. of Credits**	**:**	4
		No. of Periods / Week	**:**	4
		Assignments / Sessional	**:**	40
		Semester Examination	**:**	60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Describe basics concepts of related with software.
CO-2	Write the SDLC
CO-3	Understand different models of software development.
CO-4	Design the SRS for software.

Objective :	The objective of the course is to familiarize the participants with the Information System Analysis and design.
Prerequisite :	The students should have basic knowledge of Information, software.
Unit –I	**Introduction :** Introduction of software , types of software – system software, application software, utility software, open source software, their features , uses in different domains, software licensing, types of licenses
Unit –II	**Software Development –** Software development life cycle, phases of SDLC , Role & Skills of system Analyst.
Unit –III	**Models**: 1) Waterfall 2) Prototyping 3) Spiral (including WIN-WIN Spiral) 4) RAD 5) Group Based Approach: JAD 6) Object Oriented methodology
Unit –IV	**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 –V	**Evaluation :** 1) Feasibility Study : economical, operational, social, technical 2) Evaluating Proposed Solution 3) Developing a System proposal 4) Software Acquisition
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
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

Subject Title		Basics of DBMS			
Subject Ref. No.		MANI108	No. of Credits		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand and Describe basic concepts of Database Systems
CO-2	Understand concept of transaction and its importance in DBMS
CO-3	Map concepts of transactions, deadlock and locking techniques with examples
CO-4	Create tables and use them to store data efficiently.
CO-5	Execute commands to retrieve data with and without conditions.

Mapping of Course Outcomes (COs) with Program Outcomes (POs)
(Course Articulation Matrix)

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1										
CO-2										
CO-3										
CO-4										
CO-5										
AVG										

Prerequisites	--
Unit I	**Introduction** - Data, Tables, DBMS, Characteristics of DBMS, need of DBMS, attributes, entity, E-R Diagrams, relationships, ODBMS, Two tier and three tier architecture, Client, Server
Unit II	**Transactions** -Concept of transaction, ACID properties, Transaction and system concepts, States of transaction, Serializibility, backup and recovery
Unit III	**Concurrency** - Concurrent transactions, Two –phase locking techniques, Concurrency control, Locking techniques, E-R Diagram, Deadlock
Unit IV	Tables – Create table command, altering structure of a table, entering data, primary key and foreign key
Unit V	Accessing data stored in DBMS, queries , store, access and retrieve data, Introduction to RDBMS concepts

Text Books	1. Database system concept Korth 2. Fundamentals of Database SysemsElmasriNavathe 3. Database Management Systems Bipin Desai 4. Relational Databases and Microsoft Access, Ron McFadyen

Subject Title		**Advanced C Programming**		
Subject Ref. No.		**MANI109**	**No. of Credits**	4
			No. of Periods / Week	4
			Assignments / Sessional	20
			Semester Examination	80

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand & Develop program in C using Pointer
CO-2	Understand how to write and use functions, how the stack is used to implement function calls, and parameter passing options.
CO-3	Write & map the concept of an Array, Pointer , Structure with function
CO-4	Understand & Implement the concept of Command Line Arguments & String Functions in C programming .
CO-5	Learn & Develop programs using File Handling Concept in C Programming.
CO-6	Design GUI application using C Graphics

Prerequisites	Fundamentals of C Programming .
Unit I	**Pointers :** Definition, declaration , syntax, symbols used to implements a pointer, difference between normal variable & pointer variable, pointer to int, float, char, Arithmetic operations using pointer , various programs
Unit II	**Functions :** definition, types-predefined & user defined , call by value & call be reference , different form of implementing functions , prototype of functions, simple function, function, return value, function having and arguments, nested functions, recursion, passing an array to function , passing pointer to function, passing structure and union to function,
Unit III	**Command Line Arguments & String Functions** : Definition of Command Line Argument, Arguments used for CMD, Memory organization of CMD, real implementation of CMD, Compilation & execution of CMDs programs, string functions with programs
Unit IV	**File Handling** : what is File Handling , type of File, Sequential & Binary , need of File handling , Steps , FILE pointer, fopen(), various modes, predefined functions used in File handling, getc, putc, getw, putw, fprintf, fscanf, fread, fwrite, various programs ,
Unit V	**C Graphics :**definition , applications, library, steps, various predefined functions require to create a graphics , small application using C Graphics

Text Book	1. C : The Complete Reference : Herbert Schildt , 2. OOPs Using C++ : Balgurusamy, 3. Graphics under C : YashwantKanetkar , 4. Let us C : YashwantKanetkar 5. Let us C++ : YashwantKanetkar **Additional** 6. Programming with C : Bryon Gottfried, 7. Graphics Under C : Y. Kanetkar
Reference Books	8. Let us C Solutions : Y.P. Kanetkar, 3. Spirit Of "C" : MoolishKooper. 9. The Complete Reference C++ by Herbert Schildt 10. C++ and Active learning approach by Randal Albert, Todd Bredlove 11. Advanced C primal ++ by Stephen prata
URL	https://fresh2refresh.com/c-programming/c-pointer/ https://www.programmingsimplified.com/c/graphics.h

Subject Title		Yoga and Meditation			
Subject Ref. No.		MANI110	No. of Credits		2
			No of Lectures/Week		2
			Assignments/Sessional		20
			Semester End Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	aware of basic yoga philosophies that can help the participant to maintain a positive attitude towards their job & their colleagues
CO-2	simple meditations & yoga postures that can be done by their own
CO-3	Learn, how meditation is effective in reducing stress and increasing organization skills

Mapping of Course Outcomes (COs) with Program Outcomes (POs)
(Course Articulation Matrix)

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1										
CO-2										
CO-3										
AVG										

Prerequisites	--
Unit I	**Yoga and Health Management** Health Management – Meaning, Significance, Factors affecting health of human being, Yoga- meaning, definition, origin of yoga, system of yoga, benefits of yoga, eight limbs of yoga.
Unit II	**Asana & Pranayama** Asanas: Meaning, Definition, Benefits of Asanas Pranayamas: Meaning, Cautions during, All types of Pranayamas
Unit III	**Dhyana (Medidation)** Meaning, Definitions, advantages of dhyana, types of dhyana **Diet and Nutrition** Meaning, importance, benefits, balance diet: meaning and importance.

Text Books	1. Asana, Pranayama, Mudra, Bandha- Swami Satyanand Saraswati Yoga Publication Mungher 2. Prana, Pranayama, Pranvidya – Swami Satyanand Saraswiti Yoga Publication Mungher
Reference Books	3. A Systematic Course in the Ancient Tantric Techniques of Yoga and Kriya – Swami Satyanand Saraswiti Yoga Publication Mungher 4. Light on Yoga – BKS Iyengar 5. Dietetics – B. Srilaxmi, New Age International Publication, New Delhi

Subject Title		Communication Skills – I			
Subject Ref. No.		MANI111	No. of Credits		2
			No of Lectures/Week		2
			Assignments/Sessional		50
			Semester End Examination		--

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Do effective formal communication with gesture and posture.
CO-2	Improvise oral communication skills.

Mapping of Course Outcomes (COs) with Program Outcomes (POs)
(Course Articulation Matrix)

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1										
CO-2										
AVG										

Prerequisites	--
Unit I	**Introduction to Communication:** Introduction, Meaning, Definition, Process, importance, Principles of effective communication, Scope of Business communication - Internal & External, Barriers to Communication, Overcoming the barriers
Unit II	**Listening Skills:** Types of Listening (theory /definition), Tips for Effective Listening, Academic Listening- (lecturing), Listening to Talks and Presentations, Listening to Announcements- (railway/ bus stations/ airport / stadium announcement etc.), Listening to Radio and Television
Unit III	**Telephone Skills:** Basics of Telephone communication, How to handle calls- telephone manners, Leaving a message, Making requests, Greeting and Leave Taking over phone(etiquette), Asking for and giving information, Giving Instructions, Listening for Tone/Mood and Attitude at the other end, Handling the situations especially trouble shooting, Teleconference handling, Handling Tele interviews for Call Centre's
Text Books	1. Business Communication, Asha Kaul, PHI
Reference Books	1. Business Communication, M. Balasubramanyam 2. Business correspondence and report writing, Sharma, K. Mohan, TataMc-Graw Hill

Subject Title		**Practical Based on Basics of DBMS**			
Subject Ref. No.		**MANC153**	**No. of Credits**		2
			No. of Periods / Week		2
			Assignments / Sessional		20
			Semester Examination		30
Assignments Based on MS ACCESS, Introduction to Oracle with relevant queries and commands will be covered.					

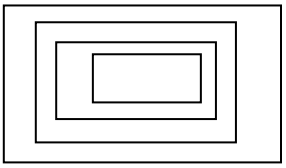
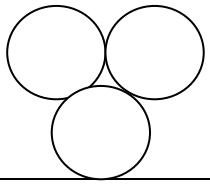
Subject Title		**Practical Based on Advanced C Programming**			
Subject Ref. No.		**MANI154**	**No. of Credits**		2
			No. of Periods / Week		2
			Assignments / Sessional		20
			Semester Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand & Develop program in C using Pointer
CO-2	Understand how to write and use functions, how the stack is used to implement function calls, and parameter passing options.
CO-3	Write & map the concept of an Array, Pointer , Structure with function
CO-4	Understand & Implement the concept of Command Line Arguments in C programming .
CO-5	Learn & Develop programs using File Handling Concept in C Programming.
CO-6	Design GUI application using C Graphics

Prerequisites	**:**	Basics of Computer Fundamentals, OS and C programming.
		Programs using C Language
	1.	WAP to create a pointer for int, float, char primitive data type
	2.	WAP to create a pointer for an array, structure & union non-primitive data type
	3.	WAP to implement simple function using call by value

