R G M COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS) NANDYAL-518501, KURNOOL DIST., A.P., INDIA

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS



MCA SYLLABUS 2020

Applicable for students admitted into MCA (Regular) from 2020-21 REGULATIONS, Course Structure & Detailed Syllabus

Autonomous

MASTER OF COMPUTER APPLICATIONS

(Affiliated to J.N.T.U.A., Ananthapuramu)

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

MCA (Regular) from 2020-21

For pursuing Two 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 2020-21 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 2020 for MCA (Regular)

(Effective for the students admitted into first year from the Academic Year 2020-2021)

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 two academic years and not more than four academic years.
- **2.2** The student, who fails to fulfill all the academic requirements for the award of the degree within four 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.

Subject	Semester								
	Periods / Week	Credits	Internal marks	External marks					
Theory	ectPeriods / WeekCreditsory0303ini Project031.5Seminar2.0uous nensive031.5tion15		40 (25 - internal Test + 15- assignment)	60					
Practical/Mini Project	03	1.5	40	60					
Technical Seminar		2.0	50						
Continuous									
Comprehensive	03	1.5	40	60					
Evaluation									
Project work	30	15							

Table 1: Credits

Rajeev Gandhi Memorial College of Engineering and Technology Autonomous MASTER OF COMPUTER APPLICATIONS

Table 2: Course pattern												
Year	Semester	No. of Subjects	Number of Labs	Total cree	lits							
		06 Subjects	Lab-1	6x3=18								
	First		Lab-2	3x1.5=4.5	24.5							
т	Tilst		Lab-3 CCE	1x2=02	24.3							
1		04 Subjects	Lab-1	6x3=18								
	Second	01 MOOCs(Elective-1)	Lab-2	3x1.5=4.5	24.5							
		01 Elective-2	Lab-3 CCE	1x2=02								
		03 Subjects	Lab-1	6x3=18								
	Third	01MOOC(Elective-3)	Lab-2	3x1.5=4.5								
п	Third	01-Elective-4 01-Elective-5	Vumber of Labs Total credits Lab-1 $6x3=18$ 2 Lab-2 $3x1.5=4.5$ 2 Lab-3 $1x2=02$ 2 cCE $6x3=18$ 2 ctive-1) Lab-1 $6x3=18$ 2 Lab-3 $3x1.5=4.5$ 2 ctive-1) Lab-2 $3x1.5=4.5$ 2 Lab-3 CCE $1x2=02$ 2 ive-3) Lab-1 $6x3=18$ $3x1.5=4.5$ 2 Lab-3(Mini project) CCE $1x2=02$ 2 CCE $1x2=02$ 2 $1x1.5=1.5$ 1 project work $1x1.5=1.5$ $1x15=1.5$ 1 TOTAL CREDITS 2 5 5	24.5								
11	Fourth		Seminar(Technical)	1x1.5=1.5	165							
	Fourth		Project work	1x15=15	10.5							
			TOTA	AL CREDITS	90							

Table 2: Course pattern

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 2nd semester. Out of the electives offered in 2nd / 3rd semesters, two elective will be based on MOOCs the student has to obtain the certificate from the organization in which he has registered for MOOCs. Any MOOCs selected by the student should be of more than 45 hours duration with 03 credits and also from the reputed organization. Attendance of the student will be finalized from the subjects (excluding the MOOCs) and labs only in that semester for fulfilling the minimum requirements of attendance for promotion to next semester. Attendance will not be recorded for MOOCs. Noncredit courses will not be considered for MOOCs. 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 outside of the institute (External examiner).
- **4.5** 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

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field. One from the panel will be selected by the principal of the institute as external Examiner for CCE.

- **4.6** For Technical Seminar 50 marks shall be for internal evaluation. The candidate has to secure a minimum of 25 marks to be declared successful. The assessment will be made by a board consisting of HOD and two internal experts at the end of 4th semester.
- **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 $\underline{03}$ 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 3rd 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 4th 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 4th 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.

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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 75 Credits.							
First Class	Below 70% but not less than 60%	First Class	≥6.5 and < 7.5	credits).							
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.

Range in which the % of marks in the subject fall	Grade	Grade point Assigned	Performance	Performance in Project work
90 to 100	0	10	Outstanding	Performance in project
80 to 89.9	A^+	09	Excellent	will be reported as
70 to 79.9	А	08	Very good	i) Good ii) Satisfactory
60 to 69.9	\mathbf{B}^+	07	good	iii) Un Satisfactory. The
50 to 59.9	В	06	Pass	credits obtained in Project
<50	F	00	Fail	will not be considered for
Ab	AB	00	Fail	the award of Class.

 Table 4: Conversion into Grades and Grade points assigned

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

$$CGPA = \frac{\sum_{1}^{m} GPA_{j} \times TC_{i}}{\sum_{1}^{m} TC_{j}}$$

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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", "hers".

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I YEAR MCA I-SEMESTER COURSE STRUCTURE

					Schem	e of Examii	nation
Code	Subject	SubjectTheoryPracticalCreditsInternalExternalTo Marksad Statistics3-3406010agement Systems3-3406010amming3-3406010ineering3-3406010stems3-3406010ganization3-3406010	Total				
					Marks	Marks	Marks
F0001201	Probability and Statistics	3	-	3	40	60	100
F0002201	Database Management Systems	3	-	3	40	60	100
F0003201	Python Programming	3	-	3	40	60	100
F0004201	Software Engineering	3	-	3	40	60	100
F0005201	Operating Systems	3	-	3	40	60	100
F0006201	Computer Organization	3	-	3	40	60	100
Laboratory							
F0001201	Database Management Systems		3	15	40	60	100
10091201	Lab	-	5	1.5	40	00	100
F0092201	Python Programming Lab	-	3	1.5	40	60	100
F0093201	Unix Operating Systems Lab	-	3	1.5	40	60	100
E0004201	Continuous Comprehensive		4	2	40	60	100
1.0094201	Evaluation	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	00	100			
	Total	18	13	24.5	400	600	1000

					Scheme of Examination			
Code	Subject	Theory	Practical	Credits	Internal	External	Total	
					Marks	Marks	Marks	
F0007202	Object Oriented Programming Through Java	3	-	3	40	60	100	
F0008202	Android Programming	3	-	3	40	60	100	
F0009202	Mathematical Foundations of Computer Science	3	-	3	40	60	100	
F0010202	Computer Networks	3	-	3	40	60	100	
F0026202	Elective-I (MOOCs)	3	-	3	40	60	100	
Elective-II								
F0011202	Formal Language and Automata Theory							
F0012202	Data Analytics and Big Data	3	-	3	40	60	100	
F0013202	Principles of Programming Languages							
F0014202	Distributed Databases							
Laboratory								
F0095202	Object Oriented Programming Through Java Lab	-	3	1.5	40	60	100	
F0096202	Android Programming Lab	-	3	1.5	40	60	100	
F0097202	Computer Networks Lab	-	3	1.5	40	60	100	
F0098202	Continuous Comprehensive Evaluation		4	2	40	60	100	
	Total	18	13	24.5	400	600	1000	

I YEAR MCA II-SEMESTER

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II YEAR MCA I-SEMESTER COURSE STRUCTURE

					Scheme of Examination			
Code	Subject	Theory	Practical	Credits	Internal	External	Total	
					Marks	Marks	Marks	
F0015203	Corporate Communication Principles	3	-	3	40	60	100	
F0016203	Web Technologies	3	-	3	40	60	100	
F0017203	Data Warehousing and Data Mining	3	-	3	40	60	100	
F0027203	Elective-III (MOOCs)	3	-	3	40	60	100	
Elective-IV								
F0018203	Compiler Design			3	40	60	100	
F0019203	Artificial Intelligence	3	-					
F0020203	Software Project Management							
F0021203	Cloud Computing							
Elective-V								
F0022203	Software Testing							
F0023203	Computer Graphics	3	-	3	40	60	100	
F0024203	Cyber Security							
F0025203	Fundamentals of Machine Learning							
Laboratory		-			-	-	-	
F0099203	Web Technologies Lab	-	3	1.5	40	60	100	
F0081203	Data Warehousing and Data Mining Lab	-	3	1.5	40	60	100	
F0082203	Mini Project	-	3	1.5	40	60	100	
F0083203	Continuous Comprehensive Evaluation		4	2	40	60	100	
	Total	18	13	24.5	400	600	1000	

II YEAR MCA II-SEMESTER COURSE STRUCTURE

Code	Subject	Credits	Internal Marks	External Marks	Total
F0084204	Project work	15	-	-	-
F0085204	Seminar	1.5	50		50

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I YEAR, I-SEM (MCA)

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(F0001201) PROBABILITY AND STATISTICS

COURSE OBJECTIVES<mark>:</mark>

COURSE OUTCOMES:

After completion of the course the student will be able to:

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

MAPPING OF COs & POs:

CO/PO	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	-	-	-	-	-	-	-	-	-	-

<u>UNIT - I</u>

Basic concept of probability – Random variables – Expectation – Discrete and continuous distributions.

UNIT – II

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

<u>UNIT – III</u>

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-IV

Small samples -t - test for one sample and two sample problem, F - test and Chi - square test (Testing of goodness of fit and independence).

<u>UNIT – V</u>

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.

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

<u>UNIT – VI</u>

Statistical quality control: Concept of quality of a manufactured product –Defects and Defectives – causes of variations – Random and assignable – The principle of Shewhart control chart – Charts for attribute and variable quality characteristics – Constructions and operation of X^- – Chart, R – Chart, P – chart and C – chart.

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.

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I YEAR, I-SEM (MCA)

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3	3

(F0002201) DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVES:

- Advantages applications of DBMS and Database system structure.
- Schema design: ER model and conceptual design.
- Relational Model, Formal Query Languages and SQL basis.
- Storage and efficient retrieval of data: various indexing techniques.
- Schema refinement: normalization and redundancy removal and functional dependant.
- Transaction management: locking protocols, serializability concepts etc.

COURSE OUTCOMES:

- Students will learn about the need for DBMS, applications and its structure.
- Students will learn about storage and efficient retrieval of large Information, constraints and formal query languages.
- Students will also learn basics of SQL, primary key, foreign key concepts 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.
- Students will learn about various storage and indexing methods and RAID concepts.

MAPPING OF COs & POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		3										2		
CO2	1			3				2						2	3
CO3		2								1	1		1		
CO4							2								2
CO5			2				2							1	

<u>UNIT I</u>

Database System Applications, database System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Database Languages – DDL – DML – Database Access for applications Programs – Database Users and Administrator – Transaction Management – Database System Structure – Storage Manager – the Query Processor- Data base design and ER diagrams – Beyond ER Design- Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Conceptual Design with the ER Model.

UNIT II

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical database Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra queries – Relational calculus – Tuple relational Calculus – Domain relational calculus.

UNIT III

The Form of a Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries, Set – Comparison Operators – Aggregate Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL, Triggers and Active Data bases.

<u>UNIT IV</u>

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

UNIT V

Overview Of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of transactions-Lock Based Concurrency Control, Performance of Locking, Transaction Support in SQL.

Concurrency Control: 2PL, Serializability and recoverability, Introduction Lock Management, Lock Conversions, Dealing with Deadlocks, Concurrency control without locking.

<u>UNIT VI</u>

Data on External Storage – File Organizations and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – The

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Memory Hierarchy, RAID, Disk Space Management, Buffer Manager, Files of Records, Page Formats, record Formats.

TEXT BOOKS:

- 1. Data base Management Systems, Raghu Ramakrishna, Johannes Gehrke, TATA McGraw Hill 3rd Edition
- 2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

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

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MASTER OF COMPUTER APPLICATIONS

I YEAR, I-SEM (MCA)

Т	С
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(F0003201) PYTHON PROGRAMMING

COURSE OBJECTIVES:

- Learn Syntax and Semantics of various Operators used in Python.
- Understand about Various Input, Output and Control flow statements of Python.
- ✤ Handle Strings and Files in Python.
- Understand Lists, Tuples in Python.
- Understand Sets, Dictionaries in Python.
- Understand Functions, Modules and Regular Expressions in Python.

