

ACADEMIC REGULATIONS,  
COURSE STRUCTURE  
AND  
DETAILED SYLLABUS

MASTER OF COMPUTER APPLICATIONS



**LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

**(Approved by AICTE, Accredited by NBA,  
Affiliated to JNTUK and ISO 9001: 2000 Certified)**

**L.B.Reddy Nagar :: Mylavaram-521 230 :: Krishna District  
ANDHRA PRADESH STATE**

**ACADEMIC REGULATIONS FOR AUTONOMOUS STREAM  
(2010-2011 Batch)**

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## **1. INTRODUCTION**

Academic Programmes of the institute are governed by rules and regulations as approved by the Academic Council, which is the highest Academic body of the Institute. These academic rules and regulations are applicable to the students admitted during academic year 2010-11 into first year of three year Postgraduate programme offered by the college leading to Master of Computer Applications(MCA) degree.

1.1 Lakireddy Balireddy College of Engineering, Mylavaram, an autonomous institution, follows Semester pattern for all three years of its Postgraduate MCA programme with internal and external evaluation.

1.2 Semester Pattern : Each academic year shall be divided into two semesters, each of 20 week duration, including instruction, evaluation, etc. Each semester consists of a minimum of 90 instruction days with at least 35 to 40 contact periods per week.

## **2. PROGRAMME OFFERED (POST GRADUATE)**

Master of Computer Applications (MCA)

## **3. ELIGIBILITY CRITERIA FOR ADMISSION**

The eligibility criteria for admission into I year MCA programme shall be as mentioned below:

- i. Admission to the above program shall be made subject to the eligibility, qualifications and specialization prescribed by the AICTE from time to time.
- ii. Admissions shall be made on the basis of merit rank obtained by the qualifying candidate at ICET examination or an entrance test conducted by the university subject to reservations prescribed by the University/State government from time to time.

## **4. AWARD OF MCA DEGREE**

A student will be declared eligible for the award of the MCA Degree if he/she fulfills the following academic regulations:

- i. Pursued a course of study for not less than three academic years and not more than six academic years.

- ii. The student has to fulfill all the academic requirements i.e. Registered for 158 credits and has to secure all the 158 credits with minimum grade points.

#### 5. DURATION OF THE PROGRAMME

Students, who fail to fulfill all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in MCA course.

#### 6. SEMESTER –WISE DISTRIBUTION OF CREDITS:

Year	First Semester Credits	Second Semester Credits	Total Credits
First Year	27+ Seminar - 1	24+ Seminar – 1 Credit + Mini Project – 1 Credit	54
Second Year	27+ Seminar – 1 Credit	24 + Seminar – 1 Credit + Mini Project – 1 Credit + 3 Credit based internship during summer vacation	57
Final Year	24+ Seminar – 1 Credit	Project Work – 20 Comprehensive Viva-2	47
		TOTAL	158

**Table .1 Semester wise Credits Distribution**

- i) There shall be an internship of four weeks duration (summer vacation) in an industry/ top academic institutes of excellence/R&D Centers at the end of the second year second semester
- ii) The internship shall be supervised by a competent faculty member of the institute who in turn shall be in touch with the respective division head of the industry. The internships are compulsory and are credits based.
- iii) All the seminars and mini projects are credit based.

**7. DISTRIBUTION AND WEIGHTAGE OF MARKS:**

- i) In I-semester and III- Semesters, the course of study consists of 6 theory subjects + 2 laboratories. In II, IV and V semesters, the course of study consists of 5 theory subjects + 2 laboratories. However, the final year second semester (i.e. VI Semester) will be on project work only.
- ii) The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. In addition, Class room seminar, mini-project, Internship and project work shall be evaluated for 50, 50,100 and 200 marks respectively.
- iii) For theory subjects the distribution shall be 40 marks (35 for Test and 5 for attendance) for Internal Evaluation and 60 marks for the End- Examination.
- iv) For theory subjects, during the semester there shall be 2 internal tests, for duration of 120 minutes. First subjective test to be conducted in 1 – 2 units and the second test be conducted in 3 – 5 units in each of the Subject. However, the weightage (75% from Best + 25% from the other) of two tests shall be considered for awarding internal marks
- v) The internal test question paper should be for 40 marks. Out of 6 questions given, student has to answer any 4 questions.
- vi) For practical subjects there shall be a continuous evaluation during the semester for 40 sessional marks and 60 end examination marks. Of the 40 marks for internal, 15 marks shall be awarded for day-to-day work, 15 marks to be awarded by conducting Internal laboratory test, 5 marks for record work and 5 marks for attendance. The end examination shall be conducted by an external examiner and the teacher concerned.
- vii) Mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of the Head of the department, the Supervisor of mini project and a senior faculty member of the department. There shall be no internal marks for mini project. The student has to secure minimum 50% marks to be declared successful.

- viii) There shall be class room seminars from I year I Semester onwards. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his/her understanding over the topic, and submit to the department, which shall be evaluated by the Department committee consisting of Head of the department, Seminar supervisor and a senior faculty member. The seminar shall be evaluated for 50 marks based on his/her presentation and the submitted report. There shall be no external examination for seminar. The student has to secure minimum 50% marks to be declared successful.
- ix) Summer internship will be evaluated for 100 marks. Evaluation will be conducted by a committee consisting of Head of the department and two senior faculty members of the department.
- x) At the end of VI Semester, Comprehensive viva will be conducted for 100 marks by a committee consisting of Head of the department, a senior faculty member of the department and an External examiner. Comprehensive Viva will be conducted on all the core subjects of entire MCA course. There is no internal evaluation for this.
- xi) **Project Work:**
1. A Departmental Project Review Committee (DPRC) shall be constituted with the Head of the Department as the chairman and two senior faculty as members to supervise the proceedings of the project work from allotment to submission.
  2. Registration of Project work:  
A student is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses) up to V Semester. A candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the DPRC for its approval. Only after obtaining the approval from DPRC, the student can initiate the Project work.
  3. The duration of the project is for one semester.
  4. If a candidate wishes to change his supervisor or topic of the project, he can do so with approval of the Departmental Project Review Committee (DPRC).

However the departmental review committee shall examine whether the change of topic/supervisor leads to a major change of his initial plans of the project proposal. If so, his date of registration for the project work shall start from the date of change of supervisor or topic as the case may be or whichever is earlier.

5. Three copies of the project report, certified by the supervisor shall be submitted to the College.
6. Out of a total 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the committee consisting of an External Examiner, Head of the Department and the Project supervisor. External examiner will be selected by the Principal/Director out of three member panel submitted by the Head of the Department who are eminent in that field of study. For maximum of 10 students, one project evaluation committee has to be formed.
7. If the work is not satisfactory, and the student could not secure the stipulated grade the student shall revise and resubmit the Project report after three months. If he/she fails to get a satisfactory report again, the project shall be summarily rejected.
8. The topics for mini projects, Internship and project work shall be different from each other. The evaluation of project work shall be conducted at the end of the III year.
9. The student has to clear all the subjects of MCA course to attend the Viva Voce of his/her project.
10. The project internal Evaluation shall be on the basis of two seminars given by each student on the progress of this project, during the project work period.

#### **8. ATTENDANCE REGULATIONS & CONDONATION:**

- i) A student shall be eligible to appear for end semester examinations, if acquired a minimum of 75% of attendance in aggregate of all the subjects.
- ii) Condonation for the shortage of attendance in aggregate up to 10% on medical grounds (65% and above and below 75%) in each semester may be granted by the College Academic Committee. However, the subject of granting is purely at the discretion of the College Academic Committee or competent authority.

- iii) A Student will not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester as applicable. They may seek re-admission for that semester as and when offered next.
- iv) Due weightage in each of the subjects shall be given to the attendance. Marks not exceeding 5 shall be given to all such candidates who satisfies the following criteria

% of attendance	Marks
$\geq 90$	5
85 to $< 90$	4
80 to $< 85$	3
$> 75$ to $< 80$	2
$= 75$	1

- v) Shortage of Attendance below 65% in aggregate shall in No case be condoned.
- vi) Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that particular semester and their registration for examination shall stands cancelled.
- vii) A stipulated fee shall be payable towards condonation of shortage of attendance.
- viii) Attendance may also be condoned for those who participate in prestigious sports, co- and extracurricular activities provided their attendance is in the minimum prescribed range for the purpose and recommended by the concerned authority.

#### 9. MINIMUM ACADEMIC REQUIREMENTS:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.8.

- i) A student shall be deemed to have secured the minimum academic requirement in a subject if he/she secures a minimum of 40% of marks exclusively in the end semester examination and a minimum aggregate of

50% of the total marks in the end semester examination and internal evaluation taken together.

- ii) A student will be promoted to second year, if he/she put up the minimum attendance requirement.
- iii) A student shall be promoted from II to III year only if he/she clears all the subjects of Semester-I, Semester-II of I year MCA.
- iv) Students who fail to earn 158 credits as indicated in the course within six academic years from the year of their admission shall forfeit their seat in MCA course and their admission shall stand cancelled.

#### 10. COURSE PATTERN:

- i) The entire course of study is of three academic years. Each academic year shall have two semesters.
- ii) A Student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject only as and when it is conducted.
- iii) All admitted students are to study 3 electives during their course of three year study at the institute. The following shall be the programme of study of electives.

Year	Semester	No. of electives
2	2	1
3	1	2

- iv) Final year II semester is completely reserved for project work.
- v) When a student is detained due to shortage of attendance/any other reason, he may be re-admitted when the semester is offered after fulfillment of academic regulations. Whereas, the academic regulations hold good with the regulations he/she first admitted.

#### 11. AWARD OF GRADE:

After a student has satisfied the requirement prescribed for the completion of the programme and is eligible for the award of MCA Degree he/she shall be placed in one of the following four grades. The award of the degree is on a grade point of scale 4. The grade points are awarded as follows:

Points	Title
>=3.00	Distinction
>=2.4 and <3.0	First division
>= 2.0 and <2.4	Pass division
< 2.0	Fail

Based on the performance of the candidate, The following shall be the criteria for the award of letter grades at the end of each semester in the subjects in which the candidate appeared for the examination

Marks Scored	Grades	Grade points
>=90	S	4.00
>=85 to<90	A <sup>+</sup>	3.67
>=80 and <85	A	3.33
>=75 and <80	B <sup>+</sup>	3.00
>=70 and <75	B	2.67
>=65 and <70	C <sup>+</sup>	2.33
>=60 and <65	C	2.00
>=55 and <60	D	1.67
>=50 and <55	E	1.33
<50	F	0

### 11.1 Calculation of Semester Grade Points Average (SGPA)

The performance of each student at the end of the each semester is indicated in terms of GPA. The SGPA is calculated as below:

$$SGPA = \frac{\sum(CR \times GP)}{\sum CR}$$

Where **CR**= Credits of a course

**GP** = Grade points awarded for a course

\* **SGPA (Semester Grade Point Average)** is calculated for the candidates who passed all the courses in that semester.

### 11.2 Calculation of Cumulative Grade Point Average (CGPA) for Entire Programme.

The CGPA is calculated as below:

$$CGPA = \frac{\sum(CR \times GP)}{\sum CR}$$

(for entire programme)

Where **CR**= Credits of a course

**GP** = Grade points awarded for a course

**12. MINIMUM INSTRUCTION DAYS:**

The minimum instruction for each semester shall be 90 instruction days excluding examination days.

**13. GENERAL:**

- a. Where the words "he" "him" "his", occur in the regulations, they include "she", "her", "hers".
- b. The academic regulation should be read as a whole for the purpose of any interpretation.
- c. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Director is final.
- d. The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.

**14. TRANSITORY REGULATIONS**

**14.1** A candidate, who is detained or discontinued in the year/semester, on readmission shall be required to do all the courses in the curriculum prescribed for such batch of students in which the student joins subsequently. However, exemption will be given to those candidates who have already passed in such courses, which he/she had passed in the earlier semester(s) he/she was originally admitted into.

**14.2** A student who is following the JNTU, Kakinada curriculum, detained due to lack of academics/attendance at the end of a semester of an academic year, shall join with the autonomous batch at the appropriate semester. Such candidates shall be required to pass in all the courses in the programme prescribed by concerned BOS for such batch of students, to be eligible for the award of degree. However, exemption will be given in all those courses of the semester(s) of the batch, which the candidate joins now, which he/she had passed earlier. The student has to clear all his backlog subjects by appearing the supplementary examinations, conducted by JNTU, Kakinada and Autonomous stream for the award of Degree. The marks secured by the students in JNTUK-Kakinada pattern will be converted into appropriate grade points as per the autonomous grading system and the class will be awarded based on the academic performance of a student in the entire 3years as per the guidelines of autonomous Pattern.

**14.3** The concerned Board of Studies shall give the guidelines regarding 'Course Equivalence' and 'Course Exemptions' from time to time.

**15. COURSE CODE AND COURSE NUMBERING SCHEME:**

Course Numbers are denoted by 5 digit unique alpha numeric characters. First two digits are 'MC', that describes the Course name i.e. Master of Computer Applications.

3. **Third digit** represents semester of offering as mentioned in Table No.