	4.	WAP to implement simple function using call by reference
	5.	WAP to implement simple function using arguments
	6.	WAP to implement simple function using arguments & return value
	7.	WAP to pass array to function & manipulate it.
	8.	WAP to pass structure & union to function & manipulate it.
	9.	WAP to pass two structure to function & manipulate it.
	10.	WAP to map an array, structure , pointer to function
	11.	WAP to demonstrate concept of CMD with memory organization
	12.	WAP to enter numbers and print it using CMD
	13.	WAP to enter names and print it using CMD
	14.	WAP to enter number and print its table using CMD
	15.	WAP to enter numbers and print its sum using CMD
	16.	WAP to enter numbers , store it an array and print it using CMD
	17.	WAP to implement sscanf function in cmd
	18.	WAP to implement string manipulation programs in C.
	19.	WAP to read and write a character in FILE.
	20.	WAP to read and write a number in FILE.
	21.	WAP to read and write a POEM in FILE.
	22.	WAP to read and write NUMBES in FILE.
	23.	WAP to read and write 20 numbers in FILE and separate odd & even & print it
	24.	WAP to read and write record in FILE using fprintf & fscanf function.
	25.	WAP to read and write records in FILE using fread & fwrite.
	26.	WAP to create a Line, circle, rectangle , arc, ellipse using C graphics
	27.	WAP to print following output 
	28.	WAP to print following output 

BCA (SEMESTER – III)

Subject Title	:	**Basics of Networking**		
Subject ref. No.	:	**MANI201**		
		No. of credits	:	4
		No. of periods per week	:	4
		Assignment/Sessionals	:	40%
		Semester Exam	:	60%
Course Objectives	:	CO1: Build an understanding of the fundamental concepts of computer networking. CO2: Familiarize the student with the basic taxonomy and terminology of the computer networking. CO3: Understand and explain the concept of Data Communication and networks, layered architecture and their applications. CO4: Enumerate the layers of the OSI model and TCP/IP. CO5: Familiarity with the basic of internet and various important terms associated with it.		
Pre Requisite	:	NA		
Unit-I **Basics of Computer Network**	:	Computer Network: Definition, Goals, Structure; Broadcast and Point-ToPoint Networks; Network Topology and their various Types; Types of Network: LAN, MAN, WAN; Server Based LANs & Peer-to-Peer LANs; Communications Types: Synchronous, Asynchronous; Modes of Communication: Simplex, Half Duplex, Full Duplex; Protocols and Standards		
Unit-II **Transmission Media**	:	Guided Media (Wired) : Coaxial Cable: Physical Structure, Standards, BNC Connector, Applications, Twisted Pair : Physical Structure, UTP vs STP, Connectors, Applications, Fiber Optics Cable: Physical Structure, Propagation Modes (Single Mode & Multimode), Fiber Sizes, Connectors , Applications , Advantages & Disadvantages; Unguided Media(Wireless): Electromagnetic Spectrum for Wireless Communication, Propagation Methods, (Ground, Sky, Line-of-Sight); Wireless Transmission: Radio Waves, Infrared, Micro-wave; Wireless LANs (IEEE 802.11)		
Unit-III **Network Models**	:	Design Issues of the Layer, Protocol Hierarchy, ISO-OSI Reference Model : Functions of each Layer, Various Terminology used in Computer Network, Connection-Oriented & Connectionless Services, Internet (TCP/IP) Reference Model, Comparison of ISO-OSI and TCP/IP Model		
Unit-IV **Network Connectivity Devices**	:	Categories of Connectivity Devices, Passive and Active Hubs, Repeaters, Bridges, Switches (2-Layer Switch, 3-Layer, Switch(Router), Gateways, Network Security Devices (Firewalls, Proxy Servers)		
Unit-V **Internet**	:	Internet:Growth, Architecture, Accessing, Internet Service Providers(ISP), Internet Addressing System:IP Address, DNS, URL; World Wide Web(WWW): Web Servers,Web Browsers, Search Engine; Concept of Intranet & Extranet. Network Interface Card (NIC), Network Adapters, Components of NIC, Functions of NIC, Types of NIC;		
Text Books	:	1. Tanenbaum, Andrew, Computer Networks, PHI 2. Forouzan Behrouz A., Tata Mcgraw Hill		
Reference Books	:	1. Norton Peter, Complete Guide To Networking		

Subject Title		Management Practices & Organizational Behavior			
Subject Ref. No.		MANI202	No. of Credits		2
			No of Lectures/Week		2
			Assignments/Sessional		20
			Semester End Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand concepts of management.
CO-2	Understand the importance of Organizational Behaviour.

Prerequisites	--
Unit I	**Management** 1.1The need, scope 1.2 Meaning and Definition 1.3 The process of Management 1.4 Managerial levels/Hierarchy 1.5 Managerial functions 1.5.1 Planning 1.5.2 Organizing 1.5.3 Staffing 1.5.4 Directing 1.5.5 Controlling 1.6 Managerial skills 1.6.1 Technical 1.6.2 Conceptual 1.6.3 Human Resource 1.7 Types of managers 1.7.1 Functional 1.7.2 Specialize 1.7.3 Generalize 1.8 Line and staff managers
Unit II	**Managerial Decision Making** 2.1 Introduction 2.2 Decision making environment 2.2.1 open Systems 2.2.2 Closed system 2.2.3 Decision making under certainty 2.2.4 Decision making under uncertainty 2.2.5 Decision making under risk 2.3 Decision Types /models 2.3.1 Structured decisions

	2.3.2 Unstructured decisions 2.3.3 Programmable decisions Non programmable Decisions 2.3.5. Classical Model Administrative model 2.4 Decision making tools 2.4.1 Autocratic 2.4.2 Participative 2.4.3 Consultative 2.5 Decision Making Tools 2.6 Herbert Simson's Model Principle of Rationality / Bounded Rationality
Unit III	**Organization** 3.1 Introduction –definition 3.2 Need for Organization 3.3 Process of Organizing 3.4 Organizational structure 3.4.1 Functional organization 3.4.1 Product Organization 3.4.2 Territorial Organization **Organizational Behavior** Definition / Concepts Need /importance/ relevance An overview
Reference Books	1. Principles and Practices of Management Shejwalkar 2. Essential of management Koontz H & Weitrich H 3. Management Today Principles And Practices Burton & Thakur 4. Mgmt. Principles and Functions Ivancevich & Gibson, Donnelly 5. Organizational behavior Stepheb Robbins 6. Organizational behavior Keith Davis 7. Organizational behavior Fred Luthans 8. Organizational behavior Dr.Ashwatthapa

Subject Title		**Mathematics-II**			
Subject Ref. No.		**MANI203**	**No. of Credits**		2
			No of Lectures/Week		2
			Assignments/Sessional		20
			Semester End Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	To provide a foundation in probability theory in order to solve appliedproblems and to prepare for more advanced courses in probability.
CO-2	To learn various distributions, Sampling Distributions that helps to enhancethe quality of research approach.
CO-3	Understand the concept of derive probability density function of transformation of random variables.
CO-4	Calculate probabilities, and derive the marginal and conditionaldistributions of bivariate random variables
CO-5	Analyze statistical data graphically using frequency distributions and cumulative frequency distributions.

Prerequisites	Prerequisites for this course is student should have a very good hands on combinatorics (permutation and combination) and set theory. Statistics requires a good knowledge of linear algebra , basic knowledge of calculas, and real analysis.
Unit I	**Algebra of Sets:** sets and classes, limit of a sequence of sets, rings, sigma-rings, fields, sigma-fields, monotone classes. Probability : Classical, relative frequency and axiomatic definitions of probability, addition rule and conditional probability, multiplication rule, total probability, Bayes' Theorem and independence, problems.
Unit II	**Random Variables** :Discrete, continuous and mixed random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, probability and moment generating function, median and quantiles, Markov inequality, Chebyshev's inequality, problems. Special Distributions: Discrete uniform, binomial, geometric, negative binomial, hyper geometric, Poisson ,continuous uniform, exponential, gamma, Weibull, Pareto, beta, normal, lognormal, inverse Gaussian, Cauchy,d o u b l e exponential distributions, reliability and hazard rate, reliability of series and parallel systems, problems.
Unit III	Function of a random variable, problems. Joint Distributions: Joint, marginal and conditional distributions, product moments, correlation and regression, independence of random variables, bivariate normal distribution, problems.

	Transformations: functions of random vectors, distributions of order statistics, distributions of sums of random variables, problems. Sampling Distributions: The Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, Chi-Square, t and F distributions, problems
Unit IV	Descriptive Statistics: Graphical representation, measures of locations and variability. Estimation: Unbiasedness, consistency, the method of moments and the method of maximum likelihood estimation, confidence intervals for parameters in one sample and two sample problems of normal populations, confidence intervals for proportions, problems.
Unit V	Testing of Hypotheses: Null and alternative hypotheses, the critical and acceptance regions, two types of error, power of the test, the most powerful test and Neyman-Pearson Fundamental Lemma, tests for one sample and two sample problems for normal populations, tests for proportions, Chi-square goodness of fit test , ANNOVA and its applications. Problem Examples.
Text Books	1. An Introduction to Probability and Statistics by V.K.Rohatgi & A.K. Md. Saleh. 2. Introduction to Probability and Statistics by J.S. Milton &J.C. Arnold. 3. Introduction to Probability Theory and Statistical Inference by H.J. Larso 4. Introduction to Probability and Statistics for Engineers and Scientists b S.M. Ross 5. A First Course in Probability by S.M. Ross
Reference Books	Probability and Statistics in Engineering by W.W. Hines,D.C. Montgomer D.M. Gpldsman & C.M. Borror 2. Lectures in Probability by M. Kac (for example on independent events) 3. C.K. Wong (1972) A note on mutually independent events. Annals Statistics, V. 26, 27.(for example on independent events). Measure Theory by P. Halmos (for algebra of sets)

Subject Title		**Object Oriented Programming using C++**		
Subject Ref. No.		**MANI204**	**No. of Credits**	4
			No. of Periods / Week	4
			Assignments / Sessional	40
			Semester Examination	60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand the concept of programming
CO-2	Learn and develop logic for programming skill using C langauge
CO-3	Enhance the knowledge of basic flow of control within a programming concept.
CO-4	Understand the concept of Object Oriented Programming
CO-5	Implement the concept of Object Oriented Concept in real software development
CO-6	Develop the conceptual programming using C++ Language