COURSE OUTCOMES:

- Examine Python syntax and semantics and be fluent in the use of various Operators of Python.
- Make use of flow control statements and Input/Output functions of Python.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core data structures like Lists and Tuples.
- Apply the core data structures like Sets and Dictionaries in Python Programming.
- ♦ Demonstrate the use of functions, modules and Regular Expressions in Python.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3								1				1	1	1
CO2	2	3							1				1	1	1
CO3	1		2						1				1	1	1
CO4	2		2						1				1	1	1
CO5	2		2						1				1	1	1
CO6	2		2						1				1	1	1

UNIT – I:

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation. Overview on data types: Numbers, Strings, Lists, Set, Tuple and Dictionaries.

Operators in Python: Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Shift Operators, Ternary operator, Membership Operators, Identity Operators, Expressions and order of evaluations. Illustrative examples on all the above operators.

<u>UNIT – II:</u>

Input and Output statements: input() function, reading multiple values from the keyboard in a single line, print() function, 'sep' and 'end' attributes, Printing formatted string, replacement operator ({}). Illustrative examples on all the above topics.

Control flow statements: Conditional statements- if, if-else and if-elif-else statements. Iterative statements – for, while. Transfer statements – break, continue and pass. Illustrative examples on all the above topics.

<u>UNIT – III:</u>

Strings: Introduction to strings, Defining and Accessing strings, Operations on string - String slicing, Mathematical Operators for String, Membership operators on string, Removing spaces from the string, Finding Substrings, Counting substring in the given String, Replacing a string with another string, Splitting of Strings, Joining of Strings, Changing case of a String, Checking starting and ending part of the string, checking type of characters present in a string. Illustrative examples on all the above topics.

Files: Opening files, Text files and lines, Reading files, Searching through a file, Using try, except and open, Writing files, debugging.

UNIT – IV:

Lists: Creation of list objects, Accessing and traversing the elements of list. Important functions oflist–len(), count(), index(), append(), insert(), extend(), remove(), pop(), reverse() and sort(). Basic Operations on list: Aliasing and Cloning of List objects, Mathematical Operators for list objects, Comparing list objects, Membership operators on list, Nested Lists, List Comprehensions. Illustrative examples on all the above topics. Tuples: Creation of Tuple objects, Accessing elements of tuple, Mathematical operators for tuple, Important

functions of Tuple - len(),count(),index(), sorted(), min(), max(), cmp().Tuple Packing and Unpacking. Illustrative examples on all the above topics.

<u>UNIT – V:</u>

Sets: Creation of set objects, Accessing the elements of set. Important functions of set –add(), update(), copy(), pop(),remove(),discard(),clear(). Basic Operations on set -Mathematical Operators for set objects, Membership operators on list, Set Comprehensions. Illustrative examples on all the above topics.

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Dictionaries: Creation of Dictionary objects, Accessing elements of dictionary, Basic operations on Dictionary - Updating the Dictionary, Deleting the elements from Dictionary. Important functions of Dictionary – dict(), len(), clear(), get(), pop(), popitem(), keys(), values(), items(), copy(), set default(). Illustrative examples on all the above topics.

<u>UNIT – VI:</u>

Functions - Defining Functions, Calling Functions, Types of Arguments - Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Recursive functions, Illustrative examples on all the above topics.

Modules: Creating modules, import statement, from Import statement.

Regular Expressions: Character matching in regular expressions, Extracting data using regular expressions, combining searching and extracting, Escape character.

TEXT BOOKS

- 1. Learning Python, Mark Lutz, Orielly
- 2. Python Programming: A Modern Approach, VamsiKurama, Pearson

REFERENCE BOOKS

- 1. Think Python, Allen Downey, Green Tea Press
- 2. Core Python Programming, W.Chun, Pearson.
- 3. Introduction to Python, Kenneth A. Lambert, Cengages

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MASTER OF COMPUTER APPLICATIONS

I YEAR, I-SEM (MCA)

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(F0004201) SOFTWARE ENGINEERING

COURSE OBJECTIVES:

- To understand Software development as a process.
- Various software process models and system models.
- Various software designs: Architectural, object oriented, user interface etc.
- Software testing methodologies overview: various testing techniques including white box testing black box testing regression testing etc.
- Software quality: metrics, risk management quality assurance etc.

COURSE OUTCOMES:

- Understand software development life cycle
- Analyze and Apply various process models for a project
- Prepare SRS document for a project
- Understand requirement and Design engineering process for a project
- Identify different principles to create an user interface
- ✤ Identify different testing methods and metrics in a software engineering project

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1							1	1			1	2	
CO2	2	3	1						2	2				3	
CO3	2	2								2				1	
CO4	2	1	2						1	1				3	
CO5	2	2	1						1	1				2	
CO6	2							1						2	

<u>UNIT I</u>

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 patterns, process assessment, personal and team process models.

<u>UNIT II</u>

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.

<u>UNIT III</u>

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. **System models:** Context Models, Behavioral models, Data models, Object models.

<u>UNIT IV</u>

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

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns.

UNIT V

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

<u>UNIT VI</u>

Metrics for Process and Products: Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. Software Quality, Software Measurement, Metrics for software quality.

TEXT BOOKS:

- 1) Software Engineering, A practitioner's Approach-Roger S.Pressman, 6thedition. McGrawHill International Edition.
- 2) Software Engineering- Somerville, 7th edition, Pearson education.

- 1) Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
- 2) Software Engineering principles and practices, Deepak Jain, Oxford.
- 3) Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
- 4) Systems Analysis and Design- Shely Cashman Rosenblatt, Thomson Publications.
- 5) Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies

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MASTER OF COMPUTER APPLICATIONS

I YEAR, I-SEM (MCA)

(F0005201	OPERATING SYSTEMS
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COURSE OBJECTIVES:

- To understand the design issues associated with operating systems.
- To understand various process management concepts including scheduling, synchronization, deadlocks.
- * To be familiar with multithreading and the concepts of memory management including virtual memory.
- To understand the issues related to file system interface and implementation, disk management with protection and security mechanisms.

Some example operating systems (UNIX, Windows, Solaris etc.)

COURSE 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.

MAPPING OF Cos & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												2	2	1
CO2	1	2	1										2	1	
CO3	1	2	1										1	1	1
CO4	1	3											2	1	1
CO5	1	2											1		
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<u>UNIT I</u>

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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.

<u>UNIT III</u>

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.

<u>UNIT V</u>

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

<u>UNIT VI</u>

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. 1 Edition. **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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Rajeev Gandhi Memorial College of Engineering and Technology

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MASTER OF COMPUTER APPLICATIONS

I YEAR, I-SEM (MCA)

F0006201	COMPLITER	ORGANIZATION
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COURSE OBJECTIVES:

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

COURSE OUTCOMES:

- Explain the organization of basic computer, its design & the design of control unit and trade-offs between hardware and software.
- Students will formulate and solve problems, understand the performance requirement of the systems and the operations & languages of the register transfer, micro operations and input-output organization.
- Students can understand how computer stores positive and negative numbers.
- Understand the organization of memory and memory management hardware.
- Elaborate advanced concepts of computer architecture, Parallel Processing, interprocessor communication and synchronization.

MAPPING OF Cos & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1	3						2				1	3	2
CO2			2	3	1								3	1	2
CO3	3	2	1										1	2	3
CO4			3	2								1	1	3	2
CO5					3						2	1	2	3	1

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.

<u>UNIT-III</u>

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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MASTER OF COMPUTER APPLICATIONS

I YEAR, I-SEM (MCA)

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(F0091201) DATABASE MANAGEMENT SYSTEMS LAB

COURSE 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 variables and Language Components.
- ✤ Make Use of Identifiers in PL/SQL.
- ✤ Make Use of Anchored Data type.

COURSE 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.
- Develop various functions definitions and procedures using PL/SQL.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		2								1		
CO2								2		2				2	
CO3			2							1	1			1	1
CO4					1							2	1		2
CO5	1		2										2		1

RECOMMENDED SYSTEMS/SOFTWARE REQUIREMENTS:

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

LIST OF EXPERIMENTS

- 1) Creation, altering and dropping 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) Nested Queries and correlated nested queries
- 5) Table alterations
- 6) 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)
- 7) Creating procedures
- 8) Creating functions and packages
- 9) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.
- 10) Introduction to ORACLE reports

- 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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MASTER OF COMPUTER APPLICATIONS

I YEAR, I-SEM (MCA)

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(F0092201) PYTHON PROGRAMMING LAB

COURSE OBJECTIVES:

- To be able to introduce core programming basics and various Operators of Python programming language.
- To demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries.
- To understand about Functions, Modules and Regular Expressions in Python Programming.

COURSE OUTCOMES:

- Student should be able to understand the basic concepts of scripting and the contributions of scripting language.
- Ability to explore python data structures like Lists, Tuples, Sets and dictionaries.
- Ability to create practical and contemporary applications using Functions, Modules and Regular Expressions.

MAPPING OF COS & POS:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2						1				1	1	1
CO2	3	3	2						1				1	1	1
CO3	3	1	2						1				1	1	1

LIST OF EXPERIMENTS

- 1) Program to demonstrate basic data type in python
- 2) Program to demonstrate operators in python
- 3) A cashier has currency notes of denominations 10, 50, and 100.If the amount to be withdrawn is input through the keyboard using input() function in hundreds, find the total number of currency notes of each denomination the cashier will have to give to the withdrawer
- 4) Program to demonstrate list and tuple in python
- 5) Write a program in Python, A library charges a fine for every book returned late. For first 5 days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or the appropriate message
- 6) Write a program to calculate overtime pay of 10 employees. Overtime is paid at the rate of Rs.12.00 per hour for every hour worked above 40 hours. Assume that employee do not work for fractional part of an hour.
- 7) Two numbers are entered through the keyboard; write a program to find the value of one number raised to the power of another.
- 8) Write a function that receives marks received by a student in 3 subjects and returns the average and percentage of these marks. Call this function from main() and print the result in main
- 9) Write a program to read a file and display its contents.
- 10) Write a program to demonstrate Regular Expressions in python.

TEXT BOOKS

- 1. Learning Python, Mark Lutz, Orielly
- 2. Python Programming: A Modern Approach, VamsiKurama, Pearson

REFERENCE BOOKS

- 1. Think Python, Allen Downey, Green Tea Press
- 2. Core Python Programming, W.Chun, Pearson.
- 3. Introduction to Python, Kenneth A. Lambert, Cengages

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MASTER OF COMPUTER APPLICATIONS

I YEAR, I-SEM (MCA)

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(F0093201) UNIX OPERATING SYSTEMS LAB

COURSE 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 and Unix.
- They can able to learn protection and security mechanisms

COURSE 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.

MAPPING OF COS & POS:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	1							3			1	2	
CO2	1							3			2		1	2	
CO3		1							2		1		2		3
CO4				1			2							1	1
CO5	2		1		3										1
CO6						1				2				2	2

LIST OF SAMPLE PROBLEMS/EXPERIMENTS:

- Simulate the following CPU scheduling algorithms

 a) Round Robin
 b) SJF
 c) FCFS
 d) Priority
- 2) Simulate all file allocation strategiesa) Sequentialb) Indexedc) Linked
- 3) Simulate MVT and MFT
- 4) Simulate all File Organization Techniquesa) 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 asa) FIFOb) LRUc) 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 ii) system calls.

