ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES
RAJAMPET

(An Autonomous Institution)

ACADEMIC REGULATIONS (R19), COURSE STRUCTURE AND SYLLABI

For the students admitted to

M.C.A., Regular Three / Two Year Degree Programme from the Academic Year 2019-20

VISION AND MISSION OF THE INSTITUTION

Vision

We impart futuristic technical education and instil high patterns of discipline through our dedicated staff who set global standards, making our students technologically superior and ethically strong, who in turn shall improve the quality of life of the human race.

Mission

Our mission is to educate students from the local and rural areas and from other states so that they become enlightened individuals, improving the living standards of their families, industry and society. We provide individual attention, world-class quality of Technical education and take care of character building.

ACADEMIC RULES AND REGULATIONS OF THREE / TWO -YEAR M.C.A REGULAR DEGREE PROGRAMME

APPLICABLE FOR THE STUDENT BATCHES ADMITTED FROM THE ACADEMIC YEAR 2019-20

CONTENTS

1. PREAMBLE

Annamacharya Institute of Technology and Sciences (Autonomous), Rajampet, relentlessly aims to achieve academic excellence by implementing new initiatives in teaching-learning and evaluation processes. Based on the directions of the University Grants Commission (UGC), New Delhi, All India Council for Technical Education (AICTE), New Delhi and Jawaharlal Nehru Technological University Anantapur (JNTUA) Anantapuramu, the institute is developed the curriculum for Master of Computer Applications (MCA) Course to match the needs, expectations, and skillsets of students of the region, in the post-graduate programme offered from the academic year 2019-20.

2. APPLICATION AND COMMENCEMENT

- The regulations are quite comprehensive and include definitions of key terms, semester system, credit system, grading system and other relevant details.
- The regulations detailed herein shall apply to all the regular post-graduate programme offered by the Institute.
- The regulations shall be applicable and come into force to the student batches admitted from the academic year 2019-20
- The Institute may revise, amend or change the regulations, scheme of examinations and syllabi, from time to time, if found necessary and on approval by the Academic Council of the Institute, keeping the recommendations of the Board of Studies in view.
- Any or all such amendments shall be effective from such date and to such batches of students including those already undergoing the programme, as may be approved through Academic Council of the Institute.
- These regulations shall be called R19 Regulations.

3. PROGRAMMES OFFERED BY THE INSTITUTE

The following M.C.A programmes are offered by the Institute from 2019-2020.

SNo	Name of the Program	Programme Code
1	Master of Computer Applications (3 Year Degree) (Regular Entry Scheme)	1F
2	Master of Computer Applications (2 Year Degree) (Lateral Entry Scheme)	5F

4. ELIGIBILITY FOR ADMISSION

The eligibility criteria for admission into the MCA Post Graduate programme offered at AITS shall be as prescribed by the Government of Andhra Pradesh. The criteria are given below:

- Admission to the above programmes shall be made subject to the eligibility and qualifications as prescribed from time to time.

- **Regular Entry Scheme**: Candidates for admission to the first semester of the Six semester MCA degree programme must have a B.C.A / B.Sc / B.Com Degree with Mathematics as one of the subject at 10+2 level or at graduation level.
- **Lateral Entry Scheme**: Candidates with the following qualifications are directly admitted to the Third semester of the six semester MCA Programme.
    - Any undergraduate science or applied science degree of three years duration in computer applications or computer science or information technology or other computer related areas.
- Admissions shall be made on the basis of Rank earned by the candidate in the relevant ICET examination / merit rank obtained by the qualifying candidate in the entrance test (ICET) conducted by the Government of Andhra Pradesh for MCA & MBA programmes or as decided by APSCHE subject to the reservations as prescribed by the university / State Government / on the basis of any other order of merit as decided by APSCHE from time to time
- Seats in each programme in the Institute are classified into two categories i.e., **Category – A** and **Category – B** as per the GOs of Andhra Pradesh.

Category – A Seats

These seats shall be filled through counselling as per the rank secured by a candidate in the Common Entrance Test (ICET) conducted by the Government of Andhra Pradesh and as per other admission criteria laid down in the GOs.

Category – B Seats

These seats shall be filled by the Institute as per the GOs issued by the Government of Andhra Pradesh from time to time

5. MEDIUM OF INSTRUCTION

The medium of instruction shall be **English** for all the courses including their content delivery and examinations, seminars, presentations and project evaluation as prescribed in the programme curriculum.

6. M.C.A PROGRAMME STRUCTURE

The structure of the M.C.A Programme on offer at AITS are based on the **Choice Based Credit System (CBCS)** as defined by the UGC and the curriculum / course structure in line with AICTE.

Semester Scheme

- The **M.C.A** Programme offered at AITS follow **semester scheme** pattern.
- The duration of a **M.C.A** Programme shall be of 3/2 **academic** years**.**
- Each academic year shall have **2 semesters** i.e., odd and even semesters and shall be counted as first semester, second semester, and so on up to six semester.

- Each semester shall consist of **16 weeks** of academic work excluding internal examinations.
- Each semester is structured to provide credits totalling to **148 credits** for the entire M.C.A. Programme.
- Each semester shall have **Continuous Internal Evaluation (CIE)** and **Semester End Examination (SEE)** for both Theory and Lab courses.
- A student after securing admission into a 3 / 2 year M.C.A Programme at AITS shall pursue and acquire the M.C.A. Degree in a **minimum period of Three / Two academic years i.e., 6 / 4 semesters** and a **maximum period of Six / Four academic years i.e., 12 / 8 semesters** starting from the date of commencement of I year I semester, failing which the student shall forfeit the seat in **M.C.A**. Programme.

7. COURSES AND CREDIT STRUCTURE

Credit: A credit is a unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work/project per week.

Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

Choice Based Credit System (CBCS): CBCS provides choice for students to select from the prescribed courses.

Each course is assigned certain number of credits based on following criterion

Type of Class	Semester	
	Periods per Week	Credits
Theory (Lecture/Tutorial)	01	01
	02	02
	03	03
	04	04
Practical	02	01
	03	1.5
	04	02
Project Work	-	12

Every course of the M.C.A. programme shall be offered by a specific section / department. The unique codes of the section / department offering the courses are given in the Table.

Course offering Department	**Code**
Basic Science Courses	C
Humanities Courses	
Master of Computer Applications	F
Master of Business Administration	E

M.C.A Programme of study shall be designed to have theory and laboratory courses. In addition, a student shall carry out project work and seminar courses as prescribed in the curriculum of the Programme.

7.1 Types of Courses

Type of courses	Course category	Code	Range of credits
Basic Sciences & Humanities courses	Humanities	HS	5
	Basic Sciences	BS	16
	Management	E	8
Core Courses	Professional Core	PC	89
	Professional Electives	PE	16
	Seminar		2
	Project work	PW	12
		Total Credits	148

7.1.1 Foundation Courses

Basic Science Courses and Humanities courses are termed as Foundation Courses and are mostly offered at I Year – I and II Semesters.

7.1.2 Professional Core Courses

Professional Core Course is to be completed by all students of respective programme before they can move on to the next semester.

7.1.3 Professional Core Electives

University Grants Commission has come up with the Choice Based Credit System (CBCS) in which the students have a choice to choose from the prescribed courses, which are referred as Professional elective courses.

Students have to register for a total of 4 professional core electives courses (PE-1 to PE-4) from the list of track-wise professional elective course as prescribed in the course structure of the programme. The following points are considered for a Professional Elective Course.

- The selection of course based on the choice for students shall be on 'first come first serve' through on line and off line registration.
- The Head of the department or concerned shall decide, whether or not to offer such course keeping in view the resources available in the department offering the course.

8. EVALUATION PROCESS

The performance of a student in each semester shall be evaluated course-wise with a maximum of 100 marks for both Theory and Lab Courses.

- For a Theory course, the distribution shall be 40 marks for Internal Evaluation and 60 marks for End-Examinations. The distribution is detailed in 8.1.1.
- For a Lab course, the distribution shall be 40 marks for Internal Evaluation and 60 marks End-Examinations. The distribution is detailed in 8.1.2
- For a seminar course shall be evaluated for 100 marks, the evaluation procedure is detailed in 8.1.3
- For the project work, the evaluation procedure is detailed in 9.0

8.1 Internal Evaluation

8.1.1 Theory Internal Examinations

For a Theory Course, 40 marks are allotted for Internal Evaluation. Two mid-term examinations (Theory Internal Examinations) shall be conducted for a Theory Course during a semester and they shall be evaluated for 40 marks. First midterm examination shall be conducted as per the syllabus of I & II units. The second midterm examination shall be conducted as per the syllabus of III, IV and V units.

The question paper shall be of subjective type in which four questions with an internal choice are to be answered. 80 % weightage for the best performance and 20 % for other shall be considered.

For Example:

Marks obtained in I mid-term examination: 19

Marks obtained in II mid-term examination: 10

Final Internal Marks: (19x0.8) + (10x0.2) = 17.2

If the student is absent for any one midterm examination, the final internal marks shall be arrived at by considering 80% weightage to the marks secured by the student in the appeared examination and zero to the other.

For Example:

Marks obtained in first mid: 0 (Absent); Marks obtained in second mid: 18

Final Internal Marks: (18x0.8) + (0x0.2) = 14.4

8.1.2 Laboratory Internal Examinations

For Lab Course, there shall be a continuous internal evaluation during the semester for 40 marks. Out of the 40 marks, day-to-day performance of the student in the laboratory shall be evaluated for 20 marks by the concerned laboratory teacher based on experimental correctness/record/viva. Two Lab Internal examinations shall be conducted for 20 marks by the concerned teacher. Performance of one best out of two tests to be considered.

8.1.3 Seminar

- A student shall present a seminar during the III year VI Semester of the M.C.A Programme
- A student under the supervision of a faculty member, shall collect literature on an allotted topic of his/her choice, critically review the literature, carry out the work and submit it to the department in a form of report as prescribed the Academic section and shall make an oral presentation before the Departmental Committee.
- Evaluation of the seminar shall consist of Continuous Internal Evaluation (CIE) shall be done by a Departmental Committee (DC) consisting of the Head of the Department, faculty supervisor and a senior faculty member of the department for a total of 100 marks.
- CIE shall be carried out for 40 marks on the basis of review presentation as per the academic calendar and evaluation format provided by Academic Section. Other 20 marks for Report writing, 20 marks for subject/topic and 20 marks for questions and answers.
- A student has to secure a minimum of 50 % marks to be declared successful.
- Prior to the submission of report to the DC for approval.
- The maximum number of seminar presentations is limited to TWO. After this, the student shall be deemed to secure 'Fail' grade in the seminar and shall re-register for it in the next semester.

8.2 External Evaluation

8.2.1 Theory End Examinations

As specified in 8.0, Theory End Evaluation is done for 60 marks. End examination of theory subjects shall be conducted at the end of semester. There shall be Regular and Supplementary End Examinations. Theory End Examination shall be conducted for 60 marks and is of 3 hours duration. The question paper shall be of subjective type with 5 questions, one question from each unit, with internal choice. All questions carry equal marks of 12 each.

8.2.2 Laboratory End Examinations

As specified in 8.0, Lab End Evaluation is done for 60 marks, in the form a Lab End Examination that shall be conducted for 3 hours in respective Laboratory. Each lab course will have its own evaluation procedure and weightage.

8.2.3 Supplementary Theory/Laboratory End Examinations

- Supplementary examination shall be conducted along with regular Semester End Examinations.
- During Semester End Examinations of even semester, supplementary examinations of odd semester shall be conducted and during semester end examinations of odd semester, supplementary examinations of even semester shall be conducted.
- The same schedule is applicable to Supplementary Lab End Examinations. Supplementary examination shall be conducted along with the next batch of students or separately.

- In case of seminars and comprehensive viva-voce examinations, supplementary seminar / comprehensive viva-voce will be conducted along with the next batch of students. If the next batch of students is not available, a separate supplementary examination will be conducted.

8.2.4 Revaluation and Recounting

Students may visit Examination Section Webpage for Norms and Procedures for Revaluation and Recounting of Answer Scripts.

- The students who wishes to apply for Revaluation/Recounting of his/her answer-books(s) must submit his/her application on the prescribed form together with the requisite fee to the Controller of Examinations before expiry of 15 days excluding the date of the declaration of his/her examination result. Application not received in the prescribed form or by the due date or without the requisite fee shall be rejected.
- After Recounting / Revaluation, records are updated with changes if any and the student will be issued a revised memorandum of marks. If there are no changes, the student shall be intimated the same through a notice.
- No Revaluation / Recounting for Laboratory Examination.
- The students are informed to be more careful in furnishing the information while applying for Recounting / Revaluation. The applications with insufficient information will be summarily rejected and the student has to forfeit the amount paid in this connection.

8.2.5 Challenge Evaluation

- Applications are invited from the students, who wish to apply for Challenge Valuation in the subjects of the M.C.A Regular and Supplementary examinations
- The student will apply for Challenge valuation in a specified application and should be routed through the HOD concerned.
- The students who have applied for the revaluation for a paper(s) of an examination are only eligible for the Challenge Valuation of that paper(s) of that examination.
- A Fee of Rs. 10000/- (Ten Thousand Rupees Only) for each paper is to be paid within the last date for challenge valuation.
- A Xerox copy of the answer script will be provided to the student on receipt of the payment of fee and date and time of the valuation will be informed to the student, so that valuation will be done in the presence of the teacher attended in support of the student nominated by the HOD concerned.
- The HOD concerned will nominate a teacher of the concerned subject to observe the valuation in support of the student. This will be done on the request of the student.

- If the marks obtained in the challenge valuation are more than or equal to 15% of the maximum marks with respect to the original marks obtained in the first valuation, then the marks obtained in the Challenge valuation will be awarded to the student and the institute will pay back Rs 9,000 (Nine thousands rupees only) to the student. If the student status changes from fail to pass, an amount of Rs. 5000 will be refunded to the student. Otherwise there will not be any change in the result of the student and original marks will be retained and the student will forfeit the fee paid.
- No Challenge valuation for Laboratory Examination

9.0 PROJECT EVALUATION

Every student shall be required to submit thesis/dissertation after taking up a topic approved by the Departmental Committee

- The Departmental Committee (DC) consisting of HOD, Project supervisor and two internal senior experts shall monitor the progress of the project work. A Project Review Committee (PRC) shall be constituted with Principal as a Chair person, Heads of the Departments of the program and two other senior faculty members, as members of PRC. PRC will come into action when DC is not able to resolve the issues.
- Registration of project work: A student is permitted to register for the project work after satisfying the attendance requirements of all the courses (theory, practical and seminars)
- After satisfying above point, a student has to submit in consultation with his supervisor, the title, objective plan of action of his project work to the DC for approval. Only after obtaining the approval of DC, the student can initiate the project work
- The work on the project shall be initiated in the penultimate semester and continued in the final semester. The student can submit project thesis with the approval of DC after 16 weeks from the date of registration at the earliest but not later than 6 Months from the date of registration for the project work. Extension of time within the total permissible limit for completing the programme is to be obtained from the Head of the Institute
- The internal evaluation shall be made by the DC to grade, on the basis of two seminars presented by the student on the topic of his project.
- The student must submit the status of thesis/dissertation only after passing all the prescribed subjects such as theory, practical's, seminar and project internal evaluation
- A Student has to prepare four copies of the thesis/dissertation certified in the prescribed format by the supervisor and HOD. Out of which three copies shall be submitted in the examination section.
- Viva Voce examination shall be conducted by a board consisting of the supervisor, Head of the

department and the External examiner. The Board shall jointly report student work as:

A- Excellent
B- Very Good
C- Good
D- Satisfactory
E- Not Satisfactory

Head of the Department shall coordinate and make arrangements for the conduct of viva-voce.

- If the report of the viva-voce is failure, the student will retake the viva-voce examination after three months. If he/she fails to get a satisfactory report at the second viva-voce examination, he/she will not be eligible for the award of the degree.

10. ATTENDANCE REQUIREMENTS AND DETENTION POLICY

- A student shall maintain a minimum required attendance of 75% in AGGREGATE.
- Shortage of attendance up to 10% i.e., attendance between 65% to 75% in aggregate, may be condoned by the Institute Academic Committee based on the rules prescribed by the Academic Council of the Institute from time to time.
- A stipulated fee shall be payable towards condonation of shortage of attendance.
- Shortage of attendance below 65 % shall in no case be condoned. A stipulated fee shall be payable towards condonation of shortage of attendance to the Institute as per following slab system

  1st Slab: Less than 75% attendance but equal to or greater than 70% a normal condonation fee can be collected from the student.

  2nd Slab: Less than 70% but equal to or greater than 65%, double the condonation fee can be collected from the student.

- Students whose shortage of attendance is not condoned OR who have not paid the stipulated fee OR who have not cleared any other due to the Institute in any semester are not eligible to write the Semester End Examination (SEE).
- Students, who do not meet the minimum required attendance of 65% in a semester, shall be detained in that semester and their registration for that semester shall stand cancelled. They shall not be promoted to the next semester.
- Students detained in a semester shall seek re-admission into that semester as and when offered.
- Academic regulations applicable to the semester in which re-admission is sought shall be applicable to the re-admitted student.
- In case, there are any professional electives and / or the same may also be re- registered, if offered. However, if those electives are not offered in the later semesters, then alternate electives may be chosen from the same set of elective courses offered under that category.

Any student against whom any disciplinary action is pending shall not be permitted to attend semester end examination (SEE) in that semester.

11. Minimum Academic Requirements and Award of the Degree

The following Academic Requirements have to be satisfied in addition to the attendance requirements mentioned in section 10.

11.1 A student shall be deemed to have satisfied the minimum academic requirements and earn the credits for each theory , practical and seminar, if he secures

- A minimum of 40 % marks for each theory course in the Semester End Examination (SEE), and
- A minimum of 50 % marks for each theory course considering both CIE and SEE taken together.

11.2 A student shall be deemed to have satisfied the minimum academic requirements and earn the credits allotted to seminar courses, if he secures

- A minimum of 50 % marks for a seminar in the Continuous Internal Evaluation (CIE)

11.3 A student shall be treated as failed, if he

- Does not submit a report of a seminar OR
- Does not make a presentation of the same before the evaluation committee as per the schedule, or
- Secures less than 50 % marks in evaluation.

11.4 If a student fails to secure a pass grade in a particular course, it is mandatory that he shall register and re-appear for the examination in that course during the next semester when SEE is conducted in that course. It is mandatory that he should continue to register and re-appear for the examination till he secures a pass grade.

11.5 A student detained in a SEMESTER due to shortage of attendance, may be re-admitted when the same semester in the next academic year for fulfillment of academic requirements.

11.6 Academic regulations applicable to the semester in which re-admission is sought shall be applicable to the re-admitted student.

11.7 A student shall be given one chance to re-register, after completion of the course work, for each course, provided the internal marks (CIE) secured by a student are less than 50% and he has failed in the SEE. In such a case, a student may re-register for the course(s) with prior permission and secure the minimum required attendance. Attendance in the re-registered course(s) shall be calculated separately to become eligible to write the semester end examination (SEE) in the re-registered course(s).

11.8 Re-registration is allowed only in those cases where the student doesn't have any course(s) yet to pass other than the re-registration course(s) where the CIE marks are less than 50%. However, in the case of re-registration of course(s) by a student, academic regulations applicable at the time of student admission in the programme shall be applicable.

11.9 In the event of re-registration, the internal evaluation marks as well as the End Semester Examinations marks secured in the previous attempt (s) for those subjects stand cancelled.

11.10 For each subject re-registered, the student has to pay a fee equivalent to one third of the semester tuition fee

11.11 A student shall register and put up minimum academic requirement of all 148 credits and earn all 148 credits for the award of M.C.A Degree

11.12 Students who fail to earn 148 credits as indicated in the course structure within six/four academic years from the year of their admission shall forfeit their seat in M.C.A course and their admission shall stand cancelled.

12. SEMESTER GRADE POINT AVERAGE (SGPA) AND CUMULATIVE GRADE POINT AVERAGE (CGPA)

The performances of students in each of the courses in the Programme are expressed in terms of letter grades based on an absolute grading system. We use 10-point grading system with letter grades. They are given in the following table.

