RGM COLLEGE OF ENGINEERING AND TECHNOLOGY

AUTONOMOUS

Affiliated to JNTUA-Ananthapuramu, Approved by AICTE-New Delhi,
Accredited by NBA-New Delhi, Accredited by NAAC with A+ Grade-New Delhi
Nandyal – 518501, AP, India

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

Regulations, Course Structure and Detailed Syllabus

RGM-R-2020

(ESTD-1995)

Applicable for students admitted into
B.Tech (Regular) from 2020-2021
B.Tech (Lateral Entry Scheme) from 2021-22

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI
B.Tech. (Regular) from 2020-21 and B.Tech. (Lateral Entry Scheme) from 2021-22

For pursuing four year Bachelor Degree Program (under graduate) of study in Engineering (B.Tech.), Two-year Master (post graduate) Degree of study in Engineering (M.Tech), Two year Master (post graduate) degree of study in Business Administration (MBA), Two year Master (post graduate) Degree of study in Computer Applications (MCA) offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal - 518501 under Autonomous status and herein referred to as RGMCET (Autonomous).

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2020-21 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

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

The candidate seeking admission into the first year of study of four year B.Tech degree Program should have:

i) Passed either Intermediate Public Examination (IPE) conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination certified by Board of Intermediate Education) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or any equivalent examination certified by State Board of Technical Education) for admission.

ii) Secured a rank in the EAMCET/EAPCET

iii) examination conducted by AP State Council for Higher Education (APSCHE) for allotment of a seat by the Convener, EAMCET/EAPCET, for admission.

Admission Procedure:

As per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made to the first year of Four year B.Tech. Degree program as follows:

a) As per the norms of Government of Andhra Pradesh, A-Category (based on the rank obtained in EAMCET/EAPCET) seats will be filled by the Convener, EAMCET/EAPCET.

b) As per the norms of Government of Andhra Pradesh, B-Category seats will be filled by the management.

Admission to the Second year of Four year B.Tech. Degree Program in Engineering:

i) Candidates qualified in ECET and admitted by the Convener, ECET, in such cases for admission, when needed permission from the statutory bodies is to be obtained.

   ii) 10% of the sanctioned strength in each program of study (of RGMCET) shall be filled by the Convener, ECET as lateral entry.

List of Programs offered

1. B.Tech – Regular & Lateral Entry
2. M.Tech – Regular
3. MBA – Regular
4. MCA – Regular

Academic Regulations for 2020-21 B. Tech. (Regular)

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

The B.Tech. Degree be conferred by the Jawaharlal Nehru Technological University Anantapur, Anantapuramu, students who are admitted to the program and fulfill all the requirements for the award of the Degree as specified below:

1.0 Award of B.Tech. Degree

   1.1. The student will be declared eligible for the award of the B. Tech. degree if he fulfils the following academic regulations:

   1.2. Pursued a course of study for not less than prescribed course work duration and not more than double the prescribed course work duration.

   1.3. Registered for 160 credits and secured 160 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

S.No	Subject Particulars		
1	All the subjects offered in B.Tech course / MOOCs	7	Technical Seminar
2	**Mandatory Learning Courses** [Environmental Science, Environmental Engineering, Universal Human Values, Indian Heritage and Culture, Constitution of India, Induction Program, Essence of Indian Traditional Knowledge]	8	2 Months Internships - Two
3	All Practical Subjects	9	6 Month Internship
4	All Skill Oriented Courses /Skill Advanced Courses/ Soft Skill Courses	10	Main Project Work
5	Comprehensive Viva	11	Universal Human Values as 03 credits course with effective from 2021 admitted students.
6	Environmental Sciences/ Universal Human Values/ Environmental Engineering/ Indian Heritage and Culture/ Constitution of India/ Constitution, Essence of Indian Traditional Knowledge etc., shall be included in the curriculum as non-credit mandatory courses.		

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2.0 Forfeit of seat

Students, who fail to fulfill all the academic requirements for the award of the degree within **eight academic years** from the year of their admission, shall forfeit their seat in B.Tech. Course.

3.0 Courses of study

The following courses of study are offered at present as specializations for the B.Tech. Course: and any other course as approved by the authorities of the University from time to time.

1) **Civil Engineering**
2) **Electrical and Electronics Engineering**
3) **Mechanical Engineering**
4) **Electronics and Communication Engineering**
5) **Computer Science and Engineering**
6) **Computer Science and Engineering (Data Science)**
7) **Computer Science and Engineering and Business Systems**

Table 2: Credits

Subject	Semester			
	Periods/ Week	Credits	Internal Marks(IM)	External Marks (EM)
Theory	2+1*	3	30	70
Mandatory Learning Courses (Internal Evaluation)	2	-	-	-
Practical	3	1.5	25	50
Drawing	1+4 P	3	30	70
Skill Development Courses (Internal Evaluation)	1+2*	2**	30	70
Summer Internship /CSP Two months (Mandatory) after second year (to be evaluated along with 5th Semester end examinations)/ Community Service Project (Internal Evaluation)	-	1.5	-	100 Certificate from Internship Agency/ signed by any authorized person. Evaluation will be carried as per the guidelines of APSCHE
Industrial/Research Internship Two months (Mandatory) after third year (to be evaluated along with 7th Semester end examinations)	-	3	-	100 Certificate from Internship Agency Evaluation will be carried as per the guidelines of APSCHE *40% for report, 60% Oral Presentation*
Comprehensive Viva (CV) in VII Semester	-	1	-	50
Major Project	-	6	50	100
Technical Seminar	-	1	50	-
6 Months Internship in Industry	-	5	-	Certificate from Internship Agency/ Industry

Note: * Tutorial

Note: ** [Skill Development Course/ Mandatory Learning Course credits will not be considered for the award of division. However, all these courses have to be cleared through internal evaluation by scoring minimum of 40% marks. The credits obtained in Skill development courses will be taken in to account for the award of degree]

Note: - EAA will not carry any credits but attendance requirements of 75% should be fulfilled otherwise they have to reregister to fulfill academic requirements.

4.0 Distribution and Weightage of Marks

4.1. The performance of the student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 75 marks for practical subject. Comprehensive Viva-Voce (CV) shall be evaluated for 50 marks each and the project work shall be evaluated for 100 marks.

4.2. For theory subjects, the distribution shall be 30 marks for Internal Evaluation (20 marks for internal test and 10 marks for assignment or field work/group task / online test) and 70 marks for the End-Examination.

4.3. During the semester there shall be 2 tests for theory subjects. In each Internal test there shall be one compulsory (short answers) question and 3 descriptive questions are to be answered. The duration of internal test will be for 2 hours. First test to be conducted in 3 units and second test to be conducted in the remaining 3 units of each subject. For awarding of 20 Internal marks the performance of the student in two Internal examinations conducted one in the middle of the semester and the other towards the end of the semester giving a weight age of 0.75 for the better score and 0.25 for the other score will be considered. There shall be two assignments (*only online submission of Assignments will be accepted*) in each subject (problem based/ field work/group task/Online test) for award of 10 marks so that internal Component (marks) will be 30 marks (20 marks for internal test+10 marks for assignments / field work/group task). *Out of these two internal tests one internal test for 20 marks will be conducted in online mode.*

Table 3: Units for Internal Tests

Semester	
3 Units - First Internal test	3 Units - Second Internal test

4.4. In the case of Skill Development Courses/ Mandatory Learning courses, two Internal examinations shall be conducted one in the middle of the semester and the other at the end of the semester for 30 marks and the marks scored by the student in these exams with a weight age of 0.75 for better score and 0.25 for the other score will be awarded as Internal marks for 30. For the remaining 70 marks an end examination will be conducted along with other theory examinations. However, skill development courses/Value added courses/ Mandatory Learning Courses, end examination will be evaluated internally.

4.5. No makeup test for internal examination or assignments/group tasks will be conducted in any subject or practical. The student, who is absent for any test shall be deemed to have scored zero marks in that subject.

4.6. Open and Professional Electives will commence from 3rd year first semester onwards. The open elective offered in 3-1 semester will be based on self-study/MOOCs. All the students have to opt for the MOOCs (Self Study) and should acquire the required credits. If the student fails to opt for MOOCs, (Under unavoidable circumstances) he/she has to write two internal tests besides the end examination conducted by the institute (Elective offered in place of MOOCs by the Dept.) like other subjects. However, he/she has to obtain the certificate from the organization in which he has registered. Any MOOCs course selected by the student should be of more than 45 hours duration / 12 weeks course with a minimum of 3 credits and also from the reputed organization. Attendance of the student who has opted for MOOCs will be taken from the remaining subjects and labs only in that semester while finalizing the attendance for fulfilling the minimum requirements of attendance for promotion to the next semester. Attendance will not be recorded for MOOCs.

{Massive open online Courses (MOOCs') B.Tech students can avail the facility of earning up to a maximum of 5% credits of their degree requirements through MOOCs. MOOC courses eligible for this purpose are the courses offered by NPTEL / SWAYAM / EDX / Course by any other reputed organisation approved by the department only. The student shall obtain prior approval of the Head of the Department before registering for MOOC's. MOOC courses can be taken in lieu of Elective courses such as Open Electives & Professional Electives (pertaining to their branch only) and Employability Enhancement Courses. No Core, Lab or Project Course can be dropped in lieu of MOOC. The student shall submit course Title, institute which offered MOOC, Examination system and Credits of the Course, duration of course. After deciding on the MOOC and a course which is approved as its equivalent in the curriculum a student can enrol for it and clear it any time as per his/her convenience and obtain the assessment certificate.

If the assessment certificate is submitted

i) Before the commencement of the semester in which the equivalent course is offered, the student will be exempted from attending the regular class work and internal assessment exams of the equivalent subject.

ii) During the semester the student is permitted to withdraw from the remaining part of the course work and internal assessment tests.

iii) After the semester is over but before the results of that semester are declared the student can request for considering his performance in the MOOC in lieu of its equivalent.