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 statement , graphics and file handing concepts using C++ programming, Exception Handling, Template JST Library and Namespace.
Prerequisites	**:** Basics of Computer Fundamentals , OS and C programming.
Unit I	A Brief History of C, C is middle-level Language, C is a Structured Language, Complier 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 & Associatively of Operators.**Console I/O** Introduction, Character input & Output, String Input & Output, Formatted Input/Output (scanf/printf) sprintf&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 O**perator 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 Book	1. C : The Complete Reference : Herbert Schildt , 2. OOPs Using C++ : Balgurusamy, 3. Graphics under C : YashwantKanetkar , 4. Let us C : YashwantKanetkar 5. Let us C++ : YashwantKanetkar **Additional** 6. Programming with C : Bryon Gottfried, 7. Graphics Under C : Y. Kanetkar :
Reference Books	8. Let us C Solutions : Y.P. Kanetkar, 3. Spirit Of "C" : MoolishKooper. 9. The Complete Reference C++ by Herbert Schildt 10. C++ and Active learning approach by Randal Albert, Todd Bredlove 11. Advanced C primal ++ by Stephen prata

Subject Title		**Practical Based on OOPs using C++**		
Subject Ref. No.		**MANI252**	**No. of Credits**	2
		Assignments / Sessional		20
		Semester Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write, compile , execute the programs in C++ using appropriate predefined functions in C++.
CO-2	Implement the loops and decision making statements to solve the problem.
CO-3	Implement pointers, structures and unions and implement it in real time applications using C & C++
CO-4	Implement the object oriented concepts in developing application using C++.
CO-5	Developing applications in C++ using the understanding of Inheritance and

		polymorphism.
	CO-6	Write the I/O streams, programs using classes to handle stream objects in C++ language
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 statement , graphics and file handing concepts using C++ programming, Exception Handling, Template JST Library and Namespace.	
Prerequisites	**:** Basics of Computer Fundamentals , OS and C programming.	
Unit I	**Programs using C Language**	
	21.	WAP to print int, float character and string data using specifies.
	22.	WAP perform arithmetic operations on int, float data.
	23.	WAP to perform all operators i.e. arithmetic operator, relational operator, conditional operator, logical operator, ternary operator & Bit-wise operators.
	24.	WAP to find greater among three , four and five number using if-else & nested if statement.
	25.	WAP to find the grade of the students using if-else ladder
	26.	WAP to find factorial using while, do-while, for statements
	27.	WAP to print sum of first 10 numbers using while, do-while, for statements
	28.	WAP to print even & odd numbers from 1 to N using while, do-while, for statements
	29.	WAP to demonstrate application of switch statement. Arithmetic operation using operator
	30.	WAP to print different output pattern using while, do-while & for statement
	31.	WAP to demonstrate the real application of goto, break, continues & exit keywords
	32.	WAP to demonstrate application of Simple Function.
	33.	WAP to demonstrate application of Function with arguments.
	34.	WAP to demonstrate application of Function with return type and no arguments.
	35.	WAP to demonstrate application of Function with arguments and return type.

	36.	WAP to demonstrate application of call by value and call reference concept.
	37.	WAP to demonstrate application of Recursion Function - Factorial of number using recursion - Sum to 10 numbers using recursion - Generate Fibonacci Series using recursion
	38.	WAP to demonstrate the use of Pointer.
	39.	WAP to create single dimension array
	40.	WAP to create double dimension array
	41.	WAP to pass an array to function.
	42.	WAP to create a structure and access its member using object. - Normal Object - Object as an Array - Object as a pointer
	43.	WAP to create a nested structure and access its member using object
	44.	WAP to create a union and access its member using object
	45.	WAP to pass the structure to Function and manipulate it.
	46.	WAP to manipulate multiple structure in one Function.
	47.	WAP the demonstrate the application of prototype of function
	48.	WAP for Command Line Argument Concepts
	49.	WAP to manipulate numeric and string data using CMD
	50.	WAP that demonstrate all string manipulation function
	51.	WAP that demonstrate Application of Storage class in C i.e. register, automatic, external and static
Unit II	**Programs using C++ Language**	
	52.	Write a C++ program to create a class and access its member and methods. Method definition inside the class.
	53.	Write a C++ program to create a class and access its member and methods. Method definition outside the class.
	54.	Write a C++ to create a class and access its member and methods using class object as an Array.
	55.	Write a C++ program to create a class and access its member and methods using class object as a pointer.
	56.	Write a C++ program to create a class and access its member and methods by using dynamic object of a class.
	57.	Write a C++ program to create a instance and class variable and

		demonstrate how data is shared by class & instance variable.
	58.	WAP a C++ program for inline function & friend function.
	59.	WAP a C++ program to implement array, pointer, structure, union in class.
	60.	WAP a C++ program that demonstrate the enumeration and typedef in C++.
Unit III	**Object & Classes**	
	61.	WAP a C++ program that demonstrate the use of Static member and static method.
	62.	WAP a C++ program that demonstrate the use of const members.
	63.	WAP a C++ program that demonstrate the use of macros in C++.
	64.	WAP a C++ program that demonstrate the use constructor and destructors in C++. Default constructor, parameterized constructor and copy constructor.
	65.	WAP a C & C++ program that demonstrate how to read & write a character in file using File Handling concept.
	66.	WAP a C & C++ program that demonstrate how to read & write a number in file using File Handling concept.
	67.	WAP a C & C++ program that demonstrate how to read & write a structure in binary file using File Handling concept.
	68.	WAP a C++ program that demonstrate how to read & write a object of a class in file using File Handling concept.
Unit IV	**Inheritance**	
	69.	Write a C++ program to demonstrate the use of **this** pointer.
	70.	Write a C++ program to create a class and access its member and methods. Method definition inside the class
	71.	Write a C++ program to demonstrate the implementation of Abstraction in C++.
	72.	Write a C++ program to demonstrate the implementation of Encapsulation in C++.
	73.	Write a C++ program to demonstrate the implementation of Single Inheritance in C++.
	74.	Write a C++ program to demonstrate the implementation of Multilevel Inheritance in C++.
	75.	Write a C++ program to demonstrate the implementation of Multiple Inheritance in C++.
	76.	Write a C++ program to demonstrate the implementation of Hybrid

		Inheritance in C++.
	77.	Write a C++ program to demonstrate the implementation of Hierarchy Inheritance in C++.
	78.	Write a C++ program to demonstrate the application of IS-A and Has-A relation
	79.	WAP a C++ program that demonstrate the use Access Modifier i.e. private, public and protected in C++.
	80.	WAP a C++ program that demonstrate how to pass the arguments to base class
	81.	WAP a C++ program to implement the application of abstract class in C++.
	82.	WAP a C++ program that demonstrate the implementation of Nested Class.
	83.	WAP a C++ program for virtual function.
	84.	WAP a C++ program that demonstrate the application of static binding .i.e overloading
	85.	WAP a C++ program that demonstrate the application of dynamic binding .i.e overriding.
	86.	
Unit V	**Exception Handling, Namespace in C++ , Template**	
	87.	WAP a C++ program to handle arithmetic exception.
	88.	WAP a C++ program to handle ArrayIndexOutOfIndex exception.
	89.	WAP a C++ program to handle NullPointer exception.
	90.	WAP a C++ program to handle Nested Exception.
	91.	WAP a C++ program to demonstrate namespace application in C++.
	92.	WAP a C++ program to demonstrate the application of template C++.

Subject Title		JavaScript, AJAX & jQuery			
Subject Ref. No.		MANI205	No. of Credits		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write code using JavaScript with HTML.
CO-2	Write program for form validation.
CO-3	Write code using AJAX concepts.
CO-4	Write code using JQuery.

Prerequisites	--
Unit I	**JavaScript Fundamentals-** 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.
Unit II	**Event handling & Validations on Forms – JavaScript** 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
Unit III	**jQuery - I** Introduction to jQuery, Syntax Overview Anatomy of a jQuery Script, Creating first jQuery script Traversing the DOM, Selecting Elements with jQuery, Refining & Filtering Selections, Selecting Form Elements Working with Selections - Chaining, Getters & Setters CSS, Styling, & Dimensions
Unit IV	**jQuery - II** Manipulating Elements - Getting and Setting Information about Elements, Moving, Copying, and Removing Elements, Creating New Elements Manipulating Attributes, Utility Methods Events - Connecting Event to Elements, Namespacing Events, Event handling,

	Triggering Event handlers, Event Delegation JQuery Effects –hide/show, fade, slide, animate, callback, stop Interactions – Draggable, Droppable, Resizable, Selectable, Sortable Widgets - Accordian, DatePicker, Menu, Tabs Plugins – Using readymade plugins, Create a basic plugin, Writing Plugins
Unit V	**AJAX** 5.1 AJAX Overview 5.2 jQuery's AJAX related methods, 5.3 Ajax and Forms 5.4 Ajax Events
Text Books	• HTML, DHTML, JavaScript, Perl & CGI Ivan Bayross • HTML & CSS : The Complete reference, Fifth Edition By Thomas Powell
Reference Books	• Html, Xhtml, And CSS Bible (English) 5th Edition (paperback) by Schafer, Steven • HEAD FIRST HTML AND CSS, 2/ED (UPDATED FOR HTML) by ROBSON • Beginning HTML and CSS (English) (Paperback) by Rob Larsen • Learn to Code HTML and CSS (English) (Paperback) by Howe • Javascript Bible (English) 7th Edition by Danny Goodman Michael, Morrison Paul Novitski Tia GustaffRayl • Javascript Programming: Pushing the Limits (English) 1st Edition By (2013)Jon Raasch • Head First JavaScript (2007) By michael Morrison • JavaScript: The Definitive Guide (2011) by Flanagan, David • Introducing HTML5 - Bruce Lawson, Remy Sharp • AngularJS - Brad Green, Shyam Seshadri • Learning jQuery - Jonathan Chaffer, Karl Swedberg • Professional Ajax, 2nd Edition Wrox Press • Internet Technology at work Hofstetter fred, TMH.
Web Reference	1.www.w3school.com 2. www.tutorialpoint.com

Subject Title		**Practical Based on JS, AJAX, JQuery**			
Subject Ref. No.		**MANI251**	**No. of Credits**		2
			Assignments / Sessional		20
			Semester Examination		30
Programs based on JS , AJAX and JQuery will be covered.					

