AUTONOMOUS INSTITUTE
(Affiliated to J.N.T.U.A., Ananthapuramu)
ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI
MCA (Regular) from 2019-20

For pursuing Three year Post graduate Degree of study in Master of Computer Applications (MCA) offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal - 518501 under Autonomous status and herein referred to as RGMCET (Autonomous).

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2019-20 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified hereafter shall be read as a whole for the purpose of interpretation as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, Rajeev Gandhi Memorial College of Engineering and Technology shall be the Chairman, Academic Council.

Academic Regulations 2019 for MCA (Regular)

(Effective for the students admitted into first year from the Academic Year 2019-2020)

The MCA Degree of the Jawaharlal Nehru Technological University Anantapur, Ananthapuramu shall be conferred on students who are admitted to the program and fulfill all the requirements for the award of the Degree.

1.0 Eligibility for Admissions:

Admission to the above program shall be made subject to the eligibility, qualifications and specialization prescribed by the University from time to time.

Admissions shall be made on the basis of merit rank obtained by the qualifying candidate at ICET examination or on the basis of any other order of merit prescribed by Andhra Pradesh State Council of Higher

Education (APSCHE) subject to reservations prescribed by the Govt. of A. P., from time to time.

2.0 Award of MCA Degree:

2.1 The student shall be declared eligible for the award of the MCA degree, if he/she pursues a course of study and completes it successfully for not less than three academic years and not more than six academic years.

2.2 The student, who fails to fulfill all the academic requirements for the award of the degree within six academic years from the year of his admission, shall forfeit his seat in MCA course.

2.3 The minimum clear instruction days for semester shall be 95.

3.0 Attendance:

3.1 The student shall be deemed to have eligibility to write End Semester examinations if he has secured a minimum of 75% of attendance in aggregate of all the subjects.

3.2 Condonation of shortage of attendance up to 10%, i. e. 65% and above, and below 75% may be given by the College academic committee.

3.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the student with supporting evidence.

3.4 Shortage of attendance below 65% shall in no case be condoned.

3.5 The student shall not be promoted to the next semester unless he fulfills the attendance requirements of the previous semester.

Table 1: Credits

Subject	Semester		MARKS	
	Periods / Week	Credits	Internals	Externals
Theory	03	03	40 (25-internal+15-Assigment)	60
Practical	03	1.5	40	60
Mini project	03	1.5	40	60
Technical Seminar		02	50	----
Continuous Comprehensive Viva(CCE)	04	02	40	60
Project	25	12.5		

Table 2: Course pattern

Year	Semester	No. of Subjects	Number of Labs	Total credits	
I	1	05	03 CCE	05X3=15 3X1.5=4.5 1X02=02	21.5
	2	05	03 CCE	5X3=15 3X1.5=4.5 1X02=02	21.5
II	3	03 01MOOC(Elective) 01 Elective	03 CCE	3X3=09 3X1=03 3x1=03 3x1.5=4.5 1X2=02	21.5
	4	03 01MOOC/Elective 01 Elective	03 CCE	3x3=9 1x3=3 1x3=3 3x1.5=4.5 2x1=2	21.5
III	5	03 01MOOC/Elective 01 Elective	02 CCE Mini project	3x3=9 1x3=3 1x3=3 2x1.5=3 1x1.5=1.5 1x2=2	21.5
	6	Project work Seminar		1X12.5=12.5 1x2=2	14.5
Total credits					**122**

4.0 Evaluation:

4.1 For theory subjects, the distribution shall be 40 marks for Internal Evaluation (25 marks for Internal test and 15 marks for assignments / field work) and 60 marks for the End-Examination.

4.2 Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 10 marks (It contains 5 short answer questions). The remaining 3 questions carry 5 marks each. Each question shall have a,b,c.... parts. The duration of internal test will be for 2 hours. First test to be conducted in 3 units in the middle of the semester and second test to be conducted in the remaining 3 units of each subject at end of the semester. There shall be two assignments in each subject (problem based/ field work) for the award of 15 marks so that internal component (marks) will be 40 marks (25 marks for internal test+15 marks for assignments / field work). For awarding of 25 Internal marks the performance of the student in two internal examinations conducted will be considered by giving a weightage of 0.75 for the better score and 0.25 for the other score.

4.3 The End Examination question paper will have 7 questions and students have to answer 5 questions. However, the first question is compulsory and it consists of 6 short answer questions, each carrying 2 marks. The next 4 questions are to be answered from the remaining 6 questions and each carries 12 marks. Each 12 marks question shall have a, b, c .. parts. For all PG (M.Tech, MBA and MCA) courses for all the subjects the valuation of answer scripts will be done by external Examiners form the other institute and as well as Internal Examiners of the institute who are teaching the subject. If the difference of marks in external and Internal evaluation is more

than 15% of external marks, then the papers will be sent to third Examiner for valuation purpose. Then average of closely spaced marks will be considered as final marks in that subject. List of Examiners for external evaluation will be finalized by CE, with the approval of the principal.

4.4 Elective subjects will commence from 3rd semester. Out of the electives offered in 3rd / 4th / 5th semesters, one elective will be MOOC / Electives offered by the department. Any student who is interested can opt for the MOOC/ Electives offered by the department and acquire the required credits. Even if the student opts for MOOC, he has to write two internal tests besides the end examination conducted by the institute like other subjects. However, he has to obtain the certificate from the organization in which he has registered. Any MOOC selected by the student should be of more than 45 hours duration and also from the reputed organization. Attendance of the student who has opted for MOOC will be taken from the remaining subjects and labs only in that semester while finalizing the attendance for fulfilling the minimum requirements of attendance for promotion to next semester. Attendance will not be recorded for MOOC. Where ever MOOC is opted by the student, the evaluation procedure will be similar to any subject offered by the department.

4.5 For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks will be for internal evaluation based on the day-to-day performance. Laboratory examination for MCA. Course shall be conducted with two Examiners, one of them being Laboratory Class Teacher and second Examiner shall be outside of the institute (External examiner).

4.6 Student has to undergo a Continuous Comprehensive Evaluation (CCE) pertaining to his specialization in each semester which carries 40 internal marks and 60 external

marks. He has to secure 50% marks to obtain required credits. External CCE will be conducted at the end of each semester by the committee consisting of HOD, senior faculty member and external Examiner from outside the institute. For this, HOD of the Department shall submit a panel of 4 Examiners, who are eminent in that field. One from the panel will be selected by the principal of the institute as external Examiner for CCE.

4.7 The candidate shall be deemed to have secured the minimum academic requirement in a subject/practical/seminar/CCE/ if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Examination and Internal evaluation taken together. In case if there is no End Examination in subject/practical/seminar/CCE etc student has to get minimum of 50% in the Internal Examination alone.

4.8 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 3.0), he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the course when offered next or do any other specified subject as may be required.

5.0 Re-registration for Improvement of Internal marks:

Following are the conditions to avail the benefit of improvement of Internal marks.

5.1 The candidate should have completed the course work and obtained examinations results for all the semesters.

5.2 He should have passed all the subjects for which the internal marks secured are more than 50%.

5.3 Out of the subjects the candidate has failed in the examination due to Internal marks secured being less than 50%, the candidate shall be given one chance for each Theory subject and

for a maximum of 03 Theory subjects for Improvement of Internal marks.

