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

# DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS (MCA)



MASTER OF COMPUTER APPLICATIONS SYLLABUS-2019

# Applicable for students admitted into MCA (Regular) from 2019-20 REGULATIONS, Course Structure & Detailed Syllabus

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## DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

#### **AUTONOMOUS INSTITUTE**

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

## ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI

MCA (Regular) from 2019-20

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

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

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

#### Academic Regulations 2019 for MCA (Regular)

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

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

#### **1.0 Eligibility for Admissions:**

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

Admissions shall be made on the basis of merit rank obtained by the qualifying candidate at ICET examination or on the basis of any other order of merit prescribed by Andhra Pradesh State Council of Higher Education (APSCHE) subject to reservations prescribed by the Govt. of A. P., from time to time.

#### 2.0 Award of MCA Degree:

- **2.1** The student shall be declared eligible for the award of the MCA degree, if he/she pursues a course of study and completes it successfully for not less than three academic years and not more than six academic years.
- **2.2** The student, who fails to fulfill all the academic requirements for the award of the degree within six academic years from the year of his admission, shall forfeit his seat in MCA course.
- **2.3** The minimum clear instruction days for semester shall be 95.

#### 3.0 Attendance:

- **3.1** The student shall be deemed to have eligibility to write End Semester examinations if he has secured a minimum of 75% of attendance in aggregate of all the subjects.
- **3.2** Condonation of shortage of attendance up to 10%, i. e. 65% and above, and below 75% may be given by the College academic committee.
- **3.3** Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the student with supporting evidence.
- 3.4 Shortage of attendance below 65% shall in no case be condoned.
- **3.5** The student shall not be promoted to the next semester unless he fulfills the attendance requirements of the previous semester.

## DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

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

## Table 2: Course pattern

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

#### 4.0 Evaluation:

- **4.1** For theory subjects, the distribution shall be 40 marks for Internal Evaluation (25 marks for Internal test and 15 marks for assignments / field work) and 60 marks for the End-Examination.
- **4.2** Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 10 marks (It contains 5 short answer questions). The remaining 3 questions carry 5 marks each. Each question shall have a,b,c.... parts. The duration of internal test will be for 2 hours. First test to be conducted in 3 units in the middle of the semester and second test to be conducted in the remaining 3 units of each subject at end of the semester. There shall be two assignments in each subject (problem based/ field work) for the award of 15 marks so that internal component (marks) will be 40 marks (25 marks for internal test+15 marks for assignments / field work). For awarding of 25 Internal marks the performance of the student in two internal examinations conducted will be considered by giving a weightage of 0.75 for the better score and 0.25 for the other score.

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- **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 3<sup>rd</sup> semester. Out of the electives offered in 3<sup>rd</sup> / 4<sup>th</sup> / 5<sup>th</sup> semesters, one elective will be MOOC / Electives offered by the department. Any student who is interested can opt for the MOOC/ Electives offered by the department and acquire the required credits. Even if the student opts for MOOC, he has to write two internal tests besides the end examination conducted by the institute like other subjects. However, he has to obtain the certificate from the organization in which he has registered. Any MOOC selected by the student should be of more than 45 hours duration and also from the reputed organization. Attendance of the student who has opted for MOOC will be taken from the remaining subjects and labs only in that semester while finalizing the attendance for fulfilling the minimum requirements of attendance for promotion to next semester. Attendance will not be recorded for MOOC. Where ever MOOC is opted by the student, the evaluation procedure will be similar to any subject offered by the department.
- **4.5** For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks will be for internal evaluation based on the day-to-day performance. Laboratory examination for MCA. Course shall be conducted with two Examiners, one of them being Laboratory Class Teacher and second Examiner shall be outside of the institute (External examiner).
- **4.6** Student has to undergo a Continuous Comprehensive Evaluation (CCE) pertaining to his specialization in each semester which carries 40 internal marks and 60 external marks. He has to secure 50% marks to obtain required credits. External CCE will be conducted at the end of each semester by the committee consisting of HOD, senior faculty member and external Examiner from outside the institute. For this, HOD of the Department shall submit a panel of 4 Examiners, who are eminent in that field. One from the panel will be selected by the principal of the institute as external Examiner for CCE.
- **4.7** The candidate shall be deemed to have secured the minimum academic requirement in a subject/practical/seminar/CCE/ if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Examination and Internal evaluation taken together. In case if there is no End Examination in subject/practical/seminar/CCE etc student has to get minimum of 50% in the Internal Examination alone.
- **4.8** In case the candidate does not secure the minimum academic requirement in any subject (as specified in 3.0), he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the course when offered next or do any other specified subject as may be required.

#### 5.0 **Re-registration for Improvement of Internal marks:**

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

- **5.1** The candidate should have completed the course work and obtained examinations results for all the semesters.
- 5.2 He should have passed all the subjects for which the internal marks secured are more than 50%.
- **5.3** Out of the subjects the candidate has failed in the examination due to Internal marks secured being less than 50%, the candidate shall be given one chance for each Theory subject and for a maximum of <u>03</u> 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

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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 1<sup>st</sup> to 5<sup>th</sup> 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 6<sup>th</sup> 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 6<sup>th</sup> semester.
- **6.4** The student must submit status report at least in two different phases during the project work period. These reports must be approved by the I.D.C. before submission of the Project Report.
- **6.5** The candidate shall be allowed to submit the thesis / dissertation only after passing in all the prescribed subjects (both theory and practical) and then take viva voce examination of the project. The viva voce examination may be conducted once in two months for all the candidates submitted during that period.
- **6.6** Three copies of the Thesis / Dissertation certified in the prescribed form by the supervisor & HOD shall be submitted to the institute.
- **6.7** The Department shall submit a panel of three experts for a maximum of 4 students at a time. However, the thesis / dissertation will be adjudicated by the board consisting of HOD, concerned supervisor and one external Examiner from other institute nominated by the principal from a panel of Examiners submitted by the Department to the Controller of Examination.
- **6.8** If the report of the board is favourable viva voce examination, the board shall jointly report candidates work as:
  - **1.** Good
  - 2. Satisfactory
  - 3. Not satisfactory

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

#### 7.0 Award of Degree and class:

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

Class	% of marks to be	Division/	CCDA	
Awarded	secured	Class	COFA	
First Class with		First Class		CGPA obtained
Distinction	70% and above	With	≥ 7.5	from 109.5
Distinction		Distinction		Credits.
First Class	Below 70% but		>65 and $< 75$	(Excluding Project
First Class	not less than 60%	First Class	$\geq 0.5$ and $\leq 7.5$	credits).
Second Class	Below 60% but	Second Class	>55 and $< 65$	
Second Class	not less than 50%	Second Class	≥ 5.5 unu < 0.5	

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#### 8.0 Grading:

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

Table 4: Conversion into Grades and Grade points assigned									
Range in which the %	Grade	Grade point	Performance	Performance in Project					
of marks in the		Assigned		work					
subject fall									
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	$B^+$	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

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

Where, m is the number of semester under consideration.  $TC_j$  the total number of credits for a  $j^{th}$  semester and GPA<sub>j</sub> 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.

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#### 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".