Subject Title		**Social Networking**			
Subject Ref. No.		**MANI206**	**No. of Credits**		2
			No of Lectures/Week		2
			Assignments/Sessional		50
			Semester End Examination		-

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand concepts of Social Networking.
CO-2	Demonstrate the usage of social Networking Sites.

Prerequisites	--
Unit I	**Introduction –** Social Networking Concept, Importance, Need, Usage. Modern trends of social network, Types of Social Networks, Social Networking through Internet, Popular social networking sites.
Unit II	**Social Networking Site - Facebook** History of Facebook, Facebook fundamentals, Usage of Facebook for Academic, Social, Business, Networking (complete Demonstration)
Unit III	**Social Networking Site - LinkedIn** History of LinkedIn, LinkedIn fundamentals, Usage of LinkedIn for Academic, Social, Business, Networking (complete Demonstration) Basic Overview of other popular Social Networking sites as Twitter, Instagram etc.
Reference Books	

<table>
<tr><td colspan="5">Subject Title : Software Engineering</td></tr>
<tr><td>Subject Ref. No.</td><td>MANI208</td><td>No. of Credits</td><td>:</td><td>04</td></tr>
<tr><td></td><td></td><td>No. of Periods/Week</td><td>:</td><td>04</td></tr>
<tr><td></td><td></td><td>Assignments/Sessional</td><td>:</td><td>40</td></tr>
<tr><td></td><td></td><td>Semester Exam.</td><td>:</td><td>60</td></tr>
<tr><td></td><td colspan="4">Course Outcomes (COs)
At the end of the course, students will be able to:
<table><tr><td>CO-1</td><td>Draw Functional Decomposition diagram (FDD), Data flow Diagram (DFD), Entity Relationship Diagram (ER).</td></tr><tr><td>CO-2</td><td>Analyze the software inspection process.</td></tr><tr><td>CO-3</td><td>Understand the architectural design, interface design, data design of the software.</td></tr><tr><td>CO-4</td><td>Calculate the software maintenance cost, along with understanding of maintenance & software documentation.</td></tr><tr><td>CO-5</td><td>Analyze the CASE tools utilized in different phases of software development.</td></tr></table></td></tr>
<tr><td>Unit –I :</td><td colspan="4">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</td></tr>
<tr><td>Unit –II :</td><td colspan="4">Software Inspection
Inspection team, members, process, steps, documents, checklist, defect recording and recommendation format, evaluation of inspection process, benefits.</td></tr>
<tr><td>Unit –III:</td><td colspan="4">Design Methods:
3.1 Data design
3.2 Architectural Design
3.3 Procedural Design
3.4 Interface Design
3.5 Code design</td></tr>
<tr><td>Unit – IV:</td><td colspan="4">Maintenance
4.1 Types of Maintenance
4.2 Maintenance Cost
4.3 Reverse Engineering
4.4 Introduction to legacy systems</td></tr>
</table>

	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	:	**Operating System Concepts**			
Subject Ref. No.	:	**MANI209**	**No. of Credits**		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Demonstrate understanding of design issues of advanced operating systems and compare different types of operating systems
CO-2	Analyze design aspects and data structures used for file subsystem, memory subsystem and process subsystem of Linux OS
CO-3	Differentiate between threads and processes and compare different processor scheduling algorithms
CO-4	Master concepts of memory management including virtual memory & Master system resources sharing among the users

Mapping of Course Outcomes (COs) with Program Outcomes (POs)
(Course Articulation Matrix)

	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**
CO-1	**2**									
CO-2		**2**	**2**							
CO-3			**3**	**3**						
CO-4			**3**							
AVG										

Prerequisites	Working knowledge of C programming, Basic Computer Architecture-Concepts., Basic algorithms and data structure concepts.
Unit I	**Introduction**: Functions of operating systems, Design approaches: layered, kernel based and virtual machine approach, types of advanced operating systems (NOS, Multiprocessor OS, Mobile OS, RTOS, Cloud OS)
Unit II	**Process Management:** Process Concept, Process Control Block, Process Schedule , Process operations, Inter-process Communication, Communication in Client-Server **CPU Scheduling:** Scheduling Concept, Scheduling Criteria, Scheduling algorithms, Scheduling Evaluation, Simulation Concept **Process Synchronization** & **Deadlock:** Synchronization concept, Synchronization Requirement, Critical Section Problem, Monitors, Deadlock concepts, Deadlock prevention & avoidance, Deadlock Detection, Deadlock Recovery
Unit III	**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 IV	**Distributed Operating system concepts:** Goals, Distributed Computing Models, Hardware Concepts, Software Concepts, Architecture of DOS. Design Issues: Transparency, Flexibility, Scalability, Reliability, Performance, fault tolerance
Unit V	**Mobile OS:** Architecture, Android OS, iOS, Virtual OS, Cloud OS and their design issues
Text Books	**1.** The Design of the UNIX Operating System, PHI, by Maurice J. Bach. **2.** Distributed Computing 2nd Edition, Mahajan and Seema Shah, OXford. **3.** Advanced Concepts in Operating Systems, Mukesh Singhal, Niranjan G Shivaratri. **4.** Mobile Computing by Rajkamal, 1st edition, Oxford.

Subject Title		**DBMS with ORACLE**			
Subject Ref. No.		**MANI210**	**No. of Credits**		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand and Describe concepts of Data Models and Views
CO-2	Understand concept of Normalization in DBMS
CO-3	Map concepts of physical media storage and its importance in DBMS
CO-4	Create tables, manipulating data and use them to store data efficiently.
CO-5	Execute and learn to create relationships among tables in a DB .

Prerequisites	--
Unit I	**Data Models and Views:** 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 attribute
Unit II	**Normalization**: 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	**Overview of physical storage media** Magnetic disk,RAID, Tertiary storage, Storage access, File organization, Organization of records in files, Data dictionary storage
Unit IV	**Introduction** to Oracle: SQL queries: DDL, DML, TCL, DCL, Specifying constraints
Unit V	**More on Oracle:** Primary Key, Foreign Key , Master Table, Transaction Table, joins and built-in functions, Domain Integrity constraints, Referential integrity constraints

Text Books	1. Database system concept Korth 2. Fundamentals of Database SysemsElmasriNavathe 3. Database Management Systems Bipin Desai 4. Relational Databases and Microsoft Access, Ron McFadyen

Subject Title		**Practical Based on DBMS using Oracle**			
Subject Ref. No.		**MANI253**	**No. of Credits**		2
			No. of Periods / Week		
			Assignments / Sessional		20
			Semester Examination		30
Assignments Based on various commands in SQL using Oracle with relevant queries and commands will be covered.					

Subject Title		**Data Structure using C++**			
Subject Ref. No.		**MANI211**	**No. of Credits**		4
			No. of Periods / Week		4
			Assignments / Sessional		40
			Semester Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	To introduce the concepts of Abstract data Type, data structure, performance measurement, time and space complexities of algorithms
CO-2	To implement linear data structures such as stacks, queues and lists and their applications using Object Orientated Programming Language
CO-3	To introduce various search data structures such as hashing, binary search trees, AVL trees, B+ trees and B*-trees.
CO-4	To implement graph theory concept (Minimum Spanning Tree) in Civil Network Planning, Computer Network Routing Protocol
CO-5	summarize searching and sorting techniques
CO-6	translate the algorithms of Data Structure to application using C++

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++
Prerequisites	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,
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 , Minimum Spanning Tree and Algorithms
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 Book	1. C & Data Structure Balagurusamy, 2. Data Structure through C in depth Shrivastava&Shrivastava , 3. Data Structure through C Y.P. Kanetkar
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 Data Structure Using C++**			
Subject Ref. No.		**MANI254**	**No. of Credits**		2
			Internal		20
			Semester Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	To introduce the concepts of Abstract data Type, data structure, performance measu
CO-2	To implement linear data structures such as stacks, queues and lists and their applic Language
CO-3	To introduce various search data structures such as hashing, binary search trees, AV
CO-4	To implement graph theory concept (Minimum Spanning Tree) in Civil Network P
CO-5	summarize searching and sorting techniques
CO-6	translate the algorithms of Data Structure to application using C++

Course Objective		
Prerequisites		
Unit I	**Introduction To Data Structure**	
	1.	WAP a C++ program to implement the addition of two Polynomial using an Array .
	2.	WAP a C++ program to implement the multiplication of two Polynomial using an Array .
	3.	WAP a C++ program to convert Array into Sparse Array using an Array .
	4.	WAP a C++ program to implement the stack operations such as push, pop, display & search element using an Array .
	5.	WAP a C++ program to implement the queue operation such as front , rear, display & search using an Array .
	6.	WAP a C++ program to implement the Circular Queue using an Array .
	7.	WAP a C++ program to implement the Priority Queue using an Array

	8.	WAP a C++ program to implement the DeQueue Queue using an Array
	9.	WAP a C++ program to implement the Reverse Stack using Queue implementation.
Unit II	**Linked List**	
	10.	WAP a C++ program to demonstrate the application of malloc, calloc and free function.
	11.	WAP a C++ program to implement the addition of two Polynomial using Linked List.
	12.	WAP a C++ program to implement the multiplication of two Polynomial using using Linked List.
	13.	WAP a C++ program to Create the Linked List and Print it.
	14.	Write a menu driven program in C++ to perform all operations such as create , delete (first,last & between), insert(first,last & between), display, search element in ***Linked List***.
	15.	Write a menu driven program in C++ to perform all operations of ***stack*** such as create , delete, insert, display, search element by using Linked List.
	16.	Write a menu driven program in C++ to perform all operations of ***queue*** such as create , delete, insert, display, search element by using Linked List.
	17.	Write a menu driven program in C++ to perform all operations such as create , delete (first,last & between), insert(first,last & between), display, search element in ***Circular Linked List***.
	18.	Write a menu driven program in C++ to perform all operations such as create , delete (first,last & between), insert(first,last & between), display, search element in ***Doubly Linked List***.
	19.	Write a menu driven program in C++ to perform all operations such as create , delete (first,last & between), insert(first,last & between), display, search element in ***Doubly Circular Linked List***.
	20.	Write a C++ program to convert normal linked List into ***Reverse Linked List.***
Unit III	**Tree**	
	21.	Write a C++ program to construct Tree by using three arrays.
	22.	Write a C++ program to construct Tree by using one array.
	23.	Write a C++ program to construct Tree by using Linked List
	24.	Write a C++ program to construct BST by using array.
	25.	Write a C++ program to construct BST by using Linked List.
	26.	Write a C++ program to construct Tree by using three arrays and perform inorder, preorder and post order on it.
Unit IV	**Graph**	

	27.	Write a C++ program to construct Graph using Adjacency Matrix.
	28.	Write a C++ program to construct Graph using Adjacency List.
	29.	Write a C++ program to construct Graph using Incidence Matrix.
Unit V	**Searching & Sorting**	
	30.	Write a C++ program to perform Bubble Sorting.
	31.	Write a C++ program to perform Insertion Sorting.
	32.	Write a C++ program to perform Selection Sorting.
	33.	Write a C++ program to perform Merge Sorting.
	34.	Write a C++ program to perform Shell Sorting.
	35.	Write a C++ program to perform Quick Sorting.