The student shall submit to the HOD the original certificate issued by MOOC authorities along with a photocopy of the same. The original will be returned after verification and verification shall be certified by the Head of the Department on the photocopy which shall be kept in records. An equivalent Grade corresponding to grade/marks awarded by MOOC agency shall be determined by a committee consisting of Principal, Controller of Examinations, Dean Student affairs and HOD concerned. This equivalent Grade shall be shown in the grade sheet and accounted in the SGPA and CGPA calculations.

4.7. Gap Year – Concept of student Entrepreneur in Residence shall be introduced and the outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I/II/III year to pursue full time entrepreneurship. This period may be extended for another one year (two years in total) and this period would not be counted for the maximum duration for completion of graduation. An evaluation committee shall be constituted to evaluate the proposal submitted by the student and committee shall decide on permitting the student for having the Gap Year. The committee consists of Principal as Chairman and all HODs as members.

4.8. In the open electives offered from III year I Sem onwards student has to select the subjects among the list of open elective subjects by the other departments (inter - department). Student has to clear the subject as per norms to get the required credits. At least minimum of 40 students should register for any open elective; otherwise, that open elective will not be offered.

4.9. Out of the professional electives offered from III Year I Semester onwards again one Professional elective in IV Year I Sem will be a MOOCs (Self Study) and the student has to acquire the required credits to clear the subject as specified in 4.6.

4.10. There shall be mandatory student induction program for freshers, with a three-week duration before the commencement of first semester. Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept. / Branch & Innovations etc., shall be included in the guidelines issued by AICTE.

4.11. All undergraduate students shall register for Extra - Academic Activity (EAA) such as

a) NCC/NSS

b) Games and Sports

c) Yoga/Meditation

d) Extension Activities

e) Literary/ Cultural Activities

f) Any other which may be offered in future.

A student will be required to participate in an activity for two hours in a week during second and third semesters. The activities shall be carried out in the allotted hours. The activities will be monitored by the respective faculty in charge, senior faculty member of the department and the Department HOD. Grades will be awarded on the basis of participation, attendance, performance and behaviour. Grades shall be entered in the marks statement as **Good**, **Satisfactory** and **Unsatisfactory** and shall not be counted towards CGPA calculation. If any student gets an Unsatisfactory Grade, he / she has to repeat the activity in the immediate subsequent Semester / year.

4.12. Courses like Environmental Sciences, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc., shall be included in the curriculum as non-credit mandatory courses. Environmental Sciences is to be offered compulsorily as mandatory course for all branches. A student has to secure 40% of the marks allotted in the internal evaluation for passing the course. No marks or letter grade shall be allotted for all mandatory non-credit courses. **Universal Human Values course** shall be included in the curriculum as credit course in place of any open elective as per the convenience of department.

4.13. Students shall undergo **two mandatory summer internships for a minimum of two months** duration at the end of **second and third** year of the Programme. There shall also be **mandatory 6 months internship** in the **final semester** of the Programme along with the project work and seminar.

4.14. **Curricular Framework for Skill oriented**

i) For skill oriented/skill advanced course, one theory and 2 practical hours or two theory hours may be allotted as per the decision of concerned BOS.

ii) Out of the five skill courses two shall be skill-oriented courses from the same domain and shall be completed in second year. Of the remaining 3 skill courses, one shall be necessarily be a soft skill course and the remaining 2 shall be skill-advanced courses either from the same domain or Job oriented skill courses, which can be of inter disciplinary nature.

iii) A pool of interdisciplinary job-oriented skill courses shall be designed by a common Board of studies by the participating departments/disciplines and the syllabus along with the pre requisites shall be prepared for each of the laboratory infrastructure requirements. The list of such courses shall be included in the curriculum structure of each branch of Engineering, so as to enable the student to choose from the list.

iv) The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/ Professional bodies /APSSDC or any other accredited bodies as approved by the concerned BoS.

v) The Board of studies of the concerned discipline of Engineering shall review the skill advanced courses being offered by eligible external agencies and prepare a fresh list every year incorporating latest courses based on industrial demand.

vi) If a student chooses to take a Certificate Course offered by industries/ Professional bodies/ APSSDC or any other accredited bodies, in lieu of the skill advanced course offered by the Department, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency/professional bodies as approved by the Board of studies.

vii) If a student prefers to take a certificate course offered by external agency, the department shall mark attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate as approved by the concerned Board of Studies, the student is deemed to have fulfilled the attendance requirement of the course and acquire the credits assigned to the course.

viii) A committee shall be formed at the level of the college to evaluate the grades/marks given for a course by external agencies and convert to the equivalent marks/grades. The recommended conversions and appropriate grades/marks are to be approved by the University/Academic Council.

4.15. Curricular Framework for Honours Programme

i) Students of a Department/Discipline are eligible to opt for Honors Programme offered by the same Department/Discipline.

ii) A student shall be permitted to register for Honors program at the beginning of 4th semester provided that the student must have acquired a minimum of 8.0 SGPA up to the end of 2nd semester without any backlogs. In case of the declaration of the 3rd semester results after the commencement of the 4th semester and if a student fails to score the required minimum of 8 SGPA, his/her registration for Honors Programme stands cancelled and he/she shall continue with the regular Programme.

iii) Students can select the additional and advanced courses from their respective branch in which they are pursuing the degree and get an honors degree in the same. e.g. If a Mechanical Engineering student completes the selected advanced courses from same branch under this scheme, he/she will be awarded B.Tech. (Honors) in Mechanical Engineering.

iv) In addition to fulfilling all the requisites of a Regular B.Tech Programme, a student shall earn 20 additional credits to be eligible for the award of B. Tech (Honors) degree. This is in addition to the credits essential for obtaining the Under Graduate Degree in Major Discipline (i.e. 160 credits).

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v) Of the 20 additional Credits to be acquired, 16 credits shall be earned by undergoing specified courses listed as pools, with four courses, each carrying 4 credits. The remaining 4 credits must be acquired through two MOOCs, which shall be domain specific, each with 2 credits and with a minimum duration of 8/12 weeks as recommended by the Board of studies.

vi) It is the responsibility of the student to acquire/complete prerequisite before taking the respective course. The courses offered in each pool shall be domain specific courses and advanced courses.

vii) The concerned BoS shall decide on the minimum enrolments for offering Honors program by the department. If minimum enrolments criteria are not met then the students shall be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BoS.

viii) Each pool can have theory as well as laboratory courses. If a course comes with a lab component, that component has to be cleared separately. The concerned BoS shall explore the possibility of introducing virtual labs for such courses with lab component.

ix) MOOC courses must be of minimum 8 weeks in duration. Attendance will not be monitored for MOOC courses. Students have to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade to be assigned will be as decided by the university/academic council.

x) The concerned BoS shall also consider courses listed under professional electives of the respective B. Tech programs for the requirements of B. Tech (Honors). However, a student shall be permitted to choose only those courses that he/she has not studied in any form during the Programme.

xi) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into free or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a "pass (P)" grade and also choose to omit the mention of the course as for the following: All the courses done under the dropped Minors will be shown in the transcript. None of the courses done under the dropped Minor will be shown in the transcript.

xii) In case a student fails to meet the CGPA requirement for Degree with Honors at any point after registration, he/she will be dropped from the list of students eligible for Degree with Honors and they will receive regular B.Tech degree only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

xiii) Honors must be completed simultaneously with a major degree program. A student cannot earn Honors after he/she has already earned bachelor's degree.

4.16. **Curricular Framework for Minor Programme:**

i) **a)** Students who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering may opt for additional courses in minor specialization groups offered by a department other than their parent department. For example, If Mechanical Engineering student selects subjects from Civil Engineering under this scheme, he/she will get Major degree of Mechanical Engineering with minor degree of Civil Engineering.

b) Student can also opt for Industry relevant tracks of any branch to obtain the Minor Degree, for example, a B.Tech Mechanical student can opt for the industry relevant tracks like Data Mining track, IoT track, Machine learning track etc.

ii) The BOS concerned shall identify as many tracks as possible in the areas of emerging technologies and industrial relevance / demand. For example, the minor tracks can be the fundamental courses in CSE, ECE, EEE, CE, ME etc. or industry tracks such as Artificial Intelligence (AI), Machine Learning (ML), Data Science (DS), Robotics, Electric vehicles, Robotics, VLSI etc.

iii) The list of disciplines/branches eligible to opt for a particular industry relevant minor specialization shall be clearly mentioned by the respective BoS.

iv) There shall be no limit on the number of programs offered under Minor. The University/Institution can offer minor programs in emerging technologies based on expertise in the respective departments or can explore the possibility of collaborating with the relevant industries/agencies in offering the program.

v) The concerned BoS shall decide on the minimum enrolments for offering Minor program by the department. If a minimum enrolments criterion is not met, then the students may be permitted to register for the equivalent MOOC courses as approved by the concerned Head of the department in consultation with BoS.

vi) A student shall be permitted to register for Minors program at the beginning of 4th semester subject to a maximum of two additional courses per semester, provided that the student must have acquired 8 SGPA (Semester Grade point average) up to the end of 2nd semester without any history of backlogs. It is expected that the 3rd semester results may be announced after the commencement of the 4th semester. If a student fails to acquire 8 SGPA up to 3rd semester or failed in any of the courses, his registration for Minors program shall stand cancelled. An SGPA of 8 has to be maintained in the subsequent semesters without any backlog in order to keep the Minors registration active.

vii) A student shall earn additional 20 credits in the specified area to be eligible for the award of B. Tech degree with Minor. This is in addition to the credits

essential for obtaining the Under Graduate Degree in Major Discipline (i.e. 160 credits).