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

## I YEAR II-SEMESTER

	<u>a</u> 11	<b>T</b> 1		Credits	Scheme of Examination		
Code	Subject	Theory	Practical		Internal Marks	External Marks	Total Marks
F0010192	Organization Structure and Personnel Management	3+1*		3	40	60	100
F0011192	Data Structures through C	3+1*		3	40	60	100
F0012193	Computer Organization	3+1*		3	40	60	100
F0013192	Operating Systems	3+1*		3	40	60	100
F0014192	UNIX and Shell Programming	3+1*		3	40	60	100
F0015192	Data Structure through C Lab		3	1.5	40	60	100
F0016192	UNIX and Shell Programming Lab		3	1.5	40	60	100
F0017192	Operating Systems Lab		3	1.5	40	60	100
F0018192	Continuous Comprehensive Evaluation		4	2	40	60	100
	Total	20	13	21.5	360	540	900

					Schem	e of Examin	ation
Code	Subject	Theory	Practical	Credits	Internal	External	Total
					Marks	Marks	Marks
F0019193	Principles of Corporate	3+1*		3	40	60	100
	Communication	-		-	-		
F0020193	Python Programming	3+1*		3	40	60	100
F0021193	Object Oriented Programming Through Java	3+1*		3	40	60	100
	ELECTIVE-I						
F0022193	Software Engineering	3+1*					
F0023193	Design and Analysis of Algorithms	5+1		3	40	60	100
F0024193	Principles of Programming						
10021195	Languages						
	ELECTIVE-II/MOOCS						
F0025193	Operation Research	3⊥1*		3	40	60	100
F0026193	Design Patterns	5+1		5	40	00	100
F0027193	Computer Networks						
F0028193	Object Oriented Programming		3	1.5	40	60	100
	Through Java Lab						
F0029193	Professional Communication & Soft Skills Lab (PROS)		3	1.5	40	60	100
F0030193	Python Programming Lab		3	1.5	40	60	100
E0021102	Continuous Comprehensive		4	2	40	60	100
F0031193	Evaluation		4	2	40	00	100
	Total	20	13	21.5	360	540	900

#### **II YEAR II-SEMESTER**

					Scheme	e of Examin	ation
Code	Subject	Theory	Practical	Credits	Internal	External	Total
					Marks	Marks	Marks
F0032194	Web Technologies	3+1*		3	40	60	100
F0033194	Object Oriented Analysis and Design Using UML	3+1*		3	40	60	100
F0034194	Software Testing Methodologies	3+1*		3	40	60	100
	ELECTIVE-III/MOOCS						
F0035194	Human Computer Interaction	3+1*		2	40	60	100
F0036194	Computer Graphics	1		3			
F0037194	Information Security						
	ELECTIVE-IV						
F0038194	Distributed Databases	2+1*		2	40	60	100
F0039194	Artificial Intelligence	5+11		5	40	00	100
F0040194	Data Analytics and Big Data						
F0041194	Web Technologies Lab		3	1.5	40	60	100
F0042194	Case Tools Lab		3	1.5	40	60	100
F0043194	Software Testing Methodologies Lab		3	1.5	40	60	100
F0044194	Continuous Comprehensive Evaluation		4	2	40	60	100
	Total	20	13	21.5	360	540	900

					Scheme	of Examir	nation
Code	Subject	Theory	Practical	Credits	Internal Marks	Extern al Marks	Total Marks
F0045195	R-Programming	3+1*		3	40	60	100
F0046195	Data Warehousing and Data Mining	3+1*		3	40	60	100
F0047195	Mobile Application Development	3+1*		3	40	60	100
	ELECTIVE-V/MOOCS						
F0048195	E-Commerce	3+1*		2	40	60	100
F0049195	PHP Programming			3			100
F0050195	Image Processing						
	ELECTIVE-VI						
F0051195	Software Project Management	2 1*		2	40	60	100
F0052195	Middleware Technologies	5+1**		3	40	00	100
F0053195	Cloud Computing						
F0054195	R-Programming Lab		3	1.5	40	60	100
F0055195	Mobile Application Development Lab		3	1.5	40	60	100
F0056195	Mini Project		3	1.5	40	60	100
F0057195	Continuous Comprehensive Evaluation		4	2	40	60	100
	Total	20	13	21.5	360	540	900

#### III YEAR, II-SEMESTER

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

I Year, I-Sem

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4	3

#### (F0001191) PROBABILITY AND STATISTICS

#### COURSE OBJECTIVES:

## 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	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>

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

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

#### <u>UNIT – II</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.

#### <u>UNIT – III</u>

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

#### UNIT-IV

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

#### UNIT – V

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

#### <u>UNIT – VI</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.

#### TEXT BOOKS/REFERENCES:

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

I Year, I-Sem

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#### (F0002191) DATABASE MANAGEMENT SYSTEMS

#### **COURSE OBJECTIVES:**

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

#### **COURSE OUTCOMES:**

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

#### Mapping of COs & POs:

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

#### <u>UNIT I</u>

**Introduction to Databases:** Data base System Applications, data base System VS file System, View of Data – Data Abstraction, Instances and Schemas, data Models – the ER Model, Relational Model, Other Models. Database Languages – DDL, DML, database Access for application Programs. Data base Users and Administrator, Transaction Management, data base System Structure – Storage Manager, the Query Processor.

#### <u>UNIT II</u>

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

#### <u>UNIT III</u>

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

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

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

#### <u>UNIT IV</u>

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

#### <u>UNIT V</u>

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

#### <u>UNIT VI</u>

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

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

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

#### **TEXT BOOKS:**

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

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

I Year, I-Sem

T C 4 3

#### (F0003191) ACCOUNTING AND FINANCIAL MANAGEMENT

#### **COURSE OBJECTIVES:**

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

#### **COURSE OUTCOMES:**

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

#### Mapping of COs & POs:

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

#### <u>UNIT I:</u>

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

#### UNIT II:

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

#### UNIT III:

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

#### UNIT IV:

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

#### UNIT V:

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

#### **UNIT VI:**

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

#### **TEXT BOOKS:**

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

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

## MASTER OF COMPUTER APPLICATION

I Year, I-Sem

Т С 3

4

## (F0004191) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

#### **COURSE OBJECTIVES:**

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

## COURSE OUTCOMES:

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

#### Mapping of COs & POs:

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

#### **UNIT-I**

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

#### **UNIT-II**

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

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

#### **UNIT-III**

Relations: Definition, Properties of Binary Relations, compatibility relation, equivalence relation and partial ordering relations, total ordered relation, Hasse diagram, Extrernal elements in posets, Lattice and its Properties. Functions: Definition of a function, types of functions, Pigeonhole principles and its applications, Composition of functions, Invertible Functions.

#### **UNIT-IV**

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

#### **UNIT-V**

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

#### **UNIT-VI**

Graph Theory: Definition of Graph, Terminology of Graphs, Representation of a Graphs, Vertex Degree and Handshaking Property, Isomorphic Graphs, Planar Graphs, Spanning Tree, DFS, BFS.

Graph Theory Applications: walk and its classifications, Euler Circuit and Euler Trail, Hamiltonian cycles and Hamiltonian path, Graph Coloring.

## TEXT BOOKS:

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

## **REFERENCE BOOKS:**

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

**MASTER OF COMPUTER APPLICATION** 

I Year, I-Sem

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4	3

#### (F0005191) C-PROGRAMING

#### **COURSE OBJECTIVES:**

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

#### **COURSE OUTCOMES:**

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

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

#### Mapping of COs & POs:

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

#### <u>UNIT I</u>

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

#### <u>UNIT II</u>

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

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

#### <u>UNIT III</u>

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

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

#### UNIT IV

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

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

## <u>UNIT V</u>

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

#### <u>UNIT VI</u>

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

#### TEXT BOOKS:

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

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

MASTER OF COMPUTER APPLICATION

I Year, I-Sem

P C 3 1.5

#### (F0006191) C-PROGRAMING LAB

#### **COURSE OBJECTIVES:**

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

#### COURSE OUTCOMES:

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#### Mapping of COs & POs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															
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#### **Recommended Systems/Software Requirements:**

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

#### EXERCISE L:

a) Write a C program to find the roots of a quadratic equation.

b) Write a C program to check the given integer is Armstrong number or not

#### EXERCISE 2:

a) Write a C program, which takes two integer operands and one operator from the user, performs the specified operation and then prints the result.

(Consider the operators +,- ,\*, /, % and use Switch Statement)

b) The total distance travelled by vehicle in t seconds is given by distance S = ut+1/2at2 where u and a are the initial velocity (m/sec.) and acceleration (m/sec2) respectively.