THIRD DIGIT	DESCRIPTION
1	First Semester
2	Second Semester
3	Third Semester
4	Fourth Semester
5	Fifth Semester
6	Sixth Semester

**Table 3: Third digit description**

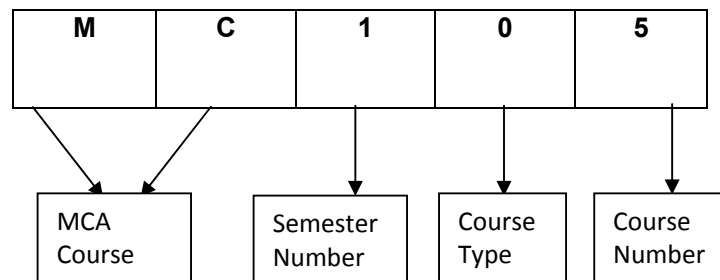
**Fourth digit** represents course type, as per Table No. 4

FOURTH DIGIT	DESCRIPTION
0	Theory course
5	Lab course/other than theory subject

**Table 4 : Course type description**

**Fifth digit** represents course number as described in Figure 1 below. However, different courses are given distinct codes.

For example, **MC105** course, the course is offered in the first semester (**1**), the course is of theory type (**0**) and the course number in that semester (**5**).



**Figure 1: Course code description for courses**

**16. MEDIUM OF INSTRUCTION**

The medium of instruction and examination is English.

**17. AMENDMENTS TO REGULATIONS**

The Academic council from time to time may revise, amend, or change the regulations, schemes of examinations, and/or syllabi.

**18. GRADE CARD**

The grade card issued shall contain the following:

- a) The credits for each course offered for that semester
- b) The letter grade obtained in each course
- c) The SGPA/CGPA
- d) Total number of credits earned by the student up to the end of that semester

**19. CONDUCT AND DISCIPLINE**

- a) Students shall conduct themselves within and outside the premises of the Institute in a manner benefitting the students of our Institution.
- b) As per the order of Honorable Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.
- c) The following acts of omission and/or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures with regard to ragging.
  - i. Lack of courtesy and decorum; indecent behavior anywhere within or outside the campus.
  - ii. Willful damage or distribution of alcoholic drinks or any kind of narcotics to the fellow students/citizens.
- d) Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.
- e) Mutilation or unauthorized possession of library books.
- f) Noisy and unseemly behavior, disturbing studies of fellow students.
- g) Hacking in computer systems such as entering into other person's areas without prior permission, manipulation and/or damage of computer hardware and software or any other cyber crime etc.
- h) Usage of camera cell phones in the campus.
- i) Plagiarism of any nature.

- j) Any other act of gross indiscipline as decided by the academic council from time to time.
- k) Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute / hostel, debarment from a examination, disallowing the use of certain facilities of the Institute, rustication for a specified period or even outright expulsion from the Institute, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.
- l) For an offence committed in (i) a hostel (ii) a department or in a class room and (iii) elsewhere, the chief Warden, the Head of the Department and the principal respectively, shall have the authority to reprimand or impose fine.
- m) Cases of adoption of unfair means and/or any malpractice in an examination shall be reported to the principal for taking appropriate action.
- n) All cases of serious offence, possibly requiring punishment other than reprimand, shall be reported to the Academic council.
- o) The Institute Level Standing Disciplinary Action Committee constituted by the academic council, shall be the authority to investigate the details of the offence, and recommend disciplinary action based on the nature and extent of the offence committed.
- p) The Principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the Program Committee in an appropriate manner, and subsequently such actions shall be placed before the academic council for ratification. Any emergency modification of regulation, approved by the academic council earlier, shall be reported to the academic council for ratification.
- q) **“Grievance and Redressal Committee” (General)** constituted by the principal shall deal with all grievances pertaining to the academic/administrative /disciplinary matters.
- r) All the students must abide by the code and conduct rules of the college.

**20. MALPRACTICES**

- a) The Principal shall refer the cases of malpractices in internal assessment tests and Semester-End Examinations, to a Malpractice Enquiry Committee, constituted by him/her for the purpose. Such committee shall follow the approved scales of punishment. The Principal shall take necessary action, against the erring students basing on the recommendations of the committee.
  
- b) Any action on the part of candidate at an examination trying to get undue advantage in the performance at examinations or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff, who are in charge of conducting examinations, valuing examination papers and preparing/keeping records of documents relating to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and recommended for award of appropriate punishment after thorough enquiry.

**21. AWARD OF RANK**

The rank shall be awarded based on the following:

- 21.1 Only such candidates who pass the Final year examination at the end of the third academic year after admission as regular final year students along with the others in their batch and become eligible for the award of the Degree shall be eligible for the award of rank. Candidates, who loose one or more years of study for any reason whatsoever are not eligible for the award of rank.
  
- 21.2 Ranks shall be awarded in each branch of study for the top five students appearing for the Regular external Examinations.
  
- 21.3 Award of prizes, scholarships, or any other Honors shall be based on the rank secured by a candidate, consistent with the desire of the Donor, wherever applicable.

COURSE STRUCTUREI – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	Credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
MC101	Fundamentals of Computers and C - Programming	4	1	--	40	60	100	4
MC102	Digital Logic and Computer System Organization	4	--	--	40	60	100	4
MC103	Accounting and Financial Management	4	--	--	40	60	100	4
MC104	Discrete Structures and Graph Theory	4	--	--	40	60	100	4
MC105	Probability and Statistical Applications	4	--	---	40	60	100	4
MC106	English Language Communication Skills-I	2	--	2	40	60	100	3
MC151	Fundamentals of Computers and C - Programming Lab	--	--	4	40	60	100	2
MC152	Digital Logic and Computer System Organization Lab	--	--	4	40	60	100	2
MC153	Seminar	--	--	--	50	--	50	1
<b>TOTAL</b>		<b>22</b>	<b>01</b>	<b>10</b>	<b>370</b>	<b>480</b>	<b>850</b>	<b>28</b>

COURSE STRUCTUREII – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	Credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
MC201	Data Structures	4	--	--	40	60	100	4
MC202	Database Management Systems	4	--	--	40	60	100	4
MC203	Operating Systems	4	--	--	40	60	100	4
MC204	Organizational Structure and Personnel Management	4	--	--	40	60	100	4
MC205	Software Engineering	4	--	--	40	60	100	4
MC251	Data Structures Lab	--	--	4	40	60	100	2
MC252	Database Management Systems Lab	--	--	4	40	60	100	2
MC253	Seminar	--	--	--	50	--	50	1
MC254	Mini Project	--	--	--	25	25	50	2
<b>TOTAL</b>		<b>20</b>	<b>--</b>	<b>8</b>	<b>355</b>	<b>445</b>	<b>800</b>	<b>27</b>

COURSE STRUCTUREIII – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	Credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
MC301	OOPs through JAVA	4	--	--	40	60	100	4
MC302	Computer Networks	4	--	--	40	60	100	4
MC303	Software Testing Methodologies	4	--	--	40	60	100	4
MC304	UNIX Network Programming	4	--	--	40	60	100	4
MC305	Operations Research	4	--	--	40	60	100	4
MC306	English Language Communication Skills - II	2	--	2	40	60	100	3
MC351	OOPs through JAVA Lab	--	--	4	40	60	100	2
MC352	UNIX Network Programming Lab	--	--	4	40	60	100	2
MC353	Seminar	--	--	--	50	--	50	1
<b>TOTAL</b>		<b>22</b>	<b>--</b>	<b>10</b>	<b>370</b>	<b>480</b>	<b>850</b>	<b>28</b>

COURSE STRUCTUREIV – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	Credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
MC401	Design and Analysis of Algorithms	4	--	--	40	60	100	4
MC402	Advanced Java	4	--	--	40	60	100	4
MC403	Cryptography and Network Security	4	--	--	40	60	100	4
MC404	'Object Oriented Analysis & Design' Using UML	4	--	--	40	60	100	4
MC4051	<b><u>ELECTIVE- I</u></b> Advanced Databases	4	--	--	40	60	100	3
MC4052	Distributed Operating Systems							
MC4053	Software Design Methodologies							
MC4054	Computer Graphics and Vision							
MC451	Advanced Java Lab	--	--	4	40	60	100	2
MC452	'Object Oriented Analysis & Design' Using UML Lab	--	--	4	40	60	100	2
MC453	Industry Oriented Internship	--	--	--	--	100	100	2
MC454	Seminar	--	--	--	50	--	50	1
MC455	Mini Project				50	50	100	2
MC456	Comprehensive Viva				--	100	100	2
<b>TOTAL</b>		<b>20</b>	<b>--</b>	<b>8</b>	<b>380</b>	<b>670</b>	<b>1050</b>	<b>30</b>

COURSE STRUCTUREV – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	Credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
MC501	Business Intelligence(BI)	4	--	--	40	60	100	4
MC502	Artificial Intelligence	4	--	--	40	60	100	4
MC503	Multimedia Application Development	4	--	--	40	60	100	4
MC5041 MC5042 MC5043 MC5044	<b><u>ELECTIVE - II</u></b> Database Tuning Open Source Software Software Quality Management Cloud Computing	4	--	--	40	60	100	3
MC5051 MC5052 MC5053 MC5054	<b><u>ELECTIVE - III</u></b> Database Administration UNIX Administration Software Project Management Principles of Programming Languages	4	--	--	40	60	100	3
MC551	Business Intelligence Lab	--	--	4	40	60	100	2
MC552	Multimedia Application Development Lab	--	--	4	40	60	100	2
MC553	Seminar	--	--	--	50	--	50	1
MC554	Comprehensive Viva					100	100	2
<b>TOTAL</b>		<b>20</b>	<b>--</b>	<b>08</b>	<b>330</b>	<b>520</b>	<b>850</b>	<b>25</b>

COURSE STRUCTUREVI – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	Credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
MC651	Project Work	-----			50	150	200	20
<b>TOTAL</b>		-----			<b>50</b>	<b>150</b>	<b>200</b>	<b>20</b>

**MC101 – FUNDAMENTALS OF COMPUTERS AND C-PROGRAMMING**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
<b>Tutorial</b>	<b>: 1 Period/Week</b>	<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

Introduction to Computers, History and Generations of Computers, Primary and Secondary memory, Input-output devices, ALU, Processor, Applications of computers, Introduction to DOS and Windows, Data representation. Types of languages, ASCII character set. Introduction to LAN, MAN, WAN, Internet and WWW.

**UNIT - II**

Algorithm / pseudo code, Flowcharts, Program development steps, Structure of C program, Identifiers, Basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation.

Control structures - If, If-Else, goto, labels, and switch statements, Loops- while, do-while and for statements, break, continue, Programming examples.

**UNIT - III**

Introduction to Arrays, 1-D arrays - declaration, definition, accessing elements, storing elements, Character arrays & Strings, string handling functions, Multidimensional arrays – example programs on arrays to expose various applications on different kinds of arrays.

**UNIT - IV**

Functions- basics, types of functions, types of parameters, parameter passing, storage classes- extern, auto, register, static, scope rules, Call by value, recursive functions, header files, C pre-processor, example programs. Pointers- concepts, declaration and initialization of pointer variables, pointers as function arguments, passing arrays to functions, dangling pointers, address arithmetic, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, C program examples.

**UNIT - V**

Derived Types-enum, typedef, structures- declaration, definition and initialization of structures, accessing structures, Nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, bit-fields, Concept of a file, text files and binary files, Formatted I/o, file I/o operations, C program examples.

**TEXT BOOKS**

1. Introduction to computers by Peter Nortons, MGH 5<sup>th</sup> Edition.
2. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.

**REFERENCES:**

1. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/ Pearson.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.
3. Programming in C, Stephen G. Kochan, III Edition, Pearson.
4. Let us C by Yaswanth Kanetkar.

**MC102 – DIGITAL LOGIC AND COMPUTER SYSTEM ORGANIZATION**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

Introduction to Digital Computer.

- 1.1 Number system - Binary, Octal, HEXA and their inter-conversion, 1's and 2's complement.
- 1.2 Boolean Algebra and Logic Gates, De-Morgan's Theorem, Duality Theorem,
- 1.3 K-Maps
- 1.4 Introduction, Binary Addition, Binary Subtraction, Addition/Subtraction of Numbers in 1's Complement Notation, addition/Subtraction of Numbers in Two's Complement Notation, Fixed and floating point representation of numbers.

**UNIT - II**

Combinational Circuits

- 2.1 Half Adder, Full Adder, Binary Adder and Subtractor
- 2.2 Decoder / Encoder.
- 2.3 Multiplexer / De-multiplexer
- 2.4 Sequential Circuits: Flip Flops - SR, D, JK, Master – Slave, Edge Triggered
- 2.5 Shift Registers.
- 2.6 Introduction to Counters: Synchronous as well as Asynchronous Counter

**UNIT - III**

Memory System

- 3.1 Memory Hierarchy
- 3.2 Primary Memory – DRAM, SDRAM, DDR, RDRAM. ROM, PROM, EPROM, EEPROM
- 3.3 Concepts of Auxiliary, Associative,
- 3.4 Cache And
- 3.5 Virtual Memory

**UNIT- IV**

CPU Organization

- 4.1 CPU Building Blocks
- 4.2 CPU Registers and BUS Characteristics. Interface Basics  
(Only Block Diagram) + Local Bus features & Types should be covered.
- 4.3 Addressing Modes, Instruction and Execution Interrupt cycle
- 4.4 Pipelining, Arithmetic Pipelining +RISC Pipelining
- 4.5 Micro programmed control - control memory, address sequence, micro program example.

## **UNIT - V**

Input Output Organization

5.1 IO interface

5.2 Modes of Transfer

5.3 Asynchronous Data Transfer

5.5 Interrupt

5.6 Direct Memory Access

5.7 Input Output Processor, Types (SISD, SIMD, MIMD, MISD)

## **TEXT BOOK**

MORRIS MANO, "Computer System Architecture " PHI Publication ,3<sup>rd</sup> edition.