viii) Out of the 20 Credits, 16 credits shall be earned by undergoing specified courses listed by the concerned BoS along with prerequisites. It is the responsibility of the student to acquire/complete prerequisite before taking the respective course. If a course comes with a lab component, that component has to be cleared separately. A student shall be permitted to choose only those courses that he/she has not studied in any form during the Programme.

ix) In addition to the 16 credits, students must pursue at least 2 courses through MOOCs. The courses must be of minimum 8 weeks in duration. Attendance will not be monitored for MOOC courses. Student has to acquire a certificate from the agencies approved by the BOS with grading or marks or pass/fail in order to earn 4 credits. If the MOOC course is a pass/fail course without any grades, the grade to be assigned as decided by the university/academic council.

x) Student can opt for the Industry relevant minor specialization as approved by the concerned departmental BoS. Student can opt the courses from Skill Development Corporation (APSSDC) or can opt the courses from an external agency recommended and approved by concerned BOS and should produce course completion certificate. The Board of studies of the concerned discipline of Engineering shall review such courses being offered by eligible external agencies and prepare a fresh list every year incorporating latest skills based on industrial demand.

xi) A committee should be formed at the level of College/Universities/department to evaluate the Grades/marks given by external agencies to a student which are approved by concerned BoS. Upon completion of courses the departmental committee should convert the obtained grades/marks to the maximum marks assigned to that course. The controller of examinations can take a decision on such conversions and may give appropriate grades.

xii) If a student drops (or terminated) from the Minor program, they cannot convert the earned credits into free or core electives; they will remain extra. These additional courses will find mention in the transcript (but not in the degree certificate). In such cases, the student may choose between the actual grade or a "pass (P)" grade and also choose to omit the mention of the course as for the following: All the courses done under the dropped Minors will be shown in the transcript. None of the courses done under the dropped Minor will be shown in the transcript.

xiii) In case a student fails to meet the CGPA requirement for B.Tech degree with Minor at any point after registration, he/she will be dropped from the list of students eligible for degree with Minors and they will receive B.Tech degree

only. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

xiv) Minor must be completed simultaneously with a major degree program. A student cannot earn the Minor after he/she has already earned bachelor's degree.

INDUSTRIAL COLLABORATIONS (CASE STUDY)

University-Industry linkages refer to the interaction between firms and universities or public research centers with the goal of solving technical problems, working on R&D, innovation projects and gathering scientific as well as technological knowledge. It involves the collaboration of Industries and Universities in various areas that would foster the research ecosystem in the country and enhance growth of economy, industry and society at large.

The Universities/Institutions (Autonomous) are permitted to design any number of Industry oriented minor tracks as the respective BoS feels necessary. In this process the Universities/Institutions can plan to have industrial collaborations in designing the minor tracks and to develop the content and certificate programs. Industry giants such as IBM, TCS, WIPRO etc., may be contacted to develop such collaborations. The Universities/Institutions shall also explore the possibilities of collaborations with major Industries in the core sectors and professional bodies to create specialized domain skills.

4.17. All the students have to undergo three mandatory internships namely

i)   Summer internship (During 2nd year break)

ii) Industrial/ Research internship (During 3rd year break)

iii) 6 Months internship in industry (During 8th Semester)

The student has to (mandatory) undergo summer internship in II year–II Sem break in a reputed organization for two months. The finalization of the internship organization will be done by HOD, two senior faculty members of the department and same will be recommended to the principal for approval. The outcome of the summer internship will be evaluated during the 5th semester which carries 1.5 credits. The student has to undergo research/ industry internship in III year –II Semester break for a period of two months in a reputed organization. The finalization of the summer internship organization will be done by HOD, two senior faculty members of the department and same will be recommended to the principal for approval. The outcome of the research/industry internship will be evaluated during 7th semester which carries 3 credits. The student has to undergo 6 months internship in IV Year, II Semester for a complete period of 6 months in a reputed organization. The finalization of the summer internship organization will be done by HOD, two senior faculty members of the department and same will be recommended to the principal for approval. The outcome of the research/industry internship will be evaluated during 7th semester which carries 3 credits. Certificate from the organization has to be

submitted to this effect attested by HOD and Internship in charge to the academic section before the commencement of 3-2 semester.

4.18. The medium of instruction for all Course work, Examination, Seminar Presentations, Project Reports and all academic activities shall be English.

5.0 Question Paper Pattern

5.1. Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 5 marks (It contains 5 questions of one marks - no choice in first question). The remaining 3 questions carry 5 marks each. Each question shall have a,b,c.... parts.

5.2. The End Examination question paper will have 7 questions and students have to answer 5 questions. However, the first question is compulsory and it consists of 7 short answer questions, each carrying 2 marks. The next 4 questions are to be answered from the remaining 6 questions and each carries 14 marks. Each 14 marks question shall have a, b, c .. parts. Evaluation of answer scripts shall be done by either Internal or External examiners appointed by the principal. A minimum of 50% of subjects will be evaluated by external examiners.

5.3. For practical subjects, there shall be a continuous evaluation during the semester for 25 internal marks and End Examination carries 50 marks. Of the 25 marks for Internal, 15 marks shall be awarded for day-to-day work, 5 marks to be awarded by conducting an internal laboratory test and 05 marks will be allotted for any creativity/ innovation/ additional learning in lab beyond prescribed set of experiments etc. The End Examination shall be conducted by the teacher concerned and an external Examiner from other institutions.

5.4. For the subject having design and/or drawing, (such as Engineering Graphics, Machine Drawing etc.) and estimation, the distribution shall be 30 marks for Internal evaluation (15marks for day-to-day work and 5 marks for Internal tests and 10 marks for assignments) and 70 marks for End Examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests.

5.5. The Engineering drawing, wherever offered is to be treated as a theory subject. Evaluation method adopted for theory subjects shall be followed here as well.

5.6. There shall be comprehensive Viva-Voce examination at the end of 7th semester. Comprehensive Viva Examination shall be conducted by the committee consisting of senior faculty (based on the recommendation of HOD), an external Examiner from other institutions and HOD and evaluated for 50 marks.

5.7. The project topic should be approved by Internal Department Committee (IDC) / Identified by organization where the student is carrying out 6 months internship. Out of total 150 marks for the project work, 50 marks shall be for Internal Evaluation and

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100 marks for the End Semester Examination. The evaluation of project work shall be conducted at the end of the IV Year, II-Semester. The external project viva voce examination will be conducted by the committee consisting of an external Examiner from other institute, Head of the Department and the supervisor of the project. The Internal evaluation for 50 marks shall be on the basis of one technical seminar (25 marks) and remaining 25 for main project related activities. The Internal evaluation of the project work for 50 marks shall be conducted by the committee consisting of head of the Department or his nominee, senior faculty member and the supervisor of project.

5.8. For all practical /main project/CV etc. the HOD of the concerned dept. shall submit a panel of 4 external examiners from different institutes and one will be selected by the Chief Superintendent of the Examination for conducting of end examination.

5.9. **Revaluation of End Examination Scripts**: Revaluation of End Examination scripts is allowed for theory subjects only by paying requisite fee. Procedure for Revaluation: The script will be revaluated by an examiner appointed by the principal. The maximum of revaluation and regular end examination grade will be awarded for that subject. Student can apply for revaluation in a subject only once.

Table 4: Distribution of weightages for examination and evaluation

S.No	Nature of subject	Marks	Type of examination and mode of assessment		Scheme of Examination
1	Theory	70	End Examination. Both internal and external Evaluation (at least a minimum of 50% subjects will be sent for external evaluation)		End Examination in theory subjects will be for 70 marks.
		30	20	Internal Examinations (Internal evaluation)	These 20 marks are awarded to the students based on the performance in two (per semester) Internal examinations with a weightage of 0.75 for better score and 0.25 for the other score.
			10	Assignments/Field work/Group task/Online Test	Average of two assignments /Field work/group task in a semester each evaluated for 10 marks.
2	Practical	50	End lab examination (External evaluation)		This End Examination in practical subjects will be for a maximum of 50 marks.
		25	15	Internal evaluation	Day-to-day performance in lab experiments and record.
			05	Internal evaluation	Internal lab examination at the end of year/semester.
			05	Internal evaluation	05 marks will be allotted for any creativity/ innovation/ additional learning in lab beyond prescribed set of experiments etc.
4	Comprehensive Viva (CV)	50	External evaluation		This end viva-voce examination in all the subjects for 50 marks
5	Project work	50	Internal evaluation		Project work for 50 marks
		100	External evaluation		This end viva-voce in project work for 100 marks

6	Skill Oriented Courses/ Skill Advanced Courses/ Soft Skill Courses	30	Internal evaluation	These 30 marks are awarded to the students based on the performance of two Internal examinations with a weight age of 0.75 for better score and 0.25 for the other score.
		70	Internal Evaluation	Based on the performance in the end examination.
7	Internship/ Internal Project/ Study Report/ Work shop	100	Internal evaluation	As per the Guidelines of APSCHE
8	Mandatory Learning Courses	-	-	No examinations. Attendance minimum is required.
9	EAA	-	Internal evaluation	Based on performance and committee report.
10	Technical Seminar	50	Internal Evaluation	Based on Seminar Report, performance and committee report.

6.0 Attendance Requirements:

6.1. The student shall be eligible to appear for End examinations of the semester if he acquires a minimum of 75% of attendance in aggregate of all the subjects of that semester.

6.2. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted by the College Academic Committee.

6.3. The student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester. They may seek re-admission for that semester when offered next.

6.4. **Shortage of Attendance below 65% in aggregate shall in <u>NO</u> case be condoned.**

6.5. Students whose shortage of attendance is not condoned in any semester are not eligible to take their End Examination of that class and their registration shall stand cancelled.