Write C program to find the distance travelled at regular intervals of time given the values of u and a. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of u and a.

#### EXERCISE 3:

a) Write a C program to find the sum of individual digits of a positive integer.

b) Write a C program to generate the first n terms of the Fibonacci sequence.

[Note: A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1.

Subsequent terms are found by adding the preceding two terms in the sequence.]

c) Write a C program to generate all the prime numbers between 1 and n, where n value is given by the user. [Note: Develop each of the above programs by using different loop constructs supported by C language. (i.e., while, do while and for Loops)]

#### EXERCISE 4:

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

## EXERCISE 5:

a) Write a C program to find all the even numbers and odd numbers in the given one dimensional array.

b) Write a c program to delete a specified integer from an array and insert an element in a specified position into that same array.

c) Write a C program to perform the following operations:

i) Addition of Two Matrices ii) Subtraction of Two Matrices

iii) Multiplication of Two Matrices

[Note: Use functions to implement the above specified operations]

d) Write a c program to find the number of non-repeated elements in an array.

#### EXERCISE 6:

a) Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To reverse a given positive integer.

#### EXERCISE 7:

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

#### EXERCISE 8:

a) Write a C Program to demonstrate that, how to pass an entire array as an argument to a Function with a suitable example.

b) Write a C Program to perform various operations on given two strings using string handling functions.

C) Write a c program to find the first and last occurrence of given character in a given string.

#### EXERCISE 9:

a) Write a C Program to perform various arithmetic operations on pointer variables.

b) Write a C Program to demonstrate the following parameter passing mechanisms:

i) call-by-value ii) call-by-address

#### EXERCISE 10:

a) Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to a given main string from the specified position.

ii) To delete n no of characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not.

#### EXERCISE 11:

a) Write a C program that displays the position or index in the string S where the string T begins, or -1 if S doesn't contain T.

b) Write a C program to count the lines, words and characters in a given text.

#### EXERCISE 12:

a) 2's complement of a number is obtained by scanning it from right to left and Complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert the given Roman numeral to its decimal equivalent value.

c) Write a c program to convert decimal number into binary number.

#### EXERCISE 13:

a) Write a C program that uses functions to perform the following operations:

i) Reading a complex number ii) Writing a complex number

iii) Addition of two complex numbers iv) Multiplication of two complex numbers

(Note: Represent the complex number using a structure.)

#### EXERCISE 14:

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

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

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

#### EXERCISE 15:

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

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

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

#### **REFERENCE BOOKS**

- 1) The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
- 2) Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
- 3) Computer Basics and C Programming, V. Raja Raman, PHI Publications.

## MASTER OF COMPUTER APPLICATION

I Year, I-Sem

P C 3 1.5

#### (F0007191) 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 Language Components.
- Make Use of PL/SQL Variables.
- Handle PL/SQL Reserved Words.
- Make Use of Identifiers in PL/SQL
- Make Use of Anchored Data type

#### **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 and functions using PL/SQL

## Mapping of COs & POs:

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

#### **Recommended Systems/Software Requirements:**

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

### LIST OF EXPERIMENTS

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

Example:- Select the roll number and name of the student who secured fourth rank in the class.

- 3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
- 4) Queries using Conversion functions (to\_char, to\_number and to\_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next\_day, add\_months, last\_day, months\_between, least, greatest, trunc, round, to\_char, to\_date)
- 5) i) Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)

ii) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

- 6) Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
- 7) Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.
- 8) Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
- 9) Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
- 10) Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.

## MASTER OF COMPUTER APPLICATION

- 11) Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
- 12) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

## TEXT BOOKS:

- 1) Oracle PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3<sup>rd</sup> 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.

## MASTER OF COMPUTER APPLICATION

I Year, I-Sem (MCA)

#### (F0008191) IT WORKSHOP

P C 3 1.5

#### **COURSE OBJECTIVES:**

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

#### **COURSE OUTCOMES:**

By the end of module students will be expected to demonstrate

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

#### Mapping of COs & POs:

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

#### PC HARDWARE

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

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

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

## **OFFICE TOOLS**

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

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

#### SPREAD SHEET

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

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

#### PRESENTATION

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

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

## MASTER OF COMPUTER APPLICATION

I Year, II-Sem

C 3

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4

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

#### **COURSE OBJECTIVES:**

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

## **COURSE OUTCOMES:**

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

#### Mapping of COs & POs:

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

#### UNIT I

<u>Introduction to Management</u>: Concepts of Management – Nature, Importance, Functions and theories of Management, Systems Approach to Management, Leadership Styles, Social Responsibilities of Management.

#### UNIT II

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

#### UNIT III

<u>Personnel Management</u>: objectives, Evolution, personnel policies - Personnel management vs HRM - Personnel department position in the organization - Role of personnel manager as line and staff manager.

#### UNIT IV

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

#### UNIT V

<u>Training and Development</u>: Objectives and policies planning - training manager and his role - Training techniques - career planning - Performance appraisal and its objectives.

#### UNIT VI

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

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

## MASTER OF COMPUTER APPLICATION

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### (F0011192) DATA STRUCTURES THROUGH C

#### COURSE OBJECTIVES

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

#### **COURSE OUTCOMES**

Students will be able

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

#### Mapping of COs & POs:

PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
-			P01 P02 P03	POI PO2 PO3 PO4 PO3 PO4 PO3 PO4 PO4 PO4 PO4 PO4 PO4 PO4 PO4	P01         P02         P03         P04         P05           - <td< th=""><th>P01         P02         P03         P04         P05         P06           -         &lt;</th><th>P01         P02         P03         P04         P05         P06         P07           -</th><th>P01         P02         P03         P04         P05         P06         P07         P08           -</th><th>P01       P02       P03       P04       P05       P06       P07       P08       P09         -</th><th>POI         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10           -</th><th>POI         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11           -<th>POI         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12           -</th><th>PO1       PO2       PO3       PO4       PO5       PO6       PO7       PO8       PO9       PO10       PO11       PO12       PS01         Image: Post of the stress of the stre</th><th>PO1       PO2       PO3       PO4       PO5       PO6       PO7       PO8       PO9       PO10       PO11       PO12       PS01       PS02         -</th></th></td<>	P01         P02         P03         P04         P05         P06           -         <	P01         P02         P03         P04         P05         P06         P07           -	P01         P02         P03         P04         P05         P06         P07         P08           -	P01       P02       P03       P04       P05       P06       P07       P08       P09         -	POI         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10           -	POI         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11           - <th>POI         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12           -</th> <th>PO1       PO2       PO3       PO4       PO5       PO6       PO7       PO8       PO9       PO10       PO11       PO12       PS01         Image: Post of the stress of the stre</th> <th>PO1       PO2       PO3       PO4       PO5       PO6       PO7       PO8       PO9       PO10       PO11       PO12       PS01       PS02         -</th>	POI         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PO12           -	PO1       PO2       PO3       PO4       PO5       PO6       PO7       PO8       PO9       PO10       PO11       PO12       PS01         Image: Post of the stress of the stre	PO1       PO2       PO3       PO4       PO5       PO6       PO7       PO8       PO9       PO10       PO11       PO12       PS01       PS02         -

#### <u>UNIT – I</u>

Introduction: Definition, Classification of Data Structures.

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

#### <u>UNIT – II</u>

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

#### <u>UNIT - III</u>

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

#### UNIT - IV

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

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

#### UNIT - V

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

## <u>UNIT – VI</u>

**Graphs** –Introduction, Graph Terminologies, Representation of Graphs, Graph traversal techniques-BFS, DFS. **TEXT BOOKS:** 

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

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

## **MASTER OF COMPUTER APPLICATION**

I Year, II-Sem

## T C 4 3

#### (f0012192) COMPUTER ORGANIZATION

## **COURSE OBJECTIVES:** To understand the s

- 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:**

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

#### Mapping of COs & POs:

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

## <u>UNIT-I</u>

**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.

#### <u>UNIT-II</u>

**REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS:** Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations **BASIC COMPUTER ORGANIZATION AND DESIGN**: Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory- reference instructions, Input – Output and Interrupt.