## **REFERENCES**

1. THOMAS C BARTEE, "Digital Computer Fundamentals " TMH Publication ,6<sup>th</sup> edition.
2. The Essentials of Computer Organization and Architecture Linda Null and Julia Lobur,2<sup>nd</sup> edition.
3. Computer Organization and Architecture, William Stallings 8<sup>th</sup> edition, Pearson
4. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006
5. Computer Organization & Design Pal Chaudhuri, 3<sup>rd</sup> edition, PHI.

**MC103 – ACCOUNTING AND FINANCIAL MANAGEMENT**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Fundamentals of accounting:** Meaning, Nature and Scope of Accounting. Double entry system of accounting. User of accounting information, Role of Accountant in modern organization.

Accounting Process : Basic books of accounts – Journals, Ledger & subsidiary books. Preparation of trial balance, Final Accounts , company final accounts.

**UNIT - II**

**Basics of Financial Management:** Meaning and scope of Financial Management, Role of Financial Manager in Modern organization

Objectives of financial Management ,Time value of money , overview capitalization and under Capitalization, Financial accounting Vs Financial management Vs Cost accounting.

**UNIT - III**

**Overview of Cost Accounting and Marginal Costing:** Meaning, nature, Scope and importance of Cost Accounting, basic cost concepts, cost sheet. Absorption costing Vs Marginal Costing. Practical applications of marginal costing. Cost – volume – profit analysis –break Even point – significance and limitation of C-V-P Analysis, simple problems on marginal costing and C-V-P analysis.

**UNIT - IV**

**Budgetary control and standard costing:** Meaning and features of budgetary control – preparation of various types of budgets fixed and flexible budgets ( production , sales, cash and master budgets) zero based budgeting.

Standard costing : Meaning and features of Standard costing – standard costing Vs budgetary control. Variance analysis – material, labor, over head and sales variances – simple problems.

**UNIT - V**

**Accounting principles and computerized accounting:** Generally accepted accounting principles (GAAP) accounting concepts and conventions –Accounting standards issued by ICAI. Computerization of Accounts – Accounting packages – Tally & wings – Documents used for data collection, files management, master files transaction files – processing of different files and output obtained.

**TEXTBOOK**

Basic Financial Accounting for Management by T. Paresh Shah, Oxford University Press, New Delhi,2008 edition.

**REFERENCES**

1. Accounting for Management, T. Vijay Kumar, TMH.
2. Guide to Financial Management, John Tannent, Viva.
3. Financial Accounting, A. Mukherjee and M. Haneef, TMH
4. Basic Financial Accounting for Management, Ambaresh Gupta, Pearson
5. Cost & Management Accounting, S.N.Maheswari, sultan chand publications

**MC104 – DISCRETE STRUCTURES AND GRAPH THEORY**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Mathematical Logic:** Statements and Notations, Connectives, Well formed Formulas, Truth Tables, Equivalence Implications, and Normal Forms  
 Rules of Inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving, Predicate Calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free and bound variables, universe of discourse, inference theory of predicate calculus

**UNIT - II**

**Set theory and Relations:** Introduction, Relations and ordering, properties of binary relations, Equivalence, Compatibility relations, Partial Ordering, Hasse Diagram.  
**Functions:** Composition of functions, Inverse function, recursive functions, Lattices and its properties, Pigeonhole principle and its applications.

**UNIT - III**

**Algebraic Structures:** Algebraic systems, Examples and general properties, Semi groups and monoids, groups, subgroups, Examples, Homomorphism, Isomorphism and related problems  
**Elementary Combinatorics:** Basics of Counting, Enumeration of Combinations and Permutations, Enumeration of Combinations and Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial and Multinomial theorems, principle of inclusion and exclusion.

**UNIT - IV**

**Generating Functions:** Generating function of sequences, calculating coefficient of generating functions  
**Recurrence Relations:** Solving recurrence relations by substitution, characteristic roots and by generating functions. Solution of non homogeneous recurrence relations

**UNIT - V**

**Graph Theory:** Representation of Graph, Spanning Trees, BFS, DFS, Dijkstra's algorithms, Kruskal's algorithm, Primes algorithm, Binary trees, Planar graphs.  
 Graph Theory and Applications, Basic concepts, Isomorphism and sub graphs, multi graphs, Euler circuits, Hamiltonian graphs, Chromatic Numbers.

**TEXT BOOKS**

- 1 Discrete Mathematical Structures with Applications to Computer Science – J.P.Tremblery, R.Manohar; TMH.
- 2 Discrete Mathematics for Computer Scientists and Mathematicians – J.L.Molt, A.Kandel, T.P.Baker; PHI.

## **REFERENCES**

1. Elements of Discrete Mathematics, C L Liu, D P Mohopatra, TMH.
2. Discrete Mathematics, Schaum's Outlines, Lipschutz, Lipson TMH.
3. Discrete Mathematical Structures, Kolman, Busby, Ross, 6<sup>th</sup> ed; PHI, 2009.

**MC105 – PROBABILITY AND STATISTICAL APPLICATIONS**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

Probability Theory: Sample spaces Events & Probability; Discrete Probability; Union, intersection and compliments of events; Conditional probability; Baye's theorem.

**UNIT - II**

Random variables and distribution: Random variables Discrete Probability Distributions, Continuous probability distribution, Mathematical Expectation or Expectation Binomial, Poisson, Normal. Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences. Central limit Elements. Theorem and related applications.

**UNIT - III**

Estimation – point estimation, interval estimation, Bayesian estimation, Text of hypothesis, one-tail, two-tail test, test of Hypothesis concerning means. Test of Hypothesis concerning proportions, F-test, goodness of fit.

**UNIT - IV**

Linear correlation coefficient Linear regression; Non Linear regression Least square fit ; polynomial and Curve fittings

**UNIT - V**

Queuing theory – Markov Chains – Introduction to Queuing systems – Elements of a queuing model – Exponential distribution – Pure birth and death models. Generalized Poisson Queuing model – Specialized Poisson Queues.

**TEXT BOOK**

Probability & Statistics.by T.K.V. Iyengar, S. Chand, 3<sup>rd</sup> Edition,2011.

**REFERENCES**

1. Higher Engineering Mathematics by B.V.Ramana, 2009 Edition, TMH,New Delhi.
2. Fundamentals of Mathematical statistics by S.C.Gupta & V.K.Kapoor Sultan Chand & Sons,New Delhi(2009).
3. Probability and Statistics by Schaum outline series,Lipschutz Seymour, TMH,NewDelhi, 3<sup>rd</sup> edition,2009.
4. Probability and Statistics by Miller and Freund,Prentice Hall India,NewDelhi, 7<sup>th</sup> edition,2009.

**MC106 – ENGLISH LANGUAGE COMMUNICATION SKILLS**

<b>Lecture</b>	<b>: 2 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
<b>Lab</b>	<b>: 2 Periods/week</b>	<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

This composite syllabus including Communication Skills Lab activities is designed for the students of MCA for various functional and situational purposes - professional or social. It aims at building effective language and communication competence, highly desirable social and behavioral traits required in academic and professional pursuits. This is sought to be achieved through an amalgamation of theoretical aspects and laboratory based skill oriented activities. Ultimately, employability quotient is sought to be improved in alignment with various soft skills.

**UNIT – I****Communicative Grammar****Part A**

Tense forms, Subject - Verb Agreement, Question Tags. Sounds of English (To Practice in the Lab)

**Part B**

One-Word Substitutes; Formation of Words, Using Words as Different Parts of Speech

**UNIT - II**

Communication – Process, Methods and Channels of Communication, Non Verbal Communication – Body Language

**UNIT - III**

Oral Presentations – Extempore & Prepared - Types of Presentation –JAM- Role Play- Group Discussion

**UNIT - IV**

Features of Effective Writing-7 Cs- Business Letters – Format - Style - Analysis of Sample Letters Collected from Industry – e-mail- Resume Writing

**UNIT - V**

Soft Skills-Significance and Components, Interpersonal Skills, Professional Etiquettes, Team Work, Empathy. This is a composite syllabus with equal emphasis on theory and conceptual clarity and practical exposure. Relevant cases have to be discussed in each unit and students must work in groups for Oral activities.

**REFERENCES & SOFTWARE**

1. John Seely. *Oxford Guide to Effective Writing and Speaking*: Oxford University Press, New Delhi, 2005.
2. Murphy. *English Grammar*: Cambridge University Press, New Delhi, 2009.
3. Rizvi Ashraf M .*Effective Technical Communication* : Tata McGraw Hill, New Delhi, 2008.
4. Ramesh & Ramesh . *Ace of Soft skills*: Pearson Education, New Delhi, 2009.



- V)** a) Write a C program to find sum and average of given numbers using Arrays.  
b) To display elements of array in reverse order  
c) To search whether the given element is in the array (or) not using linear search & binary search.  
d) Write a C program to perform the following operations  
i) Addition, subtraction and multiplication of Matrices  
ii) Transpose of given matrix  
e) Write a C program to find whether the given string is palindrome (or) not.  
f) To accept line of text and find the number of characters, number of vowels and number of blank spaces in it.  
g) Write an example program to illustrate the use of any 5 string handling functions.
- VI)** a) To find factorial of a given number using functions.  
b) Swap two numbers using functions.  
c) To find GCD of two numbers using recursion  
d) Write a recursive function to solve Towers of Honai problem.  
e) Write an example program to illustrate use of external & static storage classes.
- VII)** a) Example program to bring clarity on pointer declaration & initialization.  
b) Write an example program to describe the usage of *call by reference*.  
c) Write a program to find sum of the elements of the array using functions.  
d) Write an example program using command line arguments.  
e) Program to illustrate the usage of dynamic memory management functions.
- VIII)** a) Write an example program using structures to process the student record. Assume suitable fields for student structures ( Different kinds of initialization of structure variables are to be exercised)  
b) Write a program to read records of 10 employees and find their average salary( exercise array of structures & Nested structures concepts through this program)

**MC152 – DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION LAB**

	<b>Internal Marks</b>	<b>: 40</b>
<b>Lab/Practical : 4 Period/Week</b>	<b>External Marks</b>	<b>: 60</b>
<b>Credits : 2</b>	<b>External Examination</b>	<b>: 4 Hrs</b>

**EXERCISE 1**

Using Logic Gates:- AND, OR, NOT , NOR, XOR, NAND, XNOR, Buffer

**EXERCISE 2**

Boolean Algebra: Theorems and logical Gates, verification of truth tables for some given expressions

**EXERCISE 3**

Realization of Boolean expressions ; Using (i) AND – OR-NOT Gates (ii) NAND Gates (iii) NOR Gates

**EXERCISE 4**

Latches Flip – Flops : RS, JK,T,D, Master –Slave FF, Edge – Triggered Flip – Flops

**EXERCISE 5**

Registers: All types of Shift Register s and Adder, Subtractor, Divider, Negator, Comparator

**EXERCISE 6**

Counters: Binary Counter, Synchronous Binary Counter, Synchronous Up/Down counter

**EXERCISE 7**

Asynchronous Binary Counter, Ripple Counter, Decade Counter, Up/Down Counter

**EXERCISE 8**

Modulo Counter: Modulo - 5, Modulo – 10

**EXERCISE 9**

Adders / Sub tractors: Half Adder, Full Adder, 1 's and 2's complement addition

**EXERCISE 10**

Multiplexers/ Data Selector: 2- input and 8- input, Demultiplexers , Logic Function Generator

**EXERCISE 11**

Decoders and Encoders

**EXERCISE 12**

BCD adders and Comparators

**EXERCISE 13**

Code Converters : Decimal –to-Binary, Binary – to – Decimal, Decimal – to- Hexa Decimal, BCD- to –Decimal, Binary – to- gray, gray- to –Binary

**EXERCISE 14**

RAM, ROM, PROM, EPROM – Testing Memory Chips

**REFERENCES**

1. Digital Fundamentals, Floyd & Jain, Pearson, 2005.
2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

**MC201 – DATA STRUCTURES**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

Introduction to the Data structures, Linear and nonlinear, Static and dynamic data structures, Introduction to complexity analysis & asymptotic notations.

Searching & sorting techniques: Linear and Binary search methods, Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort.

**UNIT - II**

Dynamic Memory allocation, Linked List- Single and Double Linked List – Implementation of various operations

**UNIT - III**

Stack and Queues: Definition, representation, Applications, Infix to postfix conversion using stacks, Evaluation of Postfix expressions using stacks, Operations on Stacks and Queues, Circular Queues, DEQueues and Priority Queues.

**UNIT - IV**

Trees- Terminology, Binary trees representation and Tree traversals, Expression trees, BST and operations on BST, Heap and Heap sort, Threaded binary trees.

**UNIT - V**

Graphs – Terminology, Graph representation, Graph traversals-DFS, BFS, Dijkstra's, Warshall's and Floyd's algorithms, Minimum Cost spanning trees-Prim's and Kruskal's algorithms

**TEXT BOOK**

Fundamentals of Data structures by Horowitz & Sahani, Galgotia, 1<sup>st</sup> Edition.

**REFERENCES**

1. Introduction to Data structures with applications, Jean Paul Trembly & Paul G.Sorenson Second Edition, TMH.
2. Data structures using C and C++, Langsam, Augenstein and Tenenbaum, PHI.
3. Problem solving with C++, the OOP 4<sup>th</sup> Edition W.Savitch, Pearson Education.
4. Schaum's outline series – Theory and Problems of Data Structures by Seymour and Lipschutz, MGH International Edition.
5. Schaum's outlines Data structures with C++ John R. Hubbard

**MC202 – DATABASE MANAGEMENT SYSTEMS**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

Database system Applications, Database system Vs File system, View of data, Data abstraction, Instances and Schemas, Data base users, Database system structure, Database design and ER diagrams, Beyond - ER Design Entities, Attributes, Entity sets, Relationships and Relationship sets, Additional features of ER model.