5.4 The candidate has to re-register for the chosen subjects and fulfill the academic requirements.

5.5 For each subject, the candidate has to pay a fee equivalent to one tenth of the semester tuition fee and the amount is to be remitted in the form of D. D. in favour of the Principal, RGMCET payable at RGMCET, Nandyal branch along with the requisition through the HOD of the respective Department.

5.6 In case of availing the Improvement of Internal marks, the internal marks as well as the End Examinations marks secured in the previous attempt (s) for the re-registered subjects stand cancelled.

6.0 Evaluation of Project / Dissertation work:

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the Department.

6.1 Registration of Project work: The candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses of 1st to 5th semester)

6.2 An Internal Department Committee (I.D.C.) consisting of HOD, Supervisor and One Internal senior expert shall monitor the progress of the project work. The project work carries no marks.

6.3 The work on the project shall be initiated in the beginning of 6th semester and continue throughout the semester. The duration of the project is for one semester. The candidate can submit Project thesis with the approval of I.D.C. at the end of 6th semester.

6.4 The student must submit status report at least in two different phases during the project work period. These reports must be approved by the I.D.C. before submission of the Project Report.

6.5 The candidate shall be allowed to submit the thesis / dissertation only after passing in all the prescribed subjects (both theory and practical) and then take viva voce examination of the project. The viva voce examination may be conducted once in two months for all the candidates submitted during that period.

6.6 Three copies of the Thesis / Dissertation certified in the prescribed form by the supervisor & HOD shall be submitted to the institute.

6.7 The Department shall submit a panel of three experts for a maximum of 4 students at a time. However, the thesis / dissertation will be adjudicated by the board consisting of HOD, concerned supervisor and one external Examiner from other institute nominated by the principal from a panel of Examiners submitted by the Department to the Controller of Examination.

6.8 If the report of the board is favourable viva voce examination, the board shall jointly report candidates work as:

1. Good
2. Satisfactory
3. Not satisfactory

If the report of the viva voce is not satisfactory the candidate will retake the viva voce examination after three months. If he fails to get a satisfactory report at the second viva voce examination he will not be eligible for the award of the degree unless the candidate is permitted to revise and resubmit the thesis.

7.0 Award of Degree and class:

After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of MCA Degree, he shall be placed in one of the following classes:

Table 3: Award of Class

Class Awarded	**% of marks to be secured**	Division/ Class	CGPA	
First Class with Distinction	70% and above	First Class With Distinction	≥ 7.5	CGPA obtained from 109.5 Credits. (Excluding Project credits).
First Class	Below 70% but not less than 60%	First Class	≥ 6.5 *and* < 7.5	
Second Class	Below 60% but not less than 50%	Second Class	≥ 5.5 *and* < 6.5	

8.0 *Grading:*

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student falls.

Table 4: Conversion into Grades and Grade points assigned

Range in which the % of marks in the subject fall	Grade	Grade point Assigned	Performance	Performance in Project work
90 to 100	O	10	Outstanding	Performance in project will be reported as i) Good ii) Satisfactory iii) Un Satisfactory. The credits obtained in Project will not be considered for the award of Class.
80 to 89.9	A^+	09	Excellent	
70 to 79.9	A	08	Very good	
60 to 69.9	B^+	07	good	
50 to 59.9	B	06	Pass	
<50	F	00	Fail	
Ab	AB	00	Fail	

8.1 Requirement for clearing any subject: The students have to obtain a minimum of 40% in End Examination and they have to score a minimum of 50% marks from Internal and external exam marks put together to clear the subject. Otherwise they will be awarded fail grade.

8.2 'F' is considered as a fail grade indicating that the student has to reappear for the end supplementary examination in that subject and obtain a non - fail grade for clearing that subject.

8.3 To become eligible for the award of degree the student must obtain a minimum CGPA of 5.5.

9.0 Supplementary Examinations:

Apart from the regular End Examinations, the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one examination per day. **The student is not permitted to improve his performance in any subject in which he has obtained pass grade.**

10.0 *Grade Point Average (GPA) and Cumulative Grade Point Average(CGPA)*

The Grade Point Average (GPA) for each semester and Cumulative Grade Point Average (CGPA) up to any semester are calculated as follows:

i) Semester Grade Point Average will be computed as follows:

$$GPA = \frac{\sum_1^n C_i \times GP_i}{\sum_1^n C_i}$$

Where, n is the number of subjects in that semester. C_i is Credits for the subjects. GP_i is the grade point obtained for the

subject and the summation is over all the subjects in that semester.

ii) A Cumulative Grade Point Average (CGPA) will be computed for every student at the end of each semester. The CGPA would give the cumulative performance of The student from the first semester up to the end of the semester to which it refers and is calculated as follows

$$CGPA = \frac{\sum_1^m GPA_j \times TC_i}{\sum_1^m TC_j}$$

Where, m is the number of semester under consideration. TC_j the total number of credits for a j^{th} semester and GPA_j is the Grade Point Average of the j^{th} semester. Both GPA and CGPA will be rounded off to the second digit after decimal and recorded as such.

While computing the GPA / CGPA, the subjects in which the student is awarded zero grade points will also be included.

11.0 *Grade Sheet:*

A grade sheet (Memorandum) will be issued to each student indicating his performance in all subjects of that semester in the form of grades and also indicating the GPA and CGPA.

12.0 Transcripts:

After successful completion of the total course of study, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

13.0 Minimum Instruction Days:

The minimum instruction days for each semester shall be 95 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared, if any.

14.0 Amendment of Regulations:

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However the

academic regulations of any student shall be same throughout the course of study in which the student has been admitted.

15.0 Transfers:

There shall be no branch transfers After the completion of admission process.

16.0 Withholding of results:

If the candidate has not paid any dues to the institute or if any case of in-discipline is pending against him, the result of the candidate will be withheld and he will not be allowed for the next semester. The issue of the degree is liable to be withheld in such cases.

17.0 Transitory Regulations:

Candidates who have discontinued or have been detained for want of attendance are eligible for admission to the same or equivalent subjects as and when subjects are offered, subject to 2.0 and 3.0

18.0 Rules of Discipline:

18.1 Any attempt by any student to influence the teachers, Examiners, faculty and staff of Examination section for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

18.2 When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject (s) and grading is done accordingly.

18.3 When the performance of the student in any subject (s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject (s).

18.4 When the student's answer book is confiscated for any kind of attempted or suspected malpractice, the decision of the Chief Superintendent is final.

19.0 General:

19.1 The Academic Regulations should be read as a whole for the purpose of any interpretation.

19.2 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the College Academic Council is final.

19.3 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.