Marks Obtained	Letter Grade	Description	Grade Points (GP)
≥90	S	Superior	10
≥80 and ≤89.99	E	Excellent	9
≥70 and ≤79.99	A	Very Good	8
≥60 and ≤69.99	B	Good	7
≥50 and ≤59.99	C	Average	6
≥40 and ≤49.99	D	Pass	5
≤40	F	Fail	--
Absent in the exam(s)	AB	Absent	--

A student is eligible for the award of the M.C.A. Degree with the class as mentioned in the following table

CGPA	Class
≥7.5	First class with Distinction
≥6.5 and <7.5	First Class
≥5.5 and <6.5	Second Class
≥5.0 and <5.5	Pass

12.1 Computation of SGPA

The performance of each student at the end of each semester shall be indicated in terms of SGPA. The SGPA shall be calculated as follows:

$$SGPA = \frac{Total\ earned\ weighted\ grade\ points\ in\ a\ semester}{Total\ credits\ in\ a\ semester}$$

$$SGPA = \frac{\sum_{i=1}^{p} C_{i.}.G_i}{\sum_{i=1}^{p} C_i}$$

Where

$C_{i.}$ = Number of credits allotted to a particular course 'i'

G_i= Grade point corresponding to the letter grade awarded to the course i

$i = 1,2,\ldots.p$ represent the number of courses in a particular semester.

Note: SGPA is calculated and awarded to those students who pass all the courses in a semester.

12.2 Computation of CGPA

The performance of a student shall be obtained by calculating Cumulative Grade Point Average (CGPA), which is weighted average of the grade points obtained on all courses during the course of study

$$CGPA = \frac{Total\ earned\ weighted\ grade\ points\ for\ the\ entire\ programme}{Total\ credits\ for\ the\ entire\ program}$$

$$CGPA = \frac{\sum_{j=1}^{m} C_{j.}.G_j}{\sum_{j=1}^{m} C_j}$$

Where

$C_{j.}$ = Number of credits allotted to a particular semester 'j'

G_j = Grade point corresponding to the letter grade awarded to the semester j

$j = 1,2,\ldots.m$ represent the number of semester of the entire programme.

12.3 Grade Card

The grade card issued shall contain the following

- The credits for each course offered in that semester
- The letter grade and grade point awarded in each course
- The SGPA and CGPA
- Total number of credits earned by the student up to the end of that semester

Example: - Computation /calculation of SGPA

Course name	Credits (C)	Letter grade	Grade point (GP)	Credit point (CP=C*GP)
Course 1	4	A	9	4x9=36
Course 2	3	S	10	3*10=30
Course 3	2.5	S	10	2.5*10=25
Course 4	1.5	C	6	1.5*6=9
Course 5	1	D	5	1*5=5
Total	12			105

Therefore, SGPA= $\frac{105}{12}$ 8.75

Example Illustration of CGPA

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5
Credit: 20 SGPA : 8.75	Credit : 20 SGPA : 8.25	Credit : 22 SGPA : 7.89	Credit: 23 SGPA : 8.21	Credit : 22 SGPA : 7.86

Thus, CGPA = $\frac{20*8.75+20*8.75+22*7.89+23*8.21+22*7.86}{107} = 8.34$

Similarly, compute CGPA obtained at the end of 6th semester shall be the final CGPA secured by the student for the entire programme.

12.4 Conversion of SGPA into percentage

In case of a specific query by students/employers regarding Semester Grade Point Average (SGPA)/ Cumulative Grade Point Average (CGPA) into percentage, the following formulae will be adopted for notional conversion of CGPA into percentage.

Percentage = 9.5 * CGPA

13. TRANSCRIPTS

After successful completion of the entire programme 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 payment of requisite fee. Partial transcript will also be issued up to any point of study to a student on request.

14. TRANSITORY REGULATIONS

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 11 and they will follow the academic regulations into which they are readmitted. Students who are permitted to avail gap year shall be eligible

for re-joining into the succeeding year of their M.C.A from the date of commencement of class work, subject to Section 11 and they will follow the academic regulations into which they are readmitted.

15. MINIMUM INSTRUCTION DAYS FOR A SEMESTER

The minimum instruction days for each semester shall be 16 weeks.

16. STUDENT TRANSFERS

Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh and the affiliating University from time to time.

17. ANNOUNCEMENT OF RESULTS

- Results review committee comprising of University nominee, Principal, Dean Academics, Chairman of various boards of studies, Controller of Examinations and Deputy Controller of Examinations will monitor the results and gives the permission for announcement of results.
- After review meeting results are loaded in to Institution website from which students can access their results by entering Hall Ticket number. And also results in form of hard copy are available with respective Heads of the departments.

18. GENERAL INSTRUCTIONS:

- The academic regulations should be read as a whole for purpose of any interpretation.
- Malpractices rules-nature and punishments are appended.
- Where the words "he", "him", "his", occur in the regulations, they also include "she", "her", "hers", respectively.
- In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal / Governing body is final.
- Any legal issues are to be resolved in Rajampet Jurisdiction.
- The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Institute.

APPENDIX I: Rules for Disciplinary Action for Malpractices / Improper Conduct in Examinations

Malpractices identified by squad or special invigilators or invigilators

Punishments shall be given to the students as per the above guidelines. The case is to be referred to the malpractice committee.

Malpractice committee

1. The Principal, Chairman
2. Dean, Academics, Member
3. Invigilator, Member
4. Subject expert, Member
5. Concerned Head of the Department, Member
6. Controller of Examinations, Member Secretary

Note:

Whenever the performance of a student is cancelled in any subject/subjects due to Malpractice, he has to register for End Examinations in that subject/subjects consequently and has to fill all the norms required for the award of Degree.

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all University examinations, if his involvement is established. Otherwise, the candidate is debarred for two consecutive semesters from class work and all University examinations.

		The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject only.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant — Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of student of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. If the candidate physically assaults the invigilator/officer-in-charge of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits

		the seat.
9.	If students of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in nay malpractice or improper conduct mentioned in class 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person (s) who does not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject only or in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations, depending on the recommendation of the committee.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 12 shall be reported to the University for further action to award suitable punishment.	

DEPARTMENT OF COMPUTER APPLICATIONS

VISION AND MISSION OF THE DEPARTMENT

Vision

To become globally prominent and significant in the areas of academics and research keeping the aim of developing competitive professionals to serve the society and to light on the needs of ever changing software industry.

Mission

- To enable the students to be knowledgeable and creative by developing state-of-the-art curriculum through innovative teaching methodologies.
- Providing training programs that bridges the gap between academia and industry to produce competitive software professionals.
- To inculcate values and ethics in the students enabling them to become socially committed professionals.
- To enhance the research quality and productivity, by providing required facilities and industry collaboration.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Practice software engineering principles and standards to develop software to meet customer requirements across verticals.

PEO2: Contribute to build sustainable and inclusive applications using mathematical, simulation and meta-heuristic models.

PEO3: Demonstrate entrepreneurial qualities through individual competence and team work.

PEO4: Achieve successful professional career with integrity and societal commitments leading to lifelong learning.

PROGRAMME OUTCOMES (POs)

1. **Computational Knowledge:** Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.
2. **Problem Analysis:** Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.
3. **Design /Development of Solutions:** Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4. **Conduct Investigations of Complex Computing Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern Tool Usage**: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.
6. **Professional Ethics:** Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.
7. **Life-long Learning:** Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.
8. **Project management and finance:** Demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
9. **Communication Efficacy**: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
10. **Societal and Environmental Concern:** Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.
11. **Individual and Team Work:** Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
12. **Innovation and Entrepreneurship:** Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Solve real world computing system problems of various industries by understanding and applying the principles of mathematics, computing techniques and business concepts.

PSO2: Design, test, develop and maintain desktop, web, mobile and cross platform software applications using modern tools and technologies.

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MCA COURSE STRUCTURE

Regulations: R19 Program Code: 1F & 5F

First Semester MCA

Course Code	Course Title	Hrs. Per week			C
		L	T	P	
19DF11T	Mathematical Foundations of Computer Science	4	0	0	4
19DF12T	Problem solving with 'C'	4	0	0	4
19DC11T	Probability and Statistics	4	0	0	4
19DC12T	Technical Communication	4	0	0	4
19DE11T	Accounting and Financial Management	4	0	0	4
19DF12L	C Programming Lab	0	0	3	1.5
19DC12L	English Language Communication Skills Lab	0	0	2	1
19DF13L	Information & Communication Technology Lab	0	0	3	1.5
	Total	20	0	9	24

Second Semester MCA

Course Code	Course Title	Hrs. Per week			C
		L	T	P	
19DF21T	Database Management Systems	4	0	0	4
19DF22T	Java Programming	4	0	0	4
19DF23T	Data Structures	4	0	0	4
19DF24T	Organization Structure & Personnel Management	4	0	0	4
19DF25T	Operations Research	4	0	0	4
19DC21T	Numerical Methods	4	0	0	4
19DF21L	DBMS Lab	0	0	3	1.5
19DF22L	Java Programming Lab	0	0	3	1.5
19DF23L	Data Structures Lab	0	0	3	1.5
Total		24	0	9	28.5

Note: L- Lecture; T- Tutorials; P-Practical; C – Credits

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MCA COURSE STRUCTURE

Regulations: R19 Program Code: 1F & 5F

Third Semester MCA

Course Code	Course Title	Hrs. Per week			C
		L	T	P	
19DF31T	Operating Systems	4	0	0	4
19DF32T	Computer Networks	4	0	0	4
19DF33T	PHP with MYSQL	4	0	0	4
19DF34T	Advanced Java for Web Technologies	4	0	0	4
19DF35T	Design & Analysis of Algorithms	4	0	0	4
19DF36T	Computer Organization	4	0	0	4
19DF31L	Operating Systems Lab	0	0	3	1.5
19DF33L	PHP with MYSQLLab	0	0	3	1.5
19DF34L	Advanced Java for Web Technologies Lab	0	0	3	1.5
Total		24	0	9	28.5

Fourth Semester MCA

Course Code	Course Title	Hrs. Per week			C
		L	T	P	
19DF41T	Software Engineering	4	0	0	4
19DF42T	Unix & Network Programming	4	0	0	4
19DF43T	Python Programming	4	0	0	4
19DF44T	Data Warehousing & Data Mining	4	0	0	4
	Elective I	4	0	0	4
	Elective II	4	0	0	4
19DF42L	Unix & Network Programming Lab	0	0	3	1.5
19DF43L	Python Programming Lab	0	0	3	1.5
19DF44L	Knowledge Engineering Lab	0	0	3	1.5
Total		24		9	28.5

Elective I		Elective II	
Course Code	**Course Title**	**Course Code**	**Course Title**
19DF4AT	Big Data	19DF4DT	Cloud Computing
19DF4BT	Distributed Databases	19DF4ET	Artificial Intelligence
19DF4CT	Data Science	19DF4FT	Machine Learning

Note: L- Lecture; T- Tutorials; P-Practical; C – Credits

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MCA COURSE STRUCTURE

Fifth Semester MCA

Course Code	Course Title	Hrs. Per week			C
		L	T	P	
19DF51T	Mobile Application Development	4	0	0	4
19DF52T	.Net Technologies	4	0	0	4
19DF53T	Object Oriented Modeling and Design with UML	4	0	0	4
	Elective III	4	0	0	4
	Elective IV	4	0	0	4
19DF51L	Mobile Application Development Lab	0	0	3	1.5
19DF52L	.Net Technologies Lab	0	0	3	1.5
19DF53L	UML Lab	0	0	3	1.5
Total		20	0	9	24.5

Elective III		Elective IV	
Course Code	**Course Title**	**Course Code**	**Course Title**
19DF5AT	Internet of Things	19DF5DT	Software Testing Methodologies
19DF5BT	Information Security	19DF5ET	IT Service Management
19DF5CT	Business Analytics	19DF5FT	Software Project Management

Sixth Semester MCA

Code	Course Title	C
19DF61S	Seminar	2
19DF62P	Project Thesis / Dissertation	12

Note: L- Lecture; T- Tutorials; P-Practical; C – Credits

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First Semester MCA

19DF11T -MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

COURSE OBJECTIVES

- Fundamental concepts and tools in discrete mathematics with emphasis on their applications to computer science.
- Topics include logic and Boolean circuits; sets, functions, relations, databases, and analysis techniques based on counting methods and recurrence equations; trees and more general graphs.

UNIT-I

MATHEMATICAL LOGIC: Statements and Notations, Connectives: AND, OR, Conditional, Bi-conditional, Negation, Truth Tables, Tautology, Contradiction, Well-formed Formulas, Logical Equivalence, Equivalence Implication, Normal Forms, **PREDICATES:** Predicative Logic, Quantifiers, Universal Quantifiers, Free & Bound Variables, Rules of Inference, Consistency, Proof of Contradiction.

UNIT-II

RELATIONS:

Operations on Relations, Properties of Binary Relations, Equivalence, Compatibility and Partial Ordering Relations, Lattices and its Properties, Hasse Diagram, Transitive Closure, Representing Relations, Diagraph of POSET

UNIT-III

ELEMENTARY COMBINATORICS: Basics of Counting, Enumerating Combinations & Permutations with Repetitions, Constrained Repetitions, Binomial Coefficients, Binomial Multinomial Theorems, The Principle of Inclusion – Exclusion, Pigeon-Hole Principles and its Application.

UNIT-IV

RECURRENCE RELATIONS: Generating Functions & Sequences, Calculating Co-efficient of Generating Function, Homogeneous Recurrence Relations: First Order, Second Order, Third and Higher Order Recurrence Relations, In-homogeneous Recurrence Relations: First Order, Second and Higher Order.

UNIT-V

GRAPH THEORY APPLICATIONS: Representation of Graphs with Examples, Vertex, Degree, Sub Graph, Multi Graph, Simple Graph, Complete Graph, Bipartite Graph, Regular Graph, Digraph, Operations on Graphs, Euler Circuits, Hamiltonian Graphs, Chromatic Number, Planar Graphs, Trees, Spanning Trees: DFS, BFS, Minimal Spanning Trees: Prim's and Kruskal's Algorithms.

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists & Mathematicians, 2/e, J.L.Mott, A.Kandel, T.P. Baker, PHI, 2008.
2. Mathematical Foundations of Computer Science, D. Chandra Sekharaiah, Prism Books.

REFERENCE BOOKS:

1. Discrete Mathematical Structures with Application to Computer Science, Tremblay, Manohar. McGraw Hill Publication.
2. Elements of Discrete Mathematics – A computer oriented approach, C.L.Liu, D.P. Mahopatra, Third Edition, TMH.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Demonstrate the understanding of the fundamental concepts of discrete mathematical structures.	L3
2: Can able to understand the predicate logic to solve problems.	L2
3: Apply the knowledge and skills obtained to investigate and solve a variety of mathematical foundation problems.	L3
4: Analyze mathematical concepts like sets, reasoning, relational algebra and graph theory to solve the problems and optimize the solution.	L2
5**:** Justify the overall mathematical knowledge gained to interpret and analyze the problems in various fields.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF11T-1	3	2	-	1	1	-	1	-	-	-	-	-
19DF11T-2	3	2	1	2	-	-	1	-	-	-	-	-
19DF11T-3	3	2	1	3	-	-	1	-	-	-	-	-
19DF11T-4	3	3	1	3	1	-	1	-	-	-	-	-
19DF11T-5	3	1	2	-	2	-	1	-	-	-	-	-

Correlation Levels 1,2 or 3 as defined below:

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), if there is no correlation, put "-".

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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First Semester MCA

19DF12T-PROBLEM SOLVING WITH 'C'

COURSE OBJECTIVES

- To impart adequate knowledge on the need of programming languages and problem solving techniques.
- To develop programming skills using the fundamentals and basics of C Language.
- To enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.
- To teach the issues in file organization and the usage of file systems.

UNIT-I

Algorithms and Flowcharts: The meaning of algorithms, Flowcharts and their need, Writing algorithms and drawing flowcharts for simple exercises Data-types: Character set, C tokens, keywords & identifiers, structure of C program, executing a C program. constants, variables, data types, declaration of variables, declaration of storage classes, assigning values to variables defining symbolic constants, declaring a variable as constant, declaring a variable as volatile, **Overflow and Underflow of Data Operators and Expressions:** Arithmetic operators, relational operators, logical operators, assignment operator, increment and decrement operator, conditional operator, bitwise operators, comma operator, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, type conversions in expressions, operator precedence and associativity, mathematical functions.

UNIT-II

Managing Input and Output Operations: The scanf() and printf() functions for input and output operations, reading a character, writing a character, (the getchar() and putchar() functions) , the address operator(&), formatted input and output using format specifiers, Writing simple complete C programs. **Decision Making and Branching:** Decision making with if statement, simple if statement, the if-else statement, nesting of if-else statements, the else-if ladder, the switch statement, the ? operator, the go-to statement, the break statement, programming examples.

Decision Making and Looping: The while statement, do-while statement, for statement, nested loops, jumps in loops, continue statement, programming examples.

UNIT III

Arrays: The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading , writing and manipulation of above types of arrays, multidimensional arrays, dynamic arrays, programming examples. **Strings:** Declaring and Initializing string variables, reading string from terminal, writing string to screen, arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions, table of strings, other features of strings, programming examples.

UNIT IV

User Defined Functions: Need for user defined functions, a multi-function program, elements of User defined functions, defining functions, return values and their types, function calls, function declaration, category of functions, no arguments and no return values, arguments but no return values, arguments with return values, no arguments with return value, functions that return multiple values, nesting of functions, recursion, passing arrays to functions, passing string to functions, programming examples. **Structures and Unions:** Defining a structure, declaring structure variables, accessing structure members, structure

initialization, copying and comparing structure variables, operations on individual members, array of structures, structures within structures, structures and functions, Unions, programming examples.

UNIT V

Pointers and Dynamic Memory Allocation: Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, chain of pointers, pointer expressions, pointers and arrays, pointer and character strings, array of pointers, pointer as function arguments, functions returning pointers, pointers to functions, pointers and structures, programming examples. **Dynamic memory allocation:** Allocating a block of memory: **malloc,** allocating multiple blocks of memory**: calloc,** releasing the used space: Free, altering the size of a block: **realloc.**

File Management in C: Defining and opening a file, closing a file, input/ output operations on files, error handling during I/O operations, and random access files, command line arguments, programming examples

TEXT BOOKS:

1. Balagurusamy: Programming in ANSI C, 6th Edition, Tata McGraw Hill, 2010. Chapters: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.1 to13.6,14
2. V Rajaraman: Computer Programming in C, Prentice Hall India, 2000. Chapters: 1.1, 1.3, 2.1, 2.3, 3.1, 3.2, 3.3

REFERENCE BOOKS:

1. R G Dromey: How to solve it by Computer, Prentice-Hall India, 1982.
2. K R Venugopal, S R Prasad: Mastering C, Prasad, Tata McGraw Hill, 2006.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: To understand the basic terminology used in computer programming.	L3
2: To write, compile and debug programs in C and C++ language.	L2
3: To use different data types in a computer program.	L2
4**:** Design programs involving decision structures, loops and functions.	L3
5: Know the Pointers and File management concepts.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF12T -1	3	-	-	-	-	3	-	-	-	3	-	3
19DF12T -2	2	-	2	-	2	3	-	2	-	3	-	3
19DF12T -3	-	-	2	-	2	2	-	3	-	3	-	3
19DF12T -4	1	-	3	-	3	3	-	3	-	3	-	3
19DF12T -5	-	-	-	-	-	3	-	2	-	3	-	3

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First Semester MCA

19DC11T-PROBABILITY AND STATISTICS

COURSE OBJECTIVES

- To familiarize the students with foundations of probability and statistical methods.
- To impart probability concepts and statistical methods in various applications of Engineering.

UNIT-I

Probability: Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem. Random variables – Discrete and continuous – Distribution functions - mean and variance.

Unit-II

Binomial distribution –Poison distribution- Uniform distribution - Normal distribution.

Unit-III

Sampling distribution: Population and sample - Sampling distributions of means (σ known and unknown). Estimation: Point estimation – interval estimation - one mean –two means (large sample) and one proportion – two proportions (large sample).

Unit-IV

Test of Hypothesis concerning one and two means, one and two proportions, two variances and goodness of fit.