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

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I YEAR, II-SEM (MCA)

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(F0007202) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

COURSE OBJECTIVES:

After taking this course, the student should be able to:

- To understand the concepts and features of object oriented programming.
- The skills to apply OOP in Java programming in problem solving
- To understand the concept of polymorphism and inheritance.
- To understand the creation of user defined packages and interfaces.
- To learn java's exception handling mechanism, multithreading,
- \clubsuit To learn the network programming implementation using java.

COURSE OUTCOMES:

- Students can able to understand the OOP concepts and java syntaxes.
- Students will Able Identify classes, objects, members of a class and relationships among them needed for a specific problem and understanding the Inheritance and polymorphism.
- Students Can Able to build directories and manage applications with interfaces.
- Able to develop java programs that manages input/output streams.
- Students can able to Write Java programs to implement error handling techniques using exception handling and multitasking.
- Students can able to Create and understanding of client/ server interactions.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1		2							2			
CO2	2	1	3	2					1			2			
CO3	2	2	2	1					2			2			
CO4	2	1	2	2								2			
CO5	3	2	3	1								2			
CO6	1	1	3	2					2			2			

<u>UNIT-I</u>

Introduction: Creation of Java, importance of Java to internet, byte code, Java buzzwords, OOP Principles, Encapsulation, Inheritance and Polymorphism, data types, variables, declaring variables, dynamic initialization, scope and life time of variables, arrays, operators, control statements, type conversion and casting, compiling and running of simple Java program.

UNIT-II

Classes and Objects: Introducing class, Class definition, Member Variables and methods, Class objects, constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing – call by value, call by Object., recursion.

Inheritance: Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class.

UNIT-III

Packages and Interfaces: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

Strings: String functions, String Buffer Class, String Tokenizer class.

UNIT-IV

Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes.

Multithreading: Concepts of Multithreading, differences between process and thread, thread life cycle, creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks.

UNIT-V

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

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<u>UNIT-VI</u>

AWT: Concepts of components, container, panel, window, frame, canvas, Font class, Color class and Graphics, Controls: Buttons, Labels, Text fields, Text area, Check boxes, Checkbox groups, Lists, Choice, Scrollbars, Menus, Layout Managers – Flow, Border, Grid and Card.

TEXT BOOKS:

- 1) The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.
- 2) Programming with java primer 3rd Edition, E.Balaguruswamy, McGraHill.

- 1) Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
- 2) Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
- 3) Core Java 2, Vol 2, Advanced Features, Cay. S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
- 4) Beginning in Java 2, Iver Horton, Wrox Publications.

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

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(F0008202) ANDROID PROGRAMMING

OBJECTIVES:

Upon completion of this course, you will be able to:

- Build your own Android apps
- Explain the differences between Android and other mobile development environments
- Understand how Android applications work, their life cycle, manifest, Intents, and using external resources
- Design and develop useful Android applications with compelling user interfaces by using, extending, and creating your own layouts and Views and using Menus.
- Take advantage of Android's APIs for data storage, retrieval, user preferences, files, databases, and content providers.
- ★ Tap into location-based services, geocode, compass sensors, and create rich map-based applications.
- Utilize the power of background services, threads, and notifications.
- Use Android's communication APIs for SMS, telephony, network management, and internet resources (HTTP).
- Secure, tune, package, and deploy Android applications.

OUTCOMES:

- Understand the Android Framework and architecture. Installation on Android studio and its project development environment.
- Display proficiency in coding on a mobile programming platform and accessing the User Interfaces builtin application tools.
- Storage tools, Webview and Telephony concepts for the Android platform.
- Design and develop Multimedia application in android.
- Create a Mobile app with a significant programming component Tap into Built-in Services.
- Create a Mobile app with a significant programming component to google map locations, content Provider and dialog box.

UNIT-I

Introduction to Android, Types of Mobile Applications, Android Architecture(About DVM, Linux kernel, Java libraries & Native libraries, application frame work), Android Framework(Activity, Service, Broadcast Receiver, Content Provider), Android Studio Environment(how to Install, install in emulator, real device) Project Structure(R.Java, res folder, manifest.xml and .apk file), Android features, History, Layout UI groups(Leaner Layout, Relative Layout, Table Layout, Frame Layout, Grid Layout), Width and height properties(Match parent, Wrap content, Pixel, Density pixel and Scaled pixel).

UNIT-II

Activity, Activity lifecycle, Life cycle Methods, Intents, Intent Methods, layout file and its child elements and attributes, Basic UI Components(Text View, Button, Edit Text, Radio Button, Check Box), Advanced UI Components (AutoCompleteTextView, Spinner, ListView) Adapters (ArrayAdapter, Custom Adapter), Toast.

UNIT-III

WebView, WebView-HTML Communication, Fragment, Fragment Life Cycle. **Storage Methods:** shared preferences, SQLite Database (insert, read, update, delete). **Telephony:** send SMS, Call, Attaching File, and Send E-Mail.

UNIT-IV

Multimedia in Android: Media Player, Video View, Audio Recording, Video recording, Camera, Gallery. **Service:** Service, Service lifecycle methods.

UNIT-V

Built-in Services (location service, Notification service, Sensor Service, WIFI Service, Bluetooth Service, Vibrator Service), Broadcast Receivers.

UNIT-VI

Content Provider, Dialog Boxes (Custom dialog, Alert dialog, date Picker, Time Picker, Progress dialog, dialog Fragment), Google Maps.

TEXT BOOKS:

- 1. Android Application Development (with Kitkat Support), Black Book by Pradeep Kothari.
- 2. Android Programming: Pushing the Limits by Erik Hellman.

- 1. Beginning Android 4 Application Development by Wei-Meng Lee
- 2. Android Application Development for Dummies by Michael Burton

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Rajeev Gandhi Memorial College of Engineering and Technology

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

(F0009202) MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

COURSE 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 CSE.
- 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 CSE.

COURSE OUTCOMES:

- Understand the truth tables, the concept of logical equivalence, normal forms. And express English assertions in symbolic form and in predicate calculus using quantifiers.
- Gain knowledge on how to check validity of premises using different methods such as rule-cp, indirect method, and direct method.
- Know the basics of relations, functions and lattices.
- Perceive the Fundamentals of algebraic structures.
- Know the fundamentals of graph theory and traversing techniques of graphs.
- Know the applications of graphs such as Euler circuits, Hamiltonian graphs, Isomorphism, and Chromatic number

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1			2										
CO2	2	1			1										
CO3	2	1			1										
CO4	2	1			2										
CO5	1	1			1										
CO6	2	1			1										

<u>UNIT-I</u>

Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, converse, inverse and contrapositive ,equivalence, implication, Normal forms.

UNIT-II

Set Theory: set and subset, operation on sets and law of set theory, Cartesian Product of sets.

Combinatorics: The rule of sum and product, Permutation and combination, Bionamial and Multinomial theorems.

<u>UNIT-III</u>

Relations: Relations, Properties of binary Relations, Types of relations: equivalence, compatibility and partial ordering relations, Hasse diagram. Lattices and its properties.

Functions: introduction to Functions, types of functions

<u>UNIT-IV</u>

Algebraic structures: Algebraic systems with examples and general properties, semi groups and monoids, groups & its types, Introduction to homomorphism and Isomorphism (Proof of theorems are not required)

UNIT-V

Graph Theory: Representation of Graph, DFS, BFS, Spanning Trees, and planar Graphs. UNIT-VI

Graph Theory and Applications: Directed Graphs, Graphs, Basic Concepts of Isomorphism and Sub graphs, walks and their classification, Multi graphs and Euler circuits, Hamiltonian graphs, Euler's formula & its applications, Chromatic Numbers.

TEXT BOOKS:

- 1. Discrete Mathematical Structures with applications to computer science Trembly J.P. & Manohar .P, TMH.(unit-1 to 4(Algebraic systems))
- 2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker Prentice Hall.(unit-4(Elementary Combinatory) to 6) 2nd Edition.

- 1. Mathematical foundations of computer science Dr D.S.Chandrasekharaiah Prism books Pvt Ltd.
- 2. Discrete Mathematics, R.K. Bisht, H.S. Dhami, Oxford.

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

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(F0010202) COMPUTER NETWORKS

COURSE OBJECTIVE:

Students will be learn

- Describe the general principles of data communication.
- ♦ Will learn different types of transmission medias in physical layer.
- Describe how computer networks are organized with the concept of layered approach.
- Describe how packets in the Internet are delivered.
- Analyze the contents in a given Data Link layer packet, based on the layer concept.
- Describe what classless addressing scheme is.
- Describe how routing protocols work.
- Use C programming language to implement network programs.
- Design and implement a network security.

COURSE OUTCOME:

After completing this course the student must demonstrate the knowledge and ability to:

- Students are able to classify network services, protocols and architectures.
- Student will learn to explain key Internet applications and their protocols.
- Students will learn to explain security issues in computer networks.
- Students are able to understand the concepts of the OSI and the TCP-IP model.
- Students are able to familiar with network tools and network programming.
- Students are able to learn the concepts of protocols, Wireless networking, network interfaces, and Design/performance issues in LAN's AND WAN's.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1		2	1							3			2	2	
CO2	1							3			2		2	1	
CO3		1							2		1			2	1
CO4				1			2						1	1	2
CO5	2		1		3								2		
CO6						1				2					3

<u>UNIT – I</u>

Introduction: Uses of Computer Networks- Business Applications, Home Applications., Networks Hardware and Software- LAN, MAN, WAN, wireless networks, Protocol Hierarchies, Design Issues in Layers, service primitives, the relationship of services to protocols., OSI, TCP/IP, Examples of Networks: Arpanet, NSFNET, Ethernet, Network Topologies.

UNIT - II

Physical Layer: Guided Transmission media- Magnetic Media, twisted pair, Co-axial cable, Fiber Optics., Unguided Media: wireless – radio waves, microwaves, Infrared, ATM (Asynchronous Transfer Mode).

UNIT - III

Data link layer: Design issues- Services provided to the network layer, framing, error control, flow control., Error detection and correction- parity bit, Hamming Distance, Checksum, CRC., Elementary Protocol-Unrestricted simplex protocol, A simplex stop and wait protocol, a simplex protocol for noisy channel, Sliding Window – a one bit sliding window protocol, a protocol using Go back N, A protocol using selective repeat.

UNIT - IV

Network Layer: Network Layer Design Issues - Services provided to the transport layer, Implementation of Connection less services, Implementation of Connection oriented services, Comparison of Virtual Circuits and datagram subnets.

Routing Algorithms: the optimality principle, shortest path routing, flooding, Distance Vector Routing, Hierarchical routing, broadcast routing, multicast routing.

<u>UNIT – V</u>

Congestion Control Algorithms: congestion prevention policies, congestion control in virtual circuit subnets, congestion control in datagram subnets.

Transport Layer: Transport Services- services provided to the upper layers, transport service primitives, Berkley sockets, Connection management- Connection Establishment, connection release., UDP protocol- Introduction to UDP, Remote procedure call, The Real time Transport protocol., TCP protocol- TCP Segment Header, TCP Connection Establishment, TCP Connection Release, TCP Connection Management Modeling.

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MASTER OF COMPUTER APPLICATIONS

<u>UNIT – VI</u>

Application Layer - DNS, WWW, E-mail.

Network Security- Cryptography- Introduction to Cryptography, substitution cipher, Transposition ciphers, DES, Public key Algorithm- RSA.

TEXT BOOKS:

- 1) Computer Networks Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
- 2) Data Communications and Networking Behrouz A. Forouzan. Fourth Edition TMH.

- 1) An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
- 2) Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

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(F0011202) FORMAL LANGUAGES AND AUTOMATA THEORY

(Elective-II)

COURSE OBJECTIVES:

The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computer sciences.