#### UNIT-III

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

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

#### <u>UNIT-IV</u>

**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.

#### <u>UNIT-VI</u>

**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

**MASTER OF COMPUTER APPLICATION** 

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4	3

#### (F0013192) OPERATING SYSTEMS

#### COURSE OBJECTIVES:

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

#### **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.
- ✤ Communicate effectively with operating system through application programs.

#### Mapping of COs & POs:

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

#### <u>UNIT I</u>

**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.

#### <u>UNIT II</u>

**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.

#### <u>UNIT IV</u>

**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,

## MASTER OF COMPUTER APPLICATION

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

#### **TEXT BOOKS:**

- Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8<sup>th</sup>Edition, John Wiley.
- 2. Andrew S.Tanenbaum: Distributed operating system, Prentice Hall International Inc.1995.

## **REFERENCE BOOKS:**

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

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#### (F0014192) UNIX AND SHELL PROGRAMMING

#### **COURSE OBJECTIVES:**

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

#### **COURSE OUTCOMES:**

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

#### Mapping of COs & POs:

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

#### <u>UNIT I</u>

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

#### <u>UNIT II</u>

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

#### <u>UNIT III:</u>

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

#### <u>UNIT III</u>

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

#### UNIT IV

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

#### <u>UNIT VI</u>

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

#### **TEXT BOOKS:**

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

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

## **MASTER OF COMPUTER APPLICATION**

I Year, II-Sem

## P C 3 1.5

#### (F0015192) DATA STRUCTURES THROUGH C LAB

## **COURSE OBJECTIVES:**

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

#### COURSE OUTCOMES:

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#### Mapping of COs & POs:

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

#### **Recommended Systems/Software Requirements:**

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

#### EXERCISE 1

Write a C program that uses functions to perform the following operations:

- i) Creation
- ii) Insertion
- iii) Deletion
- iv) Traversal on Singly linked list

#### EXERCISE 2

Write a C program that uses functions to perform the following operations:

- i) Creation
- ii) Insertion
- iii) Deletion
- iv) Traversal on Doubly linked list

#### EXERCISE 3

Write a C program that uses functions to perform the following operations:

- i) Creation
- ii) Insertion
- iii) Deletion
- iv) Traversal on Circular linked list

# a) Write

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

#### EXERCISE 5

Write a C program that uses Stack operations to perform the following:

- i) Converting infix expression into postfix expression
- ii) Evaluating the postfix expression

#### EXERCISE 6

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

- i) Bubble sort
- ii) Selection sort
- iii) Insertion sort

## EXERCISE 7

Write C program that implements the following sorting method to sort a given list of integers in ascending order:

- i) Quick sort
- ii) Merge sort
- iii) heap sort

## EXERCISE 8

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

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

## EXERCISE 9

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

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

## EXERCISE 10

Write C programs that implement

- i) BSF
- ii) DSF

- 1) The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
- 2) Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
- 3) Computer Basics and C Programming, V. Rajaraman, PHI Publications

## **MASTER OF COMPUTER APPLICATION**

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#### (F0016192) UNIX AND SHELL PROGRAMMING LAB

#### **COURSE OBJECTIVES:**

★ To teach students various unix utilities and shell scripting.

#### COURSE OUTCOMES:

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#### Mapping of COs & POs:

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

#### **Recommended Systems/Software Requirements:**

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

## WEEK1

## SESSION-1

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

#### **SESSION-2**

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

#### WEEK2

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

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

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

## WEEK3

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

#### WEEK4

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

#### WEEK5

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

#### WEEK6

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

## WEEK7

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

## WEEK8

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

#### WEEK9

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

## <u>WEEK10</u>

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

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

(Note: Use stat/fstat system calls)

#### <u>WEEK11</u>

Write C programs that simulate the following unix commands:

- a) mv
- b) cp

(Use system calls)

#### WEEK12

Write a C program that simulates ls Command

(Use system calls / directory API)

#### TEXT BOOKS

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

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RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG AND TECHNOLOGY, NANDYAL AUTONOMOUS

## **MASTER OF COMPUTER APPLICATION**

I Year, II-Sem

C 1.5

## (F0017192) 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.
- 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:

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

## LIST OF SAMPLE PROBLEMS/EXPERIMENTS:

- Simulate the following CPU scheduling algorithms

   a) Round Robin
   b) SJF
   c) FCFS
- 2) Simulate all file allocation strategiesa) Sequentialb) Indexedc) Linked
- 3) Simulate MVT and MFT
- 4) Simulate all File Organization Techniquesa) Single level directoryb) Two level
- 5) Simulate Bankers Algorithm for Dead Lock Avoidance
- 6) Write a C program to cResearch Methodology & IPRResearch Methodology & IPRreate 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 usingi) Standard I/Oii) system calls.

#### **REFERENCES:**

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

d) Priority

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## MASTER OF COMPUTER APPLICATION

II Year, I-Sem (MCA)

## T C 4 3

## (F0019193) PRINCIPLES OF CORPORATE COMMUNICATION

The Course Principles of Corporate Communication comprises key communication principles to turn MCA students into corporate professionals. The other aspects like Ethical 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 colleagues and Corporate people.
- 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
- To guide Graduates to imbibe professional values such as Leadership Qualities.
- To train the Communication ability to address carved issues inside the corporate sector.
- Students will be able capable to solve and develop innovative and domain specific problems and Innovative thinking which help them to be Entrepreneur in their upcoming career.

#### Mapping of COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO1										2		3	
CO2										2		3	
CO3					3	2							
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 – Non Verbal Communication.

#### UNIT-II:

Writing Skills- Letter Writing – Business Letters – Complaint letters - Emails – Report Writing – Project Report Analysis.

#### UNIT-III:

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

#### 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:

Social Media Skills- Basic Do's and Don'ts –Facebook-Twitter- Pinterest- Instagram- Linked In. Learning Outcomes: Students will be able to

- Improve communication in terms of Speaking, Writing and Reading
- Demonstrate Professional Skills such as Presentation Skills
- Able to acquire Professional Competencies like Interview Skills

- Technical Communication (Principles and Practice) by Meenakshi Raman & Sangeeta Sharma, Oxford University 2004.
- 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
## **MASTER OF COMPUTER APPLICATION**

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#### (F0020193) PYTHON PROGRAMMING

#### **COURSE OBJECTIVES:**

This course will enable students to:

- 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:**

The students should be able to:

- 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:

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

#### 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.

#### <u>UNIT – IV:</u>

Lists: Creation of list objects, Accessing and traversing the elements of list. Important functions of list – 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.

**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(), setdefault(). 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) Python for Everybody: Exploring Data Using Python 3 Dr. Charles R. Severance

#### **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

## MASTER OF COMPUTER APPLICATION

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#### (F0021193) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

#### **COURSE OBJECTIVES:**

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

- Describe the Windows event-driven programming model
- Build simple JAVA applications according to the model
- Write fluent JAVA code for creating classes
- Use JAVA variables, data, expressions and arrays
- Design and create forms, menus and controls
- Write clear, elementary Java programs (applets and applications)
- Use a Java-enabled browser and/or the applet viewer to execute Java applets
- Use the Java interpreter to run Java applications
- Design and construct effective graphic user interfaces for application software.
- Use Java Beans, RMI to build complex business applications

#### **COURSE OUTCOMES:**

Student will be able to

- ✤ Understand the syntax and concepts of JAVA
- Understand the concept of class and its members.
- Write JAVA programs to create and implement interface and packages.
- Know the exception handling techniques and write the program based on multithreading concept.
- ✤ Write the window based applications using Applets.
- ♦ A passing student shall demonstrate knowledge of GUI-based event-driven program.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <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.