Unit-V

Queueing theory: Pure birth and death process,(M/M/1) model and simple problems

TEXT BOOKS:

1. Fundamentals of Mathematical Statistics, S C Gupta and V K Kapoor, Sultan schand& sons.
2. Queueing Theory (a linear algebraic approach), second edition,LesterLipsky, Spinger

REFERENCE BOOKS:

1. Probability, Statistic and Queueing Theory with Computer Science applications, 2nd edition,Ornald O. Allen, Academic press.
2. Probability & Statistics for Engineers (Miller and John E. Freund"s), Richard A Jhonson, seventh Edition,PHI.

EXPECTED COURSE OUTCOMES

Student's will be able to	Blooms Level of Learning
1:Understand the basic concepts of probability and random variables.	L2
2: Apply discrete and continuous probability distributions	L3
3: Understand the concepts of sampling distributions and theory of estimation.	L2
4:Test various hypothetical statements for large samples and provide the knowledge in testing the goodness of fit and decision making.	L4
5:Make use of the concept Queueing theory and its applications.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DC11T -1	3	3	-	-	-	-	-	-	-	-	-	3
19DC11T -2	3	3	-	-	-	-	-	-	-	-	-	2
19DC11T -3	3	3	-	-	-	-	-	-	-	-	-	3
19DC11T -4	3	3	-	-	-	-	-	-	-	-	-	3
19DC11T -5	3	2	-	-	-	-	-	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES:: RAJAMPET
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First semester MCA

19DC12T-TECHNICAL COMMUNICATION

COURSE OBJECTIVES

- To develop and create awareness regarding communication in organization.
- To know various key issues and strategies in developing soft ware
- To learn team working and attempt interviews successfully.
- To impart writing skills viz email writing, business letters

UNIT I:

Basics of Technical Communication – Introduction, Process of Communication, Language as a Tool, Levels of Communication, Communication Networks,

Active Listening : Introduction , Types of Listening , Traits of good Listener , Active versus Passive Listening , implications of effective listening ; Barriers to Communication : Definition of Noise, Classification of Barriers

UNIT II:

Technology in Communication : Impact of Technology , Transmitting Documents, Effective use of email .

The Importance of Non-Verbal Communication: Kinesics, Proxemics ,Paralinguistics and Chronemics.

Effective Presentation Strategies: Introduction, defining purpose , Analyzing Audience and Locale , Organizing Contents , Preparing outline , Usage of Visual Aids , Understanding Nuances of Delivery.

UNIT III:

Business Letters: Significance, Purpose, Structure, Layout and principles.

Types – Claim Letters, Adjustment Letters, Sales Letters and Job Application Letters.

Memos – Structure and Layout, Style and Samples,

E-mail – Style, Structure and Content, E-mail Etiquettes, Sample E-mail Messages, Effectiveness and Security.

UNIT IV:

Reports – Introduction, Objectives, Characteristics of a Report, Types of Reports, The importance of Reports, Formats, Structure of Reports, Writing the Report and Samples

UNIT V:

Group Communication: Introduction, Group Discussion, Organizational Group Discussion, Group discussion as part of selection process Meetings, conferences.

Interviews: Introduction, Objectives, Types of Interviews, Job Interviews, Resume Writing: Format and style, Sample Resume.

TEXT BOOKS:

1. Technical Communication , Principles and Practices, Meenakshi Raman and Sangeetha Sharma, Oxford University Press , 2004
2. Communication skills, Sanjay kumar ,PushapaLatha, oxford University Press, 2011

EXPECTED COURSE OUTCOMES

Student 's will be able to	**Blooms Level of Learning**
1. Demonstrate & practice different communication skills to overcome barriers at organizational level	L3
2. Send communication using electronic forms of communication	L2
3. Crack the interviews with sheer confidence.	L3
4. Write letters, Memos and E-mails for constructive official communication	L2
5. Send reports to acquire pragmatic results in the organization.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DC12T-1	-	-	-	-	-	-	-	-	-	3	-	3
19DC12T-2	-	-	-	-	-	-	-	-	-	3	-	3
19DC12T-3	-	-	-	-	-	-	-	-	-	3	-	3
19DC12T-4	-	-	-	-	-	-	-	-	-	3	-	3
19DC12T-5	-	-	-	-	-	-	-	-	-	3	-	3

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First Semester MCA

19DE11T-ACCOUNTING AND FINANCIAL MANAGEMENT

COURSE OBJECTIVES

- This course aims at introducing the basic accounting procedures and financial management processes. It also focuses on the computerized implementation of the various accounting principles discussed at different levels.
- It demonstrates an appropriate mastery of the knowledge, skills and tools of financial accounting principles and financial management concepts.
- This subject examines the design and operation of accounting systems and the course integrates ideas and concepts from accounting and financial information with a range of other disciplines.
- It is assumed that students have little prior knowledge of accounting and financial management.

UNIT I

INTRODUCTION TO ACCOUNTING: Principles, Concepts and Conventions, Basics of accounts, Double entry system of accounting, Classification of accounts and debit-credit rules. **Introduction to basic books of accounts:**Journal and Ledger – Trial balance –**Preparation of final accounts:**Trading account, Profit and Loss account and Balance sheet with adjustments (with simple illustrations)

UNIT II

BREAK EVEN ANALYSIS - Introduction, Definition, meaning and BEP analysis and BEP in units. Concept of Break Even Point, Cost-Volume-Profit Analysis, Determination of Break Even Point, Margin of Safety and P/V ratio, Practical applications of Break Even Analysis, Simple problems.

UNIT III

FINANCIAL ANALYSIS THROUGH RATIOS: Ratio Analysis meaning –advantages and disadvantages, Classification of ratios – Analysis and interpretation of financial statements through ratios of liquidity, Solvency and Profitability.

UNIT IV

INTRODUCTION TO FINANCIAL MANAGEMENT: Time value of money-Present Value of Money-Future Value of Money. Financial management Definition-scope, Objectives of financial management, Sources of finance.

UNIT V

CAPITAL BUDGETING: Features, Proposals, Methods of capital budgeting, Payback method, AccountingRate of Return (ARR), 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. Management Accounting: Theory and Practice, Pandikumar M.P 1st edition, Excel Books, 2007.
3. Financial Management, I.M.Pandey, Vikas Publications.
4. Financial Management, Prasanna Chandra, T.M.H, 2009.

REFERENCE BOOKS:

1. Financial Management and Policy, Van Horne, James.C. Pearson, 2009.
2. Management Accounting, Khan My, Jain P.K, 4th Edition, Tata McGraw Hill, 2007.
3. Financial Accounting, Tulsian, S Chand, 2009.
4. Financial Statement Analysis, Khan and Jain, PHI, 2009

EXPECTECD COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1. This course is to understand how businesses use accounting and financial information for decision-making purposes.	L2
2. Identifying the appropriate managerial and business issues critical to analyzing accounting data and other information used for identifying opportunities and risks, developing organizational plans, allocating and resources.	L1
3. Utilizing technology (Such as computers, Accounting Software , information database) to facilitate and enhance accounting and financial reporting processes.	L3
4. To analyze the fund management and allocation of fund to various sectors.	L4
5. To estimate long term assets for future business growth.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DE11T-1	3	-	-	-	-	3	-	-	-	3	-	-
19DE11T-2	2	-	-	-	2	-	1	-	-	-	-	3
19DE11T-3	-	-	2	-	-	-	-	3	-	-	-	-
19DE11T-4	1	-	3	-	-	-	1	-	-	3	-	-
19DE11T-5	-	-	-	-	-	3	-	2	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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First Semester MCA

19DF12L-C PROGRAMMING LAB

COURSE OBJECTIVES

- Understand the basic concepts of C programming.
- Practice the use of conditional and looping statements.
- Implement arrays, functions and pointers.
- Gain skills to handle strings and files.

EXERCISES:

1. Write a C program that implement the expression, typecasting statements in the presence of decision statements and loop statements.
2. Write a C program that implement one dimensional array operations on integer and float data values.
3. Write a C program that implement library function to perform various String operations.
4. Write a C program that implement manipulation of string without library function.
5. Write a C program that implement function and parameters of array, string, float and integer data types and test different parameter passing mechanisms.
6. Implement a function to perform string operations.
7. Write a C program to find a factorial of a given number.
8. Write a C program to implement recursive function.
9. Write a C program that shows how to use a structure in a program.
10. Write a C program to process one dimensional array using pointer.
11. Write a C program to process two dimensional array using pointer.
12. Write a C program that implement file operations on text file.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: To Employ good software engineering practices such as incremental development,data integrity	L3
2: Checking and adherence to style guidelines. Select and model data using primitive and structured types.	L2
3: Construct programs that demonstrate effective use of C features including arrays, structures, pointers and files.	L3

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF12L-1	-	-	-	-	-	-	-	-	-	3	-	3
19DF12L-2	-	-	-	-	-	-	-	-	-	3	-	3
19DF12L-3	-	-	-	-	-	-	-	-	-	3	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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First Semester MCA

19DC12L-ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

COURSE OBJECTIVES

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning and to sensitize the students to the nuances of English speech sounds.
- To provide opportunities for practice in using English in day to day situations.
- To improve the fluency in spoken English and neutralize mother tongue influence
- To help the students to prepare resume effectively.
- To train students to use language appropriately for Group Discussion and help students to face interviews confidently and presents his ideas efficiently.

Unit –I PHONETICS

– Introduction to Sounds of Speech – Vowels – Consonants – Phonetic Transcription and word stress – Rules of word stress.

Unit -II SITUATIONAL DIALOGUES

Role-play – Expressions in various situations – Self Introduction – Introducing others – Greetings Apologies – Requests – Giving directions -Social and Professional etiquettes

Unit -III RESUME PREPARATION

Structures, formats and styles –planning-defining career objective-projecting one's strength and skills – creative self-marketing – sample resumes-cover letter.

Unit -IV ORAL PRESENTATIONS

Collection of data from various sources –planning, preparation and practice –attention gathering strategies -transition –handling questions from audience.

Unit- V INTERVIEW SKILLS – GROUP DISCUSSION

Concept and process –pre-interview planning- preparation-body language –answering strategies-frequently asked questions and communicating views and opinions- discussing- intervening-agreeing and disagreeing asking for and giving clarification –substanding-providing solution on any given topic.

TEXT BOOK:

Lab Manual developed by Faculty Members of English

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Learn about the significance of pronunciation accent and will attempt to neutralize the accent	L2
2: Improve their public speaking skills, interpersonal and intrapersonal skills effectively in different contexts	L2
3: Construct Resume effectively and properly and writing cover letter relevantly.	L2
4: Enhance his skills to make presentation effectively	L4
5: Take a part how to participate in group discussion to face interviews confidently.	L4

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DC12L-1	-	-	-	-	-	-	-	-	-	3	-	3
19DC12L-2	-	-	-	-	-	-	-	-	-	3	-	3
19DC12L-3	-	-	-	-	-	-	-	-	-	3	-	2
19DC12L-4	-	-	-	-	-	-	-	-	-	3	-	2
19DC12L-5	-	-	-	-	-	-	-	-	-	2	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

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First Semester MCA

19DF13L-INFORMATION & COMMUNICATION TECHNOLOGY LAB

COURSE OBJECTIVES

- To help the students to know about the basics of computers
- To train students in dis-assembling and assembling PC
- To help the students in identifying failures
- To help the students in knowing BIOS settings
- To help the students in identifying components of network

TASK 1: Introduction to Computers, Advantages and Disadvantages of computers draw the block diagram of computer.
TASK 2: Identify the peripherals of a computer like Input and Output Devices.
TAKS 3: Identify the Components of a CPU and their function, components with the configuration of each peripheral device is to be submitted to your instructor.
TASK 4: Every student should dis-assemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a viva.
TASK 5: Demonstrate an experiment for testing the hardware failures in a Computer.
TASK 6: Demonstrate an experiment for testing the software failures in a Computer.
TASK 7: Identify the components of network like Network Interface Cards, Hubs, Switches, Bridges, Routers, Gateways, Modems and Transmission Media.
TASK 8: Students should get connected to their Local Area Network and access the internet. In the process they configure the TCP/IP settings.
TASK 9: Students should do BIOS settings for configuration of system. For example student canchange booting option.
TASK 10: Demonstrate how to access the website and how to use the search engines. A few topics would be given to the students for which they need to search on Google.
TASK 11: Demonstrate how to create email ids for sending mails with attachments and show down loading procedure files.
TASK 12: Develop a static web page using frames, tables, forms, lists, hyperlinks, images etc.

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1:	Learn all about computers	L2
2:	Improve his skills in dis-assembling and assembling computer effectively	L1
3:	Student can develop static web page using HTML	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF13L-1	-	1	1	-	3	-	2	1	1	-	2	-
19DF13L-2	-	2	-	-	-	-	3	2	-	-	1	-
19DF13L-3	-	1	1	-	3	1	2	1	-	3	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & CIENCES::RAJAMPET
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Second Semester MCA

19DF21T-DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVES

- Explain database concepts and structures and terms related to database design, transactions and management
- Demonstrate data modeling, normalization and development of the database
- Formulate SQL statements for data definition, modification and retrieval of Data
- Analyze how databases are affected by real-world transactions
- Design and build a simple database system

UNIT I

INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS:

Data Vs Information, Purpose of databases, Views of data, Database languages, Data models, Database architecture -users and administrators. E-R Model, Entity-Relationship diagrams, E-R diagrams design issues, Extended E-R features, Specialization, Generalization,Aggregation.

UNIT II

RELATIONAL MODEL: Structure of Relational database, Relational algebra, Tuple relational calculus, Domain relational calculus, QBE (Query-by-Example).

UNIT III

STRUCTURED QUERY LANGUAGE (SQL): Introduction to SQL, SQL Operators, SQL Functions, Join queries, Sub queries, Nested queries, Views, Integrity constraints, Functional Dependencies, Database design - **Normalization:** Normal Forms-1st, 2nd, 3rd and BCNF, Multi - Valued Dependency-4th Normal Form, 5th NF/Projection-Join Normal form and De- Normalization.

UNIT IV

TRANSACTION MANAGEMENT: Transaction concept, ACID properties, Transaction state, concurrent execution. **Recovery System:** Storage structure, Recovery and atomicity, Log-Based Recovery, ARIES Recovery Technique and Remote Back systems.

UNIT V

STORAGE AND FILE STRUCTURE: Overview of Physical Storage media, Magnetic Disks, RAID, File Organization, Organization of Records in Files and Data-Dictionary Storage. **Indexing and Hashing:** Ordered Indices, B+-Tree Index Files, B-Tree Index files, Multiple-key access, Static and Dynamic Hashing.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan. Database system Concepts. McGraw Hill International Edition, 2006, 5thEd.
2. Elmasri, Navate, Fundamentals of Database Systems, Person Education,2008.

REFERENCE BOOKS:

1. C.J Date,Introduction to Database Systems, Pearson Education,2009.
2. S.Shah and V. Shah SPD,Oracle for Professionals, The X team,2010.

3. PS Deshpande, SQL/PLSQL for Oracle 9i ,dreamtec Press,2007.
4. Raghurama Krishna, Johannes Gehrke, Database management systems,TMH.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Explain the basic concepts of data models,database design for transaction processing and Query language.	L3
2: Analyze an information storage problem and derive an information model expressed in the form of an entity relation diagram.	L3
3: Transform high-level conceptual model to relational data model, populate database and formulate queries based on principles of normalization.	L2
4: Design and implement a database for any given problem.	L3
5: Prepare and store the files as per the structure.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF21T -1	3	-	2	-	3	-	-	3	3	3	-	3
19DF21T -2	2	-	-	-	3	-	2	3	-	3	-	3
19DF21T -3	1	-	-	-	3	-	-	3	-	-	-	-
19DF21T -4	2	-	-	-	3	2	-	-	-	-	-	3
19DF21T -5	3	-	2	-	2	-	-	3	-	3	-	3

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Second Semester MCA

19DF22T-JAVA PROGRAMMING

COURSE OBJECTIVES

- This course provides an introduction to object oriented programming (OOP) using the Java programming language.
- Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm.
- Analyze a software development problem and express its essence succinctly and precisely.

UNIT I

CLASSES AND OBJECTS : Concepts of classes, objects, methods, access control, this keyword, garbage collection, simple java program, constructors, parameter passing, recursion, Enumeration, **Auto-boxing**: Enumeration, Type Wrappers, Auto boxing. **Generics:** What are Generics?, A Simple Generics Example, A Generics Class with two Type Parameters, The General Form of a Generic Class.

String Handling: The String Constructors, String Length, Special String Operations, Character Extraction, String Comparison, Searching Strings, Modifying a String, Data Conversion Using valueof ( ), Changing the Case of Characters Within a String, Additional String Methods, String Buffer, String Builder.

UNIT II

INHERITANCE : Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance, Member access rules, super keyword and its uses, using final with inheritance, **polymorphism-** method overriding, abstract classes, Method overloading, Inner Classes-Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

UNIT III

PACKAGES AND INTERFACES: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, Interfaces vs Abstract classes, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring packages –java.util.

UNIT IV

EXCEPTION HANDLING AND MULTITHREADING: Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups

UNIT V

FILE-STREAMS: Byte Streams, Character Streams, text Input/output, Binary input/output, random access file operations, File management using file class, using java.io**, NETWORKING**: Basics of network programming, addresses, ports, sockets, Socket connection and simple client server program, multiple clients, Java .net package.

TEXT BOOKS:

1. Herbert Schildt, Java. The complete reference. TMH, 2010, 7th Ed.
2. T. Budd. Understanding OOP with Java. Pearson education, 2008, Updated Ed.

REFERENCE BOOKS:

1. J.Nino and F.A. Hosch. An Introduction to programming and OO design using Java. John Wiley and sons, 2004.
2. T. Budd. An Introduction to OOP. Pearson education, 2009, 2nd Ed.
3. Y. Daniel Liang. Introduction to Java programming. Pearson education, 2010, 6th Ed.
4. R.A. Johnson. An introduction to Java programming and object oriented application development. Thomson, 2009.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1**:**The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism.	L2
2: Fundamental features of an object oriented language like Java,object classes and interfaces, exceptions and libraries of object collections.	L3
3:How to take the statement of a business problem and from this determine suitable logic for solving the problem	L2
4:Then be able to proceed to code that logic as a program written in Java.	L3
5: Identify key entities and relationships in the problem domain; write succinct textual descriptions of problems in the style of a user manual.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF22T-1	3	3	3	-	3	3	3	-	3	-	3	-
19DF22T-2	3	3	3	-	3	3	3	-	3	-	3	-
19DF22T-3	2	3	3	-	2	3	3	-	3	-	2	-
19DF22T-4	1	2	3	-	1	2	3	-	1	-	2	-
19DF22T-5	2	2	3	-	1	2	-	-	1	-	-	-

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Second Semester MCA

19DF23T-DATA STRUCTURES

COURSE OBJECTIVES

- Understand and remember algorithms and its analysis procedure.
- Introduce the concept of data structures through ADT including List, Stack, Queues.
- To introduce various techniques for representation of the data in the real world.
- To develop application using data structure algorithms.
- Compute the complexity of various algorithms.

UNIT I

INTRODUCTION TO DATA STRUCTURES: Need for Data structures - Definitions – Algorithm Analysis: Problem Solving – Modular Design - Implementation of Algorithms – Testing – Verification – Time Complexity Classes – Asymptotic Analysis. –Efficiency classes – Mathematical analysis of Non recursive algorithm - Mathematical analysis of recursive algorithm.

UNIT II

ARRAYS, LISTS, STACKS AND QUEUES: Arrays: Implementation – Operations- Applications,**Linked List**: Implementation – Operations- Applications,**Stack:** Implementation – Operations - Applications, **Queues:** Implementation – Operations – Applications.

UNIT III

SORTING, SEARCHING: Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Radix Sort and Quick Sort, Heap Sort **Searching:** Linear Search, Binary Search, and Fibonacci Search.

UNIT IV

NON LINEAR DATA STRUCTURES AND HASH TABLES

Introduction- Definition and Basic terminologies of trees and binary trees- Representation of trees, Binary tree Traversals- Threaded binary trees- Topological sorting- **Hash Tables:** Introduction,Hash Tables, Hash Functions and its applications, closed hashing, comparison of collision resolution techniques.

UNIT V

ADVANCED TREES: Graphs- basic concepts –- representation and traversals, Introduction-Binary Search Trees: Definition- Operations and applications. **Height Balanced Trees or AVL Trees:** Definition- Operations and applications**, B Trees:** Definition- Operations and applications, Red – Black Trees- Splay Trees and its applications.