6.6. The stipulated fee shall be payable towards Condonation of shortage of attendance to the college.

6.7. A student is eligible to write the University examinations if he acquires a minimum of 50% in each subject and 75% of attendance in aggregate of all the subjects after Condonation. In case of the student having less than 50% of attendance in any one of the courses (**One subject / lab only**) during that particular semester, he/she will not be permitted to register and appear for that particular course in that particular semester end examinations. In such cases, the students need to register for makeup classes which will be notified by the CoE office after the completion of that particular semester or at appropriate time whichever is applicable. The students need to secure **90%** of the attendance in the make-up classes to appear for the supplementary examinations thereafter and this will be treated as a second attempt. The number of makeup classes to be conducted will be at least 35% of the regular class work taken

in that particular course. **If the attendance is less than 50% in more than one subject/lab he/she will be completely detained in that semester**.

7.0 Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.6.0.

7.1. The student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or CV or drawing subject or Skill Development Courses or project if he secures not less than 35% of marks in the End Examination (If applicable)) and he has to score minimum of 40% marks from internal and external exam marks put together to clear the subject.

7.2. The student shall be promoted from II to III year only if he fulfils the academic requirement of securing a minimum of 50% (41 credits out of 82) credits from all the exams conducted up to and including II Year II-Semester regular examinations irrespective of whether the candidate takes the examination or not.

7.3. The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing minimum of 50% (62.5 credits out of 125) credits from all the exams conducted up to and including III year II semester regular examinations, whether the candidate takes the examinations or not.

Table 5: Promotion rules

Promotion from	Total credits to register	Minimum credits to obtain for promotion
II year to III year	82	41
III year to IV year	125	62.5

7.4. The student shall register and put up minimum attendance in all 160 credits and earn 160 credits. Grades obtained in 160 credits shall be considered for the calculation of CGPA.

7.5. Students who fail to earn 160 credits as indicated in the course structure in Table-1 within eight academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission shall stand cancelled.

8.0 Course pattern:

8.1. The entire course of study is of four academic years. Each academic year consists of two semesters

8.2. The student is eligible to appear for the End Examination in a subject, but absent at it or has failed in the End Examination may appear for that subject at the supplementary examination.

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Table: 6: Course pattern

Year	Sem	No. of Subjects		Number of Labs		Total credits	
		CSE/ CSE(DS) /CSE&BS/ EEE	ECE/ CE/ Mech.	CSE/ CSE(DS) / CSE&BS/ EEE	ECE/ CE/ Mech.		
First	I	1) BSC - LA&AC 2) BSC - AP 3) ESC - PSP 4) ESC - BEE/BEE/BEE/FED 5) ESC - ED	1) BSC - LA &DE/ LA&AC/ LA&AC 2) BSC - MEC/AC/AC 3) ESC - PSP 4) ESC - FEE/EM /ED 5) HSS - English	1) ESC Lab - E&ITW 2) BSC Lab – EP Lab 3) ESC Lab - PSP	1) HSS Lab - DEL Lab 2) BSC Lab - EC Lab 3) ESC Lab - PSP Lab	Subjects - 5X3 = 15 Labs - 3X1.5 = 4.5	19.5
	II	1) BSC - DE&VC 2) BSC - MEC 3) ESC - DS 4) ESC - MFCS/MFCS/MFCS/BEE 5) HSS - English 6) ML - ES	1) BSC - AC&TT/ DE&VC 2) BSC - AP/ EP/ EP 3) ESC - DS 4) ESC - NWA/ BEEE/ MS 5) ESC - ED/ ED/ BEM 6) ML - ES	1) HSS Lab - DEL Lab 2) BSC Lab - EC Lab 3) ESC Lab - DS Lab	1) ESC Lab - E&ITW 2) BSC Lab - EP Lab 3) ESC Lab - DS Lab	Subjects - 5X3 = 15 ML – No Credits Labs - 3X1.5 = 4.5	19.5
Second	I	1) BSC 2) PCC 3) PCC 4) PCC 5) PCC 6) SOC 7) ML	1) BSC 2) PCC 3) PCC 4) PCC 5) PCC 6) SOC 7) ML	1) PCC Lab 2) PCC Lab 3) PCC Lab	1) PCC Lab 2) PCC Lab 3) PCC Lab	Subjects - 5X3 = 15 SOC - 1x2 = 2 ML – No Credits Labs - 3X1.5 = 4.5 EAA - No Credits	21.5
	II	1) ESC 2) BSC/PCC 3) PCC 4) PCC 5) HSS 6) SOC	1) ESC 2) BSC/PCC 3) PCC 4) PCC 5) HSS 6) SOC	1) ESC/PCC - Interdisciplinary Lab 2) PCC Lab 3) PCC Lab	1) ESC/PCC – Interdisciplinary Lab 2) PCC Lab 3) PCC Lab	Subjects - 4X3 = 12 HSS – 1X3 =3 SOC - 1x2 = 2 ML – No Credits Labs - 3X1.5 = 4.5	21.5
Third	I	1) PCC 2) PCC 3) PCC 4) OEC/JOE 5) PEC 6) SAC/SSC 7) ML	1) PCC 2) PCC 3) PCC 4) OEC/JOE 5) PEC 6) SAC/SSC 7) ML	1) PCC Lab 2) PCC Lab 3) Summer Internship/CSP	1) PCC Lab 2) PCC Lab 3) Summer Internship/CSP	Subjects - 3X3 = 9 OEC/JOE - 1X3 = 3 PEC – 1X3 = 3 SAC/SSC - 1x2 = 2 ML – No Credits Labs - 2X1.5 = 3 Internship - 1X1.5=1.5	21.5
	II	1) PCC 2) PCC 3) PCC 4) PEC 5) OEC/JOE 6) SAC/SSC 7) ML	1) PCC 2) PCC 3) PCC 4) PEC 5) OEC/JOE 6) SAC/SSC 7) ML	1) PCC Lab 2) PCC Lab 3) PCC Lab	1) PCC Lab 2) PCC Lab 3) PCC Lab	Subjects - 3X3 = 9 PEC – 1X3 = 3 OEC/JOE - 1X3 = 3 SAC/SSC - 1x2 = 2 ML - No Credits Labs - 3x1.5 = 4.5	21.5
Fourth	I	1) PEC 2) PEC 3) PEC 4) OEC/JOE 5) OEC/JOE 6) SAC/SSC 7) HSSE	1) PEC 2) PEC 3) PEC 4) OEC/JOE 5) OEC/JOE 6) SAC/SSC 7) HSSE	1) Industrial/ Research Internship 2) CVV	1) Industrial/ Research Internship 2) CVV	PEC - 3X3 = 9 OEC/JOE - 2X3 = 6 SAC/SSC - 1X2 = 2 HSSE - 1X2 = 2 Internship - 1X3 = 3 CVV - 1X1 = 1	23
	II	1) Technical Seminar 2) Internship in Industry 3) Major Project	1) Technical Seminar 2) Internship in Industry 3) Major Project			Seminar - 1X1 = 1 Internship - 1X5 = 5 Project - 1X6 = 6	12
						Total Credits	160

Note-1:
1) BSC – Basic Science Course
2) ESC – Engineering Science Course
3) HSS – Humanities and Social Science
4) ML – Mandatory Learning Course
5) SOC – Skill Oriented Course
6) SAC – Skill Advanced Course
7) PCC – Professional Core Courses
8) PEC – Professional Elective Course
9) OEC – Open Elective Course
10) JOE – Job Oriented Elective
11) SSC – Soft Skill Course
12) CSP – Community Service Project

Note-2: **Mandatory Learning Courses**
1) EC - Environmental Science
2) UHV - Universal Human Values
3) IHC - Indian Heritage and Culture
4) CI - Constitution of India

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Note-3: 1) Summer Internship Two months (Mandatory) after Second Year (to be evaluated during 5th Semester).

    2) Industrial/Research Internship Two months (Mandatory) after Third Year (to be evaluated during 7th Semester).

    3) Internship in Industry (during 8th Semester)

9.0 Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone this 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 2.0 and they continue to be in the academic regulations in which they were readmitted.

10.0 With-holding of results:

If the candidate has any dues not paid to the Institute or if any case of indiscipline of malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

11.0 Award of Class:

After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. degree he shall be placed in one of the following four classes:

Table 7: Award of Division

Class Awarded	% of marks to be secured	Division/ Class	CGPA	
First Class with Distinction	70% and above	First class With Distinction	≥ 7.5	CGPA Secured from 160 Credits
First Class	Below 70% but not less than 60%	First Class	≥ 6.5 to < 7.5	
Second Class	Below 60% but not less than 50%	Second Class	≥ 5.5 to < 6.5	
Pass Class	Below 50% but not less than 40%	Pass	≥ 4 to < 5.5	

12.0 Grading:

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

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Table 8: Conversion into Grades and Grade points assigned

Range in which the % of marks in the subject fall	Grade	Grade point Assigned	Performance
90 to 100	O	10	Outstanding
80 to 89.9	A$^+$	09	Excellent
70 to 79.9	A	08	Very Good
60 to 69.9	B$^+$	07	Good
50 to 59.9	B	06	Above Average
45 to 49.9	C	05	Average
40 to 44.9	P	04	Pass
<40	F	00	Fail
AB	AB	00	Fail

12.1. Requirement for clearing any subject: The students have to obtain a minimum of 35% in End Examination and they have to score minimum of 40% marks from Internal and external exam marks put together to clear the subject. Otherwise, they will be awarded fail grade.

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

12.3. In case of Skill Oriented/ Skill Advanced/ Soft Skill Subjects, as there is no end exam, all 100 marks are for internal assessment only. Student has to score 40% in these courses to complete the subject which will be evaluated internally. Marks obtained in these courses shall not be considered for award of Division.