**UNIT - II**

Introduction to Relational model- Integrity constraints over the relations, Enforcing integrity constraints, Database Languages, DDL, DML, TCL, basic form of SQL query, querying relational data, Logical database design, views, Destroying and altering tables/views. Nested queries, correlated nested queries, Null values, Relation Algebra- selection, projection, renaming, join, examples, Tuple relational calculus, Domain relational calculus.

**UNIT - III**

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless-join Decomposition , Dependency- preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – Fourth Normal Form and Fifth Normal form.

**UNIT - IV**

Overview of Transaction Management: ACID Properties – Transactions and Schedules – Concurrent Execution of transaction –Lock Based Concurrency Control – Performance Locking – Transaction Support in SQL. Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions – Dealing with Dead Locks – Specialized Locking Techniques – Concurrency without Locking. Crash recovery. Crash recovery - Introduction to ARIES – the Log – Other Recovery related Structures – the Write-Ahead Log Protocol – Check pointing.

**UNIT - V**

Overview of Storage and Indexing: Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing Tree base Indexing – Comparison of File Organizations –Indexes and Performance Tuning. Introduction to Distributed databases. The System Catalogue, Tree Structured Indexing: Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: Dynamic Index Structure. Hash Based Indexing: Static Hashing – Extendable hashing – Linear Hashing – Introduction to Query Optimization.

**TEXT BOOKS**

1. Data Base System Concepts, 6/e, Silberschatz, Korth, TMH
2. Data Base Management Systems, Raghurama Krishnan, Johannes Gehrke, TMH

**REFERENCES**

1. Data Base Management System, 5/e, Elmasri Navathe, Pearson
2. Introduction to Data Base Systems, 8/e, C.J.Date, Pearson
3. Data Base Management Systems, Majumdr, Bhattacharyya, TMH ,96
4. Data Base System Concepts, Peter ROB,Coronel,Cengage.

**MC203 – OPERATING SYSTEMS**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Introduction to Operating System:** Definition of Operating System, Functions of Operating System, Multi-user, Multiprocessing, Multiprogramming, Time Sharing, Real Time Systems, Virtual Computer, Hardware Interface, CPU, Memory and addressing, Interrupts and I/O Devices, Operating System Structure, System Components, Services, System Calls, System Programs, System Design and Implementation.

**UNIT - II**

**Process Management:** Process concept, Context Switching, Process Control Block, Process Scheduling, Operations on Processes, Co-operating Processes, Inter Process Communication,  
CPU Scheduling: Scheduling Concepts, Criteria, Scheduling Algorithms, Multiprocessor Scheduling, Real time Scheduling.

**UNIT - III**

**Process Synchronization:** Critical Section, Synchronization Hardware, Semaphores, Problems of Synchronization, Critical Regions, Monitors.  
**Deadlocks:** Characterization, Handling Deadlocks, Deadlock Prevention, Avoidance, Detection, Deadlock Recovery.

**UNIT - IV**

**Memory Management:** Storage Hierarchy, Storage Management Strategies: Contiguous, Non Contiguous Storage Allocation, Single User-Fixed Partition, Variable Partition, Paging, Segmentation, Swapping-Virtual Memory concept, Demand paging and its performance, Need for Page Replacement, Page Replacement Algorithms, Thrashing.

**UNIT - V**

**File System Interface and Implementation:** Access Methods, Directory Structure, Protection, File system structure, Allocation Methods, Free space Management, Directory Management, Directory Implementation, Efficiency and Performance, RAID Levels.  
**Device management:** Physical characteristics Disk Scheduling: FCFS, SST, and C- SCAN, sector queuing. I/O scheduling policies ,terminal I/O handling , channels and control units, I/O buffering, Disk Cache.

**TEXT BOOK**

Silberschatz, Galvin ,Gagne, “Operating System Principles”, 7<sup>th</sup> Edition, Wiley.

## **REFERENCES**

1. Tenenbaum A.S., Modern Operating Systems, 2<sup>nd</sup> edition, Pearson Education, 2001
2. William Stallings, "Operating Systems", Sixth edition, PHI.
3. Milan Milankovic, "Operating Systems, Concepts and Design", McGraw-Hill.
4. Harvey M Deital, "Operating Systems", Addison Wesley
5. Operating System By Stuart .E. Madnick & John. J. Donovan

**MC204 – ORGANIZATION STRUCTURE AND PERSONNEL MANAGEMENT**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Introduction to Management:** Concepts, Nature and definitions of Management- Management and administration, principles of management functions of management - planning, organizing, directing and controlling-importance of management-introduction to motivation.

**UNIT - II****Classical Theories of Organization & Behavior Theories of Organization:**

Functional approach-division of labor, levels of authority, span of control, authority & responsibility, Efficiency of management.

Concept of organization structure-formal and informal organization, difficulties due to informal organization-group behavior-Committee-motivation and theories of motivation.

**UNIT - III**

**Human Resource Management:** Objectives, functions of HRM, duties and responsibilities of HR department in the organization-changing, concepts of personal management

**UNIT - IV**

**HR Planning, Training and Development:** Preparation of man power inventory and forecasting, job description, recruitment, job specification and selection, Interviewing techniques, transfers, promotion and its policies.

Objectives of training-identifying training needs-training methods-on the job training-off the job training-job evolution-training functions India- state of-Art-survey.

**UNIT - V**

**Communication, Strategic Management:** Importance of communication, communication process-methods of -two way communication, barriers of communication, Organizational barriers-essentials of effective Communication system.

Introduction-study of Strategic Management-environmental scanning-internal environment and external environment SWOT analysis-challenges in LPG.

**TEXT BOOK**

Personnel and Human Resource Management,Recenzo,Robins,PHI,India.

**REFERENCES**

1. Human Resource Management by Gay Dessler-PHI,India.
3. Organization and Management,Agarwal,TMH.
4. Personnel management and Human Resources, Venkat Ratnam,TMH.
5. Human Resource Management- L.M.Prasad, S.Chand Publications.
6. Human Resource & Personnel Management-Aswathappa, TMH

**MC205 – SOFTWARE ENGINEERING**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software, Software myths.

**A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI)

**Process models:** The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

**Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

**UNIT - II**

**Requirements engineering process:** Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

**Design Engineering:** Design process and Design quality, Design concepts, the design model.

**Creating an architectural design:** software architecture, Data design, Architectural styles and patterns, Architectural Design.

**UNIT - III**

**Object-Oriented Design:** Objects and object classes, An Object-Oriented design process, Design evolution.

**Performing User interface design:** Golden rules, User interface analysis and design, Interface analysis, interface design steps, Design evaluation.

**UNIT - IV**

**Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

**Product metrics:** Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

**Metrics for Process and Products:** Software Measurement, Metrics for software quality.

**UNIT - V**

**Risk management:** Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

**Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

**TEXT BOOK**

Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition.  
McGraw-Hill International Edition.

**REFERENCES**

1. Software Engineering- Somerville, 7th edition, Pearson education.
2. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers.
3. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
4. Software Engineering principles and practice- Waman S Jawadekar, MGH.

**MC251 – DATA STRUCTURES LAB**

	<b>Internal Marks</b>	<b>: 40</b>
<b>Lab/Practical : 4 Period/Week</b>	<b>External Marks</b>	<b>: 60</b>
<b>Credits : 2</b>	<b>External Examination</b>	<b>: 4 Hrs</b>

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**LIST OF EXPERIMENTS**

Implement the following programs using C language.

1. Implement Linear and Binary Search mechanisms.
2. Sort the given list of numbers using a) Selection Sort b) Bubble Sort c) Insertion Sort d) Merge sort e) Quick sort
3. Create a single linked list and implement the following operations:
  - a) Insert a node at specific position
  - b) Delete a node from a specific position
  - c) Counting the nodes
  - d) Reversing the linked list
4. Create a Double linked list and implement the following operations:
  - a) Insert a node at specific position
  - b) Delete a node from a specific position
  - c) Counting the nodes
  - d) Reversing the linked list
5. Implement PUSH and POP operations on Stacks using Arrays. Handle the OVERFLOW and UNDERFLOW problems also.
6. Implement PUSH and POP operations on Stacks using Linked List. Handle the OVERFLOW and UNDERFLOW problems also.
7. Implement Insertion and Deletion operations on Queues using Arrays. Handle the OVERFLOW and UNDERFLOW problems also.
8. Implement Insertion and Deletion operations on Queues Linked List. Handle the OVERFLOW and UNDERFLOW problems also.
9. Implement Insertion and Deletion operations on Queues using Arrays and Linked List. Handle the OVERFLOW and UNDERFLOW problems also.
10. Write program to create a BST and traverse it in Inorder, Preorder and Post order.
11. Write a program to count the number of leaf nodes in a Binary tree.
12. Write a program to find the Path Matrix of a graph using Warshall's algorithm.
13. Implement BFS and DFS traversal techniques on a given graph.
14. Write a program to find the All Pairs Shortest Path matrix using Floyd's

**MC252 – DATABASE MANAGEMENT SYSTEMS LAB**

	<b>Internal Marks</b>	<b>: 40</b>
<b>Lab/Practical : 4 Period/Week</b>	<b>External Marks</b>	<b>: 60</b>
<b>Credits : 2</b>	<b>External Examination</b>	<b>: 4 Hrs</b>

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**DATABASE MANAGEMENT SYSTEMS LAB (Using Oracle, SQL & PLSQL)**

1. Creating tables for various relations(in SQL)
2. Construct a bank database with ER diagrams and tables with all IC's
3. Create sailors, reserves and boats tables and implement all algebraic operations.
4. Create a database for university with all IC's
5. Aggregate functions
6. String functions
7. Nested queries
8. Views
9. Writing Triggers on bank database
10. Writing triggers on university database
11. Writing functions
12. Writing procedures
13. Forms
14. Reports

**MC301 – OOPS THROUGH JAVA**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I****Features of OOPS:**

Introduction to Java, History of Java, Features of Java, The Java Virtual Machine, Garbage collection , Java is important for Internet, Programming concepts of basic Java, Identifiers and Keywords, Data types in Java, Java coding conventions, Expressions in Java, Control structures, Decision making statements ,Arrays.

**UNIT - II**

Objects and Classes, Object fundamentals, Pass by value, Pass by reference, Overloading, Overriding, Constructors, Finalization, Subclasses(Inheritance), this, super, final with inheritance, Dynamic method dispatch, Scope rules, Static data, Static methods, Static blocks. ,All modifiers of class, String Handling, Command line arguments, Abstract Classes, Interfaces, Inner classes, Packages, Package access, Importing packages and classes, User define packages, Class-path.

**UNIT - III**

Exception Handling, Types of Exceptions, try, catch, finally, throw keywords, Creating your own Exceptions.

**Multithreading** - Differences between multiple processes and multiple threads, Thread states, Creating threads, Interrupting threads, Thread priorities, Synchronizing threads, Inter thread communication, Thread groups, Daemon threads.

**UNIT - IV**

Abstract Window Toolkit, Components and Graphics, Containers, Frames and Panels, Layout Managers, Border Layout, Flow Layout, Grid Layout, Card Layout, Event delegation model, Event source and handlers, Event categories, Listeners, Adapters classes, Anonymous classes.

**Applets**

Types of Applets, Applet life cycle, Graphics, getDocumentBase() & getCodeBase ()

**UNIT - V****Java.util**

Java utility packages, Classes & Interfaces, HashTable, Vector, ArrayList, StringTokenizer, Date.

**SWINGS**

Introduction to Swings: Japplet, Handling Swing Controls like Icons, Buttons, TextBoxes, CombBoxes, TabbedPanels, ScrollPanels, JTree, JTable, Differences between AWT Controls & Swing Controls, developing home page using Applets & Swings.

**JAVA I/O**

Files and Streams, Stream classes, Reader-Writer classes, File class tests and Utilities, Serialization and Deserialization.

**TEXT BOOK**

The Complete Reference Java J2SE ,7th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.

**REFERENCES**

1. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons, Pearson Edu.
2. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
3. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
4. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
5. Beginning in Java 2, Iver Horton, Wrox Publications.
6. Java, Somasundaram, Jaico.
7. Introduction to Java programming, By Y.Daniel Liang, Pearson

**MC302 – COMPUTER NETWORKS**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I****Introduction:**

Uses of Computer Networks, Network Hardware: LAN, MAN, WAN, Bridges, Repeaters, Gateways, Network Software: Protocol hierarchies, Design issues, Types of services, Reference models: OSI, TCP/IP, ATM

**Physical Layer:**

Guided Transmission Media

**UNIT - II****Data Link Layer:**

Design issues of Data Link Layer, Error Correction and Detection, Elementary Data Link Protocols: Unrestricted Simplex Protocol, Stop and Wait, Simplex Protocol for noisy channel, Sliding Window Protocol, Go back N, Selective Repeat, HDLC.

Medium Access Control sublayer (MAC): Multiple Access Protocols, Ethernet-802.3, Wireless LAN, Bluetooth.

**UNIT - III****Network Layer:**

Design Issues of Network Layer, Routing Algorithms: Optimality, Shortest path, Flooding, Distance Vector Routing, Hierarchical Routing, and Routing for Mobile Hosts. Congestion Control Techniques: Leaky Bucket, Token Bucket. Congestion Prevention Techniques: Traffic Shaping, Choke Packet, Load Shedding, Jitter Control.