TEXT BOOKS:

1. Samanta.D, “Classic Data Structures”, Prentice Hall of India (PHI), 2nd Edition.

REFERENCE BOOKS:

1. Mark Allen Weiss, “Data Structures and Problem Solving using C++”, The Benjamin Cummings / Addison Wesley Publishing Company, 2002
2. Pai G.A.V., “Data Structures and Algorithms”, TMH, 2009,
3. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran “Fundamentals of Computer Algorithms”, 2nd edition, University Press, 1996

EXPECTED COURSE OUTCOMES

Student's will be able to		Blooms Level of Learning
1 :	Select appropriate data structures as applied to specified problem definition.	L1,L2
2 :	Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.	L3
3 :	Students will be able to implement Linear and Non-Linear data structures.	L3
4 :	Implement appropriate sorting/searching technique for given problem.	L3
5 :	Design advance data structure using Non-Linear data structure.	L3
6 :	Determine and analyze the complexity of given Algorithms.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF23T-1	-	-	2	2	-	-	-	-	-	-	1	-
19DF23T-2	1	-	3	-	3	-	-	3	-	-	2	-
19DF23T-3	2	-	3	-	2	-	-	-	-	2	-	3
19DF23T-4	1	-	-	3	1	-	2	-	1	-	2	-
19DF23T-5	1	-	3	-	1	-	-	-	1	-	-	-
19DF23T-6	1	-	-	-	-	2	-	-	-	2	-	

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Second Semester MCA

19DF24T-ORGANIZATION STRUCTURE AND PERSONNEL MANAGEMENT

COURSE OBJECTIVES

- Students will study the structure and dynamics of organizational open systems.
- There will be a focus on the external environment, technology, structure (and their interrelationship), organizational culture and change management.
- This course will also address the actions that managers must take to ensure that behavior within the organization aids rather than impedes achievement of overall organizational goals.

UNIT I

INTRODUCTION TO MANAGEMENT: Concepts of Management and organization – Nature, Importance, Functions and theories of management, Systems approach to management, leadership styles, and Social responsibilities of management. Introduction to Organization: Designing Organizational structures: Basic concepts related to Organization – Department and Decentralization, Types and structures of organization.

UNIT II

DECISION PROCESS APPROACH: Parts of organization system, Dynamics of decision, Role of system, Personnel Management: Evolution, Objectives, Personnel Policies, Personnel management vs HRM, Position of the personnel department in the organization, Role of personnel manager as line manager and staff manager.

UNIT III

MAN POWER PLANNING: Need-strategies and limitations, Manpower inventory, Manpower forecasting, Job description, Recruitment, Job specification and selection, Interviewing techniques, Transfers and promotion policies, Training And Development: Objectives and policies planning, Organizing the training department, Training manager and his job, on and off the job training techniques, Career planning, Objectives of performance appraisal.

UNIT IV

COMMUNICATION: Importance of communication, Interpersonal communication, Barriers of communication, Communication in organizations, Using communication skills to manage conflicts, Personality– Transactional Analysis, Perception: Perceptual process, Development of Attitudes and Values, Team Effectiveness.

UNIT V

CONTEMPORARY STRATEGIES: Total Quality Management (TQM), Six sigma, People Capability Maturity Model (PCMM) levels, Performance management, Business Process Outsourcing (BPO), business process re-engineering, bench marking and balanced score card.

TEXT BOOKS:

1. Dr. LM Prasad, “Principles & Practice of Management”, 7e, S.Chand series.
2. Organization Structure and Personnel Management, P.Subbarao HPH, 2009.
3. Organizational Behavior, Aswathappa.K: Himalaya Publishers.

REFERENCE BOOKS:

1. Industrial Business Management, Martand T Telsang, S.Chand.
2. Human Resources Management, DrL.M.Prasad, S.Chand.
3. Dynamic Personnel Administration, Rudrabasavaraj MN, Himalaya.
4. Personnel Management, Mamoria&Gankar, HPH, 2009.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1:Explore the organization structures and systems approach to organization development.	L1
2:Analysis of organizational theories and conceptualize these with contemporary organizational designs.	L2
3:Describe the interaction of organizational designs and competitive strategies.	L1
4: Explain how organizations both affect and are affected by their environments .	L2
5:Have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF24T -1	3	2	-	1	1	-	1	-	-	-	-	-
19DF24T -2	3	2	1	2	-	-	1	-	-	-	-	-
19DF24T -3	3	2	1	3	-	-	1	-	-	-	-	-
19DF24T -4	3	3	1	3	1	-	1	-	-	-	-	-
19DF24T -5	3	1	2	-	2	-	1	-	-	-	-	-

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Second Semester MCA

19DF25T-OPERATIONS RESEARCH

COURSE OBJECTIVES

- Formulate a real-world problem as a mathematical programming model
- Understand the theoretical workings of the simplex method for linear programming and perform iterations of it by hand
- Understand the relationship between a linear program and its dual, including strong duality and complementary slackness
- To introduce the operations research techniques such as Linear Programming, Integer Programming

UNIT I

Introduction to Operations Research-Basic definition, Scope, Objectives, Phases, Models and Limitations of Operations Research, Linear Programming Problem – Formulation of LPP, Simplex Method, Big-M method, Two-phase Method, Degeneracy and Unbound solutions, Revised simplex method, Duality, Dual Simplex Method.

UNIT II

Transportation Problem – Formulation, Unbalanced Transportation problem, Finding basic feasible solutions - Northwest corner rule, least cost method and Vogel's approximation method, Optimality test – MODI method, Assignment model – Formulation, Hungarian method for optimal solution, Solving unbalanced problem.

UNIT III

Sequencing models : Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines, Processing n Jobs through m Machines.

UNIT IV

Replacement Models: Group replacement policy, Game Theory: Competitive games, Rectangular game, Saddle point, Minimax (Maximin) method of optimal strategies, Value of the game, Solution of games with saddle points, Dominance principle, Rectangular games without saddle point – mixed strategy for 2 X 2 games.

UNIT V

Inventory models: Inventory costs, Models with deterministic demand – model (a) demand rate uniform and production rate infinite, model (b) demand rate non – uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

TEXT BOOK:

1. Operations Research, A.M. Natarajan, P. Balasubramani, A. Tamilarasi, Pearson Education,2005.

REFERENCE BOOKS:

1. Operations Research, R. Panneerselvam 2/e, PHI2008
2. Operations Research, P.K. Gupta and D.S. Hira, S.Chand& CO.,2007

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1:	Identify and develop operational research models from the verbal description of the real system.	L2
2:	Understand the mathematical tools that are needed to solve optimization problems.	L3
3:	Use mathematical software to solve the proposed models.	L2
4:	Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision- making processes in Management Engineering	L2
5:	Understand demand rate and production rate models	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF25T-1	-	2	1	-	2	-	3	1	1	-	3	-
19DF25T-2	-	2	-	-	-	-	3	2	-	-	1	-
19DF25T- 3	-	2	1	-	3	1	3	3	-	1	-	-
19DF25T -4	-	2	-	-	3	-	2	3	-	-	-	-
19DF25T-5	1	-	-	1	-	-	1	2	-	3	1	1

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Second Semester MCA

19DC21T-NUMERICAL METHODS

COURSE OBJECTIVES

- The subject gives awareness on computer- oriented methods for solving numerical problems in science and engineering.
- The course provides the knowledge on numerical solutions to systems of simultaneous linear equations, nonlinear algebraic equations (root solving)
- The course explains the methods for solving ordinary differential equations numerically.
- The course describes interpolation and curve fitting.

Unit-I

Solution of algebraic and transcendental equations: Bisection method – method of false position – Secant method – Newton Raphson method – Muller's method

Unit-II

Solutions of linear simultaneous algebraic equations – Gauss eliminating method – Factorization Method – Jacobi's method – Gauss Seidal method – relaxation method - Eigen values and Eigen vectors using power method.

Unit-III

Curve fitting: The method of least squares – fitting of linear and nonlinear curves - Coefficient of Correlation - Linear Regression– multiple regressions.

Unit-IV

Interpolation: Introduction – Newton's forward and backward interpolation formulae – Gauss's forward and backward interpolation formulae – Lagrange's interpolation formula.

Unit-V

Numerical solutions of Ordinary Differential equations - Taylor's series - Euler's Method – Picard's Method - Runge-Kutta Fourth Order Method – Milne's Predictor-Corrector Method.

TEXT BOOKS:

1. Numerical Methods in engineering and science with programs in C &C++, B.S Grewal, 9th Edition, Khanna Publishers.
2. Numerical Methods for Scientific and Engineering Computation, M K Jain, S.R.K.Jain, R.K.Jain, 5th edition, New Age International Publishers.

REFERENCE BOOKS:

1. Numerical Methods with programs in C, Veerarjan and Ramachandran, Tata McGraw Hill.
2. Numerical Methods, S. Arumugam, A. Thangapandi Isaac, A. Somasundaram, Scitech Publications, India.
3. Numerical Methods for Engineers and Scientists using MATLAB, RaminS. Esfandiari, CRC Press (Taylor and Francis Group).
4. Applied Numerical Methods with MATLAB for Engineers and Scientists, Steven C.
5. Chapra, 2nd Edition,Tata McGraw-Hill.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Apply the knowledge of numerical methods to solve algebraic and transcendental equations.	L3
2: Solve the linear simultaneous algebraic equations by using numerical techniques.	L3
3: Make use of the concept of curve fitting and correlation analysis.	L3
4: Point out the ordinate values by using interpolation.	L4
5: Understand the techniques of numerical methods to get the solutions of ordinary differential equations.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DC21T -1	3	3	-	-	-	-	-	-	-	-	-	2
19DC21T -2	3	3	-	-	-	-	-	-	-	-	-	2
19DC21T -3	3	3	-	-	-	-	-	-	-	-	-	3
19DC21T -4	3	3	-	-	-	-	-	-	-	-	-	2
19DC21T -5	3	2	-	-	-	-	-	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Second Semester MCA

19DF21L-DBMS LAB

COURSE OBJECTIVES

- To give a good formal foundation on the relational model of data.
- To present SQL and procedural interfaces to SQL comprehensively.
- To present the concepts and techniques relating to query processing by SQL engines.
- To present the concepts and techniques relating to ODBC and its implementations.

List of Sample Problems/Experiments

1. Creation, altering and drop of tables and inserting, deleting and update the rows into a table using SELECT Command.
2. Queries using integrity constraints.
3. Queries using SQL operators like, relational, logical and set operators.
4. Queries using Aggregate and SQL functions.
5. Queries using join conditions.
6. Create Views,Sequences.
7. Write a Simple PL/SQL Program to display student's details.
8. Create PL/SQL block using IF/ELSE, IF/NESTED -IF statement.
9. Create PL/SQL block using WHILE/FOR Loops.
10. Create PL/SQL block using CURSORS.
11. Create PL/SQL block using EXCEPTION handling.
12. Create PL/SQL block using FUNCTION, PROCEDURE, TRIGGER and PACKAGE

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Design and implement a database schema for a given problem domain.	L2
2: Populate and query a database using SQL DDL/DML commands.	L3
3:Program in PL/SQL including stored procedures, stored functions, cursors, packages.	L3
4: Design and build a GUI application using a 4GL.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF21L -1	-	-	3	-	3	-	-	-	3	-	3	-
19DF21L -2	-	-	3	-	3	-	-	-	3	-	3	-
19DF21L -3	-	-	3	3	2	-	-	-	3	-	2	-
19DF21L -4	-	-	3	3	1	-	-	-	1	-	2	-

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Second Semester MCA

19DF22L-JAVA PROGRAMMING LAB

COURSE OBJECTIVES

- This course provides an introduction to Object Oriented Programming (OOP) using the Java programming language.
- Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm.
- Analyze a software development problem and express its essence succinctly and precisely.

1. Write a Java Program to find the area of a box by using Class and Object.
2. Write a Java Program for passing Objects using Call by Value and Call by Reference.
3. Write a Java Program using constructor.
4. Write a Java Program for creation of classes and use of different types of functions.
5. Write a Java Program to count the number of objects created for a class using static member function.
6. Write a Java Program on interfaces.
7. Write a Java Program on packages.
8. Write a Java Program using function overloading and overriding.
9. Write a Java Program using inheritance.
10. Write a Java Program using IO streams.
11. Write a Java Program using files.
12. Write a Java Program using exception handling mechanism.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1:The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism.	L2
2: Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections.	L3
3:How to take the statement of a business problem and from this determine suitable logic for solving the problem	L2
4:Then be able to proceed to code that logic as a program written in Java.	L3
5: Identify key entities and relationships in the problem domain; write succinct textual descriptions of problems in the style of a user manual.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF22L -1	3	3	3	-	3	3	3	-	3	-	3	-
19DF22L -2	3	3	3	-	3	3	3	-	3	-	3	-
19DF22L -3	2	3	3	-	2	3	3	-	3	-	2	-
19DF22L -4	1	2	3	-	1	2	3	-	1	-	2	-
19DF22L 5	2	2	3	-	1	2	-	-	1	-	-	-

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Second Semester MCA

19DF23L-DATA STRUCTURES THROUGH C LAB

COURSE OBJECTIVES

- Understand the fundamentals of Problem solving concepts.
- Be able to write a C program to solve various problems.
- Be able to choose appropriate data structures to solve the problems.

1. Write a Program to perform the operations on Arrays.
2. Write a Program to perform the operations on single linked list
3. Write a Program to perform the operations of Double linked list
4. Write a Program that demonstrates the polynomial manipulation using linked list.
5. Write a Program to implement stack data structure using array representation.
6. Write a Program to perform the operations of simple Queue. Use linked list representation.
7. Write a Program to convert given infix expression to post fix expression.
8. Write a Program to demonstrate the following Sorting techniques.
   a) Bubble Sort
   b) Insertion Sort and Quick Sort
9. Write a Program to demonstrate the following Searching techniques using integer or float or string or structure data.
   a) Binary Search
   b) Fibonacci Search
10. Write a Program to evaluate the given post fix expression.
11. Write a Program to perform the operations insert a node, delete a node, search and traverse using Binary Search Tree.
12. Write a Program to perform the operations insert a node, delete a node, search and traverse using Height Balanced Tree.

EXPECTED COURSE OUTCOMES

Student's will be able to		**Blooms Level of Learning**
1:	Implement & test the performance of data structures like linked list, stacks & queues.	L1
2:	Implement & test the performance of searching & sorting techniques.	L1
3:	Implement & test the performance of tress and graph traversal techniques.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF23L -1	3	3	-	2	-	-	-	1	-	-	3	1
19DF23L -2	3	3	-	2	-	-	-	-	1	-	3	1
19DF23L -3	3	3	-	2	-	-	-	-	1	-	3	2

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Third Semester MCA

19DF31T-OPERATING SYSTEMS

COURSE OBJECTIVES

- Identify the concepts, principles and services of operating system
- Understand the operating system functionalities managing with hardware
- Analyze the structure and design decisions involved in the implementation of an operating system
- Evaluate different algorithms related to different operating system components
- Explore various operating system utility commands to manage operating system
- Implement various operating system algorithms and its evaluation

UNIT I

OPERATING SYSTEM INTRODUCTION: Operating System Definition, Evolution of Operating Systems- Simple, Batch, Multi Programmed, Time-Shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System Calls, Types of System Calls.

UNIT II

PROCESS AND CPU SCHEDULING: Process Concepts- The Process, Process State, Process Control Block, **Process Scheduling**- Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling Algorithms, **PROCESS COORDINATION**: Process Synchronization, the Critical-Section Problem, Semaphores, Classic Problems of Synchronization.

UNIT III

DEADLOCKS: System model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

UNIT IV

MEMORYMANAGEMENT: Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms.

FILE SYSTEM INTERFACE: The Concept of a File, Access methods, Directory Structure, Allocation methods, Disk Scheduling algorithms.

UNIT V

PROTECTION: System Protection- Goals of Protection, Principles of Protection, Access Matrix

Security: - The Security Problem, Program Threats, System and Network Threats,

TEXT BOOKS:

1. Abraham Silberchatz, Peter B. Galvin. Operating System Principles. Wiley Student Edition, 2010, 8th Ed.
2. Andrew S Tanenbaum. Modern Operating Systems. Pearson/ PHI, 2011, 3rd Ed.

REFERENCE BOOKS:

1. R. Elmasri, A.G.Carrick and D.Levine. Operating Systems. MGH,2010.
2. A.S. Godbole. Operating Systems. TMH, 2009, 2nd Ed.
3. W. Stallings. Operating Systems-Internal and Design Principles, Pearson Education, 2009, 6th Ed.

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1:	Explain the fundamentals of operating system components and its functionalities	L2
2:	Analyze the basic operating system resources and its management techniques	L1
3:	Apply algorithms to handle the operations of an operating system	L3
4:	Implement solutions for classical problems in managing the computer resources	L2
5:	Identify the need to create the special purpose operating system.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF31T -1	-	1	1	-	3	-	2	1	1	-	2	-
19DF31T -2	-	2	-	-	-	-	3	2	-	-	1	-
19DF31T -3	-	1	1	-	3	1	2	1	-	3	-	-
19DF31T -4	-	-	-	1	-	2	-	-	3	-	-	1
19DF31T -5	-	1	1	-	3	1	2	1	-	3	-	-

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Third Semester MCA

19DF32T - COMPUTER NETWORKS

COURSE OBJECTIVES

- To know the concepts of the Reference Models and understand the fundamentals of Computer Networks.
- To understand various techniques of data link layer.
- To know various issues of routing, quality of service and congestion control.
- To understand various transport protocols.
- To know various security issues of computer networks.

UNIT I

INTRODUCTION: Uses of Computer Networks, Network Topologies, Network Hardware, Network Software, **Reference Models**- The OSI Reference model, The TCP/IP Reference Model, A comparison of the OSI and TCP/IP Reference Models; Metric units,

THE PHYSICAL LAYER: Multiplexing- Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Code Division Multiplexing, **Switching-** Packet Switching, Circuit Switching.

UNIT II

THE DATA LINK LAYER:**Data Link layer design issues**-Framing, Error Control, Flow Control, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols.

THE MEDIUM ACCESS CONTROL SUB-LAYER: The Channel Allocation Problem, **Multiple Access Protocols**- ALOHA, Carrier Sense Multiple Access Protocols (CSMA), Collision-Free Protocols, Limited-Contention Protocols, Wireless LAN Protocols.

UNIT III

THE NETWORK LAYER: Network layer design issues; **Routing Algorithms**-The Optimality Principle, Shortest path Algorithm, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcasting routing, **Internetworking-**How Networks Differ, Tunneling, Internetwork Routing, Packet Fragmentation; The IP Version 4 Protocol, IP Addresses, The IP Version 6 Protocol. Internet multicasting.

UNIT IV

THE TRANSPORT LAYER: The Transport Service, The Internet Transport Protocols: UDP,The Internet Transport Protocols: TCP, Performance Issues.

THE APPLICATION LAYER: The Domain Name System(DNS), Electronic Mail.

UNIT V

NETWORK SECURITY: Cryptography, Symmetric-Key Cryptography algorithms- Data Encryption Standard (DES), Advanced Encryption Standard (AES); Asymmetric-Key Cryptography algorithms- Rivest, Shamir, and Adleman (RSA); Digital Signature, Entity Authentication.

TEXT BOOKS:

1. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Pearson education, 2018, 5th Ed.
2. Behrouz A. Forouzan, Data Communications and Networking, 4th Ed.,McGraw-Hill, 2007.

REFERENCE BOOKS:

1. James F. Kurose, Keith W. Rose. Computer Networks- A Top-Down Approach Featuring the internet, Pearson education, 2009.
2. S. Keshav. An engineering Approach to Computer Networking, ATM Networks, the Internet and the Telephone Network. Pearson education, 2009.
3. Williams Stallings. Data and Computer Communication. PEA, 2003, 7th Ed.
4. Nadir F. Mir, Computer and Communication Networks. Pearson Education, 2009.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Understand the concepts of the Reference Models and fundamentals of computer networks.	L2
2: Understand different data link layer techniques.	L2
3: Identify various issues of routing, quality of service and congestion control.	L2
4: Analyze various transport protocols.	L3
5**:** Understand the use of cryptography and network security techniques.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF32T -1	3	1	-	-	2	-	2	1	-	-	1	-
19DF32T -2	2	-	2	1	-	-	2	-	-	1	-	-
19DF32T -3	-	2	1	3	-	-	-	2	-	-	2	-
19DF32T -4	3	3	-	-	1	-	-	2	-	-	2	1
19DF32T-5	2	-	2	3	-	-	1	-	-	1	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Third Semester MCA

19DF33T-PHP WITH MYSQL

COURSE OBJECTIVES

- The objective of this course is to gain the PHP programming skills needed to successfully build interactive, data-driven sites.
- Use the MVC pattern to organize code, test and debug a PHP application, work with form data, use cookies and sessions, work with regular expressions.
- Handle exceptions, and validate data to provide security and improve efficiency.