12.4. To become eligible for the award of degree the student must obtain a minimum CGPA of 4.0

13.0 Supplementary Examinations:

Apart from the regular End Examinations, the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one examination per day. For eighth semester, special (Advance) supplementary examinations will be conducted in second week following the results publication date of regular examination of eighth semester only.

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14.0 Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)

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

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

$$GPA = \frac{\sum_1^n C_j \times GP_j}{\sum_1^n C_j}$$

Where, n is the number of subjects in that semester. C_j is Credits for the subjects. GP_j is the grade point obtained for the subject and the summation is over all the subjects in that semester.

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

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

Where 'm' is the number of semesters under consideration. TC_j the total number of credits for a jth semester and GPA_j is the Grade Point Average of the jth semester. Both GPA and CGPA will be rounded off to the second digit after decimal and recorded as such.

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

For any academic/employment purpose the following formulae shall be used for conversion of CGPA to % of marks. % of marks = (CGPA –0.5) x 10.

15.0 Grade Sheet:

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

16.0 Award of Degree

After having admitted into the program, B.Tech degree shall be conferred on a student who has satisfied the following conditions.

i) The student joining with Intermediate qualification must have, after admission into the Regular B.Tech programme of the college, pursued a regular course of study for not less than four academic years and not more than eight academic years.

ii) The student joining under lateral entry scheme with diploma qualification must have, after admission into III Semester B.Tech, pursued a regular course of study for not less than three academic years and not more than six academic years.

iii) The student must have satisfied the minimum academic requirements in appropriate branch of engineering in each semester of the program, herein after prescribed.

iv) Students must register for all the courses and earn the credits specified

v) Students who fail to fulfil all the academic requirements for the award of degree within the specified period from the year of their admission shall forfeit their seat in B.Tech course and their admission stands cancelled.

vi) The student shall successfully complete non-credit courses like EAA / ML / Internship.

vii) The student has no dues to the institution, library, hostels etc.

viii) The student has no disciplinary action pending against him/her.

The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on recommendations by the Academic council of RGMCET (Autonomous) basing on the eligibility as in clause 6.0 and 7.0.

17.0 Transcripts:

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

18.0 Rules of Discipline:

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

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

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

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

19.0 Minimum Instruction Days:

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

20.0 Amendment of Regulations:

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However, the academic regulations of any student will be same

throughout the course of study in which the student has been admitted. However, students will continue to be in the academic regulations in which they were readmitted.

21.0 Transfers

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

22.0 General:

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

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

22.3. The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.

22.4. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

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Academic Regulations for B.Tech. (Lateral Entry Scheme)

(Effective for the students getting admitted into II year from the Academic Year 2021-2022 onwards)

1.0 The students have to acquire a minimum of 121 credits out of 121 from II to IV year of B.Tech. Program (Regular) for the award of the degree.

2.0 Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

3.0 The same attendance regulations are to be adopted as that of B. Tech. (Regular).

4.0 Promotion Rule:

The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing minimum of 43 credits out of 86 credits from all the exams conducted up to and including III-year, II semester regular examinations, whether the candidate takes the examinations or not.

5.0 Award of Class:

After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes: The marks obtained in the best 121 credits will be considered for the calculation of percentage and award of class.

Table 1: Award of Division

Class Awarded	% of marks to be secured	Division/ Class	CGPA	
First Class with Distinction	70% and above	First class With Distinction	≥ 7.5	CGPA secured from 121 Credits
First Class	Below 70% but not less than 60%	First Class	≥ 6.5 to < 7.5	
Second Class	Below 60% but not less than 50%	Second Class	≥ 5.5 to < 6.5	
Pass Class	Below 50% but not less than 40%	Pass	≥ 4 to < 5.5	

6.0 All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

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INSTITUTE VISION

❖ To develop this rural based engineering college into an institute of technical education with global standards

❖ To become an institute of excellence which contributes to the needs of society

❖ To inculcate value based education with noble goal of "Education for peace and progress"

INSTITUTE MISSION

❖ To build a world class undergraduate program with all required infrastructure that provides strong theoretical knowledge supplemented by the state of art skills

❖ To establish postgraduate programs in basic and cutting edge technologies

❖ To create conductive ambiance to induce and nurture research

❖ To turn young graduates to success oriented entrepreneurs

❖ To develop linkage with industries to have strong industry institute interaction

❖ To offer demand driven courses to meet the needs of the industry and society

❖ To inculcate human values and ethos into the education system for an all-round development of students

INSTITUTE QUALITY POLICY

❖ To improve the teaching and learning

❖ To evaluate the performance of students at regular intervals and take necessary steps for betterment

❖ To establish and develop centers of excellence for research and consultancy

❖ To prepare students to face the competition in the market globally and realize the responsibilities as true citizen to serve the nation and uplift the country's pride.

VISION OF THE DEPARTMENT

❖ To empower students with cutting edge technologies in computer science and engineering.

❖ To train the students as entrepreneurs in computer science and engineering to address the needs of the society.

❖ To develop smart applications to disseminate information to rural people.

MISSION OF THE DEPARTMENT

❖ To become the best computer science and engineering department in the region offering undergraduate, post graduate and research programs in collaboration with industry.

❖ To incubate, apply and spread innovative ideas by collaborating with relevant industries and R & D labs through focused research groups.

❖ To provide exposure to the students in the latest tools and technologies to develop smart applications for the society.

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Program Outcomes (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex 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, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Program Educational Objectives (PEOs)

PEO-1: Pursue a successful career in the field of Computer Science & Engineering or a related field utilizing his/her education and contribute to the profession as an excellent employee, or as an entrepreneur.

PEO-2: Be aware of the developments in the field of Computer Science & Engineering; continuously enhance their knowledge informally or by pursuing graduate studies.

PEO-3: Engage in research and inquiry leading to new innovations and products.

PEO-4: Be able to work effectively in multidisciplinary and multicultural environments.

PEO-5: To be responsible members and leaders of their communities, understand the human, social and environmental context of their profession and contribute positively to the needs of individuals and society at large

Program Specific outcomes (PSOs)

PSO-I: Students will have the ability to understand the principles and working of computer systems to assess the hardware and software aspects of computer systems.

PSO-II: Students will have the ability to understand the structure and development methodologies of software system, that possess professional skills and knowledge of software design process.

PSO-III: Students will have the ability to use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations.

Note: Program Outcomes (POs) and Program Specific Outcomes (PSOs) are mapped with Course Outcomes (COs) and they are correlated in following levels

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

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I B.TECH., I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0001201	Linear Algebra and Advanced Calculus	2	1	0	3	30	70	100
A0004201	Applied Physics	2	1	0	3	30	70	100
A0501201	Problem Solving and Programming	2	1	0	3	30	70	100
A0202201	Basic Electrical Engineering	2	1	0	3	30	70	100
A0301201	Engineering Drawing	1	0	4	3	30	70	100
PRACTICALS								
A0592201	Engineering Workshop & IT Workshop	0	0	3	1.5	25	50	75
A0093201	Engineering Physics Lab	0	0	3	1.5	25	50	75
A0591201	Problem Solving and Programming Lab	0	0	3	1.5	25	50	75
	Total	**9**	**4**	**13**	**19.5**	**225**	**500**	**725**

I B.TECH., II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0007202	Differential Equations and Vector Calculus	2	1	0	3	30	70	100
A0005201	Modern Engineering Chemistry	2	1	0	3	30	70	100
A0502202	Data Structures	2	1	0	3	30	70	100
A0503202	Mathematical Foundations of Computer Science	2	1	0	3	30	70	100
A0003201	English for Engineers	2	1	0	3	30	70	100
MANDATORY LEARNING COURSE-I								
A0010202	Environmental Science	2	0	0	0	0	0	0
PRACTICALS		0	0	0	0	0	0	0
A0091201	Digital English Language Lab	0	0	3	1.5	25	50	75
A0092201	Engineering Chemistry lab	0	0	3	1.5	25	50	75
A0593202	Data Structures Lab	0	0	3	1.5	25	50	75
	Total	**12**	**5**	**9**	**19.5**	**225**	**500**	**725**

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II B.TECH., I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week				Marks		
		Theory	Tutorial	Lab	Credits	Internal	External	Total
THEORY								
A0018203	Engineering Economics & Accountancy	2	1	0	3	30	70	100
A0504203	Python Programming	2	1	0	3	30	70	100
A0505203	Advanced Data Structures Through C++	2	1	0	3	30	70	100
A0406203	Digital Logic Design	2	1	0	3	30	70	100
A0506203	Computer Organization & Architecture	2	1	0	3	30	70	100
SKILL DEVELOPMENT COURSE-I								
A0019203	Aptitude Arithmetic Reasoning & Comprehension	1	2	0	2	30	70	100
MANDATORY LEARNING COURSE-II								
A0014203	Indian Heritage & Culture	2	0	0	0	0	0	0
PRACTICALS								
A0594203	Advanced Data Structures Through C++ Lab	0	0	3	1.5	25	50	75
A0571203	Python Programming Lab	0	0	3	1.5	25	50	75
A0493203	Digital Logic Design Lab	0	0	3	1.5	25	50	75
	Total	13	7	9	21.5	255	570	825

II B.TECH., II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week				Marks		
		Theory	Tutorial	Lab	Credits	Internal	External	Total
THEORY								
A0509204	Java Programming	2	1	0	3	30	70	100
A0507203	Database Management Systems	2	1	0	3	30	70	100
A0508203	Formal Languages and Automata Theory	2	1	0	3	30	70	100
A0510204	Design and Analysis of Algorithms	2	1	0	3	30	70	100
A0020203	Probability and Statistics	2	1	0	3	30	70	100
SKILL DEVELOPMENT COURSE-II								
A0511204	User Interface Technologies	1	2	0	2	30	70	100
PRACTICALS								
A0595203	Database Management Systems Lab	0	0	3	1.5	25	50	75
A0597204	Java Programming Lab	0	0	3	1.5	25	50	75
A0598204	Design and Analysis of Algorithms Lab	0	0	3	1.5	25	50	75
	Total	11	7	9	21.5	255	570	825