19.4 Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “her’s”.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY, NANDYAL

AUTONOMOUS

MASTER OF COMPUTER APPLICATIONS

I YEAR MCA I-SEMESTER

COURSE STRUCTURE

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
F0001191	Probability and Statistics	3+1*		3	40	60	100
F0002191	Database Management Systems	3+1*		3	40	60	100
F0003191	Accounting and Financial Management	3+1*		3	40	60	100
F0004191	Mathematical Foundations of Computer Science	3+1*		3	40	60	100
F0005191	C-Programming	3+1*		3	40	60	100
F0006191	C-Programming Lab		3	1.5	40	60	100
F0007191	Database Management Systems Lab		3	1.5	40	60	100
F0008191	IT Workshop		3	1.5	40	60	100
F0009191	Continuous Comprehensive Evaluation	4		2	40	60	100
Total		**24**	**9**	**21.5**	**360**	**540**	**900**

I YEAR MCA II-SEMESTER

COURSE STRUCTURE

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
F0010192	Organization Structure and Personnel Management	3+1*		3	40	60	100
F0011192	Data Structures through C	3+1*		3	40	60	100
F0012192	Computer Organization	3+1*		3	40	60	100
F0013192	Operating Systems	3+1*		3	40	60	100
F0014192	UNIX and Shell Programming	3+1*		3	40	60	100
F0015192	Data Structure through C Lab		3	1.5	40	60	100
F0016192	UNIX and Shell Programming Lab		3	1.5	40	60	100
F0017192	Operating Systems Lab		3	1.5	40	60	100
F0018192	Continuous Comprehensive Evaluation		4	2	40	60	100
Total		**20**	**13**	**21.5**	**360**	**540**	**900**

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY, NANDYAL

AUTONOMOUS

MASTER OF COMPUTER APPLICATIONS

II YEAR MCA I-SEMESTER

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
F0019193	Technical Communication	3+1*		3	40	60	100
F0020193	Python Programming	3+1*		3	40	60	100
F0021193	Object Oriented Programming Through Java	3+1*		3	40	60	100
	ELECTIVE-I	3+1*		3	40	60	100
F0022193	Software Engineering						
F0023193	Design and Analysis of Algorithms						
F0024193	Principles of Programming Languages						
	ELECTIVE-II/MOOCS	3+1*		3	40	60	100
F0025193	OPERATION RESEARCH						
F0026193	DESIGN PATTERNS						
F0027193	Computer Networks						
F0028193	Object Oriented Programming Through Java Lab		3	1.5	40	60	100
F0029193	Professional Communication & Soft Skills Lab (PROS)		3	1.5	40	60	100
F0030193	Python Programming Lab		3	1.5	40	60	100
F0031193	Continuous Comprehensive Evaluation		4	2	40	60	100
	Total	**20**	**13**	**21.5**	**360**	**540**	**900**

II YEAR MCA II-SEMESTER

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
F0032194	Web Technologies	3+1*		3	40	60	100
F0033194	Object Oriented Analysis and Design Using UML	3+1*		3	40	60	100
F0034194	Software Testing Methodologies	3+1*		3	40	60	100
	ELECTIVE-III/MOOCS	3+1*		3	40	60	100
F0035194	Human Computer Interaction						
F0036194	Computer Graphics						
F0037194	Information Security						
	ELECTIVE-IV	3+1*		3	40	60	100
F0038194	Distributed Databases						
F0039194	Artificial Intelligence						
F0040194	Data Analytics and Big Data						
F0041194	Web Technologies Lab		3	1.5	40	60	100
F0042194	Case Tools Lab		3	1.5	40	60	100
F0043194	Software Testing Methodologies Lab		3	1.5	40	60	100
F0044194	Continuous Comprehensive Evaluation		4	2	40	60	100
	Total	**20**	**13**	**21.5**	**360**	**540**	**900**

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY, NANDYAL

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MASTER OF COMPUTER APPLICATIONS

III YEAR MCA I-SEMESTER

COURSE STRUCTURE

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
F0045195	R-Programming	3+1*		3	40	60	100
F0046195	Data Warehousing and Data Mining	3+1*		3	40	60	100
F0047195	Mobile Application Development	3+1*		3	40	60	100
	ELECTIVE-V/MOOCS	3+1*		3	40	60	100
F0048195	E-Commerce						
F0049195	PHP Programming						
F0050195	Image Processing						
	ELECTIVE-VI	3+1*		3	40	60	100
F0051195	Software Project Management						
F0052195	Middleware Technologies						
F0053195	Cloud Computing						
F0054195	R-Programming Lab		3	1.5	40	60	100
F0055195	Mobile Application Development Lab		3	1.5	40	60	100
F0056195	Mini Project		3	1.5	40	60	100
F0057195	Continuous Comprehensive Evaluation		**4**	2	40	60	100
	Total	**20**	**13**	21.5	360	**540**	**900**

III YEAR MCA II-SEMESTER

Code	Subject	Credits	Internal Marks	External Marks	Total
F0058196	Seminar	2	50		50
F0059196	Project work	12.5	-	-	

F0060193 – MOOCS-I (ELECTIVE-II)
F0061194 – MOOCS-II (ELECTIVE-III)
F0062195 – MOOCS-III (ELECTIVE-V)

Note: In MOOCs(NPTEL/Swayam) Minimum Score must be >=50%

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AUTONOMOUS
MASTER OF COMPUTER APPLICATIONS

I Year, I-Sem

T	C
4	3

F0001191	**PROBABILITY AND STATISTICS**		**4**–0–**0**	**3 Credits**

Course Out comes: After completion of the course the student will be able to:

CO1	Understand the basic probability concepts and random variables that have numerous applications in computer science.
CO2	Apply the concept of distribution functions in web data and traffic network modeling in computer science engineering.
CO3	Analyze statistics and its applications in simulation, data mining and reliability theory.
CO4	Determine the process constructing linear and non-linear curves through the method of least square and understand its usage in binary mixtures.
CO5	Identify the concept of statistical quality control in computer science and mechanical engineering.

Mapping of Course outcomes with Program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**2**	-	-	-	-	-	-	-	-	-	-
CO2	**3**	**1**	-	**1**	-	-	-	-	-	-	-	-
CO3	**1**	**2**	-	-	-	-	-	-	-	-	-	-
CO4	**2**	**3**	-	**2**	-	-	-	-	-	-	-	-
CO5	**1**	**2**	-	-	-	-	-	-	-	-	-	-

COURSE OUTCOMES:

1. Understand the basic probability concepts and random variables that have numerous applications in computer science.
2. Apply the concept of distribution functions in web data and traffic network modeling in computer science engineering.
3. Analyze statistics and its applications in simulation, data mining and reliability theory.
4. Determine the process constructing linear and non-linear curves through the method of least square and understand its usage in binary mixtures
5. Identify the concept of statistical quality control in computer science and mechanical engineering.

Unit - I

Review of basic concepts of probability – Random variables – Expectation – Moment generating function – Discrete and continuous distributions.

Distribution functions: Binomial Distribution – Poison Distribution and Normal Distribution – Related properties.

Unit – II

Test of Hypothesis: population and sample – Confidence interval of mean from normal distribution – Statistical Hypothesis – Null and Alternative hypothesis- level of significance. Test of significance – Test based on normal distribution –Z test for means and proportions.

Unit – III

Small samples – $t-\ test$ for one sample and two sample problem, $F-\ test$, $Chi-square\ test$ for testing of goodness of fit and independence.

UNIT-IV

Analysis of variance for one way classification or one factor experiments and for two factor experiments.

Unit – V

Curve fitting: Fitting a straight line – Second degree curve – Exponential curve-Power curve by method of least squares using MATLAB.

Unit – VI

Correlation: Rank correlation – Correlation Coefficient – Karl Pearson's Coefficient Correlation – Spearman Rank Correlation.