UNIT I

PHP, MYSQL, LAMP: what they are and what they do. Static Vs Dynamic pages, Client-side Vs Server-side scripting, obtaining PHP and MYSQL software, resources and tools, XAMPP as a development environment.

UNIT II

Basics of programming with PHP - variables, constants, data types, operators, expressions, control structures & decision making, functions, type casting, program flow. Documenting your code, Simple templating with PHP, organizing your application, finding and fixing bugs in your code.
HTTP client-server communication: HTTP headers, server response codes.

UNIT III

MYSQL: Relational databases vs spreadsheets. MYSQL in the terminal, relational database design, MYSQL's data types, **CRUD operations:** create, read, update and delete data, primary, foreign and unique keys. **Getting results from more than one table:** joins. One-to-one, one-to-many, many-to-many relationships, Column and table aliases, changing table structure, table types and aggregate queries.

UNIT IV

PHP Forms: PHP Form Handling, PHP Form Validation, PHP Form Required, PHP Form URL/E-mail, PHP Form Complete, **PHP, MYSQL and Apache admin:** how to handle and log PHP errors.

UNIT V

PHP and MYSQL on the web: Connecting to MYSQL using PHP. Querying the database and using the results, Dynamic templating, Single and multiple article templates. PHP's super globals, accepting user input through the URL and forms. **Forms:** validation and giving user feedback. Dynamic navigation, **Building a simple CMS:** Database CRUD operations through a web frontend, defensive programming, security considerations, working as a web developer.

TEXT BOOKS :

1. Steven Holzner, “PHP : the Complete Reference, 1st Edition, McGraw Hills, PHP 5.2, 2015.
2. VikramVaswani , “MySQL: The complete Reference. 1st Edition, McGraw Hills, 2015.

EXPECTED COURSE OUTCOMES

Student's will be able to	Blooms Level of Learning
1: To understand the basics of programming in PHP.	L3
2: To write and debug procedural PHP scripts.	L2
3: To understand fundamental relational database concepts.	L3
4: To design a relational database suitable for a blog and analyze database concepts like CRUD	L2
5: To understand the importance of web application security.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF33T -1	3	2	-	2	1	-	1	-	-	-	-	-
19DF33T -2	3	2	1	2	-	-	1	-	-	-	-	-
19DF33T -3	1	2	3	3	-	-	1	-	-	-	-	-
19DF33T -4	3	1	1	3	1	-	1	-	-	-	-	-
19DF33T -5	3	1	2	-	2	-	1	-	-	-	-	-

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Third Semester MCA

19DF34T-ADVANCED JAVA FOR WEB TECHNOLOGIES

COURSE OBJECTIVES

- Explain the history of the internet and related internet concepts that are vital in understanding web development.
- Discuss the insights of internet programming and implement complete application over the web.
- Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style Sheet.
- Utilize the concepts of JavaScript and Java.
- Use Web application development software tools i.e, AJAX and XML etc, and identify the environments currently available on the market to design web sites.

UNIT I

HTML COMMON TAGS: Introduction, HTML Basics- Text, Colors, Links, Images, Lists, Forms, Frames, Tables, Web Page Design, HTML5, Cascading Style Sheets-Introduction to CSS, Types of CSS, CSS3

JAVA SCRIPT: Introduction to JavaScript, Basics of JavaScript, Control Structures, Pop Up Boxes, Functions, Arrays, Events, Objects and Simple Web Application. JQUERY, **XML**: Introduction, Document type definition, XML Schemas, Document Object Model, XML and Data Binding, Presenting XML(XSL), XML Processors: DOM and SAX.

UNIT II

WEB SERVERS AND SERVLETS:

Introduction to Servlets, Web Servers, Deployment of Servlets- How to write servlet, how to execute servlet, Life-Cycle of a servlet, JSDK, The Servlet API, The javax.servlet package, Reading Servlet Parameters, Reading Initialization Parameters, The javax.servlet.http package, Handling HTTP Request and Responses, Cookies, Session Tracking.

UNIT III

INTRODUCTION TO JSP: The Problem with servlet, The anatomy of JSP page, JSP Processing, JSP application design with MVC, Setting up JSP environment, Installing the Java Software Development Kit, Tomcat Server and Testing Tomcat, JSP Standard Tag Library(JSTL).

UNIT IV

JSP APPLICATION DEVELOPMENT: Generating Dynamic Content- Directive Elements, Template Text, Beans and JSP, Action Elements. Using scripting elements, Implicit JSP Objects, Conditional Processing-Declaring Variables and methods, Error handling and debugging.

UNIT V

DATABASE ACCESS: Introduction, Database Programming with JDBC- How JDBC works, JDBC Architecture, JDBC Driver Types. Studying javax.sql.* package, Installation of MYSQL, Accessing Database from JSP page- Use of Prepared Statement, Deploying Java Beans in a JSP Page.

TEXT BOOKS:

1. Patrick Naughton and Herbert Schildt. Complete Reference Java. 2002, 2nd Edition
2. Hans Bergstan. Java Server Pages. SPD publications, 2003, 3rd Ed.

REFERENCE BOOKS:

1. Knuckles. Web Applications Technologies Concepts. John Wiley, 2006, 1st Ed.
2. Wang. An Introduction to Web Design and Programming. Thomson, 2007, 1st Ed.
3. Pekowsky. Java Server Pages. Pearson, 2008.
4. D.Flanagan, Java Script, O"Reilly, SPD.
5. Michael Morrison, XML Unleashed, Tech Media
6. O"neil, Java Beans Programming, TMH, 2005.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Understand Mark-up and Scripting language concepts and their applications.	L3
2: Demonstrate the working of dynamic documents in web designing and analyse appropriate content layout design and event-handling techniques.	L2
3: Implement static web document using HTML5,CSS, Java Script and XML.	L3
4: Demonstrate the Database programming using JDBC-ODBC driver without any error.	L2
5: Develop Server Side Components using Java Servlet with the interaction of different tiers.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF34T -1	3	3	2	3	3	2	2	2	-	1	1	2
19DF34T -2	3	3	2	2	3	-	2	2	-	-	-	1
19DF34T -3	3	2	3	2	3	1	1	1	1	-	1	-
19DF34T -4	3	2	3	2	3	2	2	2	1	-	1	1
19DF34T -5	3	2	2	3	3	2	2	2	2	-	1	-

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Third Semester MCA

19DF35T -DESIGN & ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES

- To teach paradigms and approaches used to analyze and design algorithms and to appreciate the impact of algorithm design in practice.
- To make students understand how the worst-case time complexity of an algorithm is defined, how asymptotic notation is used to provide a rough classification of algorithms.
- To teach various advanced design and analysis techniques such as greedy algorithms, dynamic programming & Know the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

UNIT I

INTRODUCTION: Notion of Algorithm - Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic Notations - Recurrence equations – Solving recurrence equations –Analysis of linear search- Recursive solution to the Tower of Hanoi Puzzle

UNIT II

DIVIDE AND CONQUER: General Method, Merge sort, Quick sort, Binary search, Binary tree traversals and related properties.

UNIT III

DYNAMIC PROGRAMMING: General Method – Multistage Graphs – All-Pair shortest paths –Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem, **Greedy Technique**: General Method, Prim's algorithm, Kruskal's algorithm, Single Source Shortest Paths- Dijkstra's algorithm.

UNIT IV

BACK TRACKING: General Method, 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles, Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem.

UNIT V '

NP- COMPLETENESS – NP-Hard and NP-Complete Problems: NP-Hard, NP-Complete Classes, COOKS Theorem.

TEXT BOOKS:

1. T. H. Corman, C Leiserson, Rivest, Ronald and stein Clifford. Introduction to algorithms. MGH, New York, 2001, 2nd Ed.
2. AnanyLevitin. Introduction to the design and analysis of algorithms. Pearson education, 2003, 2nd Ed.
3. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007. (For Units II to V).

REFERENCE BOOKS:

1. E Horowitz, S Sahni, S Rajasekaran, Fundamentals of computer algorithms. Universities press, 2008, 2nd Ed.
2. Richard Neopolitan, KumarssNaimipour, Foundations of algorithms using C++ pseudo code, Jones and Bartlett Learning, 1998, 2nd Ed.
3. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (For Unit I)

EXPECTED COURSE OUTCOMES

	Student's will be able to	Blooms Level of Learning
1 :	Students will be able to Analyze a given algorithm and express its time and space complexities in asymptotic notations.	L1
2 :	Students will be able to design algorithms using Divide and Conquer Strategy.	L3,L5
3 :	Students will be able to compare Dynamic Programming and Divide and Conquer Strategies.	L3,L4
4 :	Students will be able to solve Optimization problems using Greedy strategy.	L2,14
5 :	Students will be able to design efficient algorithms using Back Tracking and Branch Bound Techniques for solving problems.	L3
6 :	Students will be able to classify computational problems into P, NP, NP-Hard and NP-Complete.	L4

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF35T-1	3	2	2	2	-	1	1	-	-	2	-	1
19DF35T-2	3	2	2	2	-	-	1	-	-	2	-	1
19DF35T-3	3	2	2	2	-	1	1	-	-	2	-	1
19DF35T-4	3	2	2	2	-	1	-	-	-	2	-	1
19DF35T-5	2	-	3	-	1	-	-	-	-	2	-	1
19DF35T-6	3	2	2	2	-	1	-	-	-	2	-	1

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Third Semester MCA

19DF36T-COMPUTER ORGANIZATION

COURSE OBJECTIVES

- Describe various data representations and explain how arithmetic and logical operations are performed by computers
- Explain the basic operation and relationship between the different components of computer.
- Understand the advanced architecture of microprocessors
- Write assembly programs for 8086 microprocessors

UNIT I

NUMBER SYSTEMS AND COMPUTER ARITHMETIC: Signed and unsigned numbers, complements, Addition and Subtraction, Multiplication, Division, Floating point representation, Gray code, BCD codes, Boolean algebra, Simplification of Boolean expressions, K-Maps. **Combinational and Sequential Circuits**: Decoders, Encoders, Multiplexers, Half and Full adders, Sequential circuits, Flip-flops.

UNIT II

MEMORY ORGANIZATION: Memory hierarchy, Main memory-RAM, ROM chips, Memory address map, Memory contention to CPU, Associative Memory-Hardware logic, Match, Read and Write logic, Cache Memory-Associative mapping, direct mapping, Set- associative mapping.

UNIT III

BASIC CPU ORGANIZATION: General Register Organization, Stack Organization, Instruction Formats- zero, one, two, and three address instructions, Instruction formats- INTEL-8086 CPU Architecture, Addressing modes.

UNIT IV

INTEL 8086 ASSEMBLY LANGUAGE INSTRUCTIONS: Data transfer instructions, Input-Output instructions, Flag transfer, arithmetic, logical, shift and rotate instructions, Conditional and unconditional transfer, Iteration control, Interrupts, Assembler directives, Programming with assembly language instructions.

UNIT V

MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Micro program example, Design of Control Unit, **Input-Output Organization:** Peripheral devices, Modes of transfer, Priority interrupts - Daisy chaining, parallel priority, DMA- DMA control, DMA transfer, Input output processor-CPU-IOP communication.

TEXT BOOKS:

1. Computer System Architecture, M. Morris Mano, 3rd Edition, PHI/Pearson Education,2008.
2. Fundamentals of Computer Organization and Design, SivaramaP.Dandamudi, Springer Int.Edition.
3. Assembly Language programming, Peter Abel, Fifth Edition IBM PC1991.

REFERENCE BOOKS:

1. Computer Organization, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 5th Edition, McGraw Hill.
2. Computer Organization and Architecture, William Stallings, 7thEdition,
3. Pearson/PHI,2007
4. Intel 8086 programming, V. Douglas Hall, Tata McGraw-Hill.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Classify and compute the performance of machines.	L3
2: Understand how to implement memory chips,boards, Modules and caches.	L2
3: Relate to arithmetic for ALU implementation.	L3
4: Understand the basics of hardware and micro-programmed Control of the CPU.	L3
5: Learn about various I/O devices and the I/O interfaces.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF36T-1	3	3	1	3	1	-	2	2	-	-	-	2
19DF36T-2	3	2	1	2	1	1	2	3	-	-	-	-
19DF36T-3	3	3	1	3	2	-	2	2	-	1	2	1
19DF36T-4	3	3	1	3	2	1	1	1	-	1	1	1
19DF36T-5	3	3	1	3	2	-	1	2	-	-	1	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Third Semester MCA

19DF31L-OPERATING SYSTEMS LAB

COURSE OBJECTIVES

- To learn the fundamentals of Operating Systems and also to learn how to use system calls
- To learn the mechanisms of implementing scheduling algorithms
- To learn the mechanisms involved in memory management
- To learn programmatically to implement simple OS mechanisms

List of Sample Problems/Experiments

1. Simulate FCFS and SJF CPU scheduling algorithms
2. Simulate SEQUENTIAL file allocation strategy
3. Simulate INDEXED file allocation strategy
4. Simulate MVT and MFT
5. Simulate TWO LEVEL file organization technique
6. Simulate Bankers algorithm for Deadlock Avoidance
7. Simulate FIFO and optimal page replacement algorithms
8. Simulate Paging Technique of Memory Management.
9. Write a C program that make a copy of a file using Standard I/O
10. Write a C program that make a copy of a file using system calls
11. Write a C program that count the number of blanks in a text file using Standard I/O
12. Write a C program that count the number of blanks in a text file using system calls

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1:	To make students able to implement CPU scheduling algorithms	L2
2:	To make students able to Bankers algorithm used for deadlock avoidance and prevention.	L1
3:	Students will be able to implement page replacement algorithms	L3
4:	Students will also be able to implement memory management algorithms.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF31L-1	3	3	3	1	1	1	2	1	1	-	2	-
19DF31L-2	1	2	1	3	-	-	3	2	-	-	1	3
19DF31L-3	-	1	1	-	3	1	2	1	-	3	2	1
19DF31L-4	1	2	-	1	-	2	-	-	3	2	2	1

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Third Semester MCA

19DF33L -PHP with MYSQL LAB

COURSE OBJECTIVES

- The objective of this course is to gain the PHP programming skills needed to successfully build interactive, data-driven sites,
- Use the MVC pattern to organize code, test and debug a PHP application, work with form data, use cookies and sessions, work with regular expressions,
- Handle exceptions, and validate data to provide security and improve efficiency.

List of Sample Problems/Experiments

1. Write a HTML file to create a simple form with 5 input fields viz. Name, Password, Email, Pin Code, Phone No. and a Submit button.
2. Write a PHP program to demonstrate required field validations to validate that all input fields are required.
3. Write a PHP program to validate Name, Email and Password.
4. Write a PHP program to display error messages if the above validations do not hold.
5. Create a form for your college library entering student details for each student in the college. Validate the form using PHP validates and display error messages.
6. Read the User id and Passwords entered in the Login form 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"
7. Write a PHP which does the following job: Insert the details of 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the User_Name and Password from the database (instead of cookies).
8. 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 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 PHP.
9. Create and delete MYSQL database using PHP.

EXPECTED COURSE OUTCOMES

Student's will be able to	Blooms Level of Learning
1: To understand the basics of programming in PHP.	L3
2: To write and debug procedural PHP scripts.	L2
3: To understand fundamental relational database concepts.	L3
4: To design a relational database suitable for a blog and analyze database concepts like CRUD	L2
5: To understand the importance of web application security.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF33L -1	3	2	-	2	1	-	1	-	-	-	-	-
19DF33L -2	3	2	1	2	-	-	1	-	-	-	-	-
19DF33L -3	1	2	3	3	-	-	1	-	-	-	-	-
19DF33L -4	3	1	1	3	1	-	1	-	-	-	-	-
19DF33L -5	3	1	2	-	2	-	1	-	-	-	-	-

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Third Semester MCA

19DF34L-ADVANCED JAVA FOR WEB TECHNOLOGIES LAB

COURSE OBJECTIVES

- Explain the history of the internet and related internet concepts that are vital in understanding web development.
- Discuss the insights of internet programming and implement complete application over the web.
- Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.
- Utilize the concepts of JavaScript and Java.
- Use Web application development software tools i.e, AJAX and XML etc, and identify the environments currently available on the market to design web sites.

List of Programs

1. Develop static pages of an online Bookstore. The pages should resemble www.amazon.com. The website should consist the following pages

   - Home Page
   - Registration Page
   - Login Page
   - Books Catalogue
   - Shopping Cart
   - Payment By Credit Card
   - Order Confirmation
2. Design a web page using Cascading Style Sheet

3. Validate the Registration Page using Java Script.

4. Write an XML file which will display the Faculty information and also XSLT Program to display XML Data in HTML document which includes:
   1) Name of the Faculty 2) First Sem Subject 3) Second Sem Subject 4) Third Sem Subject
   5) Fourth Sem Subject 6) Fifth Sem Subject

5. Install Tomcat Web Server.

6. Create an HTMl file and retrieve the data from servlet using Tomcat Server.

7. Create a Cookie and retrieve the cookie by using HTTP Servlet using Tomcat Server.

8. Develop a JSP Page for entering Student details, and must be saved in database using JDBC Connections and will be displayed the data from the database in the webpage.

9. Develop a JSP Page for entering and retrieving Employee details, and data will be given in JSP Page, the data must be updated in the database using JDBC Connections and will be displayed the data from the database in the webpage.

10. Create a JDBC Program in which data will be retrieved from the database using MS-Access and output will be displayed in DOS Prompt.

11. Create a JDBC Program in which output will be displayed from Access Database.

12. Create a program using database in which the output will be displayed in the command prompt and the data will be updated in MS-Access also.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Understand Mark-up and Scripting language concepts and their applications.	L3
2: Demonstrate the working of dynamic documents in web designing and analyse appropriate content layout design and event-handling techniques.	L2
3: Implement static web document using HTML5,CSS, Java Script and XML.	L3
4: Demonstrate the Database programming using JDBC-ODBC driver without any error.	L2
5: Develop Server Side Components using Java Servlet with the interaction of different tiers.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF34L -1	3	3	2	3	3	2	2	2	-	1	1	2
19DF34L -2	3	3	2	2	3	-	2	2	-	-	-	1
19DF34L -3	3	2	3	2	3	1	1	1	1	-	1	-
19DF34L -4	3	2	3	2	3	2	2	2	1	-	1	1
19DF34L -5	3	2	2	3	3	2	2	2	2	-	1	-

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Fourth Semester MCA

19DF41T-SOFTWARE ENGINEERING

COURSE OBJECTIVES

- To explain the basic terminologies and implement systems effectively using various system models
- To comprehend the testing Process and software evolution in order to meet dynamic changing requirements
- To develop understanding of advanced concepts and methods required for construction of large software systems
- To apply project management strategies for effective software development

UNIT – I

Software, Software Engineering, and Process: The nature of Software, The unique nature of WebApps, Software engineering- A layered technology, General principles of software engineering practice, Software myths, Agile development: What is an Agile Process?, Capability Maturity Model Integration (CMMI).

UNIT – II

Process Models: A Generic process model (framework), Process assessment and improvement, Prescriptive process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process, **Software Requirements**: Functional and Non-functional requirements; User requirements; The software requirements document, **Requirements Engineering Processes**: Requirements elicitation and analysis; Requirements validation; Requirements management, **System Modeling**: Context models; Behavioral models; Data models; Object models; Structured Methods.

UNIT – III

Design concepts: Design Concepts, **Architectural Design**: Architectural design decisions; System organization; Modular decomposition styles;
Object-Oriented design: Objects and Object Classes; An Object-Oriented design process; Design Evolution

UNIT – IV

Verification and Validation: Planning verification and validation; Software inspections; automated static analysis; Verification and formal methods.
Software testing: System testing; Component testing; Test case design; Test automation, **Quality management:** Software Quality Assurance.