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III B.TECH., I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0516205	Computer Networks	2	1	0	3	30	70	100
A0517205	Operating Systems	2	1	0	3	30	70	100
A0518205	Software Engineering	2	1	0	3	30	70	100
OPEN ELECTIVE-I/JOB ORIENTED ELECTIVES								
A0519205	Full Stack Application Development	2	1	0	3	30	70	100
A0513205	Web Programming							
A0520205	R Programming							
PROFESSIONAL ELECTIVE-I								
A0521205	Data Warehousing and Mining	2	1	0	3	30	70	100
A0522205	Compiler Design							
A0523205	Advanced Computer Architecture							
SKILL DEVELOPMENT COURSE								
A0524205	Cloud Foundations	1	2	0	2	30	70	100
MANDATORY LEARNING COURSE-III								
A0022203	Constitution of India	2	0	0	0	0	0	0
PRACTICALS								
A0599205	Computer Networks and Operating Systems Lab	0	0	3	1.5	25	50	75
A0581205	Full Stack Application Development Lab	0	0	3	1.5	25	50	75
A0582205	Web Programming Lab							
A0583205	R Programming Lab							
A0023205	Community Service Project/Summer Internship	0	0	3	1.5	0	100	100
	Total	**13**	**7**	**9**	**21.5**	**230**	**620**	**850**

III B.TECH., II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0534206	Software Testing Methodologies and Tools	2	1	0	3	30	70	100
A0535206	Computer Graphics	2	1	0	3	30	70	100
A0536206	Big Data Analytics	2	1	0	3	30	70	100
OPEN ELECTIVE-II/JOB ORIENTED ELECTIVE								
A0525205	Android Programming	2	1	0	3	30	70	100
A0537206	SAP-ABAP and Basic Applications							
A0538206	Computer Vision and Image Processing							
PROFESSIONAL ELECTIVE-II/MOOCs								
A0548206	Network Programming	2	1	0	3	30	70	100
A0539206	Parallel Processing							
A0540206	Internet of Things							
SKILL DEVELOPMENT COURSE								
A0028206	Professional Ethics and Soft Skills	1	2	0	2	30	70	100
PRACTICALS								
A0585206	Software Testing Tools Lab	0	0	3	1.5	25	50	75
A0586206	Android Programming Lab	0	0	3	1.5	25	50	75
A0587206	SAP ABAP Applications Lab							
A0588206	Computer Vision and Image Processing Lab							
A0589206	Big Data Analytics Lab	0	0	3	1.5	25	50	75
	Total	**11**	**7**	**9**	**21.5**	**255**	**570**	**825**

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IV B.TECH., I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
PROFESSIONAL ELECTIVE-III								
A0515205	Artificial Intelligence	2	1	0	3	30	70	100
A0543207	Machine Learning							
A3441207	Business Intelligence							
PROFESSIONAL ELECTIVE-IV								
A0532206	Cyber Security	2	1	0	3	30	70	100
A3216207	Fundamentals of Quantum Computing							
A0554207	Human Computer Interaction							
PROFESSIONAL ELECTIVE-V/MOOCS								
A3201203	Foundations of Data Science	2	1	0	3	30	70	100
A3446206	Software Application Development using DevOps							
A0555207	Advanced Databases							
OPEN ELECTIVE-III/JOB ORIENTED COURSE								
A0551207	Data Analytics with R-Programming	2	1	0	3	30	70	100
A0552207	PHP Programming							
A0546207	Object Oriented Analysis & Design							
OPEN ELECTIVE-IV/JOB ORIENTED COURSE								
A0545207	Linux System Administration	2	1	0	3	30	70	100
A3225207	Augmented Reality and Virtual Reality							
A0553207	Multimedia and Application Development							
SKILL DEVELOPMENT COURSE								
A0547207	Block Chain Technologies	1	2	0	2	30	70	100
HUMANITIES AND SOCIAL SCIENCE								
A0021204	Management Science	2	0	0	2	30	70	100
MANDATORY LEARNING COURSE								
A0015203	Universal Human Values	2	0	0	0	0	0	0
A0094207	Comprehensive Viva	0	0	0	1	0	50	50
A0095207	Industrial / Research Internship	0	0	0	3	0	100	100
	Total	**15**	**7**	**0**	**23**	**210**	**640**	**850**

IV B.TECH., II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
A0096208	Technical Seminar	0	0	0	1	50	0	50
A0097208	Internship in Industry	0	0	0	5	0	100	100
A0098208	Major Project	0	0	0	6	50	100	150
	Total	**0**	**0**	**0**	**12**	**100**	**200**	**300**

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I B.Tech, I-Sem (CSE)

L	P	C
2	1	3

(A0001201) LINEAR ALGEBRA AND ADVANCED CALCULUS
For branches: CE, EEE, ME, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To familiarize the concepts of matrices and mean value theorems and their applications in engineering.
- ❖ To equip the students to solve various application problems in engineering through evaluation of Gamma, Beta functions and multiple integrals etc.,

COURSE OUTCOMES:
After completion of the course the student will be able to:
- ❖ Understand the use of matrices and linear system of equations in solving Network analysis, encoding and decoding in Cryptography and Quantum mechanics problems.
- ❖ Apply the concept of Gamma and Beta functions in digital signal processing, discrete Fourier transform, digital filters and Oscillatory theory in engineering.
- ❖ Analyse differential and integral calculus to solve improper integrals and its applications in many engineering disciplines.
- ❖ Determine the process to evaluate double and triple integrals and understand its usage to find surface area and volumes of various bodies in engineering.
- ❖ Identify the applications of advanced calculus & Linear algebra in electro-magnetic theory and in telecommunication engineering.

MAPPING OF COs & POs:

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

UNIT – I
Matrices: Elementary row transformations – Rank – Echelon form, Normal form – Solutions of Linear System of Homogenous and Non Homogeneous equations.

UNIT – II
Eigen Values, Eigen vectors – Properties – Cayley – Hamilton Theorem – Inverse and Power of a matrix by Cayley – Hamilton theorem.

UNIT – III
Quadratic forms: Linear Transformation – Reduction of quadratic form to canonical form and their nature (Rank, Signature and Index).

UNIT – IV
Mean value theorems: Rolle's Theorem – Lagrange's Mean Value Theorem – (excluding proof). Simple examples of Taylor's and Maclaurin's Series.
Functions of several variables – Jacobian – Maxima and Minima of functions of two variables - Lagrange method of Multipliers with three variables only.

UNIT – V
Multiple integrals: – Evaluation of Double integrals (Cartesian and Polar) – Change of Variables – Change of order of Integration – Changing into Polar coordinates – Evaluation of triple integrals.

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UNIT – VI

Special functions: Gamma function – Properties – Beta function – properties – Relation between Gamma and Beta functions – Evaluation of Integrals using Gamma & Beta functions.

TEXTBOOKS:
1) B. S. Grewal, Higher Engineering Mathematics, Khanna Publications.
2) R. K. Jain, S.R.K. Iyengar, Advanced Engineering Mathematics, Alpha Science.
3) T.K.V. Iyengar, B. Krishna Gandhi, A Text Book of Engineering Mathematics, Vol – I, S. Chand & Company.

REFERENCES:
1) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2) Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons,2011.
3) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
5) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

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I B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0004201) APPLIED PHYSICS
For branches: EEE, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To provide basic concepts of optics, quantum physics, semiconductors and their applications to the engineering students.

COURSE OUTCOMES:
After the completion of the course the students will be able to:
- ❖ Understand the concept of signals by studying the properties of light.
- ❖ Construct a quantum mechanical model to explain the behaviour of a system at the microscopic level.
- ❖ Analyse the structures of materials.
- ❖ Identify the semiconducting materials for a particular application.
- ❖ Develop new optoelectronic devices for various applications.

MAPPING OF COs & POs:

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

UNIT-I: WAVE –OPTICS
Interference: Introduction –Division of amplitude–Newton's rings and its applications.
Diffraction: Introduction – Fraunhofer diffraction at single slit– Diffraction Grating– Grating spectra –Determination of wavelength of light.

UNIT-II: QUANTUM MECHANICS
Introduction to quantum physics – Wave-Particle duality – de Broglie hypothesis – Verification of wave character of Matter waves (Davison–Germer experiment)– Uncertainty principle– Thought experiment (Electron diffraction) – Wave function (ψ) –Schrodinger's one-dimensional time-independent wave equation – Particle in 1D-potential box.

UNIT III: QUANTUM OPTICS & FIBER OPTICS
Lasers: Characteristics – Einstein's coefficients – Radiation processes – Population inversion – Pumping processes Lasing action –Nd-YAG and He-Ne lasers – Engineering applications
Fiber Optics: Structure –Principle – Acceptance angle, Numerical aperture – Propagation of light in Step-index and Graded-index fibers–Applications: Fibre optic communication system (Block diagram).

UNIT IV: THE CRYSTAL STRUCTURE OF SOLIDS
Introduction –Space lattice – Basis – Unit cell (primitive and Non-primitive) – Crystal systems – Bravais lattices –Atomic radius, Nearest neighbouring distance, Coordination numberand packing factor for SC, BCC, FCC lattices – Diamond structure – Crystal planes and directions– Miller Indices – calculation of interplanar distance.

UNIT V: FREE ELECTRON THEORY & BAND STRUCTURE OF SOLIDS
Introduction –Free electron theory–Sources of electrical resistivity – Fermi energy – Fermi level – Effect of temperature on Fermi distribution function –Kronig-Penny model (qualitative)–Energy bands– Effective mass – Classification of materials based on band theory.