**UNIT - IV****Transport Layer**

Services of Transport Layer, Elements of Transport Protocols:UDP and TCP, Service Model, Protocol segment Header, Connection Establishment, Connection Release, TCP Connection Management.

**UNIT - V****Application Layer**

DNS: Domain Name System, Electronic Mail (SMTP) :Architecture, User Agent , Message Format, Message Transfer, Delivery, FTP, The World Wide Web (HTTP) , Introduction to Storage Area Networks(SAN), Peer-to-Peer Networks

**TEXT BOOK**

Andrew S. Tanenbaum "Computer Networks" Fourth Edition, Pearson Education-2002.

## **REFERENCES**

1. Behrouz A.Frouzon "Data Communications and Networks" Tata McGraw Hill Publication, 2006
2. William Stallings "Data and Computer Communication "Sixth Edition , Pearson Education Asia, 2002.
3. Larry L.Peterson and Bruce S.Davie "Computer Networks" A system approach Third Edition, Kaufmann Publisher, 2003.
4. Computer Communication and Networking Technologies" Michel A. Gallo, William M.Hancock- Thomson Publication.
5. Understanding Data Communications and Networks, William Ashay, 2<sup>nd</sup> Edition, Vikas Publishing House.

**MC303 – SOFTWARE TESTING METHODOLOGIES**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I****Basics of Software Testing:**

Humans, Errors and Testing, Software Quality, Requirements, Behavior and Correctness, Correctness versus Reliability, Testing and Debugging, Test Metrics, Software and Hardware testing, Testing and Verification, Defect Management, Execution History, Test-Generation strategies, Static Testing, Control flow Graph, Dominators and Post Dominators, Program dependence Graph.

**UNIT -II****Testing Techniques:**

Levels of Testing, Acceptance Testing. Special Tests: Complexity Testing, GUI Testing, Security Testing, Performance, Volume and Stress Testing, Recovery Testing, Requirement Testing, Regression Testing, Smoke Testing, Sanity Testing, Adhoc Testing, State Graph, Object-Oriented Applications Testing, COTS Testing.

**UNIT - III****Test Planning:**

Test policy, Test strategy, Test plan, Quality plan and Test plan, Quality plan template, Test plan template, Guidelines for developing the Test plan, Test Standards, Building Test data and Test cases, Test scenario, Test cases, Template for Test cases, Test scripts, Test Log Document, Effective Test cases, Test file, Building Test data, Generation of Test data, Roles and Responsibilities in Testing life cycle, Test progress monitoring.

**UNIT - IV****Test Metrics and Test Reports:**

Test Metrics and Test Reports, Categories of the Product/Project Test Metrics, Estimated, Budgeted, Approved and Actual, Resources Consumed in Testing, Effectiveness of Testing, Defect Density, and Defect Leakage Ratio, Residual Defect Density, Test team efficiency, Test case efficiency, Rework ,MTBF/MTTR, Implementing Measurement Reporting System in an Organization, Test Reports, Project Test Status Report, Test Reports: Integration Test Report, System Test Report, Acceptance Test Report, Guidelines for writing and using Report, final Test Reporting, Test Status Report.

**UNIT - V****Test process Improvement:**

The need for Test process Improvement, Test process Maturity, Test process Improvement Model, Test process Improvement Model stages, Graphical representation of Improvements.

**Testing Tools:**

Introduction, Features of Test Tool, Guidelines for selecting a Tool, Tools and Skills of Tester, Static Testing Tools, Dynamic Testing Tools, Advantages of using Tools, When to use Automated Test Tools.

**TEXT BOOK**

Software Testing, Principles, Techniques, and Tools.—M G Limaye (TMH).

**REFERENCES**

1. Foundations of Software Testing. – Aditya P. Mathur
2. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
3. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.
4. Software Testing Techniques – SPD(Oreille)
5. Software Testing in the Real World – Edward Kit, Pearson.
6. Effective methods of Software Testing, Perry, John Wiley.

**MC304 – UNIX NETWORK PROGRAMMING**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

Unix Utilities-Introduction to Unix file system, Features of Unix OS, vi editor, File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, umask, ulimit, ps, who, w, finger, arp, ftp, telnet, rlogin, text processing utilities and backup utilities, detailed commands to be covered are cat, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, comm, cmp, diff, tr, tar, cpio.

**UNIT - II**

Problem solving approaches in Unix: Using single commands, Using compound commands, Shell scripts, C programs, Building own command library of programs. Working with the Bourne shell: what is a shell, Shell responsibilities, Pipes and input redirection, Output redirection, here documents, Shell as a programming language, Shell meta characters, Shell variables, Shell commands, Environment, Control structures, Shell script examples.

**UNIT - III**

Unix Files: Unix file structure, Directories, Files and devices, System calls, Library functions, Low level file access, Usage of open, creat, read, write, close, lseek, stat, fstat, umask, dup, dup2, Standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets ), formatted I/O, Streams and file descriptors, File and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir)

**UNIT - IV**

**Unix Process:** What is Process, Process structure, Starting new process, Waiting for a process, Zombie process, Process control, Process identifiers, System call interface for process management-fork, vfork, exit, wait, waitpid, system, FIFOs.

**Semaphores-**Unix system-V Semaphores, Unix kernel support for Semaphores, Unix APIs for Semaphores.

**UNIT - V**

**Message Queues-**Unix system-V Messages Queues, Unix kernel support for Message Queues, Unix APIs for Message Queues, Client/Server example.

**Shared Memory-**Unix system-V Shared memory, Unix kernel support for shared memory, Unix APIs for shared memory, Semaphore and Shared memory example.

**Sockets:** Berkeley Sockets, Socket system calls for connection oriented protocol and connectionless protocol, Client/Server example.

**TEXT BOOK**

Unix Network Programming, W.R.Stevens Pearson/PHI

**REFERENCES**

1. Unix Concepts and Applications, 3rd Edition, Sumitabha Das, TMH.
2. Unix system programming using C++, T.Chan, PHI.
3. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
4. Unix System-V Network Programming, Stephen A.Rago, Pearson Education.
5. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education.

**MC305 – OPERATIONS RESEARCH**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Development:** Characteristics and Phases scientific method, Types of models, General methods for solving OR problems, Operations Research models, Significance of operations research.

**Linear Programming:** Introduction to Linear Programming, Two phase Simplex method, Big-M method, Duality, Interpretation, Applications.

**UNIT - II**

**Transportation Problem:** Introduction, Optimal solution, Un-balanced transportation problem, Degeneracy, Assignment problem: formulation optimal solution, variations. 1. a non-square (m $\times$ n) matrix, Restrictions.

**Sequencing Model:** Classification of self-problems, processing of n jobs through two machines, three machines, processing of two jobs through m machines.

**UNIT - III**

**Network optimization Models:** Shortest path problem, Minimum spanning tree problem, Maximum flow problem, Minimum cost flow problem, The project management with PERT/CPM, Scheduling a problem with PERT/CPM, Dealing with uncertain activity durations, Considering time cost trades Offs, Scheduling and Controlling, Projects costs, Evaluation of PERT/CPM.

**UNIT - IV**

**Waiting Lines:** Introduction, Single channel, Poisson arrivals, Exponential service times, Unrestricted queue, with infinite population models, Single channel, Exponential Service times with infinite population and restricted queue, Multi-channel, Exponential service times with infinite population and unrestricted queue.

**UNIT - V**

**Dynamic Programming:** Introduction, Billman's principal of optimality, Solution of problems with finite number of stages.

**TEXT BOOK**

S.D.SHARMA: Operations Research, Kedarnath Ramnath, Meerut.

**REFERENCES**

1. P.K.GUPTA & D.S.HIRA: Operations Research, S. Chand
2. Taha, Operations Research, Macmillan.

**MC306 – ENGLISH LANGUAGE COMMUNICATION SKILLS - II**

<b>Lecture</b>	<b>: 2 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
<b>Lab.</b>	<b>: 2 Periods/week</b>	<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

This composite syllabus including Communication Skills Lab activities is designed for the students of MCA for various functional and situational purposes - professional or social. It aims at building effective language and communication competence, highly desirable social and behavioral traits required in academic and professional pursuits. This is sought to be achieved through an amalgamation of theoretical aspects and Laboratory –based skill oriented activities. Ultimately, Employability quotient is sought to be improved in alignment with various soft skills

**UNIT - I****Communicative Grammar****Part A**

Sounds of English- accent & stress, Spotting the errors, voice change, Direct & Indirect speech

**Part B**

Idioms and phrases; Words often confused

**UNIT - II**

Communication - Listening-process & requisites of good listening – Reading skills- process & requisites – Barriers to Effective Communication -Body Language

**UNIT - III**

Oral Presentations – Technical - Seminar preparation - Interview Skills – types - Mock Interviews

**UNIT - IV**

Technical Report writing - Types- Format- Analysis of sample reports from Industry - Academic writing-Synopsis and thesis writing, Statement of purpose

**UNIT - V**

Soft skills - Leadership development strategies - Team work- concept and exercises - Cross cultural communication - Networking skills

This is a composite syllabus which seeks to place equal emphasis on theory and developing conceptual clarity and practical exposure. Relevant cases have to be discussed in each unit and students must work in groups for oral activities.

**REFERENCES & SOFTWARE**

1. Technical communication by Raman and Sharma, OUP
2. Murphy, English Grammar, Cambridge
3. Effective Technical communication by Rizvi Ashraf , TMH
4. Soft skills: know yourself & know the world, K. Alex, S.chand
5. Oxford Guide to Effective Writing and Speaking by John Seely, OUP
6. Clarity Software

**MC 351 – OOPS THROUGH JAVA LAB.**

<b>Lab.</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 2</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

- 1) Write a Java program to find the roots of a quadratic equation?
- 2) Write a Java program to generate first n Fibonacci numbers?
- 3) a) Write a Java program to reverse the given number?  
b) Write a Java program to check whether given number is Prime or not?
- 4) Write a Java program to check whether given number is Palindrome or not?
- 5) Write a Java program to check whether given number is Armstrong or not?
- 6) Write a Java program to find factorial of the given number using recursions?
- 7) Write a Java program to find min and max number of given array?
- 8) Write a Java program to search an element by using linear search and binary search?
- 9) Write a Java program to sort the elements of an Array?
- 10) Write a Java program to perform Matrix Multiplication?
- 11) Write a Java program using constructors
- 12) Write a Java program using inheritance?
- 13) Write a Java program to implement Method over Loading and Method over riding?
- 14) Write a Java program by using this and super key word.
- 15) Write a Java program by using final variables and final methods.
- 16) Write a Java program to implement dynamic method dispatch.
- 17) Write a Java program using abstract class?
- 18) Write a Java program to implement Multiple Inheritance (Interface)?
- 19) Write a Java program on demonstration of packages?
- 20) a) Write a Java program to check whether given string is palindrome (or) not. ?  
b) Write a Java program to sort the set of strings in sorting order?  
c) Write a Java program to find sum of the numbers using String Tokenizer?
- 21) Write a Java program by using length () and capacity () Methods of String Buffer?
- 22) Write a Java program to find the sum of the numbers by using command line arguments?
- 23) (a) Write a Java program by using Exception handling Mechanism including Finally block?  
(b) Write a Java program to Handle User Defined Exceptions?
- 24) (a) Write a Java program to create Multithreads?  
(b) Write a Java program on Thread Synchronization
- 25) Write a Java program to implement Inter thread communication?
- 26) (a) Write a sample Applet program to Display Message?  
(b) Write an Applet program using Graphics?  
(c). Write an Applet program to pass parameters to Applet.
- 27) (a). Write a Java program to create user login by using AWT components?  
(b). Write a Java program to implement arithmetic calculator using Swing Components?
- 28) (a) Write an applet program to handle Mouse Events?  
(b) Write an applet program to handle Key Events using adapter Class?

**MC 352 – UNIX NETWORK PROGRAMMING LAB.**

<b>Lab.</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 2</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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1. Write a Shell script to generate a multiplication table.
2. Write a Shell script that copies multiple files to a directory.
3. Write a Shell script that counts the number of lines and words present in a given file.
4. Write a Shell script that displays the list of all files in the given directory.
5. Write a Shell script (small calculator) that adds, subtracts, multiplies and divides the given two integers. There are two division options: one returns the quotient and the other returns remainder. The script requires 3 arguments: The operation to be used and two integer numbers. The options are add (-a), subtract (-s), multiply (-m), quotient (-c) and remainder (-r).
6. Write a Shell script to reverse the rows and columns of a matrix.
7. Write a C program that counts the number of blanks in a text file.  
(a) Using standard I/O  
(b) Using system calls.
8. Implement in C the following Unix commands using system calls.  
a) cat b) ls c) mv
9. Write a program that takes one or more file/directory names as command line input and reports the following information on the file:  
a) File type b) Number of links c) Time of last access,  
d) Read, Write and Execute permissions.
10. Write a C program that illustrates uses of the mkdir, opendir, readdir, closedir, and rmdir APIs.

11. Write a C program that illustrates how to execute two commands concurrently with a command pipe.
12. Write a C programs that illustrates the following:
  - a) Two-way communication with unidirectional pipes.
  - b) Two-way communication with bidirectional pipes
13. Write a C program that illustrates the creation of child process using fork system call.
14. Write a C program that displays the real time of a day every 60 seconds.
15. Write a C program that illustrates file-locking using Semaphores.
16. Write a C program that implements a Producer-Consumer system with two processes. (Using semaphores)
17. Write a C program that illustrates InterProcessCommunication(IPC) using shared memory system calls.
18. Write a C program that illustrates the following.
  - a) Creating a Message Queue.
  - b) Writing to a Message Queue.
  - c) Reading from a Message Queue.
19. Write a C program to develop simple Client /Server application using Sockets(system calls).