COURSE OUTCOMES:

- To introduce the computer science students to the theoretical foundations of computer science.
- To study abstract models of information processing machines and limits of digital computation.
- To provide theoretical preparation for the study of programming languages and compilers.
- ✤ To design structural description of language statements.
- To develop the skills of formal and abstract reasoning as needed; for example, when designing, analysing, and / or verifying complex software/hardware systems.
- Be familiar with thinking analytically and intuitively for problem-solving situations in related areas of theory in computer science.

MAPPING OF COs & POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	3	1		1				1	2		1		1		
CO2	1	1		1									1		1
CO3		2		1					1			1		2	
CO4		2		1					1		1	1	2		
CO5	1	1						1			1	1			
CO6		2							1					1	

UNIT I:

Automata: Why study Automata Theory: introduction to FA, Structural Representations, Automata and complexity.

The central concepts of Automata: Alphabet, Strings, Language and Operations.

Deterministic finite automaton: definition, How DFA processes Strings, Simpler notations for DFA's, extending the transition Function to Strings, The Language of a DFA and minimization of FSM.

UNIT II:

Non deterministic finite automaton: An informal view of NFA, Definition, The extended Transition Function, The language of an NFA, Equivalence of DFA and NFA.

Finite Automata with \in transitions: use of \in transitions, Notation, Epsilon closures, Eliminating \in Transitions: \in -NFA to DFA conversion.

Finite Automata with output: Moore and Melay machines.

UNIT III:

Regular Languages: Regular expressions, identity rules for regular expressions, Arden's Theorem.

Finite Automata and regular expressions: Converting a regular expression to a finite automata, Converting finite automata to a regular expression, Converting DFA's to Regular Expressions by Eliminating States(state elimination method), Converting finite automata to a regular expression using Algebraic method (using Arden's theorem), Equivalence of two finite automata. Pumping lemma of regular sets, Applications of pumping lemma, closure properties of regular sets (proofs not required).

UNIT IV:

Context free grammar and Languages- Chomsky hierarchy of languages, Definition of CFG, Right most and leftmost derivations, The language of a grammar, Sentential Forms.

Regular grammars: construction of Regular grammar generating for a given DFA. Constructing a FA for given RG.

Parse Trees: Constructing Parse Trees, Application of CFG.

Ambiguity in grammars and Languages: Ambiguous grammars.

UNIT V:

Properties of CFL-Normal Forms for CFG: Eliminating Useless Symbols, Computing the generating and reachable symbols, Eliminating €- productions, Eliminating unit productions, Chomsky normal form, Greibach normal form, Pumping Lemma for CFL and Closure properties of CFL (proofs are not required).

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Push Down Automata- PDA: definition, model, graphical notation for PDA's, Instantaneous Descriptions of a PDA and The Language of a PDA.

UNIT VI:

Introduction to Turing Machines-TM: notation for the Turing Machine, Instantaneous Descriptions for TM, Transition Diagrams for TM, The language of a TM.

Extensions to the basic TM: Multi-tape TM, NDTM, Restricted Turing machines: Multi-stack machines, Counter Machines. Universal Turing Machine, Church's thesis, Linear bounded automata and context sensitive languages, Undecidability, Recursive and recursively enumerable languages, Post's Correspondence Problem.

TEXT BOOKS:

- 1) "Introduction to Automata Theory Languages and Computation". John E. Hopcroft, Rajeev Motwani and Jeffery D. Ullman. Pearson Education third edition
- 2) Formal Language and Automata Theory by KVN Sunitha ,Tata McGraw Hill Education

- 1) "Theory of Computer Science (Automata languages and computation)" K. L. P. Mishra and N. Chandra Shekaran, 2nd edition, PHI. (UNIT II)
- 2) Theory of Computation, Vivek Kulkarni, Oxford.
- 3) Formal Languages and Automata Theory, C.K. Nagpal.

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

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(F0012202) DATA ANALYTICS AND BIG DATA (Elective-II)

COURSE OBJECTIVES:

- It is intended for the students with knowledge about big data
- To appreciate the basic concepts and foundations of big data and analytics with text data.
- To learn real world technology and methodologies of big data.
- Understanding Big Data challenges in Transforming Business Processes, Social media analytics etc...

COURSE OUTCOMES:

The student will be able to:

- ✤ Understand technical aspects of big data.
- Understand the importance of capturing, organization, integration, analysing different types data with Big Data Environment.
- Understanding the Impact of Streaming Data and Complex Event Processingon Business.
- Understand the company's need and use the Big Data Analytics to Preventing Fraud and increasing the Business Benefit.
- Know how to Adding New Dimensions to the Planning Cycle and Transforming Business Processes.
- Understanding the role of relational databases in big data and Managing and integrating different data types into a big data environment.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			1				1			1	2	1		
CO2		3				1				2		1		2	
CO3	1	2								3			2		1
CO4			3		2			1				2		1	
CO5			2	1		1	1						1		2
CO6			2		1			1						1	3

UNIT-I:

Grasping the Fundamentals of Big Data: The Evolution of Data Management, Understanding the Waves of Managing Data, Creating manageable data structures, Web and content management, Managing big data, Defining Big Data ,Building a Successful Big Data Management Architecture, Beginning with capture, organize, integrate, analyze, and act Setting the architectural foundation ,Performance matters, Traditional and advanced analytics.

UNIT-II:

Examining Big Data Types: Defining Structured Data, Exploring sources of big structured data, Understanding the role of relational databases in big data, Defining Unstructured Data Exploring sources of unstructured data, understands the role of a CMS in big data management, looking at Real-Time and Non-Real-Time Requirements Putting Big Data Together, Managing different data types, integrating data types into a big data environment.

UNIT-III:

Understanding Text Analytics and Big Data: Exploring Unstructured Data, Understanding Text Analytics, The difference between text analytics and search, Analysis and Extraction Techniques, Understanding the extracted information, Taxonomies, Putting Your Results Together with Structured Data, Putting Big Data to Use, Voice of the customer, Social media analytics, Text Analytics Tools for Big Data.

UNIT-IV:

Dealing with Real-Time Data Streams and Complex Event Processing: Explaining Streaming Data and Complex Event Processing, Using Streaming Data, Data streaming, The need for metadata in streams, Using Complex Event Processing, Differentiating CEP from Streams, Understanding the Impact of Streaming Data and CEP on Business.

UNIT-V:

The Importance of Big Data to Business: Big Data as a Business Planning Tool (Planning with data, doing the analysis, checking the results, acting on the plan), Adding New Dimensions to the Planning Cycle (Monitoring in real time, Adjusting the impact, Enabling experimentation), Keeping Data Analytics in Perspective, Getting Started with the Right Foundation Getting your big data strategy started, planning for Big Data, Transforming Business Processes with Big Data.

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UNIT-VI:

Improving Business Processes with Big Data Analytics: A Real-World View: Understanding Companies' Needs for Big Data Analytics, Improving the Customer Experience with Text Analytics, The business value to the big data analytics implementation, Using Big Data Analytics to Determine Next Best Action, Preventing Fraud with Big Data Analytics, The Business Benefit of Integrating.

TEXT BOOKS:

1) Big Data for Dummies by Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman and Published by John Wiley & Sons, Inc.

REFERENCES:

1) Big Data Now: 2012 Edition Publisher: O'Reilly Media

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

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(F0013202) PRINCIPLES OF PROGRAMMING LANGUAGES

(Elective-II)

COURSE OBJECTIVES:

The main objective is that students will have a deep, working knowledge of the functional paradigm and the key ideas used in modern programming languages. It provides an exposure to core concepts and principles in contemporary programming languages

COURSE OUTCOMES:

- Apply the parse tree, ambiguity, semantics and syntax of a grammar and understanding the programming domains.
- Understanding arrays of different programming languages and variables.
- Understanding the statements, parentheses and control statements of different programming language.
- Apply the concepts of subprograms of programming languages.
- Understanding the Abstract data types and designs various kinds of programming languages.
- Understanding the logic programming and functional programming.

MAPPING OF COS & POS:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	1	2						2			1	1	1	
CO2	2	1	1						1			2		2	1
CO3	1											2		2	2
CO4	2	1	1						1			2		2	1
CO5	2	1	2						1			1		2	
CO6	2	1							1					1	

<u>UNIT – I</u>

Preliminary Concepts: Reasons for studying concepts of programming languages, Programming domains, Language Evaluation Criteria Influences on language design ,Language categories, Language Design Trades- Offs, Implementation Methods, Programming Environments Syntax and Semantics: general Problem of describing Syntax and Semantics, Formal Methods of Describing Syntax-BNF,EBNF.

<u>UNIT – II</u>

Data types: Introduction, primitive, character, user defined, array, associative, record, union, design and implementation uses related to these types. Names, Variable, type checking, strong typing, type compatibility.

UNIT-III

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation Assignment Statements, Control Structures: Statement Level, Compound Statements, Selection, Iteration, guarded commands.

UNIT - IV

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, Design issues of subprograms and operations, parameter passing methods, generic sub-programs, user defined overloaded operators, co routines.

UNIT - V

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, language examples, object oriented programming in small talk, C++, Java, C#. Exception handling: Exceptions, exception Propagation, Exception handler in Java, Ada.

<u>UNIT – VI</u>

Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming. Functional Programming Languages: Introduction, fundamentals of FPL, The first FPL: LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

TEXT BOOKS:

- 1. Concepts of Programming Languages Robert W. Sebesta, Eighth Edition, Pearson Education, 2008.
- 2. Programming Language Design Concepts, D. A. Watt, Wiley Dreamtech, rp-2007.

REFERENCE BOOKS:

- 1. Programming Languages, Second Edition, A.B. Tucker, R.E. Noonan, TMH.
- 2. Programming Languages, K. C.Louden, Second Edition, Thomson, 2003.
- 3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
- 4. Programming in Prolog, W.F. Clocksin and C.S.Mellish, Fifth Edition, Springer.

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

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(F0014202) DISTRIBUTED DATABASES (Elective-II)

COURSE OBJECTIVES:

- The first is study of the classical distributed database management Issues and architectural Issues in DDB.
- To inform the students about the architecture, principles and design issues of distributed databases.
- This course will introduce distributed truncations of distributed databases
- ✤ To learn about concurrency control protocols implantation in distributed database.
- This course exclusively focuses on the distributed query processing.
- This course will introduce distributed transaction management.
- To learn about importance of catalog management and reliability of distributed database.

COURSE OUTCOMES:

Upon completion of the course students are able to

- * Students will understand distributed database management concepts.
- Students will get good knowledge of distribution transparency and they will know the architecture of distributed databases.
- Students will be able to understand complex topics like Distribution design, distributed query processing.
- Students can be able to find solutions to the some of the Architectural issues.
- Students can solve the problems of deadlocks and concurrency control.
- ✤ Students will be able to give new examples of distributed database design.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			1	1				1	1		1	2	1	1
CO2	2			1	1		1			1		1	2	1	
CO3	2	1		1	1		1		1	1		1	1	1	
CO4	2	1		1	1		1		1	1		1	1	1	1
CO5	1	1		1	1								1	1	1
CO6	1	1		1	1		1		1	1			1	1	1
	-														

<u>UNIT I</u>

Introduction to Distributed Databases: Features of Distributed versus Centralized Databases, why distributed databases?, Distributed Database Management Systems, Review of databases, Review of computer networks.

<u>UNIT II</u>

Levels Of Distribution Transparency: Reference Architecture for Distributed Databases, Types of Data Fragmentation, Distribution Transparency for Read only Applications, Distribution Transparency for Update Applications, Distributed Database Access Primitives, Integrity Constraints in Distributed Databases.

Distributed Database Design: A Framework for Distributed database Design, The Design of database Fragmentation.

<u>UNIT III</u>

Translation of Global Queries to Fragment Queries: Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

<u>UNIT IV</u>

The Management of Distributed Transactions: A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions.

<u>UNIT V</u>

Concurrency Control: Foundation of Distributed Concurrency Control, Distributed Deadlocks, and Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT VI

Reliability: Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart.