Subject Title		**Mini Project**			
Subject Ref. No.		**MANI255**	**No. of Credits**		2
			No. of Periods / Week		
			Assignments / Sessional		50
			Semester Examination		-
Students must complete project work based on technology learned.					

BCA (SEMESTER – V)

Subject Title		**Quantitative Aptitude**			
Subject Ref. No.		**MANI301**	**No. of Credits**		2
			No. of Periods / Week		2
			Assignments / Sessional		--
			Semester Examination		50

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	apply general mathematical models to solve a variety of problems
CO-2	solve problems and correctly arrive at meaningful conclusions regarding their answers.
CO-3	manipulate equations and formulas in order to solve for the desired variable.

Prerequisites	
Unit I	**Simple equations :** Definition of Linear Equations, Formation of simple equations, Problems on Ages, Fractions and Digits, Indeterminate system of equations, Special cases in indeterminate system of equations.
Unit II	**Ratio and proportion :** Definition of Ratio, Properties of Ratios, Comparison of Ratios, Problems on Ratios, Compound Ratio **Percentages :** Introduction, Converting a percentage into decimals, Converting a Decimal into a percentage, Percentage equivalent of fractions Problems on percentages, **Profit And Loss** : Problems on Profit and Loss percentage, Relation between Cost Price and Selling price, Discount and Marked Price, Two different articles sold at same Cost Price, Two different articles sold at same Selling Price, Gain% / Loss% on Selling Price
Unit III	**Partnership :** Introduction, Relation between capitals, Period of investments and Shares **Simple Interest :** Definitions, Problems on interest and amount, Problems when rate of interest and time period are numerically equal, **Compound Interest :** Definition and formula for amount in compound interest Difference between simple interest and compound interest for 2 years on the same principle and time period.
Text Books	1. GL Barrons, Mc Graw Hills, Thorpe's verbal reasoning, LSAT Materials 2. R S Agarwal, S Chand, 'Quantitative Aptitude' 3. Quantitative Aptitude - G. L BARRONS 4. Quantitative Aptitude - Abhijit Guha Mc Graw Hills

Subject Title		**Entrepreneurship Development**			
Subject Ref. No.		**MANI302**	**No. of Credits**	:	2
			No. of Periods / Week	:	2
			Assignments / Sessional	:	20
			Semester End Examination	:	30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	define, identify and/or apply the principles of entrepreneurial and family business
CO-2	Know the parameters to assess opportunities and constraints for new business ideas
CO-3	Understand the systematic process to select and screen a business idea
CO-4	Design strategies for successful implementation of ideas
CO-5	Write a business plan

Pre Requisite		--
Unit – I		**Introduction**: Entrepreneur- Functions and Qualities, Entrepreneurship- Motivating Factors and Obstacles in Entrepreneurship.
Unit – II		**Entrepreneurship in different sectors Part I**: Women Entrepreneurship- Limitations and measures, Rural Entrepreneurship- Need, Problems, How to develop Rural Entrepreneurship. Agri Entrepreneurship- Need, Opportunities, Problems and Suggestions. **Entrepreneurship in different sectors Part II:** Social Entrepreneurship- (Brief Introduction) Entrepreneurial Opportunities in small scale sector. Online Sector and Ecommerce.
Unit – III		**Starting New Venture: Idea Generation**- Brain Storming, Creativity, Checklist, Focus Groups, and Problem Inventory Analysis. **Formulation and Appraisal of Project Report:** Content of Project Report, Preparation of different project reports of different small scale units. Methods of Project Appraisal (Financial Analysis, Economic Analysis, Market Analysis, Technical Feasibility, Managerial Competence)
Text Books		Entrepreneurial Development (2013), Dr. S.S. Khanka- S. Chand & Company, New Delhi Dynamics of Entrepreneurial Development and Management by Vasant Desai, Himalya Publication House. Entrepreneurship- Second Edition, Rajeev Roy, Oxford University Press, New Delhi. Entrepreneurship- Fifth Edition, Robert D. Hisrich, Michel P. Peters, Tata Macgraw Hill Edition.
Additional Reference Books		Dynamics of Business Entrepreneurship G. S. Sudha, RSBA Publishers, Jaipur. Entrepreneurial Development E. Gordan, Dr. Natarajan, Himalya Publication House.

Subject Title		**CORE JAVA**			
Subject Ref. No.		**MANI303**			
			No. of Credits	:	4
			Assignments / Sessional	:	40
			Semester Examination	:	60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write, compile, and execute Java programs that may include basic data types and control flow constructs using J2SE or other Integrated Development Environments (IDEs) such as Eclipse, NetBeans, and JDeveloper
CO-2	demonstrate the use of good object-oriented design principles including encapsulation ,information hiding, Inheritance , Full Abstraction and Partial Abstraction
CO-3	Create GUI Application using Applet & HTML
CO-4	Implement the Multithreading Concept with real time application
CO-5	Control & Maintain Run-Time Exception occurred during web based software development
CO-6	Maintain the file using File handling concepts and provide the ability to inspect & modify the runtime behavior of application using Reflection

Course Objective	This subject helps to clarify the programming concepts in JAVA language. This language covers all the techniques of developing the JAVA programs. The course structure of JAVA programming Languages is help to develop web based applications and APPs for Android Mobiles
Prerequisites	Fundamentals of Computer System , operating system , C and C++ Language
Unit I	Java Fundamentals , J2SE, J2EE, J2ME, Features of Java , OOPs concepts, benefits of JAVA, Hardware / Software requirement, Support system and Environment of JAVA, System Variable, Environment Variable, Path and Class Path. JAVA API. Application of More JAVA, application with two classes , program structure , tokens, statements installing and configuration JAVA , implementing JAVA program, JAVA virtual M/C Architecture and different alias with functionality, command line arguments, program style, keywords , data types, Operators, Decision Making and Branching , looping Statement . Predefined classes (Scanner, Date, Random …….)
Unit II	Class objects and methods: class definition, methods, fields declaration.Object,

	ways to create an object and operations on it. Garbage Collector. constructor , overloading , static members , nesting methods , Inheritance, overloading , Final class and Methods , array string and vector, Interfaces : definition , implementation , accessing Interface Variables , Packages : introduction, uses , creating , accessing adding a class to package hiding class
Unit III	Multithreaded Programming : Introduction , creating threads stopping and blocking a threads , Life cycle of a thread, its exceptions priority, synchronization, Managing Errors and Exception : types of error , exception , syntax of exception Handling , multiple catch statement, throwing our own exception Applet Programming : Introduction , preparing to write Applets building Applets code, creating an executable Applet , designing a web page , applet tag, adding Applet Tag, running applet more HTML tags , event handling
Unit IV	AWT programming : introduction , create JAVA application using AWT, creating JAVA Applet using AWT , execute applet, execute applet in browse, message in the status bar, get HTML and AREA size , window and event, Graphic Programming : introduction, Graphic class, lines and rectangles, circle, ellipse, arcs poly, line graphs, using control loops in Applets , Bar charts , Text Field, Label , button , check box layouts , text area, scroll list , selection control, scrollbar, menu, dialog.
Unit V	Managing Input / Output Files in JAVA : streams, streams classes, Byte streams classes , reading and writing characters , bytes, Random Access Files , Interactive I/p and o/p, Reflection API- class identification, interface identification, parent class information and methods information.
Text Book	Programming with Java A Primer, E.Balaguruswamy Tata McGraw Hill Companies, Core Java, Dietel and Dietel
Reference Books	The complete reference JAVA2, Herbert schildt. TMH, Java Programming John P. Flynt Thomson 2nd, Java Programming Language Ken Arnold Pearson , Big Java, Cay Horstmann 2nd edition, Wiley India Edition

Subject Title		**Practical Based on Core Java**			
Subject Ref. No.		**MANI351**	**No. of Credits**		2
			Assignments / Sessional		20
			Semester Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Design the fundamentals of object oriented application, and have the ability to apply them
CO-2	Identify, formulate and solve problems by using object oriented programming
CO-3	Use APIs (Application Programmer Interfaces) and design/program APIs
CO-4	Implement Inheritance , Association and Abstraction using OOPs concepts
CO-5	Maintain the Exceptions in Software Development & Design GUI using AWT controls
CO-6	Develop Webpage using Applet & Implement multithreading concept in real application

Course Objective	This subject helps to clarify the programming concepts in JAVA language. This language covers all the techniques of developing the JAVA programs. The course structure of JAVA programming Languages is help to develop web based applications and APPs for Android Mobiles	
Prerequisites	Fundamentals of Computer System , operating system , C and C++ Language	
Unit I	**Java Fundamentals**	
	1.	Practical demo on JDK installation, Path setting , Classpath Setting , Run program on Console, MyEclipse
	2.	WAP a to demonstrate the primitive data types with their default values.
	3.	WAP a to demonstrate the Looping and decision statements in Java.
	4.	WAP a to demonstrate the function of Predefined class ***Scanner***.
	5.	WAP a to demonstrate the function of Predefined class ***Date***.
	6.	WAP a to demonstrate the function of Predefined class ***Random***.
Unit II	**Class objects and methods**	
	7.	WAP a program to demonstrate the use of Static member and static method
	8.	WAP a program to demonstrate the use of Static member, static block and static method
	9.	WAP a program to demonstrate the use of this, Instance Initializer block