UNIT – V

Project Management: Management activities; Project planning; Project scheduling; Risk management.
Software Cost Estimation: Software Productivity; Estimation techniques; The COCOMO II Model, Project duration and staffing.

TEXT BOOKS:

1. Roger S. Pressman. Software Engineering - A Practitioners approach. McGraw-Hill, 2007, 7th Ed **(Unit 1 and Process Models of Unit 2).**
2. Ian Sommerville. Software Engineering. Pearson Education Publications, 2007,8th Ed. (**Software Requirements, Requirements Engineering Processes**, **System Modeling of Unit 2, Unit 3, Unit 4 and Unit V).**

REFERENCE BOOKS:

1. Shari Lawrence Pfleeger, Joanne M. Atlee. Software Engineering Theory and Practice. Pearson Education, 2006, 3rd Ed.
2. Waman S Jawadekar. Software Engineering Principles and Practice, Tata McGraw Hill, 2004.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Understand the basic terminologies and various process models associated with software engineering	L3
2: Comprehend the testing Process and software evolution	L2
3: Analyze and Apply advanced software engineering concepts and methods for construction of large software systems.	L3
4: Able to understand various testing strategies.	L2
5: Evaluate project management strategies for effective software development	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF41T -1	2	-	2	2	3	1	1	2	3	1	1	-
19DF41T -2	1	-	1	2	2	1	1	2	2	-	2	1
19DF41T -3	1	-	3	2	2	1	1	1	3	1	1	1
19DF41T -4	2	1	2	1	2	2	1	3	2	1	1	2
19DF41T -5	2	-	2	2	3	2	1	2	3	1	2	2

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Fourth Semester MCA

19DF42T-UNIX & NETWORK PROGRAMMING

COURSE OBJECTIVES

- To make the students know about UNIX and LINUX environment
- To Classify Linux kernel mode with user mode and differentiate Kernel structuring methods
- To Describe Process management and Thread management strategies.
- To Demonstrate internal file system structure with device drivers and file operations using system calls.
- To Contruct shell scripts with different programming .

UNIT I

INTRODUCTION: LINUX/UNIX Operating System; The LINUX/UNIX Architecture; Features of LINUX / UNIX; General Purpose Utilities; UNIX file system; Navigating the File System; Handling Ordinary Files; basic Filters;

UNIT II

ESSENTIAL SHELL PROGRAMMING AND FILE PROCESSING: shell variables;shell constants shell meta characters; test command, control structures, arithmetic in shell, shell functions, pipes **FILE PROCESSING:** File types, system calls for file processing; File permissions and Security, System calls (chmod, chown), Directory management system calls.

UNIT III

LINUX / UNIX PROCESSES I: The Environment of a Process, main function, Process Termination, Memory Layout of a C Program, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions.

LINUX / UNIX PROCESSES II: Process Identifiers, fork, vfork, exit, wait, waitpid, waitid, wait3, wait4 functions, Race Conditions, exec functions, Process Groups, Sessions, Controlling Terminal.

UNIT IV

SIGNALS: Signal types, Kernel Support for Signals, Signal function, signal mask, sigaction function, The sigsetjmp and siglongjmp functions, kill, alarm, raise, pause, sigpause functions.

UNIT V

INTERPROCESS COMMUNICATION: Pipes, FIFOs; XSI IPC: Message Queues, Semaphores, shared memory, **Sockets:** Introduction; Socket Descriptors; Addressing; Connection establishment; Data transfer system calls; Implementation of TCP/IP and UDP.

TEXT BOOKS:

1. W.Richard Stevens, Stephen A. Rago. Advanced Programming in the UNIX Environment, Pearson Education / Prentice-Hall of India, 2005, 2nd Ed.
2. Sumitabha Das, UNIX concepts and applications–2010.

REFERENCE BOOKS:

1. Terrence Chan. UNIX System Programming Using C++. Prentice-Hall of India / Pearson Education,1999.
2. Marc J. Rochkind. Advanced UNIX Programming. Pearson Education, 2005, 2nd Ed.
3. Maurice. J. Bach. The Design of the UNIX Operating System. Pearson Education / PHI,1987. UreshVahalia.UNIX Internals. Pearson Education,2001.

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1:	Classify Linux Kernel mode with user mode & contrast between Kernel structures	L1
2:	Identify and estimate process management & thread management strategies along with their different operations (Process creation)	L2
3:	Implement different system calls for various file handling operations	L3
4:	Determine paging and Caching techniques related to Virtual Memory	L3
5:	Construct shell scripts	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF42T-1	-	3	3	-	2	-	1	1	3	-	-	-
19DF42T-2	-	1	2	-	-	-	2	-	-	-	-	-
19DF42T-3	-	2	3	-	2	1	3	1	-	3	-	-
19DF42T-4	-	-	2	3	-	2	-	-	3	-	-	2
19DF42T-5	-	-	-	1	-	2	-	3	-	-	-	3

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Fourth Semester MCA

19DF43T - PYTHON PROGRAMMING

COURSE OBJECTIVES

- To introduce Python programming language through its core language basics and program design techniques suitable for modern applications.
- To understand the wide range of programming facilities available in Python covering graphics, GUI, data visualization and Databases.
- To utilize high-performance programming constructs available in Python, to develop solutions in real life scenarios.
- Learn to use Turtle to develop GUI applications
- To import the text files and process them accordingly
- Understand the object-oriented features of Python

UNIT-1

Introduction to Python: Getting Started: Introduction to Python- an interpreted high level language, interactive mode and script mode. Basics: Python - Variables - Executing Python from the Command Line - Editing Python Files - Python Reserved Words - **Data And Expressions:** Literals, Variables and Identifiers, Operators, Expressions and Data types with examples.

UNIT-2

CONTROL STRUCTURES: Boolean Expressions (Conditions), Selection Control, Iterative Control and Examples, **LISTS:** List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python with Examples.

UNIT-3

FUNCTIONS: Definition - Passing parameters to a Function - Variable Number of Arguments - Scope - Passing Functions to a Function - Mapping Functions in a Dictionary – Program Routines, More on Functions, **OBJECTS:** Software Objects, Turtle Graphics, Turtle programs

UNIT-4

MODULAR DESIGN: Modules, Top-Down Design, Python Modules, **TEXT FILES:** Using Text Files, String Processing, Exception Handling, **DICTIONARIES AND SETS:** Dictionary Type in Python, Set Data Type.

UNIT-5

RECURSION: Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion, **OBJECT-ORIENTED PROGRAMMING:** Encapsulation, Inheritance, Polymorphism, APPLICATIONS USING PYTHON: Exploratory analysis in Python - Building predictive models: logistic regression, decision tree – visualization -Web application development: opening an url-creating a simple web page

TEXT BOOKS:

1. Charles Dierbach, Introduction to Computer Science using Python, Wiley, 2015
2. Wesley J Chun, “Core Python Applications Programming”, Prentice Hall, 2012.
3. Mark Summerfield. “Programming in Python 3: A Complete introduction to the Python Language”, Addison-Wesley Professional, 2009.

REFERENCE BOOKS:

1. James Payne, Beginning Python: Using Python 2.6 and Python 3, Wiley India, 2010
2. Paul Gries, Jennifer Campbell, Jason Montojo, Practical Programming: An Introduction to Computer Science Using Python 3, Pragmatic Bookshelf, 2/E 2014
3. Wesley J Chun, "Core Python Applications Programming", Prentice Hall, 2012.
4. Andreas C. Müller , Sarah Guido, "Introduction to Machine Learning with Python: A Guide for Data Scientists" , O"Reilly, 2016.
5. Sumit Gupta "Building Web Applications with Python and Neo4j",Packt publishers,2015

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1 :	Understand the benefits of python programming over other languages and program using python language.	L1,L3
2 :	Understand and implement classes and objects in python.	L1,L2,L3
3 :	Process the text files and Design approach for problem solving	L3
4 :	Apply python programming in solving computational problems in real time applications, web frameworks and cloud operations.	L1,L3
5 :	Summarize the object-oriented features	L2,L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF43T-1	3	3	3	2	-	-	2	-	-	2	-	-
19DF43T-2	3	3	3	2	-	-	2	-	1	2	-	-
19DF43T-3	3	2	1	2	-	3	2	-	-	2	-	-
19DF43T-4	3	-	3	2	-	-	2	-	1	2	-	-
19DF43T-5	3	3	3	2	-	1	2	1	1	2	-	-

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Fourth Semester MCA

19DF44T-DATAWARE HOUSING & DATA MINING

COURSE OBJECTIVES

- To introduce students to the basic concepts and techniques of Data Mining.
- To introduce a wide range of clustering, estimation, prediction, and classification algorithms.
- To introduce mathematical statistics foundations of the Data Mining Algorithms.
- To introduce basic principles, concepts and applications of data warehousing.

UNIT – I

Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi-Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.

UNIT -II

Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.

UNIT – III

Data Mining: Overview, Motivation, Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation.

UNIT– IV

Concept Description:- Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, **Association Analysis**- Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases

UNIT – V

Classification and Predictions: What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods K- nearest neighbor classifiers, Genetic Algorithm. **Cluster Analysis:** Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering- CURE and Chameleon. Density Based Methods-DBSCAN, OPTICS. Grid Based Methods- STING, CLIQUE. Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis

TEXT BOOKS:

1. M.H.Dunham,"DataMining:Introductory and Advanced Topics" Pearson Education,2013

2. Jiawei Han, MichelineKamber, "Data Mining Concepts & Techniques" Elsevier, 2013.

REFERENCE BOOKS:

1. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World: A Practical Guide for Building Decision Support Systems, 1/e", Pearson Education. 2009.

2. Mallach,"Data Warehousing System", McGraw –Hill, 2008.

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1 :	Identify the key processes of data mining, data warehousing and knowledge discovery process.	L1,L3
2 :	To understand various data pre-processing techniques to improve the quality of data and efficiency and the ease of the mining process.	L1,L2,L3
3 :	The student will understand the concept of data classification methods	L3
4 :	The student will understand the concept of association rule mining methods	L3
5 :	To understand the unsupervised learning techniques and the algorithm used for data clustering.	L1,L3
6 :	The student will understand the advanced data mining techniques and the popular data mining tools used.	L2,L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF44T-1	3	3	3	1	-	-	-	-	1	-	-	2
19DF44T-2	2	2	3	1	-	-	-	-	1	-	-	1
19DF44T-3	3	1	3	1	-	3	-	-	1	-	-	1
19DF44T-4	3	2	3	3	-	-	-	-	1	-	-	1
19DF44T-5	3	2	3	1	-	-	-	-	-	-	-	-
19DF44T-6	3	1	3	1	-	-	-	-	-	-	-	-

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Fourth Semester MCA

19DF4AT - BIG DATA
(ELECTIVE – I)

COURSE OBJECTIVES

- To know the fundamentals and need of Big Data
- To learn various big data technologies
- To know holistic view of big data analytics and gain the knowledge for decision making.
- To learn advanced analytics platform of big data
- To gain knowledge about HadoopMapReduce and parallel processing patterns

UNIT I

INTRODUCTION TO BIG DATA : What is Big Data and why is it important?, Four V"s of Big Data, Drivers for Big Data, Building the big data team, Big data sources, Big Data Analytics applications.

UNIT II

BIG DATA TECHNOLOGIES: Hadoop's Parallel World, Data discovery, Open-source technology for Big Data Analytics, The cloud and Big Data, Predictive Analytics, Mobile Business Intelligence, Crowd Sourcing Analytics, Inter- and Trans-Firewall Analytics, Information Management.

UNIT III

THE PEOPLE PART OF THE EQUATION: Rise of the data scientist, Using deep math, science, and computer science, Holistic view of analytics, Creating talent for decision sciences, Setting up the right organizational structure for institutionalizing analytics, Best practices for big data analytics.

UNIT IV

ADVANCED ANALYTICS PLATFORM: Real-Time Architecture for conversations, Orchestration and Synthesis Using Analytics Engines, Discovery using Data at Rest, Implementation of Big Data Analytics: Big Data Governance, Analytics Business Maturity Model

UNIT V

PROCESSING BIG DATA USING HADOOP: What is HadoopMapReduce?, HadoopMapReduce components, Advantages of HadoopMapReduce, HadoopMapReduce Example, Building blocks of HadoopMapReduce, Design of HDFS, HDFS Concepts, Data flow. Anatomy of a MapReduce job run.

TEXT BOOKS:

1. Michael Minelli, Michehe Chambers, AmbigaDhiraj "Big Data, Big Analytics: EmergingBusiness Intelligence and Analytic Trends for Today"s Businesses", 1st Edition, Wiely CIO Series, 2016.
2. ArvindSathi, "Big Data Analytics: Disruptive Technologies for Changing theGame", 1st Edition, IBM Corporation, 2012.

REFERENCE BOOKS:

1. Frank J. Ohlhorst, "Big data analytics: Turning big data into big money", 1st Edition, Wiley, 2015.
2. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", 1st Edition, Wiley and SAS BusinessSeries, 2012.
3. Tom White, "Hadoop: The Definitive Guide", 3rd Edition, O"reilly, 2012.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Know the concepts of Big Data.	L1
2: Understand various big data technologies.	L2
3: Know big data analytics and gain the knowledge for decision making.	L2
4: Learn advanced analytics platform of big data.	L3
5: Understand HadoopMapReduce and parallel processing patterns.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF4AT -1	-	1	-	-	1	2	1	-	-	1	-	-
19DF4AT -2	-	2	1	-	2	2	-	-	1	-	1	-
19DF4AT -3	1	3	2	2	-	3	-	1	-	2	-	2
19DF4AT-4	2	-	2	2	-	-	1	-	-	1	-	1
19DF4AT-5	2	2	2	1	1	-	-	2	-	-	1	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Fourth Semester MCA

19DF4BT-DISTRIBUTED DATABASES
(Elective I)

COURSE OBJECTIVES

- To learn the principal and foundation of distributed databases.
- To learn the architecture, design issue and integrity control of distributed databases.
- To learn the details of query processing and query optimization technique.
- To learn the concept of transaction management in distributed databases.

UNIT I
DISTRIBUTED DATABASES: Features of Distributed versus Centralized Databases, Why Distributed Databases? Distributed Database Management Systems (DDBMSs), Architecture for Distributed Databases, Types of Data Fragmentation,

UNIT II
LEVELS OF DISTRIBUTION TRANSPARENCY: Distribution Transparency for Read- Only Applications, Distribution Transparency for Update Applications, Distributed Database Access Primitives, Integrity Constraints in Distributed Databases,

UNIT III
Translation of Global Queries into Fragment Queries: Equivalence Transformations for Queries, Transforming global queries into fragment Queries, Distributed grouping and aggregate function Evaluation, parametric Queries. A Framework for Query Optimization,

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

CONCURRENCY CONTROL: Foundations of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control Based on Timestamps.

UNIT V
Reliability: Basic Concepts, Non-blocking Commit Protocols.
DISTRIBUTED DATABASE ADMINISTRATION: Catalog Management in Distributed Databases, Authorization and Protection,

TEXT BOOK:

1. Stefano ceri, Giuseppe Pelagatti. Distributed Databases Principles and System.MGH, Aug 2008.

REFERENCE BOOK:

1. M.Tamerozsu, Patrick Valduriez. Principles of Distributed database systems. July 2007, 3rd Edition.

EXPECTED COURSE OUTCOMES

	Student's will be able to	Blooms Level of Learning
1:	Explain the techniques used for data fragmentation, replication, and allocation during the distributed database design process.	L2
2:	Evaluate simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer	L3
3:	Explain how the two-phase commit protocol is used to deal with committing a transaction that accesses databases stored on multiple nodes.	L1
4:	Describe distributed concurrency control based on the distinguished copy techniques and the voting methods.	L2
5:	Understand the administration of distributed databases.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF4BT-1	3	2	1	3	1	2	-	-	3	2	2	1
19DF4BT-2	-	-	-	-	-	-	2	1	2	-	-	-
19DF4BT-3	1	3	2	2	2	1	3	-	-	-	-	2
19DF4BT-4	2	-	-	-	-	-	-	-	2	-	-	3
19DF4BT-5	-	-	1	2	2	-	1	3	-	2	1	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Fourth Semester MCA

19DF4CT-DATA SCIENCE
(Elective I)

COURSE OBJECTIVES

- The course gives you a set of practical skills for handling data that comes in a variety of formats and sizes, such as texts, spatial and time series data.
- These skills cover the data analysis lifecycle from initial access and acquisition, modeling, transformation, integration, querying, application of statistical learning and data mining methods, and presentation of results.
- This includes data wrangling, the process of converting raw data into a more useful form that can be subsequently analysed.

UNIT – I
Fundamentals of Data science: Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.
Supervised Versus Unsupervised Learning, Regression Versus Classification Problems, Assessing Model Accuracy, Measuring the Quality of Fit, The Bias-Variance Trade-of, The Classification Setting.

UNIT – II
Maintenance of Data, Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, using multiple data sources.

UNIT-III
Classification, Logistic Regression, Linear Discriminant Analysis, A Comparison of Classification Methods, Logistic Regression, LDA, QDA, and KNN, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes.

UNIT- IV
Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, mapping variables to encodings, Visual encodings. Data Wrangling: Data Acquisition, Data Formats, Imputation, The split-apply-combine paradigm.

UNIT-V
Data Science-Applications , Applications of Data Science, Technologies for visualization, Bokeh (Python), Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

TEXT BOOKS:

1. Alberto Boschetti, Luca Massaron, “Python Data Science Essentials”, Packt Publications, 2nd Edition, 2016.
2. Davy Cielen, Arno Meysman, Mohamed Ali, “Introducing Data Science: Big Data, Machine Learning, and more, using Python tools”, Manning Publications; First Edition, 2016.
3. Mark Gardener, Beginning R The statistical Programming Language, Wiley, 2015.
4. Han ,Kamber, and J Pei, Data Mining Concepts and Techniques, 3rd edition, Morgan Kaufman, 2012.

REFERENCE BOOKS:

1. SinanOzdemir, Principles of Data Science, Packt Publishing Ltd Dec 2016.
2. Joel Grus, Data Science from Scratch, Oreilly media, 2015.

EXPECTED COURSE OUTCOMES

	Student's will be able to	Blooms Level of Learning
1 :	Understand the fundamentals of data science	L1,L2
2 :	Explain how data is collected, managed and stored for data science.	L2
3 :	Analyze the data by applying various techniques.	L2
4 :	Explore data visualization techniques.	L3
5 :	Investigate several applications in data science.	L2,L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF4CT-1	2	-	-	-	-	-	-	-	3	-	-	-
19DF4CT-2	-	2	-	3	-	1	-	-	-	-	-	-
19DF4CT-3	2	-	-	2	2	-	-	-	-	3	-	-
19DF4CT-4	-	-	-	-	2	-	-	-	-	-	2	-
19DF4CT-5	3	-	-	-	-	2	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Fourth Semester MCA

19DF4DT-CLOUD COMPUTING

COURSE OBJECTIVES

- The objective of this course is to establish the definition of cloud computing
- Describing the various service delivery models of a cloud computing architecture, and the ways in which clouds can be deployed as public, private, hybrid, and community clouds.
- Able to understand the Advantages and Risks exists in Cloud Computing
- Understand the concept of Virtual Storage paradigms exits in Cloud computing

UNIT I

Cloud Computing: Introduction, History of Cloud Computing, uses, services, types of cloud computing. Applications of Cloud Computing, feature perspective and developments of cloud computing.

UNIT II

Working of cloud computing and Collaboration of Cloud computing, Centralizing email communication, cloud computing for community, collaboration on schedules, collaborating on group projects and events, cloud computing for corporation and mapping scheduling & managing projects.

UNIT III

Collaborating on calendars, schedulers and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets and databases ,Evaluating web mail services, evaluating instant messaging, evaluating web conference tools, Creating groups on social networks, evaluating on line groupware, collaborating via blogs and wikis.

UNIT IV

Understanding Cloud Storage, evaluating on-line file storage, exploring on-line book marking services, exploring on-line photo editing applications, exploring photo sharing communities, controlling it with web bases desktops.