#### **REFERENCES**

1. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Thomson.
2. Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.

**MC401 – DESIGN AND ANALYSIS OF ALGORITHMS**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Introduction:** Algorithm, Pseudo code for expressing algorithms, Performance Analysis: Space complexity, Time complexity, Asymptotic Notation: Big Oh notation, Omega notation, Theta notation,

Divide and conquer: General method, Applications, Binary search, Quick sort, Merge sort, Stassen's matrix multiplication.

**UNIT - II**

**Greedy Method:** General method, Applications: Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem, Optimal storage on tapes.

Basic Search and traversal Techniques: AND/OR graphs, Biconnected components, Depth-first search, Breadth - first Search.

**UNIT - III**

**Dynamic Programming:** General method, Applications: Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales man problem, Reliability Design.

**UNIT - IV**

**Backtracking:** General method, Applications: n-queens problem, sum of subsets problem, graph colouring, Hamiltonian cycles.

**UNIT - V**

**Branch and Bound:** General method, Applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP-Complete problems: Basic concepts, Non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

**TEXT BOOK**

Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.

## REFERENCES

1. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia,John wiley and sons.
2. Introduction to Algorithms, secondedition,T.H.Cormen,C.E.Leiserson, R.L.Rivest,and C.Stein,PHI Pvt. Ltd./ Pearson Education
2. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
4. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
5. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.
6. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson education.

**MC402 – ADVANCED JAVA**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**HTML:** Introduction, Common tags ,HTML Tables and formatting internal linking, Complex HTML forms. Introduction to Scripting Languages: Java Script, Control structures

**UNIT - II**

Java script functions, Arrays & Objects, DHTML, CSS, Event model

**XML:** Introduction, DTD, Schema.

Parsers: DOM and SAX.

**UNIT - III**

**JDBC:** Database Programming using JDBC, Studying Javax.sql.\* package

Types of JDBC Drivers, Writing JDBC applications using select, insert, delete, update, Types of Statement objects (Statement, Prepared Statement and Callable Statement); ResultSet, ResultSetMetaData, Inserting and updating records,

BDK: Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizers, Java Beans API

**UNIT - IV**

**Servlets:** Introduction of Servlet, HTTP Servlet Basics, Types of Servlets and Life cycle, Servlet API Overview; Writing and running Simple Servlet. ServletConfig & ServletContext, Writing Servlet to handle Get and Post Methods, Reading user request data, Writing thread safe Servlets, Concept of cookies, Reading and writing cookies, Need of Session Management, Types of Session management, Using HttpSession Object ,Servlet chaining , Servlet & JDBC,

How to configure TOMCAT, Directory structure for a web Application

**UNIT - V****JSP:**

The Problem with Servlets, The anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC.

Introduction to JSP and JSP Basics, Implicit Objects, JSP Tags, Life cycle of JSP, JSP and Java Beans, JSP:sessions and cookies, Error Handling with JSP, JDBC with JSP

**TEXT BOOK**

Harvey M. Deitel and Paul J. Deitel, **“Internet & World Wide Web How to Program”, 4/e,** Pearson Education.

## **REFERENCES**

1. J. McGovern. Adatia, Y. Fain, 2003, J2EE 1.4 Bible, Wiley-dreamtech India Pvt. Ltd, New Delhi.
2. H. Schildt, 2002, JAVA Complete Reference, 5th Edition, Tata McGraw-Hill, New Delhi.
3. K. Moss, 1999, Java Servlets, Second edition, Tata McGraw Hill, New Delhi.
4. D. R. Callaway, 1999, Inside Servlets, Addison Wesley, Boston
5. Joseph O'Neil, 1998, Java Beans from the Ground Up, Tata McGraw Hill
6. Tom Valesky, Enterprise JavaBeans, Addison Wesley. 7. Cay S Horseman & Gary Cornell, Core Java Vol II Advanced Features, Addison Wesley.

**MC403 – CRYPTOGRAPHY AND NETWORK SECURITY**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I****INTRODUCTION:**

Security Trends, OSI Security Architecture, Security Attacks, Security Services, Security Mechanism, A model for Network Security

**Symmetric Cipher:**

Classical Encryption Techniques, Block Ciphers, Data Encryption Standard, Advanced Encryption Standard, Triple DES, Placement of Encryption Function, Traffic confidentiality, Key Distribution, Random Number Generation.

**UNIT - II****PUBLIC-KEY CRYPTOGRAPHY**

Number Theory, Principles of public-key Cryptosystems, RSA, Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic and cryptography.

**UNIT - III****AUTHENTICATION AND HASH FUNCTIONS**

Authentication Requirements and Functions, Message Authentication Codes, Hash Functions, Security of Hash Function and MACs, Secure Hash Algorithm, HMAC, CMAC, Digital Signatures, Authentication Protocols, Digital Signature Standard.

**UNIT - IV****NETWORK SECURITY**

Authentication Applications: Kerberos, X.509 Authentication Service, Public-Key Infrastructure, Electronic Mail Security: PGP, S/MIME, IP Security, Web Security

**UNIT - V****SYSTEM SECURITY**

Intruders, Intrusion Detection, Password Management, Viruses and Related Threats, Virus Counter Measure, Firewall Design principles, Trusted Systems.

**TEXT BOOK**

“Cryptography and Network Security Principles and practices” by William Stallings 4<sup>th</sup> Edition, Prentice Hall.

**REFERENCES**

1. “Fundamentals of Network Security” by Eric Maiwald Dreamtech press
2. “Principles of Information Security”, by Whitman, Thomson
3. “Network Security: the complete reference”, by Robert Bragg, Mark Rhodes, TMH
4. “Introduction to Cryptography” by Buchmann, Springer.

**MC404 – OBJECT ORIENTED ANALYSIS & DESIGN USING UML**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Introduction to UML:** Object, Object Orientation, Development, Modeling, Object Modeling, Importance of Modeling, Principles of Modeling, Conceptual model, Model Driven Architecture with UML, Software Development Life Cycle of UML, UML Architecture

**UNIT - II**

**Basic Structural Modeling:** Classes, Relationships, Diagrams.

**Advanced structural Modeling:** Advanced Classes, Advanced relations, Interfaces, Types and Roles

**UNIT - III**

**Class & Object diagrams:** Terms, Concepts, Common Modeling techniques for Class & Object diagrams.

**Basic Behavioral Modeling –I:** Interactions, Interaction diagrams.

**Basic Behavioral Modeling –II:** UseCases, UseCase Diagrams, Activity Diagrams.

**UNIT - IV**

**Advanced Behavioral Modeling:** Events and Signals, State machines, State chart diagrams.

**Architectural Modeling:** Component, Development, Component Diagrams, and Deployment Diagrams.

**UNIT - V**

**Design Patterns:-** Introduction, Benefits of patterns, Creational patterns, Structured Patterns, Behavioral patterns, Expectations from Design Patterns, Pattern Community.

**TEXT BOOK**

Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Edition

## **REFERENCES**

1. Craig Larman," Applying UML and Patterns- An Introduction to Object oriented Analysis and Design and Iterative Development", 3<sup>rd</sup> Edition Pearson Edition.
2. HansEriksson, Magnus, Penker, BrainLyons, DavidFado:UML2Toolkit, WILEY-Dreamtech India Pvt.Ltd
3. Meilir Page-Jones:Fundamentals of Object Oriented Design in UML-Pearson Education
4. Atul Kahate: Object Oriented and Design,The McGraw-Hill Company
5. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language Reference Manual, Addison Wesley,1999
6. Object Oriented Analysis and Design Bennett,Simon McGraw Hill

**MC4051 – ADVANCED DATABASES**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Object Oriented Databases:** Concepts for Object databases, Object database Standards, Languages and Design.

**Parallel Databases- Introduction:** I/O Parallelism, Inter- Query Parallelism, Intra-Query Parallelism, Intra-Operation Parallelism, Inter-Operation Parallelism, Design of Parallel System.

**UNIT - II**

Active Database concepts and Triggers, Temporal database concepts, Multimedia Databases, Deductive databases.

**UNIT - III****Distributed databases:**

Distributed Database Concepts, Data fragmentation, Replication and Allocation techniques for Distributed database Design, Types of Distributed Database Systems, Query processing in Distributed Databases, Concurrency control and Recovery in Distributed Databases, 3-tier Client-Server architecture, Distributed Databases in Oracle.

**UNIT - IV****Query processing & Optimization:**

**Query processing:** Measures of Query cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions.

**Query Optimization:** Overview, Transformation of relational Expressions, Estimating Statistics of Expressions, Results, Choice of Evaluation plans, and Materialized views.

**UNIT - V****Advanced transaction processing :**

Transaction processing monitors, Transactional work flow, Real time transaction system, Long duration transactions, Transaction management in multimedia databases

**TEXT BOOK**

Fundamentals of Database Systems – Elmasri, Navathe, Somayajulu, Gupta.  
4<sup>th</sup> edition, Pearson.

**REFERENCES**

Database System Concepts- Abraham Silberschatz, Henry F.Korth, S.Sudarshan.  
5<sup>th</sup> edition, McGrawHill.

**MC4052 – DISTRIBUTED OPERATING SYSTEMS**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I****Introduction**

Definition of a DOS, Goals, H/w and S/w Concepts, Client-Server Model

**Processes Threads:** Introduction to Threads, Threads in Distributed Systems, Clients: User Interfaces, Client-Side Software for Distribution Transparency; Servers: General Design Issues, Object Servers; Code Migration: Approaches to Code Migration, Migration and Local Resources, Migration in Heterogeneous Systems; Software Agents: Software Agents in Distributed Systems, Agent Technology.

**UNIT - II****Naming Systems:**

Naming Entities: Names, Identifiers, and Addresses, Name Resolution, The Implementation of a Name Space, Example: DNS, X.500 Locating Mobile Entities: Naming versus Locating Entities, Simple Solutions, Home-Based Approaches, Hierarchical Approaches Clock synchronization, logical clocks, global state, election algorithms, mutual exclusion.

**UNIT - III****Consistency and Replication:**

Introduction, Data-Centric Consistency Models, Client-Centric Consistency Models, Distribution Protocols, Consistency Protocols.

**Fault Tolerance:**

Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit.

**UNIT - IV****Distributed File System**

Sun Network File System, Coda File System, Plan~9, XFS and SFS, Scalable Security. Distributed Shared memory: Introduction, Bus based multi processors, Ring based multiprocessors, Switched multiprocessors - NUMA comparison of shared memory systems.

**UNIT - V****Distributed Object Based System**

CORBA, Distributed Com, Globe and Comparison of CORBA, DCOM.

**Distributed Document-Based System and Coordinate Based System**

The World Wide Web, Lotus Notes, Comparison of WWW and Lotus Notes.

**TEXT BOOK**

Distributed Systems, Principles and paradigms, 2/e Tanenbaum, Maarten Vansteen, Pearson education.

**REFERENCES**

1. Andrew S.Tanenbaum: Distributed Operating System, Prentice Hall International Inc. 1995,McGrawHill.
2. Distributed Operating Systems & Algorithm Analysis, Chow, Johnson,PEA.
3. Distributed Systems Concepts and Design 4/e , George coulouris, Dollimore ,Kindberg ,PEA
4. Distributed Operating Systems ,Pradeep K.Sinha ,PHI,2009.

**MC4053 – SOFTWARE DESIGN METHODOLOGIES**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I****Basic concepts of Design:**

Introduction, Characteristics of Design activities, Essential elements of Designs.

**Design Quality:**

Software Quality models: Hierarchical models, Relational models, The effect of Design on software quality, Efficiency, Correctness and Reliability, Portability, Maintainability, Reusability, Interoperability, Quality attributes of software Design, Witt, Baker and Merritt's Design objectives, Parnas and Weiss's requirements of good Designs, Quality of development process

**Design Principles:**

Basic rules of software Design: Causes of difficulties, Vehicles to overcome difficulties, Basic rules of software Design

Design processes: The context of Design in Software development process, Generic Design process, Descriptive models, Structure of software Design methods

**UNIT - II****Software Architecture:**

The notion of Architecture: Architecture in the discipline of buildings, Architecture in the discipline of computer hardware, General notion of architecture. The notion of software architecture, Prescriptive models, Descriptive models, Multiple view models, Roles of architecture in software Design. Software architectural style, Introductory examples, the notion of software architectural style.

**Description of Software Architectures:**

The Visual Notation: Active and Passive elements, Data and control Relationships, Decomposition/Composition of Architectural elements

**UNIT - III****Typical Architectural Styles:**

Data flow: General data flow styles, The pipe- and filter sub-style, The batch sequential processing ,sub-style Independent components: the general independent components style, the event-based implicit invocation systems sub-style.

Call and return:

The general call and return style, the layered systems sub-style, Data Abstraction: the abstract data type and object-oriented sub-style

Data-centered style, Virtual machine Architecture

**Using Styles in Design:**

Choices of styles, Combinations of styles: Hierarchical heterogeneous styles, Simultaneously heterogeneous styles, Locationally heterogeneous styles

**UNIT - IV****Architectural Design space:**

Theory of Design spaces: Structure of Design spaces, Solving Design synthesis and analysis problems ;Design space of architectural elements: Behavior features, Static features, Design space of architectural styles,Characteristic features of architectural styles, Classification of styles

**Scenario-Based Analysis and Evaluation:**

The concept of scenario,Scenarios for evaluating modifiability, Scenarios for evaluating Performance, Scenarios for evaluating reusability.