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UNIT VI: SEMICONDUCTOR PHYSICS & DEVICES

Introduction –Intrinsic and Extrinsic semiconductors–Fermi level (qualitative)– Carrier generation and recombination–Carrier transport: Diffusion and Drift–Hall Effect and its applications–Direct and indirect band gap semiconductors –p-n junction, Band diagram and Working principle –LED – Solar cell.

TEXT BOOKS
1) M. N. Avadhanulu, P.G. Kshirsagar& TVS Arun Murthy" A Text book of Engineering Physics"- S. Chand Publications, 11thEdition 2019.
2) R. K. Gaur and S.C. Gupta, "Engineering Physics", Dhanpat Rai Publications, New Delhi.

REFERENCES
1) "Concepts of Modern Physics", Arthus Beiser Tata Mc Graw Hill Publications, New Delhi.
2) "Physics Volume – II", Resnick, Halliday and Krane, Wiley, New Delhi.
3) "Elements of Solid-State Physics", J.P. Srivastava, PHI, 4theds.New Delhi.
4) "Semiconductor Devices: Physics and Technology" S. M. Sze,2nd eds. Wiley.
5) "Solid State Electronic Devices" Ben G. Streetman, Sanjay Kumar Banerjee, 6th eds. PHI Learning.
6) "Electronic Devices and Circuits", 2ndeds. Reston Publishing Company, Inc., Reston, Virginia.
7) "Solid State Physics" R.K. Puri and V.K. Babber, S. Chand Publishing,

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I B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0501201) PROBLEM SOLVING AND PROGRAMMING
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ Introduce the internal parts of a computer, and peripherals.
- ❖ Introduce the Concept of Algorithm and use it to solve computational problems
- ❖ Identify the computational and non-computational problems
- ❖ Teach the syntax and semantics of a C Programming language
- ❖ Demonstrate the use of Control structures of C Programming language
- ❖ Illustrate the methodology for solving Computational problems

COURSE OUTCOMES:
- ❖ Construct his own computer using parts (L6).
- ❖ Recognize the importance of programming language independent constructs (L2)
- ❖ Solve computational problems (L3)
- ❖ Select the features of C language appropriate for solving a problem (L4)
- ❖ Design computer programs for real world problems (L6)
- ❖ Organize the data which is more appropriated for solving a problem (L6)

MAPPING OF COs & POs:

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

UNIT I

Computer Fundamentals: What is a Computer, Evolution of Computers, Generations of Computers, Classification of Computers, Anatomy of a Computer, Memory revisited, Introduction to Operating systems, Operational overview of a CPU.

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts, Strategy for designing algorithms, Tracing an algorithm to depict logic, Specification for converting algorithms into programs.

Learning Outcomes: Student should be able to
1. Identify the different peripherals, ports and connecting cables in a PC (L2)
2. Illustrate the working of a Computer (L3)
3. Select the components of a Computer in the market and assemble a computer (L4)
4. Solve complex problems using language independent notations (L3)

UNIT II

Introduction to computer problem solving: Introduction, the problem-solving aspect, top-down design, implementation of algorithms, the efficiency of algorithms, the analysis of algorithms.

Fundamental algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reversing the digits of an integer.

Learning Outcomes: Student should be able to
1. Solve Computational problems (L3)
2. Apply Algorithmic approach to solving problems (L3)
3. Analyse the algorithms (L4)

UNIT III

C Language Preliminaries: Keywords and Identifiers, Constants, Variables, Data Types, and Input Output Statements with suitable illustrative "C" Programs.

Operators: Assignment Operators, Relational and Logical Operators, Increment and Decrement Operators, Bitwise Operators, Ternary Operator, Type Conversion, Precedence and Associativity with suitable illustrative C Programs.

Learning Outcomes: Student should be able to
1. Understand keywords, data types in C (L2)
2. Use various operators in C program (L6)
3. Apply type conversions and also understand, analyse precedence and associativity (L2)

UNIT IV

Conditional/Decision Statements: if, if-else, Nested if-else, else-if ladder, Switch-Statement and go to statement with suitable illustrative C Programs.

Loop Control Statements: while, do-while and for with suitable illustrative "C" Programs, break, continue statements.

Learning Outcomes: Student should be able to
1. Select the control structures for solving the problem (L4)
2. Apply statements for solving the problem (L3)
3. Understand the statements in C language (L2)

UNIT V

Arrays: Definition, Importance of an array in C language, One-Dimensional Arrays, Two-Dimensional Arrays, Example programs on the topics mentioned above

Strings: Introduction to Strings, String I/O, String Operations and functions.

Functions: Introduction to Functions, benefits of functions, types of functions, Function calls, return vs. exit( ), Parameter Passing mechanisms, Call-by-Value, Recursion.

Learning Outcomes: Student should be able to
1. Design and develop C programs using functions and arrays. (L6)
2. Apply modular approach for solving the problem (L3)
3. Understand and apply various string handling functions (L2)

UNIT VI

Files: Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions(standard library input / output functions for files), file status functions (error handling),Positioning functions, command –line arguments, C program examples.

Storage Classes, pre-processor directives.

Learning Outcomes: Student should be able to
1. Describe the Files types and File operations. (L2)
2. Practice Command line arguments. (L3)
3. Perform Error handling in Filerelated programming in C.(L4)

TEXT BOOKS:
1. PradipDey, and Manas Ghosh, "Programming in C", 2018, Oxford University Press.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.

3. Brian W. Kernighan, and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Pearson.

REFERENCE BOOKS:

1) P.Chenna Reddy, "Computer Fundamentals and C Programming" 2018, BS Publications
2) RS Bichkar "Programming with C", 2012, Universities Press.
3) PelinAksoy, and Laura Denardis, "Information Technology in Theory", 2017, Cengage Learning.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0202201) BASIC ELECTRICAL ENGINEERING
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:

The course will enable the students to
- ❖ Get exposed to the basics in Electrical and Magnetic terms
- ❖ Get exposed to the basics in DC and AC circuits
- ❖ Briefing of Electrical machines fundamentals.
- ❖ Get exposed to real time applications of various types of electrical machines.
- ❖ To provide theoretical prerequisites necessary to do lab work on electrical machines and circuits.

COURSE OUTCOMES:

- ❖ To understand the basic concepts of electrical and magnetic circuits.
- ❖ To analyse DC Circuits with the basics of electrical engineering.
- ❖ To evaluate AC Circuits with the basics of electrical engineering.
- ❖ To remember the magnetic circuits concept to understand single phase transformers in detail.
- ❖ To apply the AC circuit's concept to understand three phase induction motor in detail.
- ❖ To create an interest to understand DC machines in detail.

MAPPING OF COS & POS:

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

UNIT-I:

Basic Electrical Quantities: Charge – Current – Voltage – Power – Energy – Work Done – Simple Problems.

Electrical Circuits: Ohm's Law and its limitations – Resistor and Resistance – Inductor and Inductance – Capacitor and Capacitance – Energy stored in inductor – Energy stored in capacitor – Simple Problems.

Magnetic Circuits: Magnetic Flux – Magnetic Flux Density – Magneto Motive Force – Faraday's Laws of Electro Magnetic Induction – Lenz's Law – Statically Induced EMF – Dynamically Induced EMF.

UNIT-II

DC Circuits: DC Voltage Source – DC Current Source – Kirchhoff's Voltage Law (KVL) – Kirchhoff's Current Law (KCL) – Simple Problems – Resistors in Series – Resistors in Parallel – Inductors in Series – Inductors in Parallel – Capacitors in Series – Capacitors in Parallel – Simple Problems on Network Reduction.

UNIT-III

Single Phase AC Circuits: AC Voltage Source – AC Current Source – Types of AC Waveforms – Cycle – Time Period – Frequency – Maximum Value, Average Value, RMS Value, Peak Factor and Form Factor of Sine Wave – Definitions of Active Power, Reactive Power, Apparent Power, Power Factor, Reactance and Impedance – Behavior of Resistor –

Behavior of Inductor – Behavior of Capacitor – Behavior of Series RL Circuit – Behavior of Series RC Circuit – Behavior of Series RLC Circuit – Simple Problems.

Three Phase AC Circuits: Introduction to Three Phase AC Circuits – Three Phase AC Waveform

UNIT-IV
DC Machine: Classification – Construction – Working Principle of DC Generator – Generated EMF Equation – Simple Problems on EMF Equation – Types of DC Generators – Applications of each type – Voltage Equations of Series Generator and Shunt Generator – Working Principle of DC Motor – Back EMF Equation – Simple Problems on Back EMF Equation – Types of DC Motors – Applications of each type – Voltage Equations of Series Motor and Shunt Motor.

UNIT-V
Single Phase Transformer: Construction – Classification – Core Type Transformer – Shell Type Transformer – Comparison between Core Type Transformer and Shell Type Transformer – Step Down Transformer – Step Up Transformer – Comparison between Step Down Transformer and Step-Up Transformer – Working Principle of Transformer – Applications – EMF Equation – Transformation Ratio – Turns Ratio – Simple Problems on EMF Equation.

UNIT-VI
Three Phase Induction Motor: Classification – Construction – Comparison between Squirrel Cage Induction Motor and Slip Ring Induction Motor – Applications – Rotating Magnetic Field Theory – Working Principle of Induction Motor – Comparison between Induction Motor and Transformer – Synchronous Speed – Slip – Frequency of Rotor Current – Simple Problems on Speed and Slip.