Regression: Regression lines – Standard Error of estimation – Classification of Regression techniques – Linear Regression (LR) Model.

Text books/references:

1. Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.
2. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
3. Statistical methods by S.P.Gupta, S.Chand Publications.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.
6. Probability and Statistics, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
7. S.C. Gupta, Fundamentals of statistics, Himalaya Publishing house.
8. Miller and Freund's, Probability and Statistics for engineers, Tata M=cGraw-hill.

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MASTER OF COMPUTER APPLICATIONS

I Year, I-Sem

T	C
4	3

(F0002191) DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:

- Advantages and applications of DBMS and Database system structure.
- Schema design: ER model and conceptual design.
- Relational model and SQL basics.
- Relational algebra and Query optimization.
- Schema refinement: normalization and redundancy removal and functional dependent.
- Transaction management: locking protocols, serializability concepts etc.
- Concurrency control and crash recovery: various mechanisms, ARIES algorithm and deadlock concepts.

OUTCOMES:

- Students will learn about the need for DBMS, the largeness of the data and why it gives rise to steam oriented processing and strategies and are at higher level than general purpose programming language such as JAVA.
- Understand ER concepts and ER mapping to relational model.
- Apply the concepts of relational algebra and relational calculus.
- Students will also learn basics of SQL and about primary key concepts and foreign key concepts. They will also learn about data manipulation (insertions deletions & updation) and triggers.
- Students will learn about functional dependency and the need for schema refinement (normalization) to remove redundancy of data.
- Students will also learn about transaction management concurrency Control and crash recovery.

UNIT I

Introduction to Databases: Data base System Applications, data base System VS file System, View of Data – Data Abstraction, Instances and Schemas, data Models – the ER Model, Relational Model, Other Models.

Database Languages – DDL, DML, database Access for application Programs. Data base Users and Administrator, Transaction Management, data base System Structure – Storage Manager, the Query Processor.

UNIT II

Entity Relationship Model: Data base design and ER diagrams – Beyond ER Design Entities., Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Concept Design with the ER Model.

UNIT III

Relational Model: Introduction to the Relational Model, Integrity Constraint Over relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views, Destroying /altering Tables and Views.

Relational Algebra: Relational Algebra - Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews

Relational calculus: Relational Calculus - Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

UNIT IV

Queries: Form of Basic SQL Query - Examples of Basic SQL Queries, Expressions and Strings in Select Command., Union, Intersection and Except, Introduction to Nested Queries – Correlated Nested Queries, Set Comparison Operators., Aggregative Operators, NULL values – Comparison using Null values, Logical connectives AND, OR and NOT, Impact on SQL Constructs , Outer Joins, Disallowing NULL values., Triggers.

UNIT V

Schema refinement and Normal Forms: Introduction to Schema Refinement - Problems Caused by redundancy, Decompositions, Problem related to decomposition, Functional Dependencies, Reasoning about FDS – Closure of set of FDs, Attribute Closure, Normal Forms - FIRST, SECOND, THIRD Normal forms, BCNF, Properties of Decompositions - Lossless join Decomposition, Dependency preserving Decomposition.

UNIT VI

Overview of Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of transaction, Lock Based Concurrency Control – 2-phase Locking Protocol, Deadlocks.

Concurrency Control: Serializability and recoverability, Introduction to Lock Management, Lock Conversions, Dealing with DeadLocks.

Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, The Write-Ahead Log Protocol, Check pointing, recovering from a System Crash.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATAMcGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, ElmasriNavrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education

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(F0003191) ACCOUNTING AND FINANCIAL MANAGEMENT

OBJECTIVES:

- To study the objectives, functions, importance and limitations of Accounting.
- To understand the principles of preparation of Final Accounts.
- To know the preparation of financial reports.
- To know the Cost Volume Profit Analysis and understand the Break- Even- Chart.
- To know the basics of Financial Management.

Out Comes:

- To understand the basics of accounting in business process
- Find out profitability and financial position of a business organization.
- To study the financial reports in business.
- To take product production related decision in a company.
- To understand the financial function environment in a business organization.
- To take investment related decisions in business

UNIT I:
Introduction to Accounting: Principles, concepts and conventions, double entry system of accounting, classification of accounts and debit-credit rules.

UNIT II:
Financial Statements: Introduction to basic books of accounts, journal and ledger – trial balance – preparation of final accounts: trading account, profit and loss account and balance sheet.

UNIT III:
Financial Analysis through ratios: Ratio Analysis – classification of ratios – short term solvency and long term solvency – profitability ratios – analysis and interpretation of financial statements through ratios of liquidity, solvency and profitability.

UNIT IV:
Break Even Analysis: Concept of Break Even Point, Cost-Volume-Profit Analysis, Determination of Break Even Point, Margin of Safety and P/V ratio, Impact of changes in cost or selling price on BEP, Practical applications of Break Even Analysis.

UNIT V:
Introduction to Financial Management: Meaning and scope, role of financial manager, objectives of time value of money – goals of financial management, leverages: operation, financial leverage and combined leverage.

UNIT VI:
Capital Budgeting: Capital and its significance, types of capital, estimation of fixed and working capital requirements, methods and sources of raising capital. Capital budgeting: features, proposals, methods of capital budgeting, payback method, accounting rate of return (AAR), Net Present Value Method (NPV) and Internal Rate of Return (IRR) -simple problems.

TEXT BOOKS:

1. Financial Accounting, S.N.Maheshwari, Sultan Chand, 2009.
2. Financial Management and Policy, Van Horne, James,C., Pearson ,2009.

REFERENCES:

1. Financial Accounting, Tulsian, S Chand, 2009.
2. Financial Statement Analysis, Khan and Jain, PHI, 2009.
3. Financial Management, I.M.Pandey, Vikas Publications.
4. Financial Management, Bhat Sundhindra, Excel: 2009.
5. Financial Management, Prasanna Chandra, T.M.H, 2009.

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(F0004191) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

OBJECTIVES:

- To teach students notations used in the discrete mathematics associated with computer science and engineering.
- To teach the rudiments of elementary mathematical reasoning (elementary proofs, proofs by induction).
- To prepare students for the theoretical parts of all further courses in MCA.
- To study logic and Boolean algebra from a mathematical perspective, but relating it to computer engineering applications.
- To introduce basic set-theoretical notions: relations, functions, graphs, equivalence relations and orderings.
- To relate these notions to applications in MCA.

OUTCOMES:

- Understand truth tables, the concept of logical equivalence and its relationship to equivalent logic circuits and Boolean functions. Know some Boolean laws of equivalence.
- Examine the validity of argument by using propositional and predicate calculus.
- Understand binary and n-ary relations and their properties. And know the information about some algebraic structures.
- Be able to use graphs as representing relations, and know the properties of partial ordering relations and lattice.
- Apply basic counting techniques to solve the combinatorial problems.
- Understand the basic concepts of graph theory and some related theoretical problems.

UNIT-I

Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, contradiction, contingency, equivalence of formulas, Duality Law, Normal forms- Disjunctive Normal Forms, Conjunctive Normal Forms, Principal Disjunctive normal form, principle conjunctive normal form.

UNIT-II

Theory of Inference for Statement Calculus: Validity using Truth Table**,** Rules of Inference, Indirect method proof.