	10.	WAP a program to demonstrate the application of Inheritance using IS-A relation & Has-A relation.
	11.	WAP a program to demonstrate the application of constructors in Inheritance concept using IS-A relation & Has-A relation.
	12.	WAP to implement static binding in JAVA.
	13.	WAP to implement dynamic binding in JAVA.
	14.	WAP to demonstrate the use of super keyword in inheritance.
	15.	WAP to demonstrate the use of final keyword with instance variable , with method and with class name.
	16.	WAP to demonstrate the implementation of an Array & Vector in Java and its access methods using enhance for a& Enumeration
	17.	WAP to demonstrate all Access Modifiers in JAVA. Default, public, private & protected.
	18.	WAP that demonstrate the applications of abstract class and interface in JAVA
	19.	WAP that demonstrate the applications of package in JAVA
	20.	WAP that demonstrate how to import package, class and how to access the static members and methods of class in JAVA
Unit III	**Multithreaded Programming**	
	21.	WAP to demonstrate the implementation of Multi Threading using Thread Class.
	22.	WAP to demonstrate the implementation of Multi Threading using Runnable Interface.
	23.	WAP to demonstrate the implementation of sleep() & join() methods with Multi-Threading.
	24.	WAP to demonstrate the application of Daemon thread in java.
	25.	WAP to demonstrate the application of Synchronized thread for Mutual Exclusion in java.
	26.	WAP to manage the ArithmeticException in Java.
	27.	WAP to manage the NullPointerException in Java.
	28.	WAP to manage the NumberFormatException in Java.
	29.	WAP to manage the ArrayIndexOutOfBoundsException in Java.
	30.	WAP to management nested Exceptions
	31.	WAP to demonstrate a Simple Applet Functionality in JAVA.
	32.	WAP to demonstrate various shapes avaiLabel in Graphics class which can be implements in JAVA Applet.

	33.	WAP to demonstrate the Applet with FontSize, Font, Color.
	34.	WAP to implement Mutli threading in Applet.
	35.	WAP to configure the components in HTML file and fetch it in Applet & manipulate.
	36.	WAP to configure the number in HTML file and print its table in Applet.
	37.	WAP to create Random Circles in Applet using Random Class and Multi Threading.
	38.	WAP to create Random Circles in different colors in Applet using Random Class and Multi Threading.
Unit IV	**AWT programming**	
	39.	WAP a program to Create a Frame by using Inheritance and Association
	40.	WAP to demonstrate the BorderLayout Layout Manager
	41.	WAP to demonstrate the GridLayout Layout Manager
	42.	WAP to demonstrate the FlowLayout Layout Manager
	43.	WAP to demonstrate the BoxLayout Layout Manager
	44.	WAP to demonstrate the CardLayout Layout Manager
	45.	WAP a program to validate Login Page using TextField & Button
	46.	WAP to create a Calculator in awt
	47.	WAP to enter two numbers and print its addition using Label, Button & TextField
	48.	WAP to perform All Arithmetic Operations on two numbers and print its addition using Label, TextField & Button ActionListener Interface
	49.	WAP to add Checkbox & Label. And apply ItemListener Interface application on it.
	50.	WAP to add CheckboxGroup & Label. And apply ItemListener Interface application on it.
	51.	WAP to add Choice & Label. And apply ActionListener on it
	52.	WAP to add List & Label. And apply ActionListener on it
	53.	WAP a create four Buttons and Two Lists and write code of each Button click to perform different operations
	54.	WAP to demonstrate Canvas Implementation.
	55.	WAP to create Scrollbar application using Label.
	56.	WAP to create MenuBar using Menu and MenuItem application using Label.
	57.	WAP to create MenuBar using Menu and MenuItem application using Label

		and apply ActionListener Interface
	58.	WAP to demonstrate the Use of Dialog Box.
	59.	WAP to enter two numbers in Dialog Box and perform Addition on it
	60.	WAP to demonstrate the Use of ActionListener on Different Components.
	61.	WAP to demonstrate the Use of MouseListener.
	62.	WAP to demonstrate the Use of ItemListener on Difference Components.
	63.	WAP to demonstrate the Use of KeyListeners .
	64.	WAP to demonstrate the Use of WindowsListeners.
	65.	WAP to demonstrate the Use of Adapter Classes .
	66.	WAP to implement WindowCloseEvent .
	67.	WAP to implement Awt control in Applet
	68.	WAP to implement Awt control & Multi Threading concept in Applet
	69.	WAP program to implement Awt control , Multi Threading & Exception concept in Applet
Unit V	**Managing Input / Output Files in JAVA**	
	70.	WAP to write & read a character to File.
	71.	WAP to write & read a string to File.
	72.	WAP to write & read the data from&to File using BufferedOutputStream & BufferedInputStream
	73.	WAP to read the data from two files and writes into another file using FileStreams and SequenceStreams.
	74.	WAP to demonstrate the use of Write & Reader classes.
	75.	WAP to demonstrate the use of FileWrite & FileReader classes.
	76.	WAP to demonstrate the use of CharArrayReader & CharArrayWritr classes.
		Reflection in JAVA
	77.	WAP to demonstrate the use of newInstance() method
	78.	WAP to demonstrate the use of javap tool.
	79.	Few program of Refection Concepts

Subject Title		**Software Testing**			
Subject Ref. No.		**MANI304**	**No. of Credits**		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand different testing types associated with software.
CO-2	Identify the importance of black box and white box testing.
CO-3	Design Test case for software.
CO-4	Perform manual testing to uncover different classes of errors.

Prerequisites	--
Unit I	**Introduction** Fundamentals of Testing 1.1 What is Testing? 1.1.1 Typical Objectives of Testing 1.1.2 Testing and Debugging Why is Testing Necessary? Testing's Contributions to Success 1.2.2 Quality Assurance and Testing 1.2.3 Errors, Defects, and Failures 1.2.4 Defects, Root Causes and Effects 1.3 Seven Testing Principles 1.4 Test Process 1.4.1 Test Process in Context 1.4.2 Test Activities and Tasks 1.4.3 Test Work Products 1.4.4 Traceability between the Test Basis and Test Work Products 1.5 The Psychology of Testing 1.5.1 Human Psychology and Testing 1.5.2 Tester's and Developer's Mind-set
Unit II	**Testing Throughout the Software Development Lifecycle** 2.1 Software Development Lifecycle Models 2.1.1 Software Development and Software Testing 2.1.2 Software Development Lifecycle Models in Context 2.2 Test Levels 2.2.1 Component Testing 2.2.2 Integration Testing 2.2.3 System Testing 2.2.4 Acceptance Testing

	2.3 Test Types 2.3.1 Functional Testing 2.3.2 Non-functional Testing 2.3.3 White-box Testing 2.3.4 Change-related Testing 2.3.5 Test Types and Test Levels 2.4 Maintenance Testing 2.4.1 Triggers for Maintenance 2.4.2 Impact Analysis for Maintenance
Unit III	**Static Testing** 3.1 Static Testing Basics 3.1.1 Work Products that Can Be Examined by Static Testing 3.1.2 Benefits of Static Testing 3.1.3 Differences between Static and Dynamic Testing 3.2 Review Process 3.2.1 Work Product Review Process 3.2.2 Roles and responsibilities in a formal review 3.2.3 Review Types 3.2.4 Applying Review Techniques 3.2.5 Success Factors for Reviews
Unit IV	**Test Techniques** 4.1 Categories of Test Techniques 4.1.1 Choosing Test Techniques 4.1.2 Categories of Test Techniques and Their Characteristics 4.2 Black-box Test Techniques 4.2.1 Equivalence Partitioning 4.2.2 Boundary Value Analysis 4.2.3 Decision Table Testing 4.2.4 State Transition Testing 4.2.5 Use Case Testing
Unit V	**White-box Test Techniques** 5.1 Statement Testing and Coverage 5.2 Decision Testing and Coverage 5.3 The Value of Statement and Decision Testing 5.4 Experience-based Test Techniques 5.4.1 Error Guessing 5.4.2 Exploratory Testing 5.4.3 Checklist-based Testing
Text Books	A. Software Engineering by R. Pressmen – 6th Ed B. Software Engineering by Sommerville C. Introducing Software Testing by Louise Tamres D. Effective Methods for software Testing by William Perry E. Software Testing in Real World by Edward Kit F. Software Testing Techniques by Boris Beizer

Subject Title		**Design and Analysis of Algorithms**		
Subject Ref. No.		**MANI305**	**No. of Credits**	4
			No. of Periods / Week	4
			Assignments / Sessional	40
			Semester End Examination	60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Analyze the asymptotic performance of algorithms.
CO-2	Write rigorous correctness proofs for algorithms.
CO-3	Demonstrate a familiarity with major algorithms using data structures.
CO-4	Apply important algorithmic design paradigms and methods of analysis

Pre Requisite		Discrete Maths, Graph Theory and Data Structure.
Unit – I		**Analysis of Algorithm:** What is an algorithm?, The efficient algorithm, Average, Best and worst case analysis, Asymptotic Notations, Analyzing control statement, Loop invariant and the correctness of the algorithm, Sorting Algorithms and analysis: Bubble sort, Selection sort, Insertion sort, Heap sort, Sorting in linear time : Bucket sort, Radix sort
Unit – II		**Divide and Conquer Algorithm:** Introduction, Recurrence and different methods to solve recurrence, GCD, Multiplying large Integers Problem, Problem Solving using divide and conquer algorithm - Binary Search, Max-Min problem, Sorting (Merge Sort, Quick Sort).
Unit – III		**Greedy Algorithm**: General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Activity selection problem, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm), Graphs: Shortest paths, The Knapsack Problem, Job Scheduling Problem, Huffman code.
Unit – IV		**Dynamic Programming:** Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming – Calculating the Binomial Coefficient, Multi-Stage Graph 0/1 Knapsack problem, All Points Shortest path, Longest Common Subsequence
Unit – V		**Backtracking and Branch and Bound:** The N Queen's problem, Hamiltonian cycle and 0/1 knapsack problem **Max flows Network:** Ford-Fulkerson Algorithm **Geometric algorithms:** convex hull **Amortized analysis**
Text Books		1. Cormen, Leiserson, and Rivest, "*Algorithms"*, MIT Press, 2010 2. E. Horowitz and S. Sahni.," *Fundamentals of Computer Algorithms"*, Galgotia, 2008
Additional Reference Books		1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "*The Design and Analysis of Computer Algorithms",* Addison Wesley, 2010

Subject Title		**Practical Based on DAA**			
Subject Ref. No.		**MANI352**	**No. of Credits**	:	2
			No. of Periods / Week	:	2
			Assignments / Sessional	:	20
			Semester End Examination	:	30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write rigorous correctness proofs for algorithms.