Distributed Database Administration: Catalog Management in Distributed Databases, Authorization and Protection.

TEXT BOOKS:

1) Distributed Database Principles & Systems, Stefano Ceri, GiuseppePelagatti McGraw-Hill.

REFERENCES:

1) Principles of Distributed Database Systems, M.TamerOzsu, Patrick Valduriez – Pearson Education.

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

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(F0095202) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

COURSE OBJECTIVES:

- ✤ To make the student operating systems.
- ✤ Learn a object oriented way of solving problems.
- To teach the student to write programs in Java to solve the problems

COURSE OUTCOMES:

After Completion of the Lab Course student should be able:

- Student can able to Designing of window based applications.
- Student can able to create a client and server communication using net package.
- Student can able to design reusable software components using java beans.
- ✤ Able to develop server side programming.
- ♦ Able to develop the dynamic web pages using JSP.
- ✤ <u>MAPPING OF COs & POs:</u>

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

RECOMMENDED SYSTEMS/SOFTWARE REQUIREMENTS:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space.
- JDK Kit. Recommended.

LIST OF EXPERIMENTS

- 1) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant b2 -4ac is negative, display a message stating that there are no real solutions.
- 2) The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and 1. Every subsequent value is the run of the two values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the nth value in the Fibonacci sequence.
- 3) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that. Integer.
- 4) a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
 - b) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome (using String Buffer class).
- 5) Write a Java program for sorting a given list of names in ascending order.
- 6) Write a Java program to multiply two given matrices.
- 7) Write a Java Program that reads a line of integers, and then displays each integers, and the sum of all the integers (use String Tokenizer class)
- 8) Write a Java program that illustrates how run time polymorphism is achieved.
- 9) Write a Java program that illustratesa) Constructor Overloading using this keywordb) Method Overloading.
- 10) Write a java program implementa) Single Inheritanceb) Multilevel
- 11) Write a java program implement Multiple Inheritance using Interface.
- 12) Write a java program to create a Package and perform the Arithmetic operations and user can select the operation.

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- 13) Write a java program convert the currency into different currency (Rupees, Pounds and Dollars) using Interface.
- 14) Write a Java program to make frequency of letters/words in a given text.
- 15) Write a Java program that displays the number of characters, lines and words in a given text.
- 16) Write a Java program that: a) Implements stack ADT.
- 17) Write a Java program for creating multiple threads.
- 18) Write a Java program that correctly implements producer consumer problem using the concept of interthread communication.
- 19) Write an applet that displays a simple message.
- 20) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the + X % operations. Add a text field to display the result.
- 21) Write a Java program for handling mouse events.
- 22) Write a Java program for handling keyboard events.
- 23) Write a Java program to create a button when the user clicks the buttons it display the color (AWT).
- 24) Write a Java program that allows the user to draw lines, rectangles and Ovals.

TEXT BOOKS:

- 1) The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.
- 2) Programming with java primer 3rd Edition, E.Balaguruswamy, McGraHill.

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I YEAR, II-SEM (MCA)

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3	1.5

(F0096202) ANDROID PROGRAMMING LAB

OBJECTIVES:

- Understand how Android applications work, their life cycle, manifest, Intents, and using external resources
- Design and develop useful Android applications with compelling user interfaces by using, extending, and creating your own layouts and Views and using Menus.
- Secure, tune, package, and deploy Android applications
- Use Android's communication APIs for SMS, telephony, network management, and internet resources (HTTP).

OUTCOMES:

- Understand the Android Framework and architecture. Installation on Android studio and its project development environment.
- Display proficiency in coding on a mobile programming platform and accessing the User Interfaces built-in application tools.
- Storage tools, Webview and Telephony concepts for the Android platform.
- Design and develop Multimedia application in android.
- Create a Mobile app with a significant programming component Tap into Built-in Services.
- Create a Mobile app with a significant programming component to google map locations, content Provider and dialog box.

EXPERIMENTS:

- 1. a) Create an android application to display RGMCET Text Message.
 - b) Create an android application to display RGMCET Message by using Button.
- 2. Create an android application to call different activities by using Implicit and Explicit Intents.
- 3 a) Create an android application to select item from given list by using AutoCompleteTextView (ACTV).
 - b) Create an android application to display dropdown menu items and pick one item by using Spinner Component.
- 4 a) Create an android application to display internal storage data using Array Adapter.
- b) Create an android application to display internal storage data in vertical format by using Custom Adapter.
- 5. Create an android application to display WhatsApp videos in grid view by using Custom Adapter.
- 6. Create an android application to display webpage by using Web view Component.
- 7. Create an android application to display different webpages in fragments by using Fragments Component.
- 8. Create an android application to store the data by using Shared Preferences.
- 9. Create an android application to demonstrate concept of SQLite Database Storage method.
- 10. Create an android application to perform different types of operations (Send SMS, Making call and sending email) by using Telephony app.
- 11. Write an android program to develop Media player application.
- 12 a) Write an android program to develop Video view application
 - b) Write an android program to develop Audio Recording application.

- MASTER OF COMPUTER APPLICATIONS
- 13 a) Write an android program to develop Video Recording application.
 - b) Write an android program to develop Camera and Gallery application.
- 14 a) Create an android application to get latitude and longitude value by using Location Service.
 - b) Create an android application to display X, Y Sensor values by using Sensor Service.
- 15 a) Create an android application to get the notifications on Notification Bar by Using Notification Service.
 - b) Create an android application to display available Wi-Fi devices and Paired Wi-Fi devices by using Wi Fi Service.
- 16 a) Create an android application to get the Bluetooth devices and list of devices using Bluetooth and Vibrator Service.
 - b) Create an android application to get the System Announcements by using Broadcast Receiver.
- 17. Create an android application to share the data between multiple applications by using Content Provider.
- 18. Create an android application to display different Dialog Boxes.
- 19. Create an android application to display current location on Google maps by using Google-Maps Service.

- 1. Android Application Development (with Kitkat Support), Black Book by Pradeep Kothari.
- 2. Beginning Android 4 Application Development by Wei-Meng Lee.
- 3. Android Application Development for Dummies by Michael Burton

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MASTER OF COMPUTER APPLICATIONS

I YEAR, II-SEM (MCA)

(F0097202) COMPUTER NETWORKS LAB

COURSE OBJECTIVES:

Upon successful completion of this course students will be able to:

- Understand the concept of modeling and mechanism involved in UML
- Learn the classes and different types of relationships in classes, objects and terms related to diagrams
- * Examine fundamental object-oriented analysis and design techniques
- Apply design patterns for viewing a system as a set of procedures.

COURSE OUTCOMES:

The main learning outcomes are:

- Explain OOAD concepts and various UML diagrams.
- Select an appropriate design pattern.
- ✤ Illustrate about domain models and conceptual classes.
- ✤ Apply Compare and contrast various testing techniques.
- To understand the functionalities of various layers of OSI model.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	1						1	3	2	1
CO2	3	3	3	2		1	1						3	2	1
CO3	3	3	2	1									3	2	
CO4	3	3	3	2	2	2	1					2	3	1	2
CO5	3	3	3	2	2	2	1	2	3	3	3	2	3	2	2

SYSTEM/ SOFTWARE REQUIREMENT

• Intel based desktop PCs LAN CONNECTED with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space

LIST OF EXPERIMENTS:

- 1) Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
- 2) Implement on a data set of characters the three CRC polynomials CRC 12, CRC 16 and CRC CCIP.
- 3) Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
- 4) Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.
- 5) Take a 64 bit playing text and encrypt the same using DES algorithm.
- 6) Write a program to break the above DES coding.
- 7) Using RSA algorithm Encrypt a text data and Decrypt the same

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MASTER OF COMPUTER APPLICATIONS

II YEAR, I-SEM (MCA)

T C 3 3

(F0015203) CORPORATE COMMUNICATION PRINCIPLES (CCP)

The Course Corporate Communication Principles comprises key communication principles to turn MCA students into corporate professionals. The other aspects like vocabulary building and writing skills benefit them to make use of specialized knowledge in professional life. Further, it is embedded with Employability Skills to enhance the opportunities of the student to meet the corporate expectations. The primary objectives are as follows:

COURSE OBJECTIVES

- ✤ To enhance the communication concepts and professional spirit
- To sharpen the students to write clear and effective letters and emails
- To enhance the employability skills among the students to meet out the corporate expectations

COURSE OUTCOMES:

Enabling the development in sharing information with family and friends

- ✤ To distinguish among various levels of organizational communication and communication barriers while developing an understanding of communication as process in an organization.
- Understanding the basic grammar techniques and utilize it in enhancing language development.
- Foster an environment for reading and develop to language skills.
- Develop flair for any kind of writing with rich vocabulary and proper syntax.
- Apply the concept of critical reading, analytical reading and comprehend the key ideas

MAPPING OF COs & POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1										2		3			
CO2		2	2	3											
CO3										2		3			
CO4										2		3			
CO5										2		3			
CO6					3	2									

UNIT-I:

Introduction to the Concept of Corporate Communication – Process & Principles – Channels - Upward -Down ward – Horizontal – Grapevine Communications - Formal and Informal Communications

UNIT-II:

Non-Verbal Communication – Gestures & Postures -Kinesics – Chronemics – Olfacts -Chromatics - Oculesics – Proxemics - Professional Etiquettes – Case Study

<u>UNIT-III:</u>

Vocabulary Building and Writing Skills– Synonyms – Antonyms –Phrasal Verbs - Idioms – Standard Abbreviations – Acronyms – Computer Jargon - Letter Writing – Business Letters – Complaint letters- Job Application Letters- Emails – Report Writing – Formats – Sample Analysis

UNIT-IV:

Effective Meetings – Role of a Leader – Agenda – Minutes – Resolutions- Video Conferencing – Negotiation Skills – Team Building Skills – Belbin's Team Roles- Case study

UNIT-V:

Employability Skills - -Resume Writing –Pre-Interview Techniques – HR Interview –Skype Interview - Typical Interview Questions for Software Industry - Technical Presentation Skills –Preparation of Slides – Graphs - Practice

UNIT VI:

Professional Development- IEEEE thical Codes for Software Professionals – Book Reading - The 7 Habits of Highly Effective People by R. Stephen Covey, Simon & Schuster Publications

- 1 Technical Communication (Principles and Practice) by Meenakshi Raman & Sangeeta Sharma, Oxford University 2004.
- 2 The Dynamics of Successful Personality and projection (Second Edition) by- J.R. Bhatti, PEARSON 2011
- 3 The ACE of Soft Skills (Attitude, Communication and Etiquette for success) by- Gopala swamy Ramesh & Mahadevan Ramesh, PEARSON 2010.
- 4 Winning at Interviews by Edgar Thorpe and Showick Thorpe, Pearson

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MASTER OF COMPUTER APPLICATIONS

II YEAR, I-SEM (MCA)

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(F0016203) WEB TECHNOLOGIES

COURSE OBJECTIVES:

- Student will be familiar with designing the User Interface.
- Student will learn about the data validation at the client side.
- Student will learn about the independent language like XML.
- Student will learn about the server side technology like Servlet and PHP.
- Student will learn about the database management using PHP
- Student will learn client server architecture and will be able to develop a web application using servlet, PHP, MYSQL database technologies.

COURSE OUTCOMES:

- Student can able to demonstrate the HTML important tags and for designing static web pages and separate design from content using CSS.
- Able to design a webpage with more user interactivity using Javascript.
- Students can able to understand the need of XML in the developing of Web applications.
- Students able to understand the need of Server side scripting using Servlets and JSP.
- ✤ Able to develop the web applications with MVC architecture design using Struts.
- Students can able to apply the java programming to develop interactive of databases and develop the scalable web applications.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2		3	1	2	2	1		2			2		2	2
CO2	1		1		2	1		1	2			2		2	
CO3	1				2	1			1			2		2	1
CO4	1	2	1	1	2	2			2	1		2	2	2	2
CO5	1	1	1	2	3				2					3	2
CO6	1	1	1		2				2			1	2	3	

<u>UNIT I</u>

HTML – Basic HTML, List, Tables, images, Hyperlinks, Frames, forms, Cascading Style sheets- Using styles, defining your own styles, Properties and Values in Styles.