Predicates Calculus: Predicates, Quantifiers, Free & Bound variables, Theory of Inference for predicate calculus.

UNIT-III

Relations: Definition, Properties of Binary Relations, compatibility relation, equivalence relation and partial ordering relations, total ordered relation, Hasse diagram, Extrernal elements in posets, Lattice and its Properties.

Functions: Definition of a function, types of functions, Pigeonhole principles and its applications, Composition of functions, Invertible Functions.

UNIT-IV

Algebraic structures: Definition of Binary Operations, properties of Binary Operations, Algebraic Structures, Semi groups and monaids, semigroup homomorphism and Isomorphism, Groups, sub groups, Group Homomorphism and Isomorphism.

UNIT-V

Elementary Combinatory: Basis of counting, Enumerating Combinations & Permutations and with repetitions, Constrained repetitions, Binomial Coefficients, Binomial & Multinomial theorems, the principles of Inclusion – Exclusion.

UNIT-VI

Graph Theory: Definition of Graph, Terminology of Graphs, Representation of a Graphs, Vertex Degree and Handshaking Property, Isomorphic Graphs, Planar Graphs, Spanning Tree, DFS, BFS.
Graph Theory Applications: walk and its classifications, Euler Circuit and Euler Trail, Hamiltonian cycles and Hamiltonian path, Graph Coloring.

TEXT BOOKS:

1. Discrete Mathematical Structures with Application to Computer Science, Tremblay, Manohar McGraw Hill Publication (for unit-1 to unit-2).
2. Mathematical Foundations of Computer Science by Dr. D.S. Chandrasekhraiah, 3rd Edition, Prism publication (for unit 3 to unit 6)

Reference Books:

1. Discrete Mathematics for Computer Scientists & Mathematicians, 2/e, J.L.Mott, A. Kandel, T.P. Baker, PHI (for unit-6).
2. Discrete and Combinatorial Mathematics- An Applied Introduction, Ralph. P.Grimaldi,5/e, Pearson Education.

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(F0005191) C-PROGRAMING

OBJECTIVES:

- To make students aware about fundamentals of computer programming.
- To provide exposure on C programming language.
- To provide exposure on various C programming concepts like arrays, functions, pointers, structures etc.
- To develop solutions for various problems by using C Programming Language by students.
- By learning the basic programming constructs they can easily switch over to any other language in feature.
- To teach the issues in file organization and the usage of file systems

OUTCOMES:

By the end of this course, students should be able:

- To understand the fundamental concepts of C language like data types, keywords, operators, Input/Output functions and control statements.
- To understand how to develop C programs to solve various kinds of problems by using different C programming concepts like arrays, functions
- To understand the need of storage class and to understand the fundamentals of strings.
- To understand about the dynamic memory allocation using pointers this is essential for utilizing memory and able to know the advantage of using functions with pointers.
- To understand about the need and advantage of User defined data types.
- To develop programs by performing I/O operations through Files.

UNIT I

INTRODUCTION TO C LANGUAGE: History of C language, Importance of C language, General Form of a C Program. Various Data Types supported by the C language. C tokens – Identifiers, Key words, Variables, Constants, Operators. Operator precedence and Associativity, Expressions and their evaluation process. Type Conversions, Managing Input/Output operations, Control Statements, Loop Constructs.

UNIT II

ARRAYS: Definition, Types of arrays, Declaration of One dimensional array, initialization of one dimensional array, storing and accessing the elements from a one dimensional array. Two-dimensional Arrays and their declaration, initialization, storing & accessing elements from it. Declaration of multi-dimensional array.

Functions: Introduction, Library Functions and User defined functions. Need for user-defined functions. General form of a function, Elements of an user defined functions- Function definition, Function call, Function declaration, Function name, return type, parameters, return statements. Categorization of functions with respect to parameters and return values. Definition of Scope and life-time of a variable with suitable examples.

UNIT III

STORAGE CLASSES AND STRINGS: Storage Classes - Automatic, External, Static, and Register. Arrays and functions - Passing an entire array as an Argument to a function. Recursion – Need of recursive functions, Solving Towers of Hanoi Problem using recursive function.

Strings - Definition, Declaring and initializing strings, Basic Operations on strings, String handling Functions, Table of strings.

UNIT IV

POINTERS: Introduction, Need of pointer variables, Pointer variable declaration, initialization of pointer variables, how to access a value from a memory location through its pointer variable. Arithmetic operations on pointer variables.

Pointers & Functions - pointers as function arguments (i.e., call-by-reference), Pointers and Arrays, Pointers and Strings, Array of Pointers, Pointers to Pointers, Generic Pointers, Pointer to Functions. Example Programs on the topics mentioned above.

UNIT V

STRUCTURE: Introduction, Features of Structures. Declaration and Initialization of Structures, Accessing structure members, Nested Structures, Array of Structures, Arrays within structures and Pointers to Structures, Structures and Functions, Unions, Union of Structures, Dynamic Memory Allocation Functions.

UNIT VI

FILE INPUT/OUTPUT: Introduction, Types of Files, File I/O Operations- High level I/O functions- Open & Close a file, Read and Write data into a file, Searching data in the file, Error handling during I/O operations on files. Command Line Arguments.

TEXT BOOKS:

1. Computer programming and Data Structures, E.Balaguruswamy, Tata McGraw Hill. 2009 revised edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education.

REFERENCES:

1. Let us C – Yeshwanthkanetkar, 5th Edition.BPB Publications.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.
3. The C Programming Language, Brian W.Kerninghan, Dennis M.Ritchie.
4. Data Structures using C – A.M.Tanenbaum,Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.
5. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

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(F0006191) C-PROGRAMING LAB

Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve typical problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

- Intel based desktop PC with ANSI C Compiler and Supporting Editors.

Exercise I:

a) Write a C program to find the roots of a quadratic equation.
b) Write a C program to check the given integer is Armstrong number or not

Exercise 2:

a) Write a C program, which takes two integer operands and one operator from the user, performs the specified operation and then prints the result.
(Consider the operators +,- ,*, /, % and use Switch Statement)
b) The total distance travelled by vehicle in t seconds is given by distance S = ut+1/2at2 where u and a are the initial velocity (m/sec.) and acceleration (m/sec2) respectively. Write C program to find the distance travelled at regular intervals of time given the values of u and a. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of u and a.

Exercise 3:

a) Write a C program to find the sum of individual digits of a positive integer.
b) Write a C program to generate the first n terms of the Fibonacci sequence.
[Note: A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.]
c) Write a C program to generate all the prime numbers between 1 and n, where n value is given by the user.
[Note: Develop each of the above programs by using different loop constructs supported by C language. (i.e., while, do while and for Loops)]

Exercise 4:

a) Write a C program to generate Pascal‘s triangle.
b) Write a C program to construct a pyramid of numbers.

Exercise 5:

a) Write a C program to find all the even numbers and odd numbers in the given one dimensional array.
b) Write a c program to delete a specified integer from an array and insert an element in a specified position into that same array.

c) Write a C program to perform the following operations:
i) Addition of Two Matrices ii) Subtraction of Two Matrices
iii) Multiplication of Two Matrices
[Note: Use functions to implement the above specified operations]
d) Write a c program to find the number of non-repeated elements in an array.