UNIT V

INDUSTRIAL PLATFORMS AND NEW DEVELOPMENTS

Cloud Platforms in Industry,Amazon web services ,Compute services Storage services, Communication services , Additional services,GoogleAppEngine ,Architecture and core concepts, Application life cycle,Cost model, Observations ,Microsoft Azure, Azure core concepts 9.3.2 SQL Azure Windows,Azure platform appliance , observations.

TEXT BOOKS:

1. Michael Miller. Cloud computing. Pearson Education, (1,2,3,4 UNITS)New Delhi, 2009.
2. Mastering Cloud Computing Foundations and Applications Programming- RajkumarBuyya Christian Vecchiola S. ThamaraiSelvi , Morgan Kaufmann is an imprint of Elsevier(ISBN: 978-0-12-411454-8)(5H UNIT)

EXPECTED COURSE OUTCOMES

Student's will be able to	Blooms Level of Learning
1: Discuss, with confidence, what is cloud computing and what are key security and control considerations within cloud computing environments.	L1
2: Identify various cloud services.	L2,L3
3: Assess cloud characteristics and service attributes, for compliance with enterprise objectives.	L3
4: Explain the four primary cloud category "types".	L2
5: Evaluate various cloud delivery models.	L1

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF4DT -1	2	2	-	3	1	-	1	-	2	-	-	-
19DF4DT -2	2	2	1	3	-	-	1	-	-	-	-	-
19DF4DT -3	2	2	1	3	-	-	1	-	1	-	-	-
19DF4DT -4	3	3	2	3	1	-	1	-	-	-	-	-
19DF4DT -5	3	2	2	-	2	-	1	-	-	-	-	-

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Fourth Semester MCA

19DF4ET- ARTIFICIAL INTELLIGENCE
(ELECTIVE – II)

COURSE OBJECTIVES

- To know the essential concepts of Artificial intelligence.
- To understand various searching techniques and algorithms for problem solving.
- To know various constraint satisfaction problems.
- To understand the required knowledge and reasoning aspects of Artificial Intelligence
- To know how to handle the problems with uncertain knowledge.

UNIT-I

Introduction: What is Artificial Intelligence?, **Intelligent Agents**: Performance Measures, Rationality, The Structure of Agents, **Problem-Solving**: Problem-Solving Agents, Formulating Problems, Uninformed Search Strategies.

UNIT-II

Informed Search and Exploration: Informed (Heuristic) Search strategies, Greedy best-first search, A* search, Memory-bounded heuristic search, Heuristic functions, Inventing admissible heuristic functions, **Local Search algorithms:** Hill-climbing search, Simulated annealing search, Local beam search, Genetic Algorithms.

UNIT-III

Constraint Satisfaction Problems: Backtracking Search for constraint satisfaction problems, variable and value ordering, Propagating information through constraints, Intelligent backtracking, local search for constraint satisfaction problems, **Adversarial Search**: Games, The minimax algorithm, Alpha-Beta pruning, Imperfect Real-Time Decisions, Games that include an Element of Chance

UNIT-IV

Knowledge and reasoning: Knowledge-Based Agents, Logic, Propositional Logic, Inference, Equivalence, validity and satisfiability, Resolution, Forward and backward Chaining, Local-search algorithms, **First-Order Logic:** Syntax and Semantics of First-Order Logic, **Inference in FOL:** Unification and Lifting, Forward Chaining, Backward Chaining.

UNIT-V

Planning: Language of planning problems, Planning with state-space search, Partial-order planning, Planning graphs, Planning with propositional logic, **Uncertain Knowledge and reasoning:** Uncertainty, Handling uncertain knowledge, Uncertain and rational decisions, Basic probability notation, The axioms of probability, Inference using full joint distributions.

TEXT BOOK:

1. Artificial Intelligence: A Modern Approach: Stuart Russel and Peter Norving, Prentice Hall Series in AI

REFERENCE BOOKS:

1. Artificial Intelligence:Winston P.H., Addison Wesley
2. Artificial Intelligence:E.Rich and Knight, Tata McGraw Hill.

EXPECTED COURSE OUTCOMES

Student's will be able to	Blooms Level of Learning
1: Understand the essential concepts of Artificial intelligence.	L2
2: Identify various searching techniques for problem solving.	L4
3: Know various constraint satisfaction problems.	L2
4: Understand the required knowledge and reasoning aspects of Artificial Intelligence.	L2
5: Know how to handle the problems with uncertain knowledge.	L4

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF4ET-1	1	-	-	1	-	-	1	-	-	-	-	-
19DF4ET-2	1	3	2	2	-.	1	-	2	-	-	2	-
19DF4ET-3	2	2	1	-	1	-	-	-	1	-	1	1
19DF4ET-4	1	1	-	2	1	1	-	-	-	1	-	-
19DF4ET-5	3	2	2	-	3	-	1	1	-	2	1	-

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Fourth Semester MCA

19DF4FT-MACHINE LEARNING
(Elective-II)

COURSE OBJECTIVES

- To formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weakness.
- To understand the basic theory underlying machine learning.
- To apply machine learning algorithms, to solve problems of moderate complexity.
- To understand different types of learning approaches.

Unit– I

INTRODUCTION: Well-posed learning problems, Designing a learning system, Perspective and issues in machine learning **Concept learning and the general to specific ordering –**Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias

Unit– II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning

Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptrons, Multilayer networks and the back propagation algorithm, face recognition

Unit– III

Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

Unit– IV

Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge.

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective.

Unit– V

Reinforcement Learning – Introduction, the Learning Task, Q Learning, Non-Deterministic Rewards and Actions, Temporal Difference Learning, Generalizing from Examples.

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

REFERENCE BOOKS:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001 3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995CRC)

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1. Understand the basic knowledge about the key algorithms and theory that form the foundation of machine learning and computational intelligence	L3
2. Understand different machine learning algorithms and methods	L2
3. Understand the principles, advantages, limitations such as over fitting and possible applications of machine learning	L3
4. Identify and apply the appropriate machine learning technique to classification, pattern recognition and optimization and decision problems.	L2
5. Understand different types of learning approaches	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF4FT-1	3	2	1	-	2	-	1	1	1	-	1	-
19DF4FT-2	3	2	-	-	-	-	2	2	-	-	1	-
19DF4FT-3	3	3	1	-	3	1	1	1	-	1	-	-
19DF4FT-4	2	1	-	-	3	-	2	1	-	-	-	-
19DF4FT-5	2	2	2	-	2	-	-	-	-	-	-	-

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Fourth Semester MCA

19DF42L-UNIX & NETWORK PROGRAMMING LAB

COURSE OBJECTIVES

- To make the students know about how to work in UNIX and LINUX environment
- To make the students to know how to work with system calls
- To Construct shell scripts with different programming styles.

List of Sample Problems/Experiments:

1) The objective of this exercise is to give experience in using telnet to connect to the Linux host, login using the user id and password provided and then to logout.

2) The objective of this exercise is to know about all basic commands and filter commands

3) 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.

4) Write a shell script program for performing word count and case conversion

5) Write a shell script to print prime numbers up to given limit.

6) Write a shell script program for performing arithmetic operations using case

7) Write a C program to implement the "cat" utility (file creation, display, file appending, etc.)

8) Write a C program by using fork function.

9) Write a C program for generating a signal.

10) Write a C program that permits a parent process to accept an integer from standard input and communicate with the child process.

11) Write a C program that performs bi-directional communication between two processes.

12) Write a C program that illustrates the communication between two processes using Message Queues/Shared Memory/Socket.

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1:	Ability to use Signals APIs to interrupt the process using suitable programs.	L2
2:	Ability to write programs using different IPCs.	L3
3:	Implement different system calls for various file handling operations	L1
4:	Ability to implement various shell script programs	L2
5:	Ability to implement various C programs in unix environment	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF42L -1	3	-	-	-	2	-	1	-	1	-	3	-
19DF42L -2	1	-	-	-	-	-	2	-	-	-	2	-
19DF42L -3	2	-	-	-	2	-	3	-	-	3	1	-
19DF42L -4	3	-	-	1	-	-	-	-	2	-	2	2
19DF42L-5	-	-	-	3	-	2	-	1	-	1	-	3

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Fourth Semester MCA

19DF43L-PYTHON PROGRAMMING LAB

COURSE OBJECTIVES

- To understand the concepts of Python
- To develop the programming skills in Python

Implement the following in Python

1. Programs using basic concepts.
2. Programs using various control structures.
3. Programs using lists.
4. Programs using functions.
5. Programs using objects.
6. Programs using turtle.
7. Programs using modules.
8. Programs using text files.
9. Programs using Exception Handling.
10. Programs using Dictionaries.
11. Programs using Recursion.
12. Programs using object oriented concepts.

EXPECTED COURSE OUTCOMES

	Student's will be able to	Blooms Level of Learning
1 :	Describe the Python language syntax including control statements, loops and functions to write programs for a wide variety problem in mathematics, science, and games.	L2
2 :	Examine the core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data.	L3
3 :	Examine the core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data.	L3
4 :	Discover the capabilities of Python regular expression for data verification and utilize matrices for building performance efficient Python programs.	L2
5 :	Identify the external modules for creating and writing data to excel files and inspect the file operations to navigate the file systems.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF43L -1	3	3	2	2	3	-	-	-	-	-	-	-
19DF43L -2	3	2	2	3	3	-	-	-	-	-	-	-
19DF43L -3	3	3	3	2	3	-	-	-	-	-	-	-
19DF43L -4	2	1	2	2	3	-	-	-	-	-	-	-
19DF43L -5	2	1	2	1	3	-	-	-	-	-	-	-

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Fourth Semester MCA

19DF44L-KNOWLEDGE ENGINEERING LAB

COURSE OBJECTIVES

- This lab course is intended to introduce data mining techniques including predictive, descriptive and visualization modeling and their effective use in discovering interesting hidden patterns in large volume of data.
- Focus is on the main process of data mining such as data preparation, classification, clustering, association analysis, and pattern evaluation

The objective of the lab exercises is to use data mining techniques to identify customer segments and understand their buying behavior and to use standard databases available to understand DM processes using WEKA / R (or any other DM tool)

1. Perform credit risk assessment Task using WEKA Tool.
2. Build Multidimensional data models for Bank Management System.
3. Implement the following Multidimensional Data Models for Bank Management System.
   i. Star Schema
   ii. Snowflake Schema
   iii. Fact Constellation
4. Implement Apriori algorithm to generate frequent Item Sets
5. Implement the following clustering algorithms
   i. K-means
   ii. K-mediods
6. Implement the following classification algorithms

i. Decision Tree Induction
ii. KNN

7. Perform data Preprocessing using WEKA
8. Perform Discretization of data using WEKA
9. Classification algorithms using WEKA
10. Apriori algorithm using WEKA

EXPECTED COURSE OUTCOMES

	Student 's will be able to	Blooms Level of Learning
1 :	Demonstrate the importance of preprocessing the given datasets.	L2
2 :	Design and implement classification algorithm to classify given problems using modern tools	L3
3 :	Design and implement clustering algorithm to group the given attributes in a dataset using modern tools.	L3
4 :	Demonstrate to find association rules for the given datasets using modern tools.	L2
5 :	Develop skills to design data warehouse for an enterprise.	L1,L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF44L-1	-	3	-	-	-	-	-	-	-	-	-	-
19DF44L-2	-	2	-	2	-	-	-	-	-	-	-	-
19DF44L-3	-	2	-	-	2	-	-	-	-	-	-	-
19DF44L-4	-	3	-	-	2	-	-	-	-	-	-	-
19DF44L-5	1	-	-	-	-	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Fifth Semester MCA

19DF51T-MOBILE APPLICATION DEVELOPMENT

COURSE OBJECTIVES

- Learning about mobile devices types
- Learning about modern mobile operating systems
- Learning about data transmission standards
- Learning about systems for mobile application distribution
- Preparing for mobile application development

UNIT I

Hello, Android: A Little Background, What Android isn"t, Android: An Open Platform for Mobile Development, Native Android Applications, Android SDK Features, Introducing the Open Handset Alliance, What Does Android Run On?, Why Develop for Mobile?, Why Develop for Android?, Introducing the Development Framework, **Getting Started:** Developing for Android, Developing for Mobile and Embedded Devices, Android Development Tools.

UNIT II

Creating Applications and Activities: What Makes an Android Application?, Using the Manifest Editor, Externalizing Resources, The Android Application Lifecycle, Understanding an Application"s Priority and its Process States,Introducing the Android Application Class, A Closer Look at Android Activities.

Building User Interfaces: Fundamental Android UI Design, Android User Interface Fundamentals, Introducing Layouts, Introducing Fragments, The Android Widget Toolbox, Creating New Views, Introducing Adapters.

UNIT III

Databases and Content Providers: Introducing Android Databases, Introducing SQLite, Content Values and Cursors, Working with SQLite Databases, Creating Content Providers, Using Content Providers, Adding Search to Your Application, Creating a Searchable Earthquake Content Provider, Native Android Content Providers, **Working In The Background:** Introducing Services, Using Background Threads, Using Alarms.

UNIT IV

Advanced User Experience: Designing for Every Screen Size and Density, Ensuring Accessibility, Introducing Android Text-to-Speech, Using Speech Recognition, Controlling Device Vibration, Working with Animations, Enhancing Your Views, Advanced Drawable Resources, Copy, Paste, and the Clipboard.

Hardware Sensors: Using Sensors and the Sensor Manager, Monitoring a Device"s

Movement and Orientation, Introducing the Environmental Sensors.

UNIT V

Maps, Geo-coding, and Location-Based Services: Using Location-Based Services, Using the Emulator with Location-Based Services, Selecting a Location Provider, Finding Your Current Location, Best Practice for Location Updates, Using Proximity Alerts, Using the Geo-coder.

Creating Map-Based Activities, Audio, Video, and Using The Camera: Playing Audio and Video, Manipulating Raw Audio, Creating a Sound Pool, Using Audio Effects, Using the Camera for Taking Pictures, Recording Video, Using Media Effects, Adding Media to the MediaStore.

TEXT BOOK:

1. Reto Meier: Professional Android 4 Application Development. Wiley India Edition, 2012.

Chapters: 1, 2, 3, 4, 8, 9, 11, 12, 13, 15

REFERENCE BOOKS:

1. Jerome(J.F.)DiMarzio:AndroidAProgrammer's Guide, Tata McGraw-Hill, 2010
2. B.M. Harwani: Android Programming, Pearson,2013 Jason Ostrander: Android UI Fundamentals Develop and Design, Pearson,2014

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Student knows mobile devices and mobile platforms	L3
2: Student has knowledge concerning mobile operating systems and their architecture	L2
3: Student is familiar with wireless communications standards and data transmission standards	L3
4: Student knows how to prepare a mobile application for distribution	L3
5: Student knows how to prepare a mobile app for location based services.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF51T -1	3	2	1	-	2	-	1	1	1	-	1	-
19DF51T -2	3	2	-	-	-	-	2	2	-	-	1	-
19DF51T -3	3	3	1	-	3	1	1	1	-	1	-	-
19DF51T -4	2	1	-	-	3	-	2	1	-	-	-	-
19DF51T -5	2	2	2	-	2	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Fifth Semester MCA

19DF52T-.NET TECHNOLOGIES

COURSE OBJECTIVES

- Design and Develop professional console and window based .NET applications.
- Construct classes, methods and assessors and instantiate objects.
- Create and manipulate GUI components in C#.
- Design and Implement database connectivity using ADO.NET in window based applications.
- Identify industry defined problem and suggesting solution(s) using .NET applications.

UNIT I

INRODUCTION TO .NET FRAMEWORK: .NET Overview, Behind Microsoft .NET, The .NET Platform, .NET Framework Design Goals, Common Language Runtime, CLR Environments and Executables , Metadata-JIT Compilation, Automatic Memory Management, Assemblies and Manifests, Intermediate Language(IL), CTS and CLS.

UNIT II

INTRODUCTION TO C# .NET PROGRAMMING: Introduction to C#, Common Elements in Visual C, C# Core Language Features, Types, Classes, Structures, Enumeration, Inheritance, Interfaces, Polymorphism, Arrays and Collections, Generics, Operator Overloading, Delegates and Events, Introduction to LINQ Programming, Exception Handling, MSIL Programming.

UNIT III

APPLICATION DEVELOPMENT USING ADO .NET: Features of ADO .NET- Architecture of ADO .NET, ADO .NET Providers, Accessing Database using ADO .NET, Connection Opening and Closing- Command Object, Data Adapter, Dataset, Data Tables, Controlling table views with Data Views , Data-binding in Windows Forms and Web Forms.

UNIT IV

INTRODUCTION TO ASP.NET: Introduction, Working in ASP.NET Controls, Session and Cookies, Caching, Authentication and Authorization, Web User Controls, Working with Web Configure file, Implementing Security, Crystal Reports, Creating Setup and Deployment.

UNIT V

WEB SERVICES: Introduction to Web Services, Web Services Protocol and Standards, WSDL, Overview of UDDI, Calling a Web Service from a Browser, Calling a Web Service by using a proxy, Creating a Simple Web Service-AJAX.

TEXT BOOKS:

1. Thuan L. Thai. .NET Framework Essentials. O'Reilly, 2003, 3rd Ed.
2. Donis Marshall. Programming Microsoft Visual C# 2008. Microsoft Press 2008.
3. Francesco Balena. Programming Microsoft Visual Basic .NET. Microsoft Press 2006.

REFERENCE BOOKS:

1. Rebecca M. Riordan. Microsoft ADO.NET Step by Step. Microsoft Press 2002.
2. Kogent, ASP.NET 3.5 Black Book, Dream Tech Publications, 2010.
3. Andy Wigley, Peter Roxburgh. Building Microsoft ASP.NET Applications for Mobile Devices.Microsoft Press 2003, 2nd Ed.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Understand, analyze and explain .NET Framework and C#.	L2
2: Understand, analyze and use basic C# constructs, delegates and events and use language interfaces, and inheritance.	L3
3: Understand, analyze and exposed to the Common Language Runtime (CLR), garbage collection, and assemblies.	L2
4: Understand, analyze and use exceptions, Windows Forms, .NET Remoting and Serialization.	L3
5: Build interactive web applications using ASP.NET and C#.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF52T -1	3	3	3	-	3	3	3	-	3	-	3	-
19DF52T -2	2	3	3	-	3	2	3	-	3	-	3	-
19DF52T -3	3	3	3	-	3	2	3	-	3	-	3	-
19DF52T -4	2	3	3	-	3	1	3	-	3	-	3	-
19DF52T -5	1	2	2	-	1	1	3	-	1	-	2	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET (AN AUTONOMOUS INSTITUTION)

Fifth Semester MCA

19DF53T- OBJECT ORIENTED MODELING AND DESIGN WITH UML

COURSE OBJECTIVES

- Specify, analyze and design the use case driven requirements for a particular system.
- Model the event driven state of object and transform them into implementation specific layouts.
- Identify, Analyze the subsystems, various components and collaborate them interchangeably

UNIT I

INTRODUCTION: Object Orientation, importance of modeling, principles of modeling, UML architecture and Conceptual model of UML.

UNIT II

STRUCTURAL MODELING: Classes, Relationships, Common Mechanisms, Advanced classes, Interfaces, Packages, modeling Class and Object Diagrams.

UNIT III

BEHAVIORAL MODELING: Interaction diagrams, Use cases, Use case Diagrams and Activity Diagrams.

UNIT IV

ADVANCED BEHAVIORAL MODELING: Events and signals, state machines, processes and Threads, time and space, state chart diagrams

UNIT V

ARCHITECTURAL MODELING: Component, Deployment, Component diagrams and Deployment diagrams

TEXT BOOKS:

1.GradyBooch, James Rumbaugh, Ivar Jacobson. The Unified ModelingLanguage User Guide.PearsonEducation.1998.
2.MichaelBlaha and James Rumbaugh. Object Oriented Modeling and Design with UML,2005.

REFERENCE BOOKS:

1.CraigLarman. Appling UML and Patterns: An introduction to Object - Oriented Analysis and Design and Unified Process. Pearson Education,2008.
2.BerndOestereich. Developing software with UML- Addision-Wesley, June2002.
3.Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado. UML 2 Toolkit, WILEY- Dreamtech India Pvt.Ltd.2004.