<u>UNIT II</u>

Java Scripts: Introduction to Java Scripts, Objects in Java Script –Data and Objects in Java Script, Regular Expressions, Exception Handling, Built Objects, Events, Dynamic HTML with Java Script – Data Validation, Opening a new Window, Messages and Confirmations.

UNIT III

XML: Introduction to XML, Basic XML, Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

UNIT IV

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servrlet, The Servlet API, The javax.servlet Package, Reading Servlet request parameters, Reading Initialization parameters, reading Context Parameters. The javax.servlet.http package, Handling Http Request & Responses, Using Cookies, Session Tracking.

<u>UNIT V</u>

Introduction to PHP: Evaluation of php, Features of php, Basic Syntax, php variables, php Data types, Operators and Expressions. Working with flow control through control statement-If, If-else, If-else ladder, If-elseif-else, Switch. Working with flow control through control statement- For, While, Do-while, Foreach, Nesting of Loops.

<u>UNIT VI</u>

Creating and Using Forms- Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.

PHP and Database Access- Basic Database Concepts, Connecting to a MYSQL database, Performing basic database operations-create, Insert, Retrieving and Displaying results, Modifying, Updating and Deleting data.

TEXT BOOKS:

- 1) Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech
- 2) The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
- 3) Beginning PHP and MySQL, 3rdEdition, Jason Gilmore, Apress Publications (Dream tech.).

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REFERENCE BOOKS:

- 1) Programming world wide web-Sebesta, Pearson
- 2) Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brwn Pearson
- 3) Internet and World Wide Web How to program by Dietel and Nieto PHI/Pearson Education Asia.
- 4) An Introduction to web Design and Programming –Wang-Thomson
- 5) Web Applications Technologies Concepts-Knuckles, John Wiley
- 6) Programming world wide web-Sebesta, Pearson
- 7) PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.

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II YEAR, I-SEM (MCA)

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(F0017203) DATA WAEHOUSING AND DATA MINING

COURSE OBJECTIVES:

- With the basic data warehousing and data mining concepts.
- ✤ To learn mining rules in large databases.
- To get idea on clustering analysis.
- Applications that can enable them to set up and manage an industrial data warehousing and data mining system.
- ✤ To learn about OLTP and OLAP systems.

COURSE OUTCOMES:

- Ability to do Conceptual, Logical, and Physical design of Data Warehouses.
- Familiarity with Requirements Engineering for Data Warehouses.
- ✤ OLAP applications and OLAP deployment.
- Have a good knowledge of the fundamental concepts that provide the foundation of data mining.
- Learn broad classes of data mining technologies.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		2							1				3	
CO2		1		2	2			2					1		
CO3	2	1				1						2			2
CO4	1			1				2					2		
CO5	1		2											3	
CO6	2		2		1			1							1

<u>UNIT – I</u>

Introduction:

Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining task primitives, Integration of data mining system with Data base or Data Warehouse system, Major issues in Data Mining.

<u>UNIT – II</u>

Data Warehouse and OLAP Technology: Overview of Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

<u>UNIT – III</u>

Data Preprocessing: Need of preprocessing the data, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT - IV

Mining Frequent patterns, Associations, and Correlations: Basic Concepts, Efficient and Scalable Frequent Item set Mining methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

$\underline{UNIT} - \underline{V}$

Classification :Overview of Classification and Prediction, Issues Regarding Classification and Prediction, Bayesian Classification, Classification by Decision Tree Induction, Nearest Neighbor classification, Prediction-Linear Regression, Nonlinear Regression, Accuracy and Error Measures.

<u>UNIT – VI</u>

Cluster Analysis: Overview of Cluster Analysis, Types of data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods.

TEXT BOOKS:

1) Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber Harcourt India, third edition.

- 1) Data Mining Introductory and advanced topics-Margaret H Dunham, Pearson Education
- 2) Data Mining Techniques Arun K Pujari, University Press.
- 3) Data Warehousing in the Real World Sam Anahory & Dennis Murray. Pearson Edition Asia.
- 4) Data Warehousing Fundamentals Paulraj Ponnaiah Wiley Student Edition
- 5) The Data Warehouse Life cycle Tool kit Ralph Kimball Wiley Student Edition.

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II YEAR, I-SEM (MCA)

(F0018203) COMPILER DESIGN

(ELECTIVE IV)

COURSE OBJECTIVES:

Thorough understanding of the overall architecture of a modern compiler.

- Being familiar with both top-down and bottom-up parsing paradigms.
- Fluent with syntax-directed translation scheme and different compiler-compilers.
- Knowledgeable with assembly language and code-block based code generation scheme.
- Knowing the inner details of compilers, libraries, operating systems/platforms, and how they interact with each other to form modern computing environments.

COURSE OUTCOMES:

- Identify and understand different phases and passes of Compiler and their functioning.
- ♦ Understand lexical, syntax and semantic analysis processes.
- Understand and define the role of lexical analyzer, use of regular expression and transition diagrams.
- ♦ Understand Finite state machine and use Context free grammar, and parse tree construction
- Determine code generation and optimization techniques.
- Apply error detection and correction methods.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3											2	1	
CO2	2	1													
CO3					1	2								1	
CO4	3						2				1	2	1	1	
CO5					1		1	1					2		
CO6											2				1

<u>UNIT-I</u>

Introduction to compilers: compilers, cousins of the compiler, phases of a compiler, interpreter, grouping of phases into pass, bootstrapping

Lexical analysis: role of the lexical analyzer, input buffering, a language for specifying lexical analyzers

<u>UNIT-II</u>

Syntax analysis: the role of the parser, context free grammars, writing a grammar: eliminating ambiguity, elimination of left recursion, elimination of left factoring

Top-down parsing: Recursive descent parsing, first and follow, predictive parsing, construction of predictive parsing table.

<u>UNIT-III</u>

Bottom up Parsing: handles, handle pruning, shift reduce parsing, viable prefixes, conflicts during shift reduce parsing

LR Parsers: SLR Parsing: LR (0) items, SLR Parse table. CLR Parser: CLR (1) Items, CLR (1) Parsing table. LALR (1) parser: LR (1) items, LALR (1) parsing table.

<u>UNIT-IV</u>

Semantic analysis: type checking: type checking of expressions, type checking of statements, type checking of functions, type conversions

Syntax directed translation: form of a syntax directed definition, synthesize attributes, inherited attributes, dependency graph, annotated parse tree.

Intermediate code generation: intermediate code forms: abstract syntax tree, polish notation, three address code implementation of three address code statements: quadruples, triples, indirect triples

UNIT-V

Symbol table and Runtime environments: symbol table format, storage organization, storage allocation strategies, parameter passing, activation trees, activation records, storage allocation for arrays, strings and records

UNIT-VI

Code optimization: Consideration for Optimization, Scope of Optimization, principle sources of optimization: function preserving transformations, local Optimization, loop Optimization, global Optimization

Data flow analysis: construction of flow graph, loops in flow graph

Code generation: object code forms, issues in code generation, a simple code generator algorithm, generic code from DAGS

TEXT BOOKS:

1) Compilers principles, techniques, &tools- A.V.Aho. J.D.Ullman; pearson Education. Second edition. **REFERENCES:**

- 1) Compiler design: Theory, Tools and examples by Seth D. Bergmann.
- 2) Compiler design, K. Muneeswaran, Oxford.

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MASTER OF COMPUTER APPLICATIONS

II YEAR, I-SEM (MCA)

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(F0019203) ARTIFICIAL INTELLIGENCE

(ELECTIVE IV)

COURSE OBJECTIVES:

- ✤ To introduce the fundamental concepts of artificial intelligence.
- To equip students with the knowledge and skills in logic programming using Prolog.
- To explore the different paradigms in knowledge representation and reasoning.
- To understand the contemporary techniques in machine learning.

COURSE OUTCOMES:

- Analyze the modern view of AI as the study of agents that receive precepts from the environment and perform actions.
- Demonstrate awareness of informed search and exploration methods.
- Demonstrate about AI techniques for knowledge representation, planning and uncertainty management.
- Develop knowledge of decision making and learning methods.
- Implement the use of AI to solve English Communication problems.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												2	2	
CO2	2	3											3	3	
CO3	2	3											3	3	
CO4	2	2	3										3	3	
CO5	2	2	3										3	3	

<u>UNIT - I</u>

Introduction: AI problems, foundation of AI and history of AI.

Intelligent agents: Agents and Environments, The concept of rationality, the nature of environments, structure of agents.

Solving Problems by Searching: Problem solving agents, Example problems.

Searching for solutions, Uniformed search strategies:- Breadth first search, depth first search, Depth limited search, Iterative deepening depth first search, Bi-direction search – comparing uniform search strategy.

<u>UNIT - II</u>

Informed Search and Exploration: Informed (Heuristic search) Greedy best first search, A* search, Memory bounded heuristic search, Heuristic functions: The effect of heuristic accuracy on performance, Inventing admissible heuristic functions, Learning heuristic from experience.

UNIT-III

Constrain satisfaction problems: Constrained satisfaction problems, Backtracking search for CSPs.

Knowledge and Reasoning: Knowledge – Based Agents, the Wumpus world logic. propositional logic: A very simple logic, syntax, semantics, a simple Knowledge base, inference, equivalence, validity, and sarisfiability, Resolution patterns in propositional logic, Resolution, Forward & Backward, Chaining.

UNIT - IV

First order logic: Representation revisited, Syntax and semantics of first-order logic: models for first-order logic, symbols and interpretation, terms, atomic sentences, complex sentences, quantifiers, equality.

Using first order logic: assertions and queries in first-order logic, the kinship domain, numbers, sets, and lists, the wumpus world.

<u>UNIT - V</u>

Uncertainty– Acting under uncertainty: handling uncertain knowledge, uncertainty and rational decisions, Design for a decision-theoretic agent, Basic probability notation: propositions, atomic events, prior probability, conditional probability, The Axioms of probability: using the axioms of probability, why the axioms of probability are reasonable, Interface using full joint distributions, independence, Bayes' rule and its use: Applying Bayes' rule: the simple case, using Bayes' rule: combining evidence.

<u>UNIT - VI</u>

Learning - Forms of learning, Induction learning.

Learning Decision Tree: Decision tree as performance elements, expressiveness of decision tree, Including decision trees from examples, Choosing attribute test, Assessing the performance of the learning algorithm, noise and overfitting, broadening the applicability of decision trees, Ensemble learning.

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TEXT BOOKS:

- 1) Artificial Intelligence A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/Pearson Education.
- 2) Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.

- 1) Artificial Intelligence, 2nd Edition, E.Rich and K.Knight (TMH).
- 2) Artificial Intelligence and Expert Systems Patterson PHI.
- 3) Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.
- 4) PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition Pearson Education

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MASTER OF COMPUTER APPLICATIONS

II YEAR, I-SEM (MCA)

T C 3 3

(F0020203) SOFTWARE PROJECT MANAGEMENT

(Elective-IV)

COURSE OBJECTIVES:

- The objective of the course is to familiarise students in practice with the initiation, management and supervision of a software project.
- During the course, actual software projects are defined and their implementation is managed and supervised.
- To provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects.
- The module is designed to provide an understanding of the particular issues encountered in handling IT projects and to offer students methods, techniques and 'hands-on' experience in dealing with them.
- Software Testing plays a key role in software development and is a key measure that is taken against producing quality product.
- This course demonstrates an in-depth understanding of the Software quality metrics that are necessary and also on various kinds of testing tools that are helpful in testing process.