Exercise 6:

a) Write C programs that use both recursive and non-recursive functions
i) To find the factorial of a given integer.
ii) To find the GCD (greatest common divisor) of two given integers.
iii) To reverse a given positive integer.

Exercise 7:

a) Write a C Program to solve the Towers of Hanoi problem by using recursive function.
b) Write a C Program to demonstrate the various storage classes, which are supported by the C language. [i.e., automatic, external, static and register]

Exercise 8:

a) Write a C Program to demonstrate that, how to pass an entire array as an argument to a Function with a suitable example.
b) Write a C Program to perform various operations on given two strings using string handling functions.
C) Write a c program to find the first and last occurrence of given character in a given string.

Exercise 9:

a) Write a C Program to perform various arithmetic operations on pointer variables.
b) Write a C Program to demonstrate the following parameter passing mechanisms:
i) call-by-value ii) call-by-address

Exercise 10:

a) Write a C program that uses functions to perform the following operations:
i) To insert a sub-string in to a given main string from the specified position.
ii) To delete n no of characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not.

Exercise 11:

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn‘t contain T.
b) Write a C program to count the lines, words and characters in a given text.

Exercise 12:

a) 2‘s complement of a number is obtained by scanning it from right to left and Complementing all the bits after the first appearance of a 1. Thus 2‘s complement of 11100 is 00100. Write a C program to find the 2‘s complement of a binary number.
b) Write a C program to convert the given Roman numeral to its decimal equivalent value.
c) Write a c program to convert decimal number into binary number.

Exercise 13:

a) Write a C program that uses functions to perform the following operations:
i) Reading a complex number ii) Writing a complex number
iii) Addition of two complex numbers iv) Multiplication of two complex numbers
(Note: Represent the complex number using a structure.)

Exercise 14:

a) Write a C program which copies contents of one file to another file.

b) Write a C program to reverse the first n Characters in a file.

(Note: The file name and n are specified on the command line.)

Exercise 15:

a) Write a C program to display the contents of a file using command line arguments.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by the contents of the second file are put in the third file)

(Note: The file name and n are specified on the command line.)

REFERENCE BOOKS

1. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.

2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.

3. Computer Basics and C Programming, V. Raja Raman, PHI Publications.

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(F0007191) DATABASE MANAGEMENT SYSTEMS LAB

OBJECTIVES

- Student will be able to:
- Create and delete database schemas and execute SQL queries
- Inserting data, Altering and dropping the tables.
- Various types of data conversions using the functions.
- Make Use of PL/SQL Language Components.
- Make Use of PL/SQL Variables.
- Handle PL/SQL Reserved Words.
- Make Use of Identifiers in PL/SQL
- Make Use of Anchored Data type

OUTCOMES

Upon completion of the lab, the student should be able to:

- Map the model into a relational database system.
- Implement the given schema on a relational DBMS.
- Design, develop, and maintain Oracle Database Objects.
- Use a database language for manipulating and querying data.
- Develop advanced packages, stored procedures, and triggers and functions using PL/SQL

Recommended Systems/Software Requirements:

- Intel based desktop PC
- Mysql /Oracle latest version Recommended.

1) Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.

   Example:- Select the roll number and name of the student who secured fourth rank in the class.
3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4) Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5) i)Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)

   ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6) Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7) Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.

8) Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9) Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10) Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.
11) Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
12) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

TEXT BOOKS:

1. ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition
2. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc- Graw Hill.
3. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.

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(F0008191) IT WORKSHOP

OBJECTIVES:

- The modules include training on PC Hardware, and Productivity tools including text processor, spread sheet, presentation tools. It enables the students to understand and fix the common hardware, software issues & makes the students to install either Windows or UNIX based Operating system in the machines.
- Enable students to understand how computers work, different types of computers, functions of applications, input and data storage devices, different operating systems,
- It makes the students to understand and use the common office suite tools like word, excel etc. effectively in their daily usage.

OUTCOMES:

By the end of module students will be expected to demonstrate

- PC Hardware- introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer. The students should work on working PC to disassemble and assemble to working condition.
- To do installation of system software like MS Widows and Linux and the required device drivers.
- Productivity tools- module would enable the students in crafting professional word documents; excel spread sheets and power point presentations using the Microsoft suite of office tools.

PC HARDWARE

Exercise 1 - Identify the peripherals of a computer, components in a CPU and its functions.

Exercise 2 - Every student should disassemble and assemble the PC back to working condition.

Exercise 3 - Every student should individually install MS windows on the personal computer and also install Linux as dual boot with both Windows and

OFFICE TOOLS

Exercise 4 - Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office equivalent tool word: Importance of LaTeX and MS office tool Word as word Processors, Details of the four tasks and features that would be covered in each. Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 1-Task III: Using Word Processor to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.

SPREAD SHEET

Exercise 5 – Spread Sheet Orientation: The mentor needs to tell the importance of MS office 2007, 2010/ equivalent tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1-Task III: Features to be covered: - Gridlines, Format Cells, Summation, auto fill, Formatting Text, Formulas, Functions

PRESENTATION

Exercise 6 - Students will be working on basic presentation utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

REFERENCES:

1) Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2) LaTeX Companion – Leslie Lamport, PHI/Pearson.
3) Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
4) Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5) Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech
6) IT Essentials PC Hardware and Software Companion Guide, Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.

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(F0010192) **ORGANISATION STRUCTURE AND PERSONNEL MANAGEMENT**

Objectives:
- To know the fundamental concepts of management theories and process.
- To know the different organizational designs, functions and processes.
- To study about concepts of Human Resources
- To identify the HR department role and performing various functions.
- To know the employee training techniques and training & development department role.
- To study the human behavioral patterns and relationships among the employees.

Outcomes:
- Understand the fundamental concepts of management theories and processes.
- Identifying different organizational designs, functions and process.
- To understand and correlate to the organization
- To understand the significance of different HR functions
- To assess the role of training and development department and functions.
- To analyse the knowledge of human behavioral patterns and relationships among the employees.

UNIT I - Introduction to Management: Concepts of Management – Nature, Importance, Functions and theories of Management, Systems Approach to Management, Leadership Styles, Social Responsibilities of Management.

UNIT II - Organization Design and structures: Principles of Organization - Formal and Informal Organization - Concepts of Organizational design and Structure - organizational structures types: Evaluation of mechanistic and structures of organization and suitability – Departmentation - Span of Management - Delegation of Authority- Centralisation and Decentralisation.

UNIT III **-** Personnel Management: objectives, Evolution, personnel policies - Personnel management vs HRM - Personnel department position in the organization - Role of personnel manager as line and staff manager.

UNIT IV - Human Resource Planning: Need – strategies, HR inventory, HR forecasting - Job analysis, Job description and job specification - Recruitment and Selection process - interviewing techniques - transfers and promotion policies.

UNIT V **-** Training and Development: Objectives and policies planning - training manager and his role - Training techniques - career planning - Performance appraisal and its objectives.

UNIT VI **-** Understanding Human Behavior: Personality - Johari Window - Transactional Analysis -Perception, Perceptual process - Development of Attitudes and Values - Understanding Group Dynamics - Team Effectiveness - Strategies to deal with conflicts and stress.