**UNIT - V****Analysis and Evaluation of Modifiability: SAAM Method:**

The input and output, the process (Activities in SAAM Analysis)

**Quality Trade- Off Analysis: ATAM Method**

ATAM analysis process, ATAM analysis activities

**Model-Based Analysis: HASARD Method**

Representation of quality models, construction of quality models.

**TEXT BOOK**

Software Design Methodology: From Principles to Architectural Styles , Hong zhu, Elsevier,2009

**REFERENCES**

1. Software Architecture: Perspectives on an Emerging discipline, Shaw, M.,Garlan, PEA, 2008.
2. Software Architecture in Practice, Bass, L., Clements P,Kazman, PEA,2003
3. Evaluating Software Architectures: Methods and Case Studies, Clements, Kazman, Klien, PEA, 2002
4. Tutorial on Software Design Techniques, Freeman, Wasserman, A.I.(Es), IEEE, 1980
5. Design and Use of Software Architectures- Adopting and Evolving a product – Line Approach, Bosch, J., ACM Press , Addison Wesley, 2000
6. Software Architecture and Design, Bernard Witt, Baker, Merritt, Von Nostrand Reinhold, NY, 1994.

**MC4054 – COMPUTER GRAPHICS AND VISION**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Introduction:** Application areas of Computer Graphics, Overview of graphics systems, Video-display devices, Raster-scan systems, Random scan systems.

Output primitives : Points and lines, Line drawing algorithms, Mid-point circle and ellipse algorithms. Filled area primitives: Scan line Polygon Fill algorithm, Boundary-fill and Flood-fill algorithms

**UNIT - II**

**2D&3D Geometrical Transformations:** Translation, Scaling, Rotation, Reflection and Shear transformations, Matrix representations and homogeneous coordinates, Composite transformations, Transformations between coordinate systems, Cohen-Sutherland line clipping algorithm, Sutherland–Hodgeman polygon clipping algorithm.

**UNIT - III**

**Introduction to Digital Image Processing :** Examples of fields that use Digital image processing, Fundamental steps in Digital image processing, Components of image processing system.

Digital Image Fundamentals: A simple image formation model, Image sampling and quantization, Basic relationships between pixels, Color models.

**UNIT - IV**

**Image enhancement in the spatial domain:** Basic gray-level transformation, Histogram processing, Enhancement using arithmetic and logic operators, Basic spatial filtering, Smoothing and sharpening spatial filters, Combining the spatial enhancement methods

**UNIT - V**

**Morphological Image Processing:** Preliminaries, Dilation, Erosion, Open and Closing, Hit or miss transformation, Basic morphologic algorithms

**Image Segmentation:** Detection of discontinuous, Edge linking and boundary detection, Thresholding, Region–based segmentation

**TEXT BOOKS**

1. “Computer Graphics C version”, Donald Hearn and M.Pauline Baker, Pearson Education. ( Units I & II)
2. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI. ( Units III,IV & V)

**REFERENES**

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Computer Graphics, Steven Harrington, TMH
3. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
4. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
5. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications

**MC451 – ADVANCED JAVA LAB.**

<b>Lab.</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 2</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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1. Write a HTML program to create a Table.
2. Write a HTML program to create Lists.
3. Write a HTML program using Frames
4. Write a HTML program to develop a web page to fill student information
5. Write a HTML program that use CSS.
6. Write a HTML program to reverse a given number.
7. Write a Java script program to find that a given number is prime or not.
8. Write a Java script program to find that a given number is Armstrong or not.
9. Write a Java script program to find the factorial of a number using recursion.
10. Write a Java script program by using Java script Objects.
11. Write a HTML program that handles the events.
12. Write an XML program using DTDs
13. Develop a web page to implement online book stores using XML
14. Write a Java program to retrieve data from data base using Type-1 and Type-4 drivers.
15. Write Java program by using Prepared Statements and Callable Statements.
16. Write a Java program using forward only and bi-directional Resultsets
17. Write an example program using BDK.
18. Write a simple Servlet program using Generic and HTTP Servlets.
19. Write a Servlet program that handles the user request by using doGet () and doPost () methods.
20. Write a Servlet program using Config and Context parameters.
21. Write a Servlet program to implement Session Tracking.
22. Write a Servlet program that uses JDBC.
23. Write a simple JSP program to display Date.
24. A) Write a JSP program by using Implicit objects.  
B) Write a JSP program to handle Exceptions.
25. Write a JSP program using JDBC.
26. Write a JSP program using Include, Forward requests.
27. Write a JSP program using useBean.

**MC452 – OBJECT ORIENTED ANALYSIS & DESIGN USING UML LAB.**

<b>Lab.</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 2</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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Draw Use case, Sequence, Collaboration, Class diagram and Activity diagrams for the following and implement both Forward and Reverse Engineering.

1. Interaction of the user with the Database.
2. Library Information System.
3. University Model
4. Bank Application
5. ATM Transactions
6. Cell Phone Networking System
7. Hospital Management System

**MC501 – BUSINESS INTELLIGENCE**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I****Introduction**

Fundamentals of Data Mining, Data Mining functionalities, Classification of Data Mining Systems, Data mining applications, Data Warehouse and OLAP Technology, Multidimensional data Model, Data warehouse architecture.

**UNIT - II**

Data preprocessing: Data cleaning, Data Integration and Transformation, Data Reduction, Discretization and concept Hierarchy generation, Data Mining primitives, Data Generalization and Summarization, Basic Characterization, attribute relevants analysis, Mining descriptive statistical measures, Data Mining query Languages.

**UNIT - III**

Association Rule Mining & Market Basket Analysis, Efficient and scalable Frequent Item Set Mining methods.( Apriory and FP growth), Mining various kinds of Association rules

**UNIT - IV**

Classification and Prediction, Classification by Decision tree induction, Bayesian classification, Prediction: Linear regression, Non-Linear regression.

**UNIT - V**

Cluster analysis: Types of Data in Cluster analysis, Categorization of clustering methods, Partitioning methods, Outlier analysis, Text Mining, Web Mining.

**TEXT BOOK**

Data Mining ,Concepts and Techniques ,Jiawei Han, Micheline Kamber,Harcourt India

**REFERENCES**

1. Data Mining, Introductory & advanced Topics, Margaret H Dunham, Pearson.
2. Data Mining Techniques, Arun K Pujari, University Press.
3. Data warehousing Fundamentals, Paulraj Ponnaiah, Wiley.
4. The Data Warehouse Life Cycle Tool kit, Ralph Kimball, Wiley.

**MC502 – ARTIFICIAL INTELLIGENCE**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I****Introduction:**

The AI Problems, The underlying Assumption

**Problems, Problem Spaces, and Search:**

Defining the problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs.

**Heuristic Search Techniques:**

Generate- and-Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-ends Analysis.

**UNIT - II****Knowledge Representation Issues:**

Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation.

**Using Predicate Logic:**

Representing Simple Facts in Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution.

**Representing Knowledge Using Rules:**

Procedural versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning, Matching.

**UNIT - III****Symbolic reasoning Under Uncertainty:**

Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a problem-solver, Depth-First search, Breadth-First search.

**Statistical Reasoning:**

Probability and Baye's Theorem, Certainly Factors and Rule-based Systems, Bayesian Networks.

**Weak Slot-and-Filler Structures:** Semantic Nets, Frames.

**Strong Slot-and Filler Structures:** Conceptual Dependency, Scripts.

**UNIT - IV****Game Playing:**

The Minimax search Procedure, Adding Alpha-beta Cutoffs.

**Planning:**

An Example Domain: The Blocks World, Components of a Planning System, Goal Stack Planning.

**Natural language Processing, Learning.**

## **UNIT - V**

### **Expert Systems, Perception and Action**

#### **Introduction to Neural Networks:**

Biological Neuron structure, Basic Artificial Neuron Models.

Types of Neural Networks, Applications of Neural Networks

### **TEXT BOOK**

Elaine Rich Kevin Knight, Shivashankar B Nair "Artificial Intelligence", 3rd Edition, TMH, 2010.

### **REFERENCES**

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education / Prentice Hall of India, 2004.
2. George F. Luger, "Artificial Intelligence – Structures and Strategies for Complex Problem Solving", Pearson Education / PHI, 2002.

**MC503 – MULTIMEDIA APPLICATION DEVELOPMENT**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 4</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT – I**

**Fundamental concepts in Text and Image:** Multimedia and Hypermedia, World Wide Web, Overview of Multimedia software tools, Graphics and image data representation, Graphics/image data types, File formats, Fundamental concepts in video and digital audio: Types of video signals, Analog video, Digital video, Digitization of sound, MIDI, Quantization and Transmission of audio.

**UNIT - II**

**ActionScript I:** ActionScript Features, Object-Oriented ActionScript, Datatypes and Type Checking, Classes, Authorizing an ActionScript Class  
**Action Script II:** Inheritance, Authorizing an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions.

**UNIT - III**

**Application Development:** An OOP Application Frame work, Using Components with ActionScript MovieClip Subclasses. Multimedia data compression, Lossless compression algorithm, Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression,

**UNIT - IV**

Lossy Compression Algorithm, Quantization, Transform Coding, Wavelet-Based Coding.

**Basic Video Compression Techniques:** Introduction to video compression, Video compression based on motion compensation, Search for motion vectors, MPEG, Basic Audio Compression Techniques.

**UNIT - V**

**Multimedia Networks:** Basics of Multimedia Networks, Multimedia Network Communications and Applications, Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand(MOD).

**TEXT BOOK**

Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew, PHI/Pearson Education

**REFERENCES**

1. Essentials ActionScript 2.0, Colin Mook, SPD O,REILLY.
2. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
3. Macromedia Flash MX Professional 2004 Unleashed, Pearson.

**MC5041 – DATABASE TUNING**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Basic Principles** : The Power of Principles, Five Basic Principles, Basic Principles and Knowledge, Tuning The Guts , Locking and Concurrency Control, Logging and the Recovery Subsystem, Operating System Considerations, Hardware Tuning.

**UNIT - II**

**Index Tuning**, Types of Queries, Key Types, Data Structures, Sparse Versus Dense Indexes, To Cluster or Not to Cluster, Joins, Foreign key Constraints, and Indexes, Avoid Indexes on small Tables.

**UNIT - III**

**Tuning Relational Systems**, Table Schema and Normalization, Clustering Two tables, Aggregate Maintenance, Record Layout, Query Tuning, Triggers. Communicating with the outside Client-server Mechanisms, Objects, application Tools, and Performance, Tuning the application Interface, Bulk Loading Data, Accessing Multiple Databases.

**UNIT - IV**

**Troubleshooting**: Introduction, How to gather Information: The Tools, Queries from Hell, Are DBMS Subsystems Working Satisfactorily, Is the DBMS Getting All It Needs.

**UNIT - V**

**Transaction Chopping** : Assumptions, Correct Choppings, Finding the Finest Chopping, Optimal Chopping Algorithm, Application to Typical Database Systems, Related Work.

**Time Series, Especially for Finance**: Setting up a Time Series Database, FAME,S-Plus, SAS, KDB, Oracle-8i Time Series, features you want for Time Series, Time Series Data Mining.

**Understanding access Plans**: Data Access Operators, Query structure Operators, Auxiliary Operators.

**Configuration Parameters**: Oracle, SQL Server, DB2 UDB.

**TEXT BOOK**

Dennis Shasha and Philippe Bonnet “Database Tuning, Principles, Experiments and Troubleshooting Techniques”, Morgan Kaufmann, Elsevier.

**REFERENCES**

1. Thomas Connolly and Carlolyn Begg,”Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education.
2. M.Tamer Ozsu, Patrick Valduriez and S.Sridhar “Principles of Distributed Database Systems”, Pearson Education.

**MC5042 – OPEN SOURCE SOFTWARE**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Open Source Software: Definitions & History-** Definitions of terms, A Brief History of Software

**Where Open Source Is Successful** –Analytical Framework, Open Source in widespread successful use, Examples of Open Source Systems

**Open Source: The Good, the Bad, and the Ugly-**What is Good about Open source, Open Source is Not enough by itself, How Choosing Open Source Is More difficult for You, What Others Say about Open Source.

**UNIT - II**

**Five Open Source Opportunities** – Introduction, Directory Services, Email, Groupware and Collaboration, Complex Web Publishing, Manage User Desktops, Other Possibilities

**Operating Systems** – Contents of the Operating systems, Linux Distribution Vendors, Enterprise Distribution Vendors, Community-Supported Distribution Vendors, International Alternatives

**UNIT - III**

**Open Source Server Applications** – Infrastructure Services, Web Services, Database Servers, Mail Servers, System Management

**Open Source Desktop Applications** – Introduction, Graphical Desktops, Web Browsers, The Office Suite, Mail and Calendar Clients, Personal Software

**UNIT - IV**

**How Open Source Software is Developed** – Methodology, Languages Used to Develop Open source Products, Cross-Platform Code

**Application Architecture** –Types of Systems, Tiered Design, Managing Performance and Scalability, Interoperability, Development Platform Choices

**UNIT - V**

**Managing System Implementations** – Implementation Roles, Open Source Impact on Team Issues, Implementation Process, Implementations Principles, Key Documents, Migration, Interacting with Open Source Community, Support.

**The Cost of Open Source Systems-** Total Cost of Ownership, Types of Costs, Scenarios

**Licensing** – Types of Licenses, Licenses in Use, Mixing Open and Closed Code, Dual Licensing, Other Intellectual Property Issues

**TEXTBOOK**

Open Source Software Implementation and Management, Paul Kavanagh, Elsevier Digital Press.