COURSE OUTCOMES:

- Students can evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities.
- Students can Understand and use risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales;
- To Identify the resources required for a project and to produce a work plan and resource schedule;
- To Understanding importance of Quality & Software Testing.
- Students can Identifying various quality metrics & standards followed by various organizations.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	3											2	
CO2			3					2					1		
CO3		1								3	3				2
CO4			2	3			3						2		
CO5			2				3				3			1	

<u>UNIT - I</u>

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT - II

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 - III

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 - IV

Model based software architectures: A Management perspective and technical perspective. Work Flows of the process: Software process workflows, Iteration workflows.

UNIT - V

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

<u>UNIT - VI</u>

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment.

TEXT BOOK:

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

- 1) Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
- 2) Software Project Management, Joel Henry, Pearson Education.
- 3) Software Project Management in practice, PankajJalote, Pearson Education.2005

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II YEAR, I-SEM (MCA)

(F0021203) CLOUD COMPUTING (ELECTIVE IV)

COURSE OBJECTIVES:

- Explain the importance and benefits of Cloud computing and the need for its rapid adoption
- Explain roadmap for transformation from classic to cloud environment
- * Identify and differentiate various infrastructure components of classic and virtualized data center
- * Explain virtualization requirements and available tools at each layer of IT infrastructure
- Explain business continuity options in a virtualized environment
- Discuss effective cloud computing deployment model for businesses/IT organizations
- Perform detailed exploration of cloud products and services
- Describe infrastructure framework and service management activities in Cloud computing
- Understand and address security concerns commonly found in Cloud computing environments
- Formulate high-level cloud migration strategy and best practices

COURSE OUTCOMES:

Upon successful completion of this course, participants should be able to:

- Explain the phases of transition from classic data center to virtual data center and then to the Cloud
- Describe virtualization technology at server, storage, network, desktop, and application layers of IT infrastructure
- * Explain the key characteristics, services, and deployment models of Cloud
- Describe the Cloud infrastructure components and service management processes
- Describe Cloud security concerns and solutions
- ✤ List the key considerations for migration to the Cloud

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1		1				1	1		1		2	
CO2	3	1	2		2				2	3		1		2	
CO3	2	1	1		1				1	2		1	1		
CO4	1	1	1		1				1	2		1			2
CO5	3	3	3		3				2	1		1			2
CO6	1	2	1		2				1	1		1	1	2	

UNIT-I

Introduction: What Is the Cloud? The Emergence of Cloud Computing, The Global Nature of the Cloud, Cloud-Based Service Offerings, Grid Computing or Cloud Computing? Is the Cloud Model Reliable?, Benefits of Using a Cloud Model, What About Legal Issues When Using Cloud Models?, What Are the Key Characteristics of Cloud Computing?, Challenges for the Cloud.

The Evolution of Cloud Computing: Hardware Evolution, Internet Software Evolution, and Server Virtualization.

<u>UNIT-II</u>

Web Services Delivered from the Cloud: Communication-as-a-Service (CaaS), Infrastructure-as-a-Service (IaaS), Monitoring-as-a-Service (MaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), Building Cloud Networks: The Evolution from the MSP Model to Cloud.

Computing and Software-as-a-Service, the Cloud Data Center, Collaboration, Service-Oriented Architectures as a Step toward Cloud Computing, Basic Approach to a Data Center-Based SOA.

<u>UNIT III</u>

Virtualization Practicum: Chapter Overview, Downloading Sun xVM VirtualBox, Installing Sun xVM VirtualBox, Adding a Guest Operating System to VirtualBox, Downloading FreeDOS as a Guest OS, Downloading the 7-Zip Archive Tool, Adding a Guest OS to Sun xVM VirtualBox.

UNIT IV

Federation, Presence, Identity, and Privacy in the Cloud: Federation in the cloud, Presence in the Cloud, Privacy and Its Relation to Cloud-Based Information Systems,

UNIT V

Security in the Cloud: Cloud security challenges, Software- as-a-service security, is Security-as-a-Service the New MSSP?

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<u>UNIT VI</u>

Common Standards in Cloud Computing: The open cloud consortium- The distributed management task force - standards for application developers - standards for messaging - standards for security

TEXTBOOKS:

- 1. Cloud Computing implementation, management and security by Joh n W.Ruttinghouse, James F. Ransome. CRC Press, Taylor & Franc is group, 2010.
- 2. Cloud computing a practical approach by Anthony T.velte, Toby J.velte Robert Elsenpeter. Tata Me Graw Hill edition, 2010

- 1) 1 Cloud Application Architectures by George Reese. Oreilly publishers
- 2) Cloud computing and SOA convergence in your enterprise, by David S. Linthicum, Addison- Wesley

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II YEAR, I-SEM (MCA)

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3	3

(F0022203) SOFTWARE TESTING (Elective-V)

BACKGROUND:

Software testing is an integral and important activity in every software development environment. Software seems to have has permeated almost every equipment that we use in our daily lives. This course is designed to enable a clear understanding and knowledge of the foundations, techniques, and tools in the area of software testing and its practice in the industry. The course will prepare students to be leaders in software testing. Whether you are a developer or a tester, you must test software. This course is a unique opportunity to learn strengths and weaknesses of a variety of software testing techniques.

COURSE OBJECTIVES:

- Upon successful completion of this course students will be able to:
- Understand the basic concepts of software testing.
- Understand the various techniques and strategies of software testing and inspection and pointing out the importance of testing in achieving high-quality software.
- Perform effective and efficient structural testing of software.
- ✤ Integrate and test the various units and components of a software system.
- Perform effective and efficient functional testing of software.
- Select the appropriate tests to regression test your software after changes have been made.
- Plan, track and control the software testing effort.
- Understand the need of automated testing tools and various kinds of automated testing tools.

COURSE OUTCOMES:

- To understand the various techniques and strategies of software testing and inspection and pointing out the importance of testing in achieving high-quality software.
- To have an ability to apply software testing knowledge and engineering methods.
- To have an ability to design and conduct a software test process for a software testing project.
- To have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
- To have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.

MAPPING OF COs & POs:

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

<u>UNIT I:</u>

Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

UNIT II:

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT III:

Dataflow testing:-Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT IV:

Paths, Path products and Regular expressions: path products & path expression, reduction Procedure, applications, regular expressions & flow anomaly detection.

UNIT V:

Logic Based testing: Overview, decision tables, path expressions, KV charts, and specifications

UNIT VI:

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, Overview of Some Commercial Testing Tools: QTP, Selenium.

TEXT BOOKS:

1) Software testing techniques - Boris Beizer, 2nd Edition, Dreamtech.

REFERENCE BOOKS:

- 1) Software Testing in the Real World Edward Kit, Pearson.
- 2) Effective methods of Software Testing, Perry, John Wiley.
- 3) Art of Software Testing Meyers, John Wiley.
- 4) Software testing Tools Dr.K.V.K.K.Prasad, Dreamtech.

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(F0023203) COMPUTER GRAPHICS (Elective-V)

COURSE OBJECTIVES:

This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.

- The interdisciplinary nature of computer graphics is emphasized in the wide variety of examples and applications.
- Course material is structured to meet the needs of both designers and users of interactive computer graphics systems
- Understand the 3-D graphics pipeline, i.,e. the steps taken to transform and draw an object. This includes 3-D transformations, lighting and shading, rasterization and texture mapping. Programmable shaders will be introduced.
- ✤ A thorough introduction to computer graphics techniques, focusing on 3D modelling, image synthesis, and rendering. Topics cover: geometric transformations, geometric algorithms, software systems (OpenGL), 3D object models (surface, volume and implicit), visible surface algorithms, image synthesis, shading and mapping, ray tracing, radiosity, global illumination, photon mapping, and antialiasing.
- Apply knowledge gained in a series of exercises using OpenGL that demonstrate the fundamental principles of computer graphics. A functional scene graph will be developed to render 3-D scenes with lighting, texture mapping, and a variety of 3-D objects

COURSE OUTCOMES:

- Be familiar with drawing primitive objects (lines, circles, polygons) on a display.
- Students will demonstrate an understanding of contemporary graphics hardware. Be exposed to graphical input and output devices
- Master 2D & 3D modelling and transformations.
- Be familiar with projection of 3-D objects on a 2-D plane.
- Master clipping, fill, and rendering techniques and be exposed to color and shading models.
- Understand the concepts of Animation techniques and languages

	III IU		J 5 G I	03.											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	3	3						3	3	3
CO2	3	2	3	2	3							3	1	3	1
CO3	3	3	3	3	3							3	3	2	3
CO4	3	3	3	3	3	3						3	3	3	
C05		2		3		1							1	2	3
CO6	2	1	3		2					2			2	3	

MAPPING OF COs & POs:

UNIT-I

A Survey of Computer Graphics: Overview of graphics systems: Video-Display Devices, Raster-scan Systems, Random-scan Systems, Graphics Monitors and Work stations, Input devices, Hardcopy Devices and Graphics Software.

<u>UNIT-II</u>

Output Primitives: Points and lines, Line drawing algorithms- DDA, Bresenhams line algorithm, Circle generation algorithm and Ellipse Generating algorithms.

<u>UNIT-III</u>

2-D Geometrical transforms: Basic Transformations, Matrix representations and Homogeneous coordinates, Composite transforms, Other Transformations, Transformations between coordinate systems.

UNIT-IV

2-D Viewing: Definition of view port, clipping and window. The Viewing Pipeline, Viewing coordinate reference frame, Window to View-port coordinate transformation, 2D Viewing functions, Clipping Operation, Point Clipping, Line Clipping: Cohen-Sutherland and Liang - Barsky line clipping algorithms, Polygon Clipping: Sutherland – Hodgeman polygon clipping algorithm.

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<u>UNIT-V</u>

3-D Geometric and Modelling Transformations: Translation, Rotation, Scaling, other Transformations, Composite Transformations.

<u>UNIT-VI</u>

3-D viewing: Viewing Pipeline, Viewing coordinates, Projections. Computer Animation: Design of Animation Sequence, General Computer Animation functions, Raster Animation, Computer Animation Languages, Key-Frame systems, Motion Specifications.

TEXT BOOKS:

1) "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.

- 1) "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
- 2) "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.
- 3) "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
- 4) "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
- 5) "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
- 6) "Computer Graphics", Steven Harrington, TMH

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(F0024203) CYBER SECURITY (ELECTIVE V)

COURSE OBJECTIVES:

- The learner will gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.
- The learner will understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.
- The learner will be able to examine secure software development practices.
- The learner will understand principles of web security.
- The learner will be able to incorporate approaches for incident analysis and response.
- The learner will be able to incorporate approaches for risk management and best practices.

COURSE OUTCOMES:

- Realize the need for Cyber Security
- Understand the need for Security in day to day communications
- Understand the vulnerabilities in the Network and Computer System
- Understand the cyber law and Cyber Forensics

MAPPING OF COS & POS:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	3	3						3	3	3
CO2			3						2		3			1	1
CO3		3							2		3		1		2
CO4	1	2	2						1		1		2		
CO5	2	3							2		1				3
CO6	1	2	2						3		2			2	

UNIT-I

Introduction to Cyber Security: Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

<u>UNIT-II</u>

Cyber Security Vulnerabilities and Cyber Security Safeguards: Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

<u>UNIT-III</u>

Securing Web Application, Services and Servers: Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

<u>UNIT-IV</u>

Intrusion Detection and Prevention: Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.

UNIT-V

Cryptography and Network Security: Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

UNIT-VI

Cyberspace and the Law: Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security

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Policy 2013.**Cyber Forensics:** Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.