#### <u>UNIT-III</u>

**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: Strings, String functions, StringBuffer Class, StringTokenizer 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.

## <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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RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG AND TECHNOLOGY, NANDYAL AUTONOMOUS

## MASTER OF COMPUTER APPLICATION

II Year, I-Sem (MCA)

#### (F0022193) SOFTWARE ENGINEERING

#### (ELECTIVE-I)

#### **COURSE OBJECTIVES:**

- To understand Software development as a process.
- Various software process models and system models.
- 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.
- Various user interface analysis and design process.

#### **COURSE OUTCOMES:**

- Students will learn to work as a team and to focus on getting working project done on time with each student being held accountable for their part of the project.
- Student will learn about risk management and quick prototyping de-risk project management.
- Students will learn about and go through the software life cycle with emphasis on different process requirements design and implementation phases.
- Students will learn about software process models and hoe to choose an appropriate model for their project will learn about risk management and quick prototyping to de-risk projects.
- Students will gain confidence and conceptualized.
- Students will learn about user interface design and analysis process and its applications.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <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.

#### <u>UNIT II</u>

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

System models: Context Models, Behavioral models, Object models.

#### <u>UNIT III</u>

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

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

#### <u>UNIT IV</u>

Design Engineering: Design process and Design quality, Design concepts.

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

#### <u>UNIT V</u>

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

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

#### <u>UNIT VI</u>

**Risk management:** Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. **Quality Management :** Quality concepts, Software quality assurance, Software Reviews, Statistical Software quality Assurance, The ISO 9000 quality standards.

## TEXT BOOKS

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

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

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## MASTER OF COMPUTER APPLICATION

II Year, I-Sem (MCA)

## (F0023193) DESIGN AND ANALYSIS OF ALGORITHMS

(ELECTIVE-I)

#### **COURSE OBJECTIVES:**

- To understand the significance of algorithms in the computer field.
- ✤ To understand the various aspects of algorithm development.
- To find the qualities of a good solution.
- To understand the significance and importance of program correctness.
- To understand the relationship between algorithms and other fields in the computer realm.
- To understand the significance of algorithm efficiency.

#### **COURSE OUTCOMES:**

- Students will be able to demonstrate the performance of algorithm and represent time complexity.
- Students will understand to design the efficient algorithms using Divide and Conquer algorithm design technique.
- Students will demonstrate a number of standard algorithms for problems using Greedy method.
- Students will be able to understand the Dynamic Programming algorithm design strategies and solve the problem using this technique.
- Students will learn the Backtracking design strategies.
- Students will be able to understand the Distinguish between P and NP Problems.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <u>UNIT I</u>

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh, Omega, Theta notation and Little oh notation, Disjoint Sets- disjoint set operations, union and find algorithms.

#### <u>UNIT II</u>

Divide and conquer: General method, applications-Binary search, Finding Maximum and minimum, Quick sort, Merge sort, Strassen's matrix multiplication.

#### <u>UNIT III</u>

Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

#### UNIT IV

Dynamic Programming: General method, applications- 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design, optimal binary search tree.

#### <u>UNIT V</u>

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

#### UNIT VI

NP-Hard and NP-Complete problems: Basic Concepts, Non Deterministic algorithms, the classes of NP Hard and NP Complete, Cook's Theorem.

#### **TEXT BOOKS:**

- 1) Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
- 2) Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John wiley and sons.

- 1) Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education.
- 2) Design and Analysis of algorithms, S. Sridhar, Oxford.
- 3) Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
- 4) Algoritms Richard Johnson baugh and Marcus Schaefer, Pearson Education.

## MASTER OF COMPUTER APPLICATION

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#### (F0024193) PRINCIPLES OF PROGRAMMING LANGUAGE

#### (ELECTIVE-I)

#### **COURSE OBJECTIVES:** The Students will learn the following:

- ✤ To know the fundamental concepts, characteristics and designing rules of various Programming Languages
- To get the knowledge of Syntax and Semantics of the various Programming Languages.
- To know various Basic Concepts of Expressions and Control Structures in various Languages like ADA, COBOL, FORTRAN, C, C++, JAVA
- To Learn the Concurrency Control mechanism in ADA

**<u>COURSE OUTCOMES</u>**: Upon the successful completion of the course, the student will be able:

- \* To analyze, develop and understand concepts of various Programming Language
- To get understand the basic concepts of Data types, Variables, Binding and Scope rules of different languages
- Allows to develop an Unambiguous Grammar and construct a parse tree
- Write and modify programs using a mostly-functional style.
- Ability to develop a Concurrency Control Mechanism in ADA, C++ Languages
- Modify interpreters to change or enhance their behavior so as to implement various features of programming languages.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <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.

#### UNIT-II

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 subprograms, and user defined overloaded operators, co routines.

#### <u>UNIT-V</u>

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

#### UNIT-VI

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, And 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.

- 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.

## MASTER OF COMPUTER APPLICATION

II Year, I-Sem (MCA)

## T C 4 3

#### (F0025193) OPERATIONS RESEARCH

(ELECTIVE-II/MOOCS)

## COURSE OBJECTIVES:

#### **COURSE OUTCOME:**

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

- ✤ Understand basic concepts in operation research.
- Analyze the methods in Linear programing.
- Apply the concept of Assignment and transportation problems to formulate special linear programing problems.
- Obtain the knowledge of Game theory and analyze its applications in real life.
- Understand the problems related to PERT and CPM to minimize/maximize the given things.

#### Mapping of COs & POs:

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

## <u>UNIT-I</u>

**Introduction :** Definition, Characteristics Operation Research, Necessity of Operations research, Scope of Operation Research, Scope of Operation Research in Management, Scope of Operation Research in Financial Management - An Overview - Typical application of Operations Research, Limitations of Operation Research.

#### <u>UNIT-II</u>

**Linear Programming:** Introduction of Linear Programming, Formation of Linear Programming problems. The Graphical Method, Simplex Method.

## UNIT-III

Assignment Model: Definition and mathematical representation, The Hungarian Method For solution, Unbalanced Assignment problem

#### UNIT-IV

**Transportation Model:** Definition and Application of the Transportation Model – Solution of the Transportation Problem.

#### UNIT-V

**Game Theory:** Game Theory Introduction -Two persons Zero-sum games - pure strategies, games with saddle point - Mixed strategies, Rules of Dominance.

#### UNIT-VI

PERT & CPM - Drawing Networks – Identifying critical path –probability of completing the project within given time – Project crashing – Optimum cost and Optimum duration.

#### TEXT BOOKS/REFERENCES

- 1) Operations Research, P.K. Gupta and D.S. Hira, S. Chand & co., 2007.
- 2) Operation Reasearch by S.D.Sarma, Kedharnath Publications.
- 3) F.S. Hillerand G.J. Lieberman: Introduction to Operations Research Holden Day Inc., San Francisco.
- 4) Cook, T.M. and R.A. Hussel: Introduction to Management Science, Prentice-Hall, Englewood Cliffs.
- 5) Gupta M.P. and J.K. Sharma, Operations Research for Management, National Publishing House, New Delhi.
- 6) Lock D. Project Management Handbook, Gower, London.
- 7) Dennerbring, D.G. and M.K. Starr, Management Science-McGraw Hill Book company, New Delhi.