References:

1. Organisational Behaviour, Robbins: Pearson, 2008.
2. Management and Organizational Behavior, P.Subbarao HPH, 2009.
3. Industrial Business Management, Martand T Telsang, S.Chand.
4. Human resources Management, Dr L.M.Prasad, S.Chand.
5. Dynamic personnel Administration, Rudrabasavaraj MN, Himalaya.
6. Personnel Management, Mamoria & Gankar, HPH, 2009.
7. Essentials of Management, Koontz & Weihrich, TMH, 2009.
8. Understanding Organisational Behaviour, Udai Pareek, P.H.I, 2009.

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(F0011192) DATA STRUCTURES THROUGH C

OBJECTIVES

- To teach efficient storage mechanisms of data for an easy access.
- To design and implementation of various basic and advanced data structures.
- To introduce various techniques for representation of the data in the real world.
- To develop application using data structures.
- To teach the concept of protection and management of data.
- To discuss the implementation linear data structures such as stacks, queues and lists and their applications.
- To discuss the implementation of different non-linear data structures such as trees andgraphs.
- To introduce various search data structures such as hashing, binary search trees, AVL tree and Heap trees.
- To introduce various internal sorting techniques and analyze their time complexities.

OUTCOMES

Students will be able

- To write programs based on linked list.
- Ability to summarize searching and sorting techniques.
- Ability to describe the operations of stack.
- Design linear data structures queues and linked lists.
- Basic concepts of trees and different types of trees.
- Design nonlinear data structures Graphs, and implement their operations and graph traversal techniques.

UNIT – I

Introduction: Definition, Classification of Data Structures.

Linked list: Definition, Singly linked lists, Doubly linked lists, Circular linked lists, Circular Double linked lists, Applications of Linked list: Sparse Matrix Manipulation, Polynomial Representation.

UNIT – II

Stacks: Introduction, Definition, Operations on stacks, Representation of Stacks- Arrays and Linked lists, Applications of stacks- infix to postfix conversion, Evaluation of Arithmetic Expression, Recursion.

UNIT - III

Queues: Introduction, Definition, Operations on Queues, Representation of Queues- Arrays and Linked lists, Various Queue structures-Deque, Circular Queues, Priority queues Applications of Queues.

UNIT - IV

Sorting: Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, and Quick Sort

Searching: Linear Search, Binary Search, and Fibonacci Search.

UNIT - V

Tress: Binary Tree, Binary Search Tree (BST), Representation and operations on BST, Tree Traversal Techniques: In order, post order, pre order. Applications of BST, AVL trees, Heap trees, Heap sort.

UNIT – VI

Graphs –Introduction, Graph Terminologies, Representation of Graphs, Graph traversal techniques-BFS, DFS.

TEXT BOOKS:

1. Samanta, Classic Data Structures, 1/e, 2001, PHI.
2. Programming in C and Data Structures, J.R. Hanly, Ashok N. Kamthane, A. Ananda Rao, Pearson Education.
3. An Introduction to Data Structures with Applications, Trembley, Sorenson, 2/e, TMH.
4. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
5. Computer Programming and Data Structures, E. Balagurusamy Education / PHI, Eighth Edition.

REFERENCES:

1. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.
3. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson.

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(F0012192) COMPUTER ORGANIZATION

OBJECTIVES:

1. To understand the structure, function, characteristics and performance issues of computer systems.
2. To understand the design of the various functional units of digital computers.
3. To understand the basic processing unit and how they are connected and how it generates control signals (using hardwired and micro programmed approaches).
4. To understand the different types of memory and how they are related.
5. To learn basics of Parallel Computing and Pipelining.

OUTCOMES:

1. Students will learn about computer performance, computer design.
2. Trade-offs between cost and performance as well as between hardware and software
3. Students will formulate and solve problems
4. Understand the performance requirements of systems
5. Students will learn to communicate effectively and learn to think creatively and critically, both independently and with others.
6. Students will learn about all the detailed design issues and circuits of each unit.

UNIT-I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers.

DATA REPRESENTATION: Fixed Point Representation, Floating Point Representation. Error Detection codes.

UNIT-II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory- reference instructions, Input – Output and Interrupt.

UNIT-III

CENTRAL PROCESSING UNIT: Stack organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control, Reduced Instruction set computer

COMPUTER ARITHMETIC: Fixed point operations - Addition and subtraction, multiplication, Division Algorithms

UNIT-IV

THE MEMORY SYSTEM: Basic concepts, semiconductor RAM memories, Read-only memories, Cache memories, performance considerations

UNIT-V

PIPELINE AND VECTOR PROCESSING: Parallel processing, Arithmetic pipeline, Instruction Pipeline, RISC Pipeline, Vector processing, Array Processors.

UNIT-VI

MULTI PROCESSORS: Characteristics of Multi Processors, Inter Connection Structures, Inter Processor Arbitration, Inter Processor Communication & Synchronization, Cache Coherence

TEXT BOOKS

1. Computer Systems Architecture – M. Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

REFERENCES

1) Computer Organization and Architecture–William Stallings Sixth Edition, Pearson/PHI

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(F0013192) OPERATING SYSTEMS

OBJECTIVES:

- This course deals with functions, structures and history of operating systems.
- To understand the design issues associated with operating systems.
- To understand various process management concepts including scheduling, synchronization, deadlocks.
- To be familiar with concepts of memory management including virtual memory and issues related to file system interface and implementation, disk management with protection and security mechanisms.
- Some example operating systems (UNIX, Windows, Solaris etc.)

OUTCOMES:

- Evaluate the key trade-offs between multiple approaches of operating system design
- Explore knowledge in-
  - Operating system structure
  - Process scheduling
  - Process and thread synchronization.
- Analyze the performance of-
  - CPU scheduling algorithms
  - Page replacement Algorithms and
  - Deadlocks.
- Design and implement software solutions for process and memory management.
- Compare and contrast paging techniques using virtual memory.
- Communicate effectively with operating system through application programs.

UNIT I

Operating System Introduction: Role of Operating Systems, Operating System Services, User Operating System Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, Operating System Structure, Virtual Machines.

Processes: Process Concept, Process Scheduling, Operations On Processes, Inter Process Communication.

UNIT II

Multithreaded Programming: Multithreaded Models, Thread Libraries, Threading Issues, Operating System Examples.

Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Algorithm Evaluation.

UNIT III

Memory Management: Background, Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation.

Virtual Memory: Background, Demanding Paging, Copy on Write, Page Replacement, Allocation of Frames, Thrashing.

UNIT IV

Deadlocks - System Model, Dead locks Characterization, Methods for Handling Dead locks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT V

Synchronization- Background, The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Monitors.

UNIT VI

File System: File Concept, Access Methods, Directory and Disk Structure, Protection,

Implementing File System: File System Structure, File-System Implementation, Directory Implementation, Allocation methods, Free-space Management, Efficiency and Performance.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8thEdition, John Wiley.
2. Andrew S.Tanenbaum: Distributed operating system, Prentice Hall International Inc.1995.

REFERENCE BOOKS:

1. Operating System A Design Approach-Crowley, TMH.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.
3. Operating Systems, Dhamdhere, TMH.