Course Objective		In this laboratory after completing experiments student has to learn how to analyze a problem & design the solution for the problem. In addition to that, solution must be optimum, i.e., time complexity & memory usage of the solution must be very low
		Prepare any Five Assignment in detail (Each for 2 Marks)
Assignment No 1		Write C/C++/Java/C# programs to implement the following: a) Bubble Sort b) Selection Sort c) Insertion Sort
Assignment No 2		Write C/C++/Java/C# programs to implement the following: a) GCD b) Binary Search
Assignment No 3		Sort a given set of elements using the Merge method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
Assignment No 4		Write C/C++/Java/C# programs to implement the following: a) Knapsack Problem
Assignment No 5		Write C/C++/Java/C# programs to implement the following: a) Prim's algorithm. b) Kruskal's algorithm
Assignment No 6		Write C/C++/Java/C# programs to implement the following: a)Multistage Graph
Assignment No 7		Write C/C++/Java/C# programs to implement the following: a) Travelling Salesman Problem
Assignment No 8		Write C/C++/Java/C# programs to implement the following: a) N-Queens Problem
Assignment No 9		Write C/C++/Java/C# programs to implement the following: a) Ford Fulkerson Algorithm
Assignment No 10		Write C/C++/Java/C# programs to implement the following: a) Convex Hull

Subject Title		Angular JavaScript & XML			
Subject Ref. No.		MANI306	No. of Credits		4
			No of Lectures/Week		4
			Assignments/Sessional		40
			Semester End Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand basics of XML.
CO-2	Explore AngularJS Component
CO-3	Develop an AngularJS Single Page Application from scratch
CO-4	Create and bind controllers with Javascript
CO-5	Apply filter in AngularJS application
CO-5	Perform CRUD functions using AngularJS form

Prerequisites	--
Unit I	**AngularJS Core Concepts** What is AngularJS?, Advantages of Angular, AngularJS MVC ,Introduction to SPA, Setting up the environment, First App using MVC architecture, Understanding ng attributes, Expression and Data Binding, Working with directives, Angular Modules , Controller, Scope and View ,Create Controller and Module, $scope hierarchy
Unit II	**Filter, Forms and Ajax Filters –** Built-in filters - upper case and lower case filters, date ,currency and number formatting ,orderBy, filter ,custom filter, Angular JS Forms – Working with AngularJS forms, model binding, form controller ,Using CSS classes, form events ,custom model update triggers ,custom validation ,$http service ,Ajax implementation using $http
Unit III	**Dependency Injection, Services ,Routing and Navigation** What is dependency injection?, Using dependency injection, Angular JS service – Understanding services , Using built-in service, Creating custom service, Injecting dependency in service, Routing – What is Routing?, Routing using ngRoute and UIRouter, ngView Directive, Configuring $routeProvider ,$stateProvider, Animating Angular App
Unit IV	**Introduction to Node.js** What is Node.js?, Features of Node.js, Setup Development Environment- Installing Node.js, Working with REPL, Node.js Console, Node.js Module, Node Package Manager,Node.js Basics, File System ,HTTP and HTTPs, Creating Web Server-

	Handling http request, Node.js Callbacks, Node.js Events
Unit V	**XML** Intro & features of XML, XML writing elements, attributes etc. XML with CSS, DSO, XML Namespaces XML DTD, XML Schemas, Writing Simple sheets usingXSLT, SAX & DOM Parsers,SOAP Intro.
Text Books	• Node.js, MongoDB, and AngularJS Web Development by Brad Dayley • Beginning Node.js, Express & MongoDB Development by Greg Lim
Reference Books	• Pro Angular JS by Adam Freeman • AngularJS Programming by Example by Agus Kurniawan • MEAN Web Development by Amos Q. Haviv
Web Reference	1.www.w3school.com 2. www.tutorialpoint.com

Subject Title		**Practical Based on Angular JS and XML**			
Subject Ref. No.		**MANI353**	**No. of Credits**	**:**	2
			No. of Periods / Week	**:**	2
			Assignments / Sessional	**:**	20
			Semester End Examination	**:**	30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write programs based on the contents.

Programs Based on the theory part will be covered in the lab.

Subject Title		**Mini Project**			
Subject Ref. No.		**MANI354**	**No. of Credits**	**:**	2
			No. of Periods / Week	**:**	-
			Assignments / Sessional	**:**	50
			Semester End Examination	**:**	--

Mini project based on the technology learned , needs to be completed.

Subject Title	:	**Resume Writing & Interview Techniques**			
Subject ref. No.	:	**MANI307**			
		No. of credits	:	2	
		No. of periods per week	:	2	
		Assignment/Sessionals	:	100%	
		Semester Exam	:	--	
Course Objectives	:	**CO1**: Gaining competency of writing effective resume. **CO2**: Dressing to impress will be impressed upon. **CO3**: Students will be able to prepare for FAQ more confidently.			
Pre Requisite	:	Soft skills			
Unit-I **Resume Writing – Tips and tricks**	:	Art of writing winning resume will be impressed upon and hands-on session will be conducted for the same. Wriitng Cover letters will also be covered.			
Unit-II **Dressing up for Interviews and Types of Interviews**	:	Nitty-gritties of formal dressing and actual colour combination that work, will be taught.			
Unit-III **FAQs in Interview**	:	Common questions asked in interview along with answers will be taken care of in the form of the session/s.			
Text Books	:	1. Rip the Resume- Torin Ellis			
Additional Reference Books	:	1. The Resume writing guide – Lisa McGrimmon			

Subject Title		**Linux Administration and Server Configuration**		
Subject Ref. No.		**MANI308**	**No. of Credits**	4
			No. of Periods / Week	4
			Assignments / Sessional	40
			Semester End Examination	60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understanding the basic set of commands and utilities in Linux/UNIX systems.
CO-2	Learn the important Linux library functions and system calls
CO-3	Understand the inner workings of Linux operating systems
CO-4	Design Live Servers.

Pre Requisite		Operating System Concepts, Windows Platform
Unit – I		**Introduction:** Basic Linux System Concepts, GNU, Free Software, and Open Source Software, Open Source Software Licenses, Distributions of Linux O.S, Installing Ubuntu, The GNOME Desktop, Linux Commands
Unit – II		**Managing the basics:** User Administration, Linux File-System Administration, File Permissions, and Networking Management.
Unit – III		**Software Installation**: The Package Management, Vi/Vim Editor, Regular Expressions. Open SSH Server, VNC Server, Installation of Python.
Unit – IV		**Server Configuration**: FTP Server, NFS Server, Samba Server, HTTP/Apache Server, DNS Server, DHCP Server, Mail Server, And Database Server: MySQL.
Unit – V		**Maintenance** : Backing Up and Restoring Files, Security and Firewall, Monitoring
Text Books		1. "Ubuntu Server Guide" by UBUNTU LTD. 2. "Introduction to Linux", A Hands on Guide by Machtelt Garrels 3. "GNU/Linux Advanced Administration", by Josep Jorba Esteve and Remo Suppi Boldrito
Additional Reference Books		1. Managing Linux® Systems with WebminTM System Administration and Module Development by Jamie Cameron
Web Reference		https://www.ubuntupit.com/27-best-linux-tutorial-books-need-download-now/

Subject Title		**Practical Based on LASC**			
Subject Ref. No.		**MANI355**	**No. of Credits**		2
			No. of Periods / Week		2
			Assignments / Sessional		20
			Semester End Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understanding the basic set of commands and utilities in Linux/UNIX systems.
CO-2	Learn the important Linux library functions and system calls
CO-3	Understand the inner workings of Linux operating systems
CO-4	Design Live Servers.

Subject Title :	**Web Programming Using PHP**		
Subject Ref. No.	**MANI309**	No. of Credits:	04
Assignments/Sessional	:		40%
Semester Exam.	:		60%

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write code for implementing basic concept of PHP as loops, conditions, arrays, strings.
CO-2	Connect the My Sql database with PHP for performing operations such as insert, update, delete, retrieve.
CO-3	Implement the concepts of COOKIES and SESSION handling using PHP.
CO-4	Write the programs using concepts of HTML + JAVASCRIPT + PHP + MYSQL.
CO-5	Design the Web portals to fulfill the requirements.