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## MASTER OF COMPUTER APPLICATION

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#### (F0026193) DESIGN PATTERNS

(ELECTIVE-II/MOOCS)

#### **COURSE OBJECTIVES:**

The Students will learn the following:

- Analyze a software development problem and express its essence succinctly and precisely.
- Design a module structure to solve a problem, and evaluate alternatives;
- Implement a module so that it executes efficiently and correctly;
- Appreciate engineering issues in the development of software, such as the importance of addressing the user's concerns, working with limited resources, maintainability, dependability, and division of labor

## COURSE OUTCOMES:

Upon the successful completion of the course, the student will be able:

- ✤ Demonstrate the underlying object oriented principles of design patterns.
- An ability to analyze a problem, and identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution.
- Understand the context in which each pattern can be applied
- An ability to apply mathematical foundations, algorithmic principles, and computer science and engineering
- Understand how the application of a pattern affects the system quality of a system and what tradeoffs are involved in design choices.
- How to use design patterns to keep code quality high without overdesign.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <u>UNIT-I</u>

Introduction: What Is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

#### <u>UNIT-II</u>

A Case Study: Designing a Document Editor : Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary .

#### UNIT-III

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

Structural Pattern Part-I: Adapter, Bridge, and Composite.

#### UNIT-IV

Structural Pattern Part-II: Decorator, façade, Flyweight, Proxy.

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator.

#### UNIT-V

Behavioral Patterns Part-II: Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

#### <u>UNIT-VI</u>

What to Expect from Design Patterns, a Brief History, the Pattern Community an Invitation, A Parting Thought. **TEXT BOOKS:** 

1) Design Patterns by Erich Gamma, Pearson Education

- 1) Pattern's in JAVA Vol-I By Mark Grand , Wiley DreamTech.
- 2) Pattern's in JAVA Vol-II By Mark Grand , Wiley DreamTech.
- 3) JAVA Enterprise Design Patterns Vol-III By Mark Grand , Wiley DreamTech.
- 4) Head First Design Patterns By Eric Freeman-Oreilly-spd.
- 5) Peeling design Patterns, Prof. Meda Srinivas Rao, Narsimha karumanchi, CareerMonk Publications.
- 6) Design Patterns Explained By Alan Shalloway, Pearson Education.

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#### RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG AND TECHNOLOGY, NANDYAL AUTONOMOUS

## MASTER OF COMPUTER APPLICATION

II Year, I-Sem (MCA)

## (F0027193) COMPUTER NETWORKS

(ELECTIVE-II/MOOCS)

#### **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:

- Independently understand basic computer network technology and identify the different types of network topologies, protocols and models.
- Understand the different types of transmission media's like copper wire, coaxial cable, twisted pair etc.
- Understand the concepts of framing and error detection and correction concepts and different congestion control techniques.
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of transportation layer, and how they can be used to assist in network design and implementation.
- Students will learn to explain security issues in computer networks and be able to know concepts of application layer.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <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.

## <u>UNIT - II</u>

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

#### <u>UNIT - III</u>

**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.

#### UNIT - V

**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-

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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.

#### <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. Third 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

## MASTER OF COMPUTER APPLICATION

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#### (F0028193) 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:

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

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															

#### **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.
- 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 illustrates
  - a. Constructor Overloading using this keyword
  - b. Method Overloading.
- 10) Write a java program implement
  - a. Single Inheritance
  - b. 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.
- 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.

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- 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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## (F0029193) PROFESSIONAL COMMUNICATION & SOFT SKILLS LAB (PROS)

The Professional Communication & Soft skills Lab (PROS) focuses on the production and practice of sounds of language and equips students with the use of English in everyday situations and contexts.

- To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- \* To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm
- To initiate them into greater use of the computer in resume preparation, report- writing, format-making etc.
- To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, GMAT etc.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### **SYLLABUS**

- Week #1 Introduction & Objectives Significance of Communication
- Week # 2 Starting Social Conversations Tips & Practice
- Week # 3 Group Discussion
- Week #4 Soft skills Team Dynamics & Corporate Communication Aspects
- Week# 5 Accent & Pronunciation Practice
- Week # 6 E-Correspondence & Virtual Communication
- Week #7 Technical Presentations
- Week # 8 Interview Skills Mock Interviews
- Week #9 Soft skills Cross-Cultural Communication
- Week #10 Reviews

## **EVALUATION:**

- 1) The practical examinations for Professional Communication & Soft skills Lab (PROS) shall be conducted as per the norms prescribed for the core subject practical sessions.
- 2) For the sessions, there shall be a continuous evaluation during the year for 40 sessional marks and 60 marks for year-end examination. Of the 40 marks, 20 marks shall be awarded for day-to-day work and 20 marks to be awarded by conducting internal lab test(s). The year-end examination shall be conducted by the teacher concerned and External Examiner from other Institution.

## SUGGESTED READINGS:

- Business Communication (Concepts, Cases, and Applications) Second Edition By P.D. Chaturvedi & Mukesh Chaturvedi, Pearson ltd. 2011
- Better English Pronunciation (Second Edition) by D. O' Connor, Cambridge University Press 1967, 1980
- 3) Technical interviews (Excel with Ease) by Anil Kumar Maini , Pearson ltd. 2011
- 4) Practical English Usage (New Edition) By Michael Swan, Oxford University Press.

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## **MASTER OF COMPUTER APPLICATION**

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#### (F0030193) 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:

CO/PO	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

- 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, Vamsi Kurama, 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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#### (F0032194) 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 JSP.
- Student will learn about the database management using java.
- Student will learn client server architecture and will be able to develop a web application using servlet, jsp, JDBC technologies.

#### **COURSE OUTCOMES:**

- Students are able to develop web page using html.
- Students are able to develop a dynamic webpage by the use of java script and DHTML.
- Students will be able to write a well formed / valid XML document.
- Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table.
- Students will be able to write a server side java application called Servlet to catch form data sent from client, process it and store it on database.
- Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database.

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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

## Mapping of COs & POs:

## <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, The status bar, Rollover Buttons, moving Images.

#### <u>UNIT III</u>

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 Servlet, 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 JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC.

Database Access: Database Programming using JDBC, Studying Javax.sql.\* package, Storing and Accessing a Database from a JSP Page.

#### <u>UNIT VI</u>

JSP Application Development: Generating Dynamic Content, JSP elements – Directive elements, standard Action elements, Scripting Elements, Expression elements., Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling, Users Data sharing between JSP pages.

#### TEXT BOOKS:

- 1) Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNIT s 1,2,3)
- 2) The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH (Chapters: 25) (UNIT 4)
- 3) Java Server Pages Hans Bergsten, SPD O'Reilly (UNITs 5,6)

#### **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

## MASTER OF COMPUTER APPLICATION

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#### (F0033194) OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

#### **COURSE OBJECTIVES:**

Solution Building block of UML: things, relationships and diagrams.

- Contents and common modeling techniques to model static aspects of any system using Class diagrams, object diagrams, deployment diagram, use case diagram.
- Contents and common modeling techniques to model dynamic aspects of any system using.
- Sequence diagram, collaboration diagram, activity diagram, state chart diagram.
- Contents and common modeling techniques to model any system using component diagram to implement physically.

#### **COURSE OUTCOMES:**

- Analyze system requirements and model problem domains.
- Design and build object oriented systems.
- Explain and justify designs based on design principles patterns and heuristics.
- Write object-oriented code to correctly implement a design.
- Be able to read and write analysis and design documentation the Unified Modeling language.
- Be able to read and write object-oriented code.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <u>UNIT – I:</u>

**Introduction to UML:** Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

## <u>UNIT – II:</u>

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Packages.

#### <u>UNIT – III:</u>

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

#### UNIT- IV:

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

#### <u>UNIT – V:</u>

Advanced Behavioral Modeling: state machines, state chart diagrams.

Architectural Modeling-I: Component, Deployment.

#### <u>UNIT – VI:</u>

**Architectural Modeling-II:** Component diagrams and Deployment diagrams. **Case Study:** The Unified Library application, ATM Application.