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(F0014192) UNIX AND SHELL PROGRAMMING

OBJECTIVES:

- Use the basic commands of the unix operation system.
- Use foreground and background processes, directory information in scripts.
- Use conditions, control statements and if command in a decision, positional parameters and escape sequences.
- Use different patterns to write the qwk scripts.
- Use the documents, file I/O operators and command options processing, command substitution and Group shell commands.

OUTCOMES:

- Should be able to know the Unix file system and its basic operations.
- Should be able to know techniques of shell programming.
- Should be able to know the file,directory,disk utilities.
- Should be able to know the different types of shell and its environments customization.
- Should be able to write awk scripts.
- Should be able to know system calls

UNIT I

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, lp, od, tar, gzip.

UNIT II

Unix Utilities:-Introduction to unix file system, types of files, directories types, vi editor, file handling utilities, security by file permissions, **process utilities**: ps, disk utilities:du, df, **networking commands**: telnet, rlogin. **Unix commands** - find, w, finger.

Unit III:

Introduction to Shells : Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Quotes, Command Substitution, Job Control, Aliases, Variables, Options, Shell/Environment Customization.

UNIT III

Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files-cmp,diff,comm **Grep:-Regular Expression-**atoms,Operations, grep Family, Searching for File Content.

UNIT IV

awk: Execution, Fields and Records, Scripts, Operations, Patterns-Simple and Range pattern Actions-types of statements, Associative Arrays, String Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

UNIT VI

File Management : File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, fstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir.

TEXT BOOKS:

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson.
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.

REFERENCES:

1. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.
2. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education.
3. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.

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(F0015192) DATA STRUCTURES THROUGH C LAB

Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve typical problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

- Intel based desktop PC with ANSI C Compiler and Supporting Editors.

Exercise 1
Write a C program that uses functions to perform the following operations:
i) Creation ii) Insertion iii) Deletion iv) Traversal on Singly linked list

Exercise 2
Write a C program that uses functions to perform the following operations:
i) Creation ii) Insertion iii) Deletion iv) Traversal on Doubly linked list

Exercise 3
Write a C program that uses functions to perform the following operations:
i) Creation ii) Insertion iii) Deletion iv) Traversal on Circular linked list

Exercise 4
a) Write C programs that implement stack (its operations) using
i) Arrays ii) Pointers
b) Write C programs that implement Queue (its operations) using
i) Arrays ii) Pointers

Exercise 5
Write a C program that uses Stack operations to perform the following:
i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

Exercise 6
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
i) Bubble sort
ii) Selection sort
iii) Insertion sort

Exercise 7
Write C program that implements the following sorting method to sort a given list of integers in ascending order:
i) Quick sort
ii) Merge sort
iii) heap sort

Exercise 8

Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear search ii) Binary search iii) Fibonacci Search

Exercise 9

Write C programs to create BST and perform operations on it.

Write C programs to implement recursive and non-recursive Tree traversal techniques.

Exercise 10

Write C programs that implement

i) BSF

ii) DSF

REFERENCES:

1. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.

2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.

3. Computer Basics and C Programming, V. Rajaraman, PHI Publications

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(F0016192) UNIX AND SHELL PROGRAMMING LAB

Objectives:

- To teach students various unix utilities and shell scripting.

Recommended Systems/Software Requirements:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space LAN Connected.
- Any flavour of Unix / Linux.

Week1

Session-1

a) Log into the system
b) Use vi editor to create a file called myfile.txt which contains some text.
c) correct typing errors during creation.
d) Save the file
e) logout of the system

Session-2

a) Log into the system
b) Open the file created in session 1
c) Add some text
d) Change some text
e) Delete some text
f) Save the Changes
g) Logout of the system

Week2

a) Log into the system.
b) Use the cat command to create a file containing the following data. Call it mytable use tabs to separate the fields.

1425	Ravi	15.65
4320	Ramu	26.27
6830	Sita	36.15
1450	Raju	21.86

c) Use the cat command to display the file, mytable.
d) Use the vi command to correct any errors in the file, mytable.
e) Use the sort command to sort the file mytable according to the first field. Call the sorted file my table (same name)
f) Print the file mytable
g) Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it my table (same name)
h) Print the new file, mytable
i) Logout of the system.

Week3

1) a) Login to the system.
   b) Use the appropriate command to determine your login shell.
   c) Use the /etc/passwd file to verify the result of step b.
   d) Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.
   e) Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

2. a) Write a sed command that deletes the first character in each line in a file.
   b) Write a sed command that deletes the character before the last character in each line in a file.
   c) Write a sed command that swaps the first and second words in each line in a file.

Week4

a) Pipe your /etc/passwd file to awk, and print out the home directory of each user.
b) Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.
c) Repeat
d) Part using awk

Week5

a) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.
b) Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.
c) Write a shell script that determines the period for which a specified user is working on the system.

Week6

a) Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.
b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

Week7

a) Write a shell script that computes the gross salary of a employee according to the following rules:
   i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.
   ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic
   The basic salary is entered interactively through the key board.
b) Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.

Week8

a) Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.
b) Write shell script that takes a login name as command – line argument and reports when that person logs in
c) Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.

Week9

a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
c) Write a shell script to perform the following string operations:
   i)To extract a sub-string from a given string.
   ii)To find the length of a given string.

Week10

Write a C program that takes one or more file or directory names as command line input and reports the following information on the file:

i)File type
ii)Number of links
iii)Read, write and execute permissions
iv)Time of last access

(Note: Use stat/fstat system calls)

Week11

Write C programs that simulate the following unix commands:

a) mv
b) cp

(Use system calls)

Week12

Write a C program that simulates ls Command
(Use system calls / directory API)

TEXT BOOKS

1. Introduction to UNIX & SHELL programming, M.G. Venkatesh Murthy, Pearson Education.
2. Unix concepts and applications, Fourth Edition, Sumitabha Das, TMH.
3. Unix for programmers and users, 3rd edition, Gaham Glass & K. Ables, pearson education.
4. Unix and shell Programming –A text book, B.A. Forouzan & R.F. Giberg, Thomson.
5. Beginning shell scripting, E. Foster – Johnson & other, Wile Y- India.

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(F0017192) OPERATING SYSTEMS LAB

OBJECTIVES:
A student will be able to:
- Prepare students for easy transfer from academia into practical life.
- Get an Insight into the Computer Technologies.
- Obtain Basic Knowledge of Operating Systems.
- They can able to learn protection and security mechanisms

OUTCOMES:
The main learning outcomes are:
- Master understanding of design issues associated with operating systems.
- Master various process management concepts including scheduling, synchronization, deadlocks.
- Master concepts of memory management including virtual memory.
- Master system resources sharing among the users.
- Master issues related to file system interface and implementation, disk management.
- Be familiar with various types of operating systems including Unix.

List of Sample Problems/Experiments:

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
   a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
   a) Single level directory b) Two level
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Write a C program to create a child process and allow the parent to display "Hello" and the child to display "Welcome" on the screen.
7. Simulate all page replacement algorithms such as
   a) FIFO b) LRU c) Optimal
8. Simulate Paging Technique of memory management.
9. Write C programs that make a copy of a file using i) standard I/O and ii) system calls.
10. Write C programs that count the number of blanks in a text file using i) Standard I/O and ii) system calls.

REFERENCES:

1. Operating Systems, P.P. Choudhury, PHI Learning Private Ltd.
2. Operating Systems, R.Chopra, S.Chand and Company Ltd.