- 1) Preston Gralla, How Personal and Internet Security Work, Que Publications
- 2) Alfred Basta and Wolf Halton, Computer Security Concepts, Issues and Implementation, Cengage Learning
- 3) Digital Defense: A Cybersecurity Primer by Joseph Pelton , Indu B. Singh
- 4) Cryptography and Network Security: Principles and Practice by William Stallings
- 5) Computer and Information Security Handbook by John R. Vacca.
- 6) Cyberlaw: The Law of the Internet and Information Technology by Brian Craig.
- 7) Cyber Warfare: Techniques, Tactics and Tools for Security Practitioners 2nd Edition by Jason Andress (Author), Steve Winterfeld (Author)
- 8) https://www.studocu.com/en/document/edith-cowan-university/computer-security / lecture -notes /lecture-notes-lectures-1-8-computer-security-notes/709625/view

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(F0025203) FUNDAMENTALS OF MACHINE LEARNING

(Elective-V)

COURSE OBJECTIVES:

- Define machine learning and problems relevant to machine learning.
- Differentiate supervised, unsupervised and reinforcement learning.
- ✤ Apply neural networks, Bayes classifier and k nearest neighbor, for problems appear in machine learning.
- Perform statistical analysis of machine learning techniques.

COURSE OUTCOMES:

- Differentiate various learning approaches, and to interpret the concepts of supervised learning.
- Compare the different dimensionality reduction techniques.
- Apply theoretical foundations of decision trees to identify best split and Bayesian classifier to label data points.
- Apply theoretical foundations of decision trees to identify best split and Bayesian classifier to label data points.
- Identify the state sequence and evaluate a sequence emission probability from a given HMM.
- Illustrate and apply clustering algorithms and identify its applicability in real life problems.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1					1			2	1	2	
CO2	3	3	3	1					1			1	1	2	1
CO3	3	3	3	1		1			1			1	2	1	1
CO4	3	3	3	1					1			2	1	1	1
CO5	3	3	3	2									1	1	1
CO6	3	3	3	3									1	1	1

<u>UNIT – I</u>

Introduction: Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning. Concept Learning: Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.

<u>UNIT – II</u>

Decision Tree Learning: Decision tree representation, Appropriate problems for decision tree learning, Basic decision tree learning algorithm, hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

<u>UNIT-III</u>

Artificial Neural Networks: Introduction, Neural Network representation, Appropriate problems, Perceptrons, Backpropagation algorithm.

UNIT - IV

Bayesian Learning: Introduction, Bayes theorem, Bayes theorem and concept learning, ML and LS error hypothesis, ML for predicting probabilities, MDL principle, Naive Bayes classifier, Bayesian belief networks, EM algorithm

<u>UNIT - V</u>

Evaluating Hypothesis: Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.

<u>UNIT – VI</u>

Instance Based Learning: Introduction, k-nearest neighbor learning, locally weighted regression, radial basis function, cased-based reasoning, Reinforcement Learning: Introduction, Learning Task, Q Learning.

TEXT BOOKS:

1) Tom M. Mitchell, Machine Learning, India Edition 2013, McGraw Hill Education.

<u>REFERENCE BOOKS:</u>

- 1) Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, 2nd edition, springer series in statistics.
- 2) Ethem Alpaydın, Introduction to machine learning, second edition, MIT press.

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II YEAR, I-SEM (MCA)

(F0099203) WEB TECHNOLOGIES LAB

COURSE OBJECTIVE:

*	To create a fully functional website with mvc architecture	e. To Develop an online Book store using we
	can sell books (Ex amazon .com).	

COURSE OUTCOMES:

- To gain knowledge on designing static and dynamic web pages.
- ✤ Able to validate web pages at client-side.
- Design and validate XML documents.
- Gain knowledge on server side scripting.
- Use cookies and sessions for authenticating users
- Validate data in PHP forms.
- ✤ To develop a Web application using php.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	1		2	2	1				2			2		2	
CO2	1	1	2	2	1		1		2	1	1	2		2	
CO3	1	1	2		2	1	2		2		1	2	2	2	2
CO4		1	3	2		2	2		2			2	2	3	1
CO5	1	1	2	2	2				2	2			1	3	2
CO6	1	1	2	2	2				3			1			

Hardware and Software required:

- ✤ A working computer system with either Windows or Linux
- ✤ A web browser either IE or firefox
- XML editor like Altova Xml-spy [www.Altova.com/XMLSpy free], Stylusstudio, etc.,
- ✤ XAMPP web server and Apache web server
- Understand the paradigm for dealing with form-based data, both from the syntax of HTML forms, and how they are accessed inside a PHP-based script.
- ✤ A database either Mysql

WEEK-1:

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

The static home page must contain three frames.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link "CSE" the catalogue for CSE Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.

Logo	Web Site Name										
Home 1	Login Registration Catalogue Cart										
CSE	Description of the Web Site										
ECE											
EEE											
CIVIL											

Fig 1.1

2) LOGIN PAGE:

This page looks like below: Logo Web Site Name Home Registration Catalogue Cart Login CSE Login : ECE Password: EEE Su R CIVIL

3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:

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- i) Snap shot of Cover Page.
- ii) Author Name.
- iii) Publisher.
- iv) Price.
- v) Add to cart button.

Logo	Web Site Name										
Home	Login	Registration	Catalogue	Cart							
CSE ECE EEE CIVIL	XML Bible	Book: XML Bible Author: Winston Publication: Wiely	\$ 40.5	Add to cart							
	Artificial Intelligence Artificial Intelligence Description	Book: AI Author: S.Russel Publication: Princeton hall	\$ 63	Add to cart							
	例释 Java2 企业就以2EEI程序设计	Book: Java 2 Author: Watson Publication: BPB publications	\$ 35.5	Add to cart							
	HIML4	Book: HTML in 24 hours Author: Sam Peter Publication: Sam publication	\$ 50	Add to cart							

Note: Week 2 contains the remaining pages and their description.

WEEK-2:

4) CART PAGE:

The cart page contains the details about the books which are added to the cart. The cart page should look like this:

Logo	Web Site Name											
Home	Login	Registration	Catalogue	Cart								
CSE ECE EEE	Book name Java 2 XML bible	Price \$35.5 \$40.5	Quantity 2 1	Amount \$70 \$40.5								
CIVIL		Tota	\$130.5									

5) **REGISTRATION PAGE:**

Create a "registration form "with the following fields

- i) Name (Text field)
- ii) Password (password field)
- iii) E-mail id (text field)
- iv) Phone number (text field)
- v) Sex (radio button)
- vi) Date of birth (3 select boxes)
- vii) Languages known (check boxes English, Telugu, Hindi, Tamil)
- viii) Address (text area)

WEEK 3:

VALIDATION:

Write JavaScript to validate the following fields of the above registration page.

- 1. Name (Name should contains alphabets and the length should not be less than 6 characters).
- 2. Password (Password should not be less than 6 characters length).
- 3. E-mail id (should not contain any invalid and must follow the standard pattern
 - name@domain.com)
- 4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

WEEK-4:

Design a web page using CSS (Cascading Style Sheets) which includes the following:

1) Use different font, styles:

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In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

<himl></himl>
<head></head>
<style type="text/css"></td></tr><tr><td>B.headline {color:red; font-size:22px; font-family:arial; text-</td></tr><tr><td>decoration:underline}</td></tr><tr><td></style>
<body></body>
This is normal bold
Selector {cursor:value}
For example:
<html></html>
<head></head>
<style type="text/css"></td></tr><tr><td>.xlink {cursor:crosshair}</td></tr><tr><td>.hlink{cursor:help}</td></tr><tr><td></style>
<body></body>

CROSS LINK
HELP LINK
 class="headline">This is headline style bold

2) Set a background image for both the page and single elements on the page.

You can define the background image for the page like this:

BODY {background-image:url(myimage.gif);}

- Control the repetition of the image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.
- 4) Define styles for links as

A:link A:visited A:active A:hover

Example:

<style type="text/css"> A:link {text-decoration: none} A:visited {text-decoration: none} A:active {text-decoration: none} A:hover {text-decoration: underline; color: red;} </style>

5) Work with layers:

For example:

LAYER 1 ON TOP:

<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div><div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-index:1">LAYER 2</div>

LAYER 2 ON TOP:

<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div>

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<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:4">LAYER 2</div>

- 6) Add a customized cursor:
 - Selector {cursor:value}

For example:

<html></html>
<head></head>
<style type="text/css"></td></tr><tr><td>xlink {cursor:crosshair}</td></tr><tr><td>hlink{cursor:help}</td></tr><tr><td></style>
<body></body>

CROSS LINK
HELP LINK

WEEK-5:

Write an XML file which will display the Book information which includes the following:

- i) Title of the book
- ii) Author Name
- iii) ISBN number
- iv) Publisher name
- v) Edition
- vi) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

WEEK 6

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Use PHP script for programs 1 and 2.

- a) Create a Cookie and add these four user ID"s and passwords to this Cookie.
- b) Read the User id and Passwords entered in the Login form and authenticate with the values (UserId and Passwords) available in the cookies. If he is a valid user (i.e., UserName and Password match) you should welcome him by name (UserName) else you should display "You are not an authenticated user".

WEEK 7

- a) Write a PHP program to start a PHP Session.
- b) Write a PHP program to destroy a PHP Session.
- c) Write a PHP to create a PHP Session without cookies.
- d) Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

WEEK 8

Write a PHP program on date and time concepts.

WEEK 9

- a) Write a PHP program to send and receive the values using GET and POST methods.
- b) Write a PHP program to validate Name, Email and Password

WEEK 10

- a) Write a PHP program on multiple forms using hidden fields.
- b) Write a PHP program to prevent multiple submissions on client and server side.

WEEK 11

a) Write a PHP program to create database connections.

iv. Delete

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b) Write a PHP program to create a personal database for the user in MYSQL **WEEK 12**

a) Write a PHP program to perform the following database operations :

i. Create ii. Insert iii. Update

Write a PHP which does the following job: Authenticate the user when he submits the login form using the UserName and Password.

- 1) Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech
- 2) Beginning PHP and MySQL, 3rdEdition, Jason Gilmore, Apress Publications (Dream tech.).
- 3) PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, CengageLearning Publications.
- 4) PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.
- 5) PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).PHP Programming solutions, V.Vaswani, TMH.

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(F0081203) DATA WAREHOUSING AND DATA MINING LAB

COURSE OBJECTIVES:

* To make the students practical exposure for various techniques of Data mining.

COURSE OUTCOMES:

Students will be able to:

- Analyse different pre-processing techniques by implementing them using Programming language like C/C++.
- Understand how to generate frequent patterns.
- Implement the classification techniques in data mining.
- Implement the clustering techniques in data mining.
- Implement the Association Rule techniques in data mining.

MAPPING WITH COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3	2	1				2					2	1
CO2	1		3	2					2					2	1
CO3		1	3	2	1				2					2	1
CO4		1	3	2	1				2					2	1

I) <u>Implement the following Data mining techniques in C/C++.</u>

- 1. Data cleaning techniques
 - a) smoothing by bin means
 - b) smoothing by bin medians
 - c) smoothing by bin boundaries
- 2. Data Transformation techniques
 - a) Min-Max normalization
 - b) z-score normalization
 - c) Normalization by decimal scaling.
- 3. Apriori algorithm.
 - Classification techniques
 - a) Bayes classification.
 - b) Nearest Neighbor classification.(NNC)
- 5. k-means clustering technique.

II) Implementation of data mining algorithms by attribute relation file formats in weka tool.

- 6. Decision Tree Classification model to classify Bank-loan Application.
- 7. Decision Tree Classification model to classify Weather Nominal Data.
- 8. Association Rule mining using Apriori Property.
- 9. Clustering analysis using K-means method.
- 10. Implementation of Bayesian Classification for known and unknown tuples.

REFERENCES:

4.

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