#### TEXT BOOKS:

- 1) Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.
- 2) Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

#### **REFERENCE BOOKS:**

- 1) Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
- 2) Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
- 3) Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
- 4) Mark Priestley: Practical Object-Oriented Design with UML, TATA McGrawHill
- 5) Appling UML and Patterns: An introduction to Object Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

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## RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG AND TECHNOLOGY, NANDYAL AUTONOMOUS

MASTER OF COMPUTER APPLICATION

II YEAR, II-SEM (MCA)

#### (F0034194) SOFTWARE TESTING METHODOLOGIES

#### **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.
- To have an ability to design and conduct a software test process for a software testing project.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <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.

## MASTER OF COMPUTER APPLICATION

II YEAR, II-SEM (MCA)

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## (F0035194) HUMAN COMPUTER INTERACTION

## (ELECTIVE-III)

#### **COURSE OBJECTIVES:**

- To expose students to the central concepts of Human-Computer Interaction.
- Establish target users, functional requirements, and interface requirements for a given computer application
- Describe and explain user interface design principles, and apply them to designing an interface.
- Develop quick-and-dirty interface designs using rapid prototyping methods.
- Develop user studies and analyse study data to gain information about users, tasks, and interface designs.

## COURSE OUTCOMES:

The Student will be able to:

- ✤ Apply HCI principles and a user-centered approach to interaction design and Analyze user needs and requirements.
- Design and develop prototypes based on user assessments (needs and requirements), while applying HCI principles and models.
- Apply evaluation and usability testing methods to interactive products to validate design decisions.
- Develop pre-design and post-design usability testing techniques on the developed website and Assess user needs and requirements.
- Categorize, design and develop information in proper architectural structures and Create interface design prototypes based on a range of design principles and user data, and user assessments.
- Apply prototype principles and a user-centered approach to interaction design.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <u>UNIT I</u>

**Introduction:** Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

#### <u>UNIT II</u>

**The graphical user interface** – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

#### <u>UNIT III</u>

**Design process** – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions.

Screen Designing: - Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content.

#### UNIT IV

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

## <u>UNIT V</u>

Components - text and messages, Icons and increases - Multimedia, colors, uses problems, choosing colors.

#### UNIT VI

**Software tools** – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

#### **TEXT BOOKS:**

- 1) The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
- 2) Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.

- 1) Human Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
- 2) Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
- 3) User Interface Design, Soren Lauesen, Pearson Education.
- 4) 4 .Human –Computer Interaction, D.R.Olsen, Cengage Learning.
- 5) Human Computer Interaction, Smith Atakan, Cengage Learning.

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## MASTER OF COMPUTER APPLICATION

II YEAR, II-SEM (MCA)

## (F0036194) COMPUTER GRAPHICS

#### (ELECTIVE-III)

#### **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
- Provide an understanding of how a computer draws the fundamental graphics primitives lines and filled polygons in both 2-D and 3-D.
- Understand the fundamental mathematics involved in generating a 3-D scene. Includes coordinate systems, transformations, and vector operations.
- 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 shades will be introduced.

#### COURSE OUTCOMES:

The Student will be able to:

- Be familiar with drawing primitive objects (lines, circles, polygons) on a display and Be exposed to graphical input and output devices
- Master two dimensional modelling and 2-D transformations.
- Be familiar with basic transformations and composite transformation.
- ✤ Master in 2-D viewing, clipping, fill, and rendering techniques.
- Master three dimensional modelling and 3-D transformations
- Be familiar with projection of 3-D objects on a 2-D plane and Animation techniques and languages.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### 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.

#### UNIT II

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

#### UNIT III

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

#### <u>UNIT IV</u>

**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.

#### UNIT V

**3-D Geometric and Modeling 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, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
- "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc-Graw hill edition.
- 4) Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
- 5) "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
- 6) Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
- 7) Computer Graphics, Steven Harrington, TMH

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RAJEEV GANDHI MEMORIAL COLLEGE OF ENGG AND TECHNOLOGY, NANDYAL AUTONOMOUS

## MASTER OF COMPUTER APPLICATION

II YEAR, II-SEM (MCA)

## (F0037194) INFORMATION SECURITY

#### (ELECTIVE-III)

#### **COURSE OBJECTIVES:**

- ✤ This course covers the major aspects of computer and network security.
- It starts with a general introduction to information security, then proceeds to cover types of threats and attacks, hacking techniques.
- It can also cover the network vulnerabilities, security policies and standards, firewalls.
- Student can learn cryptography, Authentication & digital signatures,
- The SSL protocol, Wireless security, intrusion detection and prevention

## **COURSE OUTCOMES:**

The student will be able to:

- Identify the major types of threats to information security and the associated attacks.
- Develop strategies to protect organization information assets from common attacks.
- Understand how security policies, standards and practices are developed.
- Identify efficient ciphers such as cryptographic algorithms such as RSA, Diffie-Hellman cryptographic algorithms, Digital Signature standard for Hashing techniques to provide novel solutions for real-time application protocols like PGP, S/MIME, SSL, TLS and SET.
- understand the purpose of security protocols and be witness to the difficulties of their verification using IP Security
- Identify the major techniques, approaches and tools used to discover network and system vulnerabilities.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <u>UNIT - I</u>

**Introduction to Security** - Security Trends, The OSI Security Architecture, Security Attacks, Security Services and Mechanisms, A model for Internetwork security, Internet Standards and Internet Security.

#### <u>UNIT - II</u>

**Symmetric Encryption and Message Confidentiality:** Symmetric Encryption Principles, Symmetric Block encryption algorithms, stream Cipher and RC4, cipher block modes of operation, location of encryption devices, key distribution.

**Public key cryptography and Message Authentication:** Approaches of Message Authentication, Secure Hash Functions and HMAC.

#### <u>UNIT - III</u>

**Public key cryptography and Message Authentication:** Public key cryptography principles, public key cryptography algorithms, digital signatures, and key management

Authentication Application: Kerberos, X.509 Directory Authentication Service, Public Key Infrastructure.

#### UNIT - IV

Electronic mail Security: Pretty Good Privacy (PGP) and S/MIME.

#### <u>UNIT - V</u>

**IP Security:** IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

#### UNIT - VI

**Network Management Security:** Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3. Intruders Introduction, Viruses and related threats Introduction.

#### TEXT BOOKS:

- 1) Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
- 2) Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W.Manzuik and Ryan Permeh, wileyDreamtech.

- 1) Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
- 2) Network Security Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
- 3) Cryptography and network Security, Third edition, Stallings, PHI/Pearson
- 4) Principles of Information Security, Whitman, Thomson.
- 5) Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
- 6) Introduction to Cryptography, Buchmann, Springer.

## MASTER OF COMPUTER APPLICATION

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## (F0038194) DISTRIBUTED DATABASES

#### (ELECTIVE IV)

#### **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:**

- ✤ To understand the basic information of Distributed database
- Student will be able to learn the techniques used for data fragmentation, replication, and allocation during the distributed database design process.
- Evaluate simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer.
- Students will also learn how the two-phase commit protocol is used to deal with committing a transaction that accesses databases stored on multiple nodes.
- Student can describe distributed concurrency control based on the distinguished copy techniques and the voting methods.
- Student can understand the reliability of distributed databases and know how the distributed databases are managed with catalogs.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### Mapping of COs & POs:

#### UNIT I

**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.

#### UNIT III

**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.

#### UNIT V

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

## <u>UNIT VI</u>

**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.

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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 APPLICATION**

II YEAR, II-SEM (MCA)

## (F0039194) 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:**

- Understand the history, development and various applications of artificial intelligence.
- Familiarize with propositional and predicate logic and their roles in logic programming.
- Understand the programming language Prolog and write programs in declarative programming style.
- Learn the knowledge representation and reasoning techniques in rule-based systems, case-based systems, and model-based system.
- Learn to evaluate the effectiveness of hybridization of different artificial intelligence techniques.

• Have read and analyzed important historical and current trends addressing artificial intelligence.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### <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.

#### <u>UNIT-III</u>

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.