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1:	Analyze, design, document the requirements through use case driven approach.	L3
2:	Identify analyses, and model structural and behavioral concepts of the system	L2
3:	Develop explore the conceptual model into various scenarios and applications	L2
4:	Apply the concepts of architectural design for deploying the code for software	L1
5:	Understand the concepts of advanced behavioral modelling.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF53T-1	3	2	-	1	-	-	3	-	2	-	-	-
19DF53T-2	2	-	-	-	-	2	-	-	-	1	2	1
19DF53T-3	1	-	1	-	-	-	-	3	1	1	2	3
19DF53T-4	1	-	2	-	1	-	-	-	2	1	2	3
19DF3T-5	-	-	1	1	2	-	-	3	-	-	1	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Fifth Semester MCA

19DF5AT- INTERNET OF THINGS

COURSE OBJECTIVES

- The objective of the course is to explore usage and performance of Internet of Things in real-world applications.
- Understand constraints and opportunities of wireless and mobile networks for Internet of Things

UNIT I

IoT definitions: overview, applications, potential & challenges, and architecture.
IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home.

UNIT II

Introduction to Internet of things: Physical Design of IoT, Logical Design of IoT,IoT Enabling Technologies .

UNIT III

Domain Specific IoTs: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry.

UNIT IV

IoT Platform Design Methodology: Purpose & requirements Specification , Process specification, Domain model specification, Information model specification, IoT level specification , Operation view specification , Application Development.

UNIT V

Raspberry PI Interface: Serial, Serial Peripheral Interface (SPI) and I2C protocol address and Interface.
Apache Hadoop: MapReduce Programming Model and HandoopMapReduce Job Execution.

TEXT BOOK :

1. ArshdeepBahga and Vijay Madisetti. " Internet of Things: a hands-on Approach" , copyright @ 2014.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Understand the usage and performance of Internet of Things in real-world applications.	L2
2: Explain in a concise manner how the general Internet as well as Internet of Things Works.	L1
3: Understand constraints and opportunities of wireless and mobile networks for Internet of Things.	L2
4: Use basic measurement tools to determine the real-time performance of packet based Networks.	L1
5: Analyze trade-offs in interconnected wireless embedded sensor networks.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF5AT -1	3	2	-	3	1	-	1	-	2	-	-	-
19DF5AT -2	1	2	1	3	-	-	1	-	-	-	-	-
19DF5AT -3	2	1	3	3	-	-	1	-	1	-	-	-
19DF5AT -4	2	3	2	3	1	-	1	-	-	-	-	-
19DF5AT -5	3	1	2	-	2	-	1	-1	1	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Fifth Semester MCA

19DF5BT- INFORMATION SECURITY

COURSE OBJECTIVES

- The objective of the course is to explore a comprehensive study of the principles and practices of computer system security
- Providing Security at operating system Level , network security, software security and web security.

UNIT I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.

UNIT II

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT III

Public key cryptography principles, public key cryptography algorithms, digital signatures, Kerberos, X.509 Directory Authentication Service, EMAIL PRIVACY: Pretty Good Privacy (PGP) and S / MIME.

UNIT IV

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.
Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats, Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS:

1. William Stallings. Network Security Essentials (Applications and Standards). Pearson Education.
2. Bruce Schneier. Applied Cryptography. Toha Wiley and Sons, 1996, 2nd Ed.
3. Stallings. Cryptography and Network Security - Principles and Practice. Prentice Hall, 2002, 3rd Ed.

REFERENCE BOOKS:

1. Eric Maiwald. Fundamentals of Network Security. Dreamtech press, 2003.

2. Charlie Kaufman, Radia Perlman and Mike Speciner. Network Security - Private Communication in a Public World. Pearson/PHI, 2002.
3. Whitman. Principles of Information Security. Thomson, 2008, 3rd Ed.

EXPECTED COURSE OUTCOMES

Student's will be able to	Blooms Level of Learning
1: To understand what are the common threats faced today.	L2
2: Able to learn the foundational theory behind information security	L1
3: Understand basic principles and techniques when designing a secure system	L2
4: Use basic measurement tools to defend attacks and defenses work in practice	L1
5: To assess threats for their significance and how to gauge the protections and limitations provided by today's technology	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF5BT -1	3	2	-	3	1	-	1	-	2	-	-	-
19DF5BT -2	1	2	1	3	-	-	1	-	-	-	-	-
19DF5BT -3	2	1	3	3	-	-	1	-	1	-	-	-
19DF5BT -4	2	3	2	3	1	-	1	-	-	-	-	-
19DF5BT -5	3	1	2	-	2	-	1	-1	1	-	-	-

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Fifth Semester MCA

19DF5CT- BUSINESS ANALYTICS

COURSE OBJECTIVES

- Assess Advanced business analytics concepts and core IT concepts
- Explain predictive analytics fundamentals
- Facilitate advanced problem solving using data mining.
- Critique problems, issues, and trends using predictive analysis

UNIT I

Fundamental of Business Analytics: Introduction to Business Analytics, Evolution of Business Analytics, Scope of Business Analytics, Business Analytics Applications, Data for Business Analytics, Decision Model, Problem Solving and Decision Making.

UNIT II

Descriptive Analytics: Introduction, Visualizing and Exploring Data, Data Visualization, Data Queries Using Sorting and Filtering, Statistical Methods for Summarizing Data, **Descriptive Statistical Measures**: Populations and Samples, Measures of Location, Measures of Dispersion, Measures of Shape, Measures of Association, Statistical Thinking in Business Decisions, Details of Data Modeling.

UNIT III

Predictive Analytics: Introduction, Predictive Modeling and Analysis, Logic-Driven Modeling, Data-Driven Modeling, Analyzing Uncertainty and Model Assumptions, Model Analysis Using Risk Solver Platform, **Introduction to Data Mining:** The Scope of Data Mining, Data Exploration and Reduction, Classification, Classification Techniques, Association Rule Mining, Cause-and-Effect Modeling, Discrete choice models

UNIT IV

Prescriptive Analytics: Introduction, Linear Optimization, Building Linear Optimization Models, Implementing Linear Optimization Models, Solving Linear Optimization Models, Graphical Interpretation of Linear Optimization, Using Optimization Models for Prediction and Insight, Time series models, Survival and duration analysis.

UNIT V

Making Decisions with Uncertain Information, Decision Trees, The Value of Information, Utility and Decision Making, Case Study

TEXT BOOKS:

1. James R. Evans, “Business Analytics: Methods, Models, and Decisions”, Pearson 2012
2. R. N. Prasad, Seema Acharya, “Fundamentals of Business Analytics” , Wiley 2011
3. Evan Stubbs, “Delivering Business Analytics: Practical Guidelines for Best Practice”, Wiley 2013

REFERENCE BOOKS:

1. Thomas H. Davenport, Jeanne G. Harris and Robert Morison, "Analytics at Work: Smarter Decisions, Better Results", Harvard Business Press, 2010
2. Business Analytics: An Application Focus, Purba Halady Rao, Prentice Hall.
3. Modeling Techniques in Predictive Analytics, Thomas W. Miller, Pearson

EXPECTED COURSE OUTCOMES

	Student's will be able to	**Blooms Level of Learning**
1 :	Describe and use a wide variety of business analytics methods in a business or an industry context	L1,L2
2 :	Understand how business analytics can be used in business development and in developing industrial processes	L2
3 :	Learn to use and to apply a selection of modern business analytics tools and software to solve real-world problems with real-world data.	L1,L3
4 :	Demonstrate hands-on skills in applying business analytics to real-world business and industrial problems	L2
5 :	Conduct an independent scientific research project, and report on and present it professionally.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF5CT-1	2	3	2	2	3	-	-	-	2	-	-	-
19DF5CT-2	2	3	3	3	3	-	-	-	-	-	-	-
19DF5CT-3	2	3	3	3	3	-	-	-	2	-	-	-
19DF5CT-4	2	3	3	3	3	-	-	-	2	1	-	2
19DF5CT-5	1	-	3	-	-	-	-	2	-	-	2	-

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Fifth Semester MCA

19DF5DT- SOFTWARE TESTING METHODOLOGIES
(ELECTIVE-IV)

COURSE OBJECTIVES

- To understand the fundamental concepts of software testing, testing objectives and taxonomy of bugs.
- To know various path testing and transaction flow testing techniques.
- To gain knowledge of data flow and domain testing.
- To understand path products, regular expressions and logic based testing techniques.
- To understand State graphs and graph matrices.

UNIT I

INTRODUCTION: The Purpose of testing, Some Dichotomies, Model for testing, Consequences of bugs, Taxonomy of bugs.

UNIT II

FLOW GRAPHS AND PATH TESTING: Basic Concepts of path-testing, Predicates, path predicates and achievable paths, Path sensitizing, Path instrumentation, Application of path testing,
TRANSACTION-FLOW TESTING: Transaction flows, transaction-flow testing techniques.

UNIT III

DATA FLOW TESTING: Basics of Dataflow testing, Strategies in dataflow testing, Application of dataflow testing.
DOMAIN TESTING: Domains and paths, Nice and Ugly domains, Domain testing, Domains and interface testing, Domains and testability.

UNIT IV

PATH, PATH PRODUCTS AND REGULAR EXPRESSIONS: Path products and path expressions, A Reduction procedure, Applications.
LOGIC BASED TESTING: Motivational Overview, Decision tables, Path expressions.

UNIT V

STATE, STATE GRAPHS AND TRANSITION TESTING: State graphs, Good and bad state graphs, State testing.
GRAPH MATRICES AND APPLICATIONS: The Matrix of a graph, Relations,The powers of a matrix, Node-reduction algorithm, Building tools.

TEXT BOOK:

1. Boris Beizer. Software testing techniques. Dreamtech, 2009, 2nd Ed.

REFERENCE BOOKS:

1. Edward kit. Software testing in the real world.Addison-Wesley professional, July 1995.
2. Dr.K.V.K.K.Prasad. Software Testing Tools. Dreamtech press, New Delhi, 2007, Reviewed.

EXPECTED COURSE OUTCOMES:

Student's will be able to	**Blooms Level of learning**
1: Understand the concepts of software testing, testing objectives and taxonomy of bugs.	L1
2: Know various path testing and transaction flow testing techniques.	L1,L2
3: Understand data flow and domain testing techniques.	L3
4; Understand path products, regular expressions and logic based testing techniques.	L2
5: Understand State graphs and graph matrices.	L3

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF5DT -1	3	2	-	1	1	-	1	-	-	-	-	-
19DF5DT -2	3	2	1	2	-	-	1	-	-	-	-	-
19DF5DT -3	3	2	1	3	-	-	1	-	-	-	-	-
19DF5DT -4	3	3	1	3	1	-	1	-	-	-	-	-
19DF5DT -5	3	1	2	-	2	-	1	-	-	-	-	-

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Fifth Semester MCA

19DF5ET-IT SERVICE MANAGEMENT
(Elective IV)

COURSE OBJECTIVES

- To know the essential concepts of Service Management.
- To understand Service Life Cycle.
- To know basic ITIL Processes and Functions.
- To understand advanced ITIL Processes with their functionalities.
- Guides on measurement and metrics.

UNIT-I

Introduction: What is Service Management?, Best practice versus Good practice, Why ITIL is required?, The ITIL framework, The ITIL Core, The ITIL Service Management Model, Benefits of ITIL.

UNIT-II

The Service Lifecycle: ITIL Publications, Service Basics, Service Strategy, Service Design, Service Transition, Service Operation, Continual Service improvement.

UNIT-III

The Processes and Functions – I: IT Financial Management, Demand Management, Service Portfolio Management, Service Level Management, Supplier Management, Capacity Management, Availability Management, Information Security Management and Access Management, Knowledge Management.

UNIT-IV

The Processes and Functions – II: Change Management, Release and Deployment Management, Request Fulfillment, Incident Management, Problem Management, IT Operations Management, Event Management.

UNIT-V

Measurement and Metrics: Service Oriented Architecture, Application Management, Technical Management, The Seven-step improvement process, Measurement and Metrics, The Deming Cycle.

TEXT BOOK:

1. IT Service Management: A Guide for ITIL V3 Foundation Exam Candidates, Ernest Brewster, Richard Griffiths, Aidan Lawes, John Sansbury, bcs The chartered institute for IT, Viva Books Private Limited.

REFERENCE BOOK:

1. ITIL for Beginners: The Complete Begineer guide to itil; 2nd Edition, Clydebank Technology, Clydebank.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Remember essential concepts of Service Management.	L1
2: Understand Service Life Cycle.	L2
3: Know basic ITIL Processes and Functions.	L2
4: Understand advanced ITIL Processes with their functionalities.	L3
5: Understand measurement and metrics.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF5ET -1	-	1	-	-	-	1	1	-	-	2	-	-
19DF5ET -2	-	2	-	-	-	1	-	2	-	1	-	-
19DF5ET -3	-	2	1	-	1	-	1	-	-	-	1	-
19DF5ET -4	1	-	1	1	1	-	-	-	1	-	-	-
19DF5ET- 5	-	-	2	1	1	-	-	2	1	-	-	2

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Fifth Semester MCA

19DF5FT-SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES

- To study how to plan and manage projects at each stage of the software development life cycle.
- To train software project managers and other individuals involved in software project planning and tracking.
- Oversight in the implementation of the software project management process.
- To understand successful software projects that support organization's strategic goals.

UNIT I

FUNDAMENTALS: Conventional software management - Evolution of software economics - Improving software economics - Conventional versus modern software project management.

UNIT II

SOFTWARE MANAGEMENT PROCESS FRAMEWORK: Lifecycle phases - Artifacts of the process - Model based software architectures - Workflows of the process - Checkpoints of the process.

UNIT III

SOFTWARE MANAGEMENT DISCIPLINES: Iterative process plans - Organization and responsibilities - Process automation - Process control and process instrumentation - Tailoring the process.

UNIT IV

MANAGED AND OPTIMIZED PROCESS: Data gathering and analysis - Principles of data gathering - Data gathering process - Software measures - Data analysis - Managing software quality - Defect prevention.

UNIT V

CASE STUDIES: COCOMO Cost Estimation Model - Change metrics - CCPDS-R.

TEXT BOOKS:

1. Walker Royce, “Software Project Management - A Unified Framework”, Pearson Education, 2004.
2. Humphrey Watts, “Managing the Software Process”, Addison Wesley, 1989

REFERENCE BOOKS:

1. Ramesh Gopalaswamy, “Managing Global Projects”, Tata McGraw Hill, 2001
2. Bob Hughes and Mikecotterell, “Software Project Management”, 3rd Edition, Tata McGraw Hill, 2004.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Remember essential concepts of Software Project Management.	L1
2: Understand Software Management Process Frame work.	L2
3: Know Interative Process Plans and process automation	L2
4: Understand the principles of data gathering.	L3
5: Understand COCOMO Model.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF5FT -1	-	1	-	1	-	1	1	-	-	2	-	-
19DF5FT -2	-	-	-	-	-	1	-	2	-	1	-	-
19DF5FT -3	1	2	1	-	2	-	1	-	-	-	-	-
19DF5FT -4	1	-	1	1	1	-	-	-	1	-	-	-
19DF5FT- 5	-	-	2	-	1	-	-	2	1	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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Fifth Semester MCA

19DF51L-MOBILE APPLICATION DEVELOPMENT LAB

COURSE OBEJECTIVES

- To gain knowledge of installing Android Studio and Cross Platform Integrated Development Environment.
- To learn designing of User Interface and Layouts for Android App.
- To learn how to use intents to broadcast data within and between Applications.
- To use Content providers and Handle Databases using SQLite.
- To introduce Android APIs for Camera and Location Based Service.
- To discuss various security issues with Android Platform.

EXPERIMENTS

1. Developing Simple Applications for Android.
2. Creating Applications with Multiple Activities and a Simple Menu using List View.
3. Creating Activities for Menu Items and Parsing XML Files.
4. Writing Multi-Threaded Applications.
5. Using Web View and Using the Network.
6. Using Audio Functions in Android.
7. Graphics Support in Android.
8. Media Store.
9. Location Services and Google Maps in Android.
10. Simulating Sensors.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Build a native application using GUI components and Mobile application development framework.	L3
2: Develop an application using basic graphical primitives and databases	L3
3: Construct an application using multi threading and RSS feed	L2
4 : Make use of location identification using GPS in an application	L3
5 : Model new applications to hand held devices	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF51L-1	3	2	1	-	2	2	2	2	1	-	1	-
19DF51L-2	3	2	2	-	-	2	-	-	1	-	1	-
19DF51L-3	3	1	-	3	1	2	-	-	2	-	2	-
19DF51L-4	-	3	-	1	-	3	2	3	-	-	-	-
19DF51L-5	3	-	-	3	2	2	-	2	3	-	3	-

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Fifth Semester MCA

19DF52L-.NET TECHNOLOGIES LAB

COURSE OBJECTIVES

- Design and Develop professional console and window based .NET applications.
- Construct classes, methods and assessors and instantiate objects.
- Create and manipulate GUI components in C#.
- Design and Implement database connectivity using ADO.NET in window based application.
- Identify industry defined problem and suggesting solution(s) using .NET applications.

List of Programs

1. a) Write a Simple Program in C# to write a String on the Screen.
   b) Write a Program in C# to prompt the user for some input and then take some action.

2. a) Write a Program in C# to demonstrate different kinds of arrays including jagged arrays.
   b) Write a Program in C# to implement an Interface.

3. a) Write a Program in C# to create a base class shape and derived classes i.e., Rectangle, Circle, and Triangle. Invoke the method from base class shape using polymorphism.
   b) Write a C# Program to print a Binary Triangle.

4. a) Write a C# Program to illustrate Single Inheritance.
   b) Write a C# Program to demonstrate Multiple Exceptions.

5. Write a C# Program for String Handling.

6. Write a VB.NET Program for String Conversion.

7. Write a VB.NET Program for performing Arithmetic Operations.

8. Write a VB.NET Program to perform timer based quiz of 10 queswtions.

9. Develop a menu based VB.NET application to implement a text editor with cut, copy, paste, save and close operations.

10. Develop a VB.NET Application using the File, Directory and Directory Controls toimplement a Common Dialog Box.

11. Develop a form ibn VB.NET to pick a date from Calendar control and display the day, month, year details in separate text boxes.

12. Write a Simple ASP.NET application.

EXPECTED COURSE OUTCOMES

Student's will be able to	**Blooms Level of Learning**
1: Understand, analyze and explain .NET Framework and C#.	L2
2: Understand, analyze and use basic C# constructs, delegates and events and use language interfaces, and inheritance.	L3
3: Understand, analyze and exposed to the Common Language Runtime (CLR), garbage collection, and assemblies.	L2
4: Understand, analyze and use exceptions, Windows Forms, .NET Remoting and Serialization.	L3
5: Build interactive web applications using ASP.NET and C#.	L2

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF52L -1	3	3	3	-	3	3	3	-	3	-	3	-
19DF52L -2	2	3	3	-	3	2	3	-	3	-	3	-
19DF52L -3	3	3	3	-	3	2	3	-	3	-	3	-
19DF52L -4	2	3	3	-	3	1	3	-	3	-	3	-
19DF52L -5	1	2	2	-	1	1	3	-	1	-	2	-

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Fifth Semester MCA

19DF53L-UML LAB

COURSE OBJECTIVES

- Describe the three pillars of object-orientation and explain the benefits of each.
- Create use case documents that capture requirements for a software system.
- Create class diagrams that model both the domain model and design model of a software system.
- Create interaction diagrams that model the dynamic aspects of a software system.
- To make the students to know about all the nine diagrams

Select 4 Projects from the following and design UML Diagrams

1. Online Library Management System
2. Airline Reservation System
3. ATM Model
4. Hospital Management System
5. Point of Sale
6. College Management System

EXPECTED COURSE OUTCOMES

	Student's will be able to	Blooms Level of Learning
1:	Select the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC.	L3
2:	Apply basic and Advanced Structural Modeling Concepts for designing real time applications.	L2
3:	Design Class and Object Diagrams that represent Static Aspects of a Software System.	L2
4:	Analyze Dynamic Aspects of a Software System using Use Case, Interaction and Activity Diagrams.	L1
5:	Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.	L3

CO- PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19DF53L -1	-	1	-	-	3	-	-	-	-	1	2	-
19DF53L -2	3	2	2	-	3	-	-	1	-	3	3	1
19DF53L -3	-	-	2	2	3	-	2	-	-	2	2	-
19DF53L -4	-	-	2	2	3	-	-	3	-	-	1	-
19DF53L -5	-	-	2	2	3	-	-	-	-	-	-	-