**REFERENCES**

1. Understanding Open Source Software Development, Joseph Feller and Brian Fitzgerald, Addison Wesley Professional 2002.
2. Producing Open Source Software, Karl Fogel, O'reilly-2006.

**MC5043 – SOFTWARE QUALITY MANAGEMENT**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

Definition of quality, software quality, different views of quality, hierarchical model definition, hierarchical models of Boehm's and McCall, quality criteria interrelation, practical evaluation of quality criteria.

**UNIT - II**

Measuring quality, quality metrics, problems with metrics, overall measure of quality, work of GILB, the COQUAMO project, recent work on metrics, quality profiles.

**UNIT - III**

Growth of software engineering methods, methodologies based upon the waterfall life cycle, case tools, contribution of methods and tools to quality, alternate approaches to software development, standards based on software life cycle

**UNIT - IV**

Elements of QMS, the key to quality management, quality in software, the problem of user requirements, A QMS for software, quality assurance, purpose of standards, THE ISO 9000 series, ISO 9003 standards, impact of ISO9000.

**UNIT - V**

Capability Maturity Model individual levels of the CMM, role of the CMM, SPICE, four key issues in quality, Are case tools addressing the right issues?, what is the likely impact of standards?, beyond software quality the need for a strategic view.

**TEXT BOOK**

Software Quality Theory and Management By ALAN C GILLIES, Cengage

**REFERENCE**

Mordechai Ben – Menachem and Garry S. Marliss "Software Quality, Thomson Asia.

**MC5044 – CLOUD COMPUTING**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Cloud Computing fundamentals:** Essential characteristics, Architectural Influences, Technological Influences, Operational Influences.

**UNIT - II**

**Cloud Computing Architecture:** Cloud Delivery models, The SPI Framework, Cloud Software as a Service (SaaS) , Cloud Platform as a Service(PaaS), Cloud Infrastructure as a Service(IaaS), Cloud deployment models, Public Clouds, Community Clouds, Hybrid Clouds, Alternative Deployment models, Expected benefits.

**UNIT - III**

**Cloud Computing Software Security fundamentals:** Cloud Information Security Objectives, Confidentiality, Integrity, Availability, Cloud Security Services, Relevant Cloud Security Design Principles, Secure Cloud Software Requirements, Secure Development practices, Approaches to Cloud Software Requirement Engineering, Cloud Security Policy Implementation.

**UNIT - IV**

**Cloud Computing Risk Issues:** The CIA Traid, Privacy and Compliance Risks, Threats to Infrastructure, Data and Access Control , Cloud Access Control Issues ,Cloud Service Provider Risks.

**Cloud Computing Security challenges:** Security Policy Implementation, Policy Types, Computer Security Incident Response Team( CSIRT).

**UNIT - V**

**Cloud Computing Security Architecture:** Architectural Considerations, General Issues, Trusted Cloud Computing, Secure Execution environments and Communications, Micro architectures, Identity Management and Access Control, Autonomic Security.

**TEXT BOOK**

*“Cloud Security A comprehensive Guide to secure Cloud Computing”* by Ronald L. Krutz, Russell Dean Vines, Wiley.

**REFERENCES**

1. *“Cloud Computing Implementation, Management and Security”* by John W. itinghouse james F.Ransome, CRC Press.
2. *“Handbook of Cloud Computing”* by Borko Furht. Armando Escalante, Springer
3. *“Cloud Revolution”* , by Charles Badcock McGrawhill.

**MC5051 – DATABASE ADMINISTRATION**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Introduction:** Database Architecture, DBMS Architecture and Data independence, DBA roles and responsibilities, Logical Database layouts, Physical Database layouts, Hardware Configurations and considerations, Overview of physical and logical storage structures.

**UNIT - II**

Schema Management, User Management and Database Security, Database creation, Connectivity and User Management, Creating and modifying user accounts, Creating and using Roles, Granting and revoking privileges, Managing user groups with profiles, Managing user and Security, Profiles, Managing privileges.

**UNIT - III**

Transaction Management, Managing multiple Databases, Managing Rollback statements, Database security and auditing, Introduction to Network administration, Network responsibilities for DBA, Network configuration, Managing large Databases, managing Distributed Databases, Configuring, Client-Server and Network computing. Oracle background processors, Overview of Oracle Net Futures.

**UNIT - IV**

**Backup and recovery** : Overview, Database backup restoration and recovery. Types of failures in oracle environment.

**Defining backup and recovery strategies** : Optimal backup and recovery procedures, Testing the backup and recovery plan.

**UNIT - V**

**Introduction to performance tuning:** Improving Database performance, Brief overview of Tuning methodology, An approach to oracle performance, Tuning, Optimizing, Oracle query processing, Query optimization and Oracle cost based Optimizer, The role of DBA to improve SQL processing.

**TEXT BOOK**

Oracle DBA Handook—Kevin Loney, Oracle press

**REFERENCES**

1. Expert Oracle database administration—Sam R Alapati, Apress.
2. Oracle DBA Bible—Jennick, Carol, McCullough Dieter, and Gerrit, Jan Linker
3. Oracle Database The complete reference—Loney Kevin, McGrahill
4. Oracle DBA fundamentals—Bob Brayela, Biju Thomas, BPV publications

**MC5052 – UNIX ADMINISTRATION**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Booting and shutting Down:** Bootstrapping, Booting Pcs, Booting in Single User mode, Startup Scripts Rebooting and Shutting down.

**UNIT - II**

**Controlling Processes:** Components of a process, Life cycle of a process, Signals, Process states.

**The File System:** Path names, Mounting and unmounting files, Organization of the file tree, File types, File attributes.

**UNIT - III**

**Adding New Users:** The /etc/passwd file, Adding users, Removing users, Disabling logins, Configuration of hardwired terminals, Special characters and Terminal driver, How to unweave a terminal.

**UNIT - IV**

**Adding a Disk:** Disk Interfaces, An overview of the disk installation procedure, Periodic Processes.

**Backups:** Motherhood and apple pie, Backup devices and media, Restoring from dumps, Using other archiving programs.

**UNIT - V**

**Syslog and Log Files:** Logging Polices, Finding Log Files, Files not to manage, Syslog.

**Drivers and the Kernel:** Kernel Types, Configuring a Solaris Kernel, Linux Kernel, Adding Device Drivers, Device Files, Naming Conventions for devices.

**TEXT BOOK**

E. Nemeth, G. Snyder, S. Seebass and T.R.Hein, "UNIX System Administration Handbook", Pearson Education, 3rd ED.

**REFERENCES**

1. Goodheart B. Cox J, "The Magic Garden Explained", Prentice Hall of India.
2. Leffler S.J., Mckusick M.K., Karels M.J. and Quarterman J.S., "The Design and Implementation of the 4.3 BSD Unix Operating System", Addison Wesley.
3. Behrouz A.Forouzan , Richard Gilbert, " Unix & Shell programming ", Thomson Asia, 2003

**MC5053 – SOFTWARE PROJECT MANAGEMENT**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Conventional Software Management:** Waterfall model, Conventional Software Management performance.

**Evolution of Software Economics:** Software economics, Pragmatic software cost estimation.

**Improving Software Economics:** Reducing Software product size, Improving software processes, Improving team effectiveness, Improving automation, Achieving required quality, peer inspections

**The Old way and the new:** The principles of conventional software Engineering, Principles of modern software management, Transitioning to an iterative process.

**UNIT - II**

**Life cycle phases:** Engineering and Production stages, Inception, Elaboration, Construction, Transition phases.

**Artifacts of the process:** The Artifact sets, Management artifacts, Engineering artifacts, Programmatic artifacts.

**UNIT - III**

**Model based software architectures:** A Management perspective and technical perspective.

**Work Flows of the process:** Software process workflows, Iteration workflows

**Checkpoints of the process:** Major mile stones, Minor Milestones, Periodic status assessments.

**UNIT - IV**

**Iterative Process Planning:** Work breakdown structures, Planning guidelines, Cost and Schedule estimating, Iteration planning process, Pragmatic planning

**Project Organization and Responsibilities:** Line-of-Business Organizations, Project Organizations, evolution of Organizations.

**Process Automation:** Automation Building blocks, The Project Environment.

**UNIT - V**

**Project Control and Process instrumentation:** The seven core Metrics, Management indicators, Quality indicators, Life cycle exceptions, Pragmatic Software Metrics, Metrics automation

**Tailoring the Process:** Process discriminants.

**Future Software Project Management:** Modern Project Profile, Next generation Software economics, Modern process transitions.

**TEXT BOOK**

Software Project Management, Walker Royce: Pearson Education, 2005.

**REFERENCES**

1. Software Project Management, Walker Royce, Bob Hughes and Mike Cotterell, Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education 2005

**MC5054 – PRINCIPLES OF PROGRAMMING LANGUAGES**

<b>Lecture</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 3</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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**UNIT - I**

**Preliminary Concepts:** Reasons for studying, Concepts of programming languages, Programming domains, Language Evaluation Criteria, Influences on Language design, Language categories, Programming Paradigms– Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation–Compilation and Virtual Machines, programming environments.

**UNIT - II**

**Syntax and Semantics:** General Problem of describing Syntax and Semantics, Formal methods of describing syntax - BNF, EBNF for common programming languages features, Parse trees, Ambiguous grammars, Attribute grammars, Denotational semantics and Axiomatic semantics for common programming language features. Names, Variable, concept of binding, type checking, Strong typing, Type compatibility, Named constants, Variable initialization. Data types: Introduction, Primitive, Character, User defined, Array, Associative, Record, Union, Pointer and Reference types, Design and Implementation issues related to these types.

**UNIT - III**

**Expressions and Statements:** Arithmetic, Relational and Boolean expressions, Short circuit evaluation, Mixed mode assignment, Assignment Statements. Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, Guarded commands. **Subprograms and Blocks:** Fundamentals of sub-programs, Scope and lifetime of variable, Static and Dynamic scope, Design issues of subprograms and operations, Local referencing environments, Parameter passing methods, Overloaded sub-programs, Generic sub-programs, Parameters that are sub-program names, Design issues for functions, User defined overloaded operators, Co-routines.

**UNIT - IV**

**Abstract Data types:** Abstractions and encapsulation, introduction to data abstraction, Design issues, Language examples, C++ parameterized ADT. Object oriented programming in C++,Java,  
**Concurrency:** Subprogram level concurrency, Semaphores, Monitors, Message passing, Java threads, C# threads.

**UNIT - V :**

**Exception handling :** Exceptions, Exception Propagation, Exception handling in Ada, C++ and Java.

**Functional Programming Languages:** Introduction, Fundamentals of FPL, LISP, ML, Haskell, Application of Functional Programming Languages and comparison of functional and imperative Languages.

**Logic Programming Language :** Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

**TEXT BOOK**

Concepts of Programming Languages Robert .W. Sebesta 4/e, Addison Wesley

**REFERENCES**

1. Programming languages –Ghezzi, 3/e, John Wiley
2. Programming Languages Design and Implementation – Pratt and Zelkowitz, Fourth Edition PHI/Pearson Education
3. Programming languages –Watt, Wiley Dreamtech
4. LISP Patric Henry Winston and Paul Horn Pearson Education.
5. Programming in PROLOG Clocksin, Springer

**MC551 – BUSINESS INTELLIGENCE LAB.**

<b>Lab.</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 2</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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1. Creation and Usage of ARFF files.
2. Develop Weka application to preprocess the Data.
3. Develop Weka application for attribute selection using Filters.
4. Develop Weka application to perform association Mining and categorical Data.
5. Develop Weka applications for various classification algorithms.
6. Develop Weka applications for various clustering algorithms.
7. Develop Weka application to access the data from database.
8. Develop Weka application to visualize the Data in Graphs
9. Develop a Clementine stream to access the data from database.
10. Develop a Clementine stream to access the data from various sources.
11. Develop a Clementine stream for various record options.
12. Develop a Clementine stream to visualize user input Data on Graphs.
13. Develop a Clementine stream to perform Clustering using various algorithms.
14. Develop a Clementine stream to perform Classification using various algorithms.
15. Develop a Clementine stream for various aggregations

**MC552 – MULTIMEDIA APPLICATION DEVELOPMENT LAB.**

<b>Lab.</b>	<b>: 4 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 2</b>	<b>External Examination</b>	<b>: 3 Hrs</b>

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1. Assigning Actions to an Object, and a Button
2. Creating Loops
3. Generation of Random Numbers
4. Creating a Function, Calling a Function
5. Detecting the Player Version
6. Detecting the Operating System
7. Checking the System language
8. Detecting Display Settings
9. Tinting a Movie Clip's Colour
10. Controlling a Movie Clip's Colour with Sliders
11. Drawing a Circle
12. Drawing a Rectangle
13. Filling a Shape with a Gradient
14. Scripting Masks
15. Converting Angle Measurements
16. Calculating the Distance Between Two Points
17. Formatting Currency Amount
18. Converting Between Units of Measurement
19. Determining Points along a Circle
20. Sorting or Reversing an Array
21. Implementing a Custom Sort
22. Creating a Text Field
23. Making a Password Input field

All the above programs are to be done in Flash MX 2004.

**REFERENCES**

1. Action Script Cookbook, Joey Lott, SPD-Oreilly.
2. Flash MX Action Script for designers, Doug Sahlin, Dreamtech Wiley.
3. Flash MX Professional 2004 Unleashed, David Voegelers and Matthew Pizzi, Pearson Education.