#### <u>UNIT - IV</u>

**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.

## **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) 3. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.
- 4) PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition Pearson Education

## **MASTER OF COMPUTER APPLICATION**

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## (F0040194) DATA ANALYTICS AND BIG DATA

(ELECTIVE - IV)

#### **COURSE OBJECTIVES:**

- Understand the Big Data Platform and its Use cases
- Provide an overview of Apache Hadoop
- Provide HDFS Concepts and Interfacing with HDFS
- Understand Map Reduce Jobs
- Provide hands on Hodoop Eco System
- Apply analytics on Structured, Unstructured Data.

#### **COURSE OUTCOMES:**

The students will be able to:

- Identify Big Data and its Business Implications.
- List the components of Hadoop and Hadoop Eco-System
- ✤ Access and Process Data on Distributed File System
- Manage Job Execution in Hadoop Environment
- Develop Big Data Solutions using Hadoop Eco System
- Apply Machine Learning Techniques using R.

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

**Pre- requisites**: Should have knowledge of one Programming Language (Java preferably), Practice of SQL (queries and sub queries), exposure to Linux Environment.

#### <u>UNIT I</u>

**INTRODUCTION TO BIG DATA AND HADOOP** Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere BigInsights and Big Sheets.

#### <u>UNIT II</u>

**HDFS**(Hadoop Distributed File System) The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

#### <u>UNIT III</u>

**MAP REDUCE:** Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

#### UNIT IV

**HADOOP ECO SYSTEM PIG**: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators.

#### <u>UNIT V</u>

**HIVE**: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase: HBasics, Concepts, Clients, Example, Hbase versus RDBMS. Big SQL: Introduction

#### UNIT VI

**DATA ANALYTICS WITH R MACHINE LEARNING**: Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with BigR.

#### TEXT BOOKS

- 1) Tom White "Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
- 2) Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

- 1) Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
- 2) Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
- Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
- 4) Anand Rajaraman and Jef rey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
- 5) Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
- 6) Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
- 7) Pete Warden, "Big Data Glossary", O'Reily, 2011.
- 8) Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
- 9) ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012

## **MASTER OF COMPUTER APPLICATION**

II Year, II-Sem (MCA)

P C 3 1.5

#### (F0041194) WEB TECHNOLOGIES LAB

#### **COURSE OBJECTIVE:**

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

## COURSE OUTCOMES:

\*

#### Mapping of COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

#### HARDWARE AND SOFTWARE REQUIRED:

- 1. A working computer system with either Windows or Linux
- 2. A web browser either IE or firefox
- 3. Tomcat web server and Apache web server
- 4. XML editor like Altova Xml-spy [www.Altova.com/XMLSpy free ], Stylusstudio, etc.,
- 5. A database either Mysql or Oracle
- 6. JVM(Java virtual machine) must be installed on your system
- 7. BDK(Bean development kit) must be also be installed

#### 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 Si	te Name	
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL		Description of	f the Web Site	

Fig 1.1

#### 2) LOGIN PAGE:

This page looks like below:

Logo		Web Site	e Name	
Home	Login	Registration	Catalogue	Cart

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CSE	Login : Password:		
ECE EEE CIVIL		Submi	Reset

## 3) CATOLOGUE PAGE:

1

1

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:

- a) Snap shot of Cover Page.
- b) Author Name.
- c) Publisher.
- d) Price.
- e) Add to cart button.

Logo		Web Site Na	me	
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	X ML Bible	Book : XML Bible Author : Winston Publication : Wiely	\$ 40.5	Add to cart
	Activities in the second	Book : AI Author : S.Russel Publication : Princeton hall	\$ 63	Add to cart
		Book : Java 2 Author : Watson Publication : BPB publications	\$ 35.5	Add to cart
	HTML 4	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 Ca			alogue	Cart
CSE ECE EEE	<b>Book name</b> Java 2 XML bible	<b>Price</b> \$35.5 \$40.5	Quanti 2 1	ty	<b>Amount</b> \$70 \$40.	5
CIVIL			Total am	ount	\$130.5	

## 5) **REGISTRATION PAGE:**

Create a "registration form "with the following fields

- a) Name (Text field)
- b) Password (password field)

- c) E-mail id (text field)
- d) Phone number (text field)
- e) Sex (radio button)
- f) Date of birth (3 select boxes)
- g) Languages known (check boxes English, Telugu, Hindi, Tamil)
- h) Address (text area)

## <u>WEEK 3:</u>

## 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:

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:
-----	----------

<html></html>
<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>
<b>This is normal bold</b>
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>
<b></b>
<a class="xlink" href="mypage.htm">CROSS LINK</a>
<a class="hlink" href="mypage.htm">HELP LINK</a>
  class="headline">This is headline style bold

#### 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
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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; zindex:1">LAYER 2</div>

LAYER 2 ON TOP:

<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div> <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>
<b></b>
<a class="xlink" href="mypage.htm">CROSS LINK</a>
<a class="hlink" href="mypage.htm">HELP LINK</a>

#### Week-5:

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

- 1) Title of the book
- 2) Author Name
- 3) ISBN number
- 4) Publisher name
- 5) Edition
- 6) 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

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# Week-6:

#### **VISUAL BEANS:**

Create a simple visual bean with a area filled with a color.

The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false.

The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window ".

Week-7:

- Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.
- Access the above developed static web pages for books web site, using these servers by putting the web
  pages developed in week-1 and week-2 in the document root. Access the pages by using the urls :
  http://localhost:4040/rama/books.html (for tomcat)

http://localhost:8080/books.html (for Apache)

#### <u>Week-8:</u>

#### User Authentication :

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following.

- 1) Create a Cookie and add these four user id's and passwords to this Cookie.
- 2) Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display "You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

#### Week-9:

Install a database(Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Practice 'JDBC' connectivity.

Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

#### Week-10:

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

#### Week-11:

Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount )) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

#### Week-12:

**HTTP** is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()).

Modify your catalogue and cart JSP pages to achieve the above mentioned functionality using sessions.

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P C 3 1.5

# (F0042194) CASE TOOLS LAB

- The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.
- 2) Student has to take up another case study of his/her own interest and do the same what ever mentioned in first problem. Some of the ideas regarding case studies are given in reference books which were mentioned in theory syllabus can be referred for some idea.

**Note :** The analysis, design, coding, documentation, database design of mini project which will be carried out in 4th year should be done in object-oriented approach using UML and by using appropriate software which supports UML, otherwise the mini project will not be evaluated.

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P C 3 1.5

### (F0043194) SOFTWARE TESTING TOOLS LAB

# **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.
- Understand the need of automated testing tools and various kinds of automated testing tools.

# **COURSE OUTCOMES:**

The main learning outcomes are:

- To understand the control structure of C program, analyse test cases that are required to test it.
- To design and conduct Manual Test Cases for a software testing project.
- To understand the need of automation and analyse the functional test tools.
- ✤ To analyse test strategies and methods to perform functional testing.
- To analyse the comparative study of Various Testing Techniques, and Tools.
- ✤ To apply software testing tool to support test automation.

#### **Mapping of COs & POs:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

# **LAB EXPERIMENTS:**

- 1) Write programs in 'C' Language to demonstrate the working of the following constructs:
- 2) i) do...while
  - ii) while....do
  - iii) if...else
  - iv) switch
  - v) for
- 3) "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.
- 4) Write manual test cases for Gmail application.
- 5) Write manual test cases for ATM application.
- 6) Write manual test cases for banking application.
- 7) Study of Quick Test Professional(QTP):
- 8) Overview of QTP Components.
- 9) Record & Run Options.
- 10) Generating Basic Script.
- 11) Enhancement of Script.
- 12) Check Points.
- 13) Output Values.
- 14) Object Repository.
- 15) Writing Script manually.
- 16) Study of Rational Functional Tester(RFT).
- 17) Study of SELENIUM.

#### **REFERENCES:**

1) Software testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.