Prerequisite :	Students must have knowledge of HTML, JavaScript.
Unit –I :	**Introduction to PHP** PHP Basics Conditions and Branches Loops Variables and Arrays Strings
Unit –II :	**Form Handling** Dealing with functions Forms Super global variables Super global array A script to acquire user input Importing user input Accessing user input Combine HTML and PHP code Using hidden fields Redirecting the user File upload and scripts Delete a File
Unit –III :	**Cookies , Sessions and Authentication** Using Cookies in PHP Setting a cookie Accessing cookie Destroying Cookie HTTP Authentication Storing Username and Passwords

	Using Sessions Starting a session Ending a session Session Security
Unit – IV :	**Database Operations with PHP** Built-in Database Functions, Connecting to a MySQL, Selecting a Database, Building and Sending the Query to Database Engine, Retrieving , Updating and Inserting Data in database
Unit – V :	**Classes And Objects** Object oriented concepts Define a class Class attributes An Object Creating an object Object properties Object methods Object constructors and destructors Class constants Static method Class inheritance Abstract classes Final keyword Implementing Interface Object serialization Understanding Advance and New Checking for class and method existence Iterators
Reference Books :	1. *PHP and MySQL Web Development* by Luke Welling, and Laura Thomson 2. *PHP, MySQL, and JavaScript* by Robin Nixon 3. *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* by Larry Ullman 4. *PHP Cookbook* by Adam Trachtenberg, and David Sklar 5. PHP Object – Oriented Solution by David Powers 6. *Head First PHP & MySQL* by Lynn Beighley, and Michael Morrison 7. *Beginning PHP and MySQL* From Novice to Professional, Third Edition by W.J. Gilmore

Subject Title	**:**	**Practical Based on PHP**			
Subject Ref. No.	**:**	**MANI356**	**No. of Credits**	**:**	2
			Internal	**:**	40%
			External	**:**	60%

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write code for implementing basic concept of PHP as loops, conditions, arrays, strings.
CO-2	Connect the My Sql database with PHP for performing operations such as insert, update, delete, retrieve.
CO-3	Implement the concepts of COOKIES and SESSION handling using PHP.
CO-4	Write the programs using concepts of HTML + JAVASCRIPT + PHP + MYSQL.
CO-5	Design the Web portals to fulfill the requirements.

Content	**:**	Assignment based on the PHP & supporting languages will be covered.

Subject Title		**ASP.NET**			
Subject Ref. No.		**MANI310**	**No. of Credits**		4
			Assignments / Sessional		40
			Semester Examination		60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Describe basic concepts of ASP.NET and identify components of a form.
CO-2	Use various validation controls on respective objects on the form.
CO-3	Establish connectivity with back end using ADO.Net.
CO-4	Implement stored procedures in ASP.NET.
CO-5	Describe use of Authentication services in ASP.NET.
CO-6	Create a mini-project using controls learnt.

Prerequisites	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 MicrosoftADO.NET Introduction to Using ADO.NET, Connecting to a Database, Accessing Data with DataSets, Using MultipleTables, AccessingDatawithDataReaders
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, Securing a Microsoft ASP.NETWebApplication
Unit V	Web Application Security Overview Working with Windows-Based Authentication Working with Forms-Based Authentication Overview of MicrosoftPassport Authentication
Text Books	1. Programming ASP.NET By Jesse Liberty, Dan Hurwitz, Publisher: O'Reilly Media
Reference books	1. ASP. NET: abeginner's guide By DaveMercer, PublisherMcGraw-HillCompanies

Subject Title		**Practical Based on ASP.NET**			
Subject Ref. No.		**MANI357**	**No. of Credits**		2
			No. of Periods / Week		
			Assignments / Sessional		20
			Semester Examination		30

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write Simple programs using C#.
CO-2	Use calendar control and Treeview control in forms.
CO-3	Using various validation controls on objects on the forms.
CO-4	ImplementDatagridcontrol,databindingandconnectivityusingC#.Net.
CO-5	Learn to use hyperlink control on Forms.
CO-6	Create a minor project using ASP.NET and SQL Server.

Prerequisites	HTML and VB.net
Unit I	Simple application using web controls A Finding factorial Value B Money Conversion C Quadratic Equation D Temperature Conversion E Login control
Unit II	States of ASP.NET Pages, Adrotator Control, 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 Treeview control A Treeview control and datalist B Treeview operations
Unit III	Validation controls Query textbox and Displaying records Display records by using database Datalist link control Databinding using dropdownlist control Inserting record into a database
Unit IV	Deleting record into a database Databinding using datalist control Datalist control templates Databinding using datagrid Datagrid control template
Unit V	Datagrid hyperlink Datagrid button column Datalist event Datagrid paging Creating own table format using datagrid
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		**Major Project**			
Subject Ref. No.		**MANI358**	**No. of Credits**		4
			No. of Periods / Week		
			Assignments / Sessional		40%
			Semester Examination		60%
Students needs to complete major project based on the technology learned during the course.					

OPEN ELECTIVE COURSE : GROUP A

Subject Title	:	**Cyber Security**			
Subject Ref. No.	:	**MANI321**	**No. of Credits**	:	2
			Assignments / Sessional	:	40
			Semester Examination	:	60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Understand the broad set of technical, social & political aspects of
CO-2	Computer Security
CO-3	Describe the operational and organizational security Aspects
CO-4	Have understood the fundamentals of cryptography
CO-5	Explain Authentication Methods

Pre Requisite	:	Basics of Networking
Unit – I	:	**Introduction To Security Trends:** The Computer Security Problem - Targets and Attacks - Approaches to Computer Security - Ethics - Basic Security Terminology - Security Models
Unit – II		**Operational and Organizational Security:** Policies, Procedures, Standards, and Guidelines - Security Awareness and Training - Interoperability Agreements - TheSecurity Perimeter - Physical Security - Environmental Issues
Unit – III	:	**Cryptography**: Cryptography in Practice - Historical Perspectives - Algorithms - Hashing Functions - Symmetric Encryption - Asymmetric Encryption - QuantumCryptography- Cryptography Algorithm Use
Unit – IV		**Authentication and Remote Access**: User, Group, and Role Management - Password Policies - Single Sign-On - Security Controls and Permissions - Preventing Data Lossor Theft - The Remote Access Process - Remote Access Methods
Unit – V	:	**Intrusion Detection Systems**: History of Intrusion Detection Systems - IDS Overview - Network-Based IDSs - Host-Based IDSs- Intrusion Prevention Systems - Honeypotsand Honeynets – Tools
Text Books	:	W.A.Coklin, G.White, Principles of Computer Security: Fourth Edition, McGrawHill, 2016 William Stallings, Cryptography and Network Security Principles and Practices, Seventh Edition,Pearson
Additional ReferenceBooks		Achyut S. Godbole, Web Technologies: TCP/IP, Web/Java Programming, and CloudComputing, Tata McGraw-Hill Education, 2013
E BOOKS		https://www.newhorizons.com/promotions/cybersecurity-ebooks
MOOC		https://www.coursera.org/learn/introduction-cybersecurity-cyber-attacks#syllabus

subject Title :	**Artificial Intelligence**		
Subject Ref. No.	**MANI322**	No. of Credits	04
		No. of Periods/Week	04
		Assignments/Sessional	40
		Semester Exam.	60

Course Outcomes (COs)

At the end of the course, students will be able to:

CO-1	Write algorithms for Heuristics searching techniques.
CO-2	Solve resolution problems.
CO-3	Represent the knowledge in the form of frames, script, and associative network.
CO-4	Solve AI problems using AI techniques.

Prerequisite :	
Unit –I :	**Introduction** a. AI Techniques – Importance of AI – Representation of Knowledge, Knowledge Base Systems b. State Space Search – Production Systems – Problem Characteristics of 8-Queens, Traveling Salesman, Missionary & Cannibals, Crypt Arithmetic, Monkey Banana Problem, Tower of Hanoi and Block World.
Unit –II :	**Heuristics Search Techniques** a. Generate & test – Hill Climbing, Depth First Search, Breadth First Search, Best First Search, **Expert Systems** a. Architecture – Need and Justification of Expert Systems – Knowledge acquisition and validation.
Unit –III :	**Predicate & Logic** a. Representing simple facts in Logic - Computable functions in predicates, resolution – unification – forward vs. backward reasoning. b. Probabilistic reasoning – Bayes's Theorem – Certainty Factors – Demphster–Shafer Theory – Fuzzy Sets, Reasoning with Fuzzy Logic, Natural Language Computation with Fuzzy Logic.
Unit – IV :	**Structured Knowledge Representation** a. Associative Networks, Semantic Nets, Frames Structures, Conceptual Dependencies & Scripts Learning – Concept of Learning – Learning Automata, Genetic Algorithm, Learning by induction.
Unit – V :	**Natural Language Processing** Overview of Linguistics, Grammars and Languages, basic Parsing techniques, semantic analysis and representation structures. Natural Language generation and Natural Language Systems.
Text Books :	a. Introduction to AI and Expert Systems - Patterson. b. Artificial Intelligence - Rich E and Knight K c. Principles of Artificial Intelligence - Nilsson.
Reference Books :	d. Artificial Intelligence – An Engineering Approach - Schalkoff R J e. Introduction to Expert System - Peter Jackson f. Artificial Intelligence - Janakiraman

Subject Title		**Enterprise Resource Planning**			
Subject Ref. No.	:	**MANI323**	**No. of Credits**	:	4
			No. of Periods / Week	:	4
			Assignments / Sessional	:	40
			Semester Examination	:	60
Course Objective :		1. To acquire in-depth knowledge of ERP as prime application software product 2. To learn operational aspects of ERP implementation and support 3. To Know features of important ERP modules 4. To Learn, through case studies, practical aspects of ERP in various industries			
Pre Requisite	:	Basic knowledge of MIS			
Unit – I	:	**Enterprise Resource Planning** What is ERP? Features of ERP (Basic and Advanced) – ERP Architectures – ERP Need Analysis, Return on Investment for ERP			
Unit – II	:	**ERP Implementation and Support** ERP Life Cycle, Methodologies and Strategy, Vendor and Software Selection- Business Process Re-engineering related to ERP – Implementation Process – Change Management – Post Implementation Support, Maintenance, Security			
Unit – III	:	**ERP Functional Modules** Human Resource Management, Accounting and Finance, Procurement, Inventory Control, Production planning and operations, sales customer relationship management and e-commerce			
Unit – IV	:	**ERP Technology Areas, Enterprise Applications** Portal and Content Management, Data Warehousing and Data Mining, Business Intelligence and Analytics – Emerging Trends in ERP Applications			
Unit – V	:	**ERP Case Studies** Case Studies of ERP Implementation of Manufacturing and Service Sectors			
Text Books	:	Enterprise Resource Planning, Ray, Tata McGraw Hill			
Additional Reference Books	:	ERP Demystified, Alexis Leon, Tata McGraw Hill Enterprise Resource Planning, A Managerial Perspective, Goyal, Tata McGraw Hill			
Websites	:	www.sap.com erp.iitkgp.ernet.in			