TEXT BOOKS:
1) Electrical and Electronic Technology – 10th Edition – Edward Hughes, Pearson Publications
2) Engineering Circuit Analysis – 8th Edition – W.Hayt & J.E.Kemmerly, McGraw Hill Publications
3) Basic Electrical Engineering – 2nd Edition – Kothari &Nagrath, TMH Publications
4) Introduction to Electrical Engineering – 3rd Edition – M.SNaidu & S.Kamakshaiah, TMH Publ.

REFERENCES:
1) Principles of Electrical Engineering – 1st Edition –V.K.Mehta, S.Chand Publications
2) Electrical Circuit Analysis –3rd Edition – Sudhakar & Shyam Mohan, TMH Publications
3) A Text Book of Electrical Technology–8th Edition-B.L.Theraja & A.K.Theraja, S.Chand Publications

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I B.Tech, I-Sem (CSE)

L	P	C
1	4	3

(A0301201) ENGINEERING DRAWING
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ Understand and appreciate the importance of basic concepts and principles of Engineering Drawing
- ❖ Realize and appreciate the importance of engineering drawing as a medium of communication to covey ideas in engineering field
- ❖ Enable the students to be aquatint with various basic engineering drawing formats
- ❖ Learn to take data and transform in to graphic drawings.

COURSE OUTCOMES:
At the end of the course, the student will be able to:
- ❖ Understand the conventions and the methods adopted in engineering drawing.
- ❖ Understand the concepts of orthographic projection.
- ❖ Improve their visualization skills and to apply these skill in developing new products
- ❖ Improve technical communicative skills in the form of communicative drawings

MAPPING OF COs& POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	2	3	-	-	2	2	3	2	-	3	2	3	2
CO2	3	2	3	2	3	-	-	2	2	3	-	-	3	2	2	2
CO3	3	2	2	1	3	-	-	2	2	3	-	1	1	2	2	2
CO4	3	2	2	2	3	-	-	2	2	3	1	-	1	2	3	2

UNIT I
Geometrical Constructions: Polygons-Construction of Regular Polygons using given length of a side; Conic sections- Ellipse- Arcs of Circles and Oblong Methods, Construction of Parabola and Hyperbola by eccentricity method only.

UNIT II
Projection of Points and Lines: Introduction to Orthographic Projections- Projections of Points-Projections of Straight Lines parallel to both planes; Projections of Straight Lines-Parallel to one and inclined to other plane, inclined to both planes, determination of true lengths, angle of inclinations.

UNIT III
Projections of Planes: Regular Planes, Plane Perpendicular to one plane and Parallel to another Reference plane, Plane inclined to one Reference Plane.

UNIT IV
Projections of Solids: Prisms, Pyramids, Cones and Cylinders with the axis perpendicular to one plane and parallel to the reference plane, Plane inclined to one reference Plane only.

UNIT V
Section of solids: Sectioning of prism, pyramid, cone and cylinder– sectional view – true shape. Solids in simple position and cutting plane inclined to one reference plane only.
Development of surface of solids: Development of truncated prism, pyramid, cone and cylinder – frustum of cone and pyramid.

UNIT VI
Orthographic and Isometric Projections: Introduction to Isometric projections/ views, Construction of Isometric view/ projections of simple solids. Conversion of Isometric Views

to Orthographic Views/Projections-Conversion of Orthographic Views to Isometric Projection/ Views.

TEXT BOOK:
1) Engineering Drawing. K.L Narayana, P. Kannaiah, Scitech Publications, 2011
2) Engineering Drawing by N.D. Bhatt, Chariot Publications,2014

REFERENCE BOOKS:
1) Engineering Drawing, B.V.R Gupta, J.K. Publishers,2008
2) Engineering Drawing and Graphics, Venugopal /New age publications,2007
3) Engineering Drawing by M.B. Shah and B.C. Rana, Pearson Publishers,2009
4) Engineering Drawing, Johle, Tata Mc Graw – Hill, 2008
5) K.V. Natarajan, 'A text book of Engineering Graphics', Dhanalakshmi publishers, Chennai, 2006.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

	T	P	C
I B.Tech, I-Sem (CSE)	0	3	1.5

(A0592201) ENGINEERING WORKSHOP & IT WORKSHOP
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS
ENGINEERING WORKSHOP

COURSE OBJECTIVES:
- ❖ To familiarize with the basic manufacturing processes and to study the various tools and equipment used, hands-on training is given in different sections. Essentially student should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work.

COURSE OUTCOMES:
At the end of the Engineering Work Shop:
- ❖ A student should know the basic knowledge of various tools and their use in different sections of manufacturing such as fitting, carpentry, tin smithy, welding etc. and basic engineering practices such as plumbing, electrical wiring, electronic circuits, machine shop practice.
- ❖ Ability to design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit.
- ❖ Ability to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder.
- ❖ Ability to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring.

MAPPING OF COs & POs:

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

Note: At least two exercises should be done from each trade.
1. TRADES FOR EXERCISES:
A] Carpentry
1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tennon Joint

B] Fitting
1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

C] House Wiring
1. Parallel / Series Connection of two/three bulbs
2. Stair Case wiring
3. Tube Light Wiring
4. Measurement of Earth Resistance/Go down Wiring

D] Tin Smithy
1. Rectangular Tray

2. Square Box without lid
3. Open Scoop
4. Funnel

E] Welding
1. Single V butt joint
2. Lap joint
3. Double V butt joint
4. T fillet joint.
5. Gas Welding

F] Soldering
1. Soldering & Desoldering Practice
2. Series Circuit
3. Parallel Circuit

2. **TRADES FOR DEMONSTRATION:**
   a) Plumbing
   b) Machine Shop
   c) Bosch Power Tools

REFERENCE BOOKS:
1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers, 2013
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas, 2009
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House, 1999.

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IT WORKSHOP

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

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

MAPPING OF COs & POs:

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

PC HARDWARE
Exercise 1 - Identify the peripherals of a computer, components in a CPU and its functions.
Exercise 2 - Every student should disassemble and assemble the PC back to working condition.
Exercise 3 – Every student should individually install MS windows on the personal computer and also install Linux as dual boot with boot with Windows.

OFFICE TOOLS
Exercise 4 - Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office equivalent tool word: Importance of LaTeX and MS office tool Word as word Processors, Details of the four tasks and features that would be covered in each. Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.
Task 1-Task III: Using Word Processor to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.

SPREAD SHEET
Exercise 5–Spread Sheet Orientation: The mentor needs to tell the importance of MS office 2007,2010/ equivalent tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.
Task 1-Task III: Features to be covered: - Gridlines, Format Cells, Summation, auto fill, Formatting Text, Formulas, Functions

PRESENTATION

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

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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, I-Sem (CSE)

T	P	C
0	3	1.5

(A0093201) ENGINEERING PHYSICS LAB
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ The laboratory should help the student to develop a broad array of basic skills and tools of experimental physics and data analysis.
- ❖ The laboratory should help students to understand the role of direct observation in physics and to distinguish inferences based on theory and the outcomes of experiments.
- ❖ To learn about the optical experiments in establishing the fundamentals in Interference and Diffraction phenomena which will be visualized with the light and laser experiments mentioned in the syllabus.
- ❖ To learn about the basic electronic experiments such as energy band gap determination, Hall Effect to know the type of extrinsic semiconductors, Stewart-Gee's experiment in field intensity determination and Solar I-V characteristics.

COURSE OUTCOMES:
After completion of the course the students will be able to
- ❖ Operate optical instruments like microscope and spectrometer
- ❖ Estimate the wavelength of different colors using diffraction grating
- ❖ Study the variation of intensity of the magnetic field due to circular coil carrying current with distance
- ❖ Identify the type of semiconductor (i.e., n-type or p-type) using Hall Effect

MAPPING OF COs & POs:

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

LIST OF EXPERIMENTS (Any10 Experiments)
1) Determination of radius of curvature of a given plano-convex lens using Newton's rings method.
2) Determination of thickness of a thin wire/film by Wedge shape method.
3) Determination of wavelength of spectral lines using Transmission Grating and Spectrometer.
4) Determination of wavelength of a sodium light binormal incidence method.
5) Determination of dispersive power of a prism using spectrometer.
6) Determination of wavelength of a laser using transmission grating.
7) Determination of particle size by laser diffraction.
8) Determination of numerical aperture of an optical fiber.
9) Study of variation of magnetic field along the axis of a circular coil carrying current using Stewart and Gee's method.
10) Determination of rigidity modulus of a given wire using Torsional Pendulum.
11) Determination of energy band gap of a Si or Ge semiconductor by Four probe method.
12) Study of B – H Curve of a ferromagnetic material.

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13) Determination of carrier density and Hall coefficient or magnetic flux density of an extrinsic semiconductor using Hall effect.

14) Study current (I) and voltage (V) characteristics of a Solar Cell.

15) Measurement of Curie temperature of a given ferroelectric material by studying the temperature dependence of dielectric constant.

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I B.Tech, I-Sem (CSE)

T	P	C
0	3	1.5

(A0591201) PROBLEM SOLVING AND PROGRAMMING LAB
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To learn about different types of operators
- ❖ To learn how decision making is done during programming
- ❖ To learn about various simple constructs used for programming
- ❖ To learn to define functions and call them with appropriate parameters
- ❖ To understand the usage of string libraries to do common string operations
- ❖ To understand pointer referencing and pointer dereferencing

COURSE OUTCOMES:
At the end of this course, the student would be able to
- ❖ Apply the specification of syntax rules for numerical constants and variables, data types
- ❖ Know the Usage of various operators and other C constructs
- ❖ Design programs on decision and control constructs
- ❖ Develop programs on code reusability using functions
- ❖ Implement various concepts of arrays and strings

MAPPING OF COs & POs:

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

RECOMMENDED SYSTEMS /SOFTWARE REQUIREMENTS:
Intel based desktop PC with ANSI C Compiler and Supporting Editors

EXERCISE 1
Write a C program to demonstrate various operators used in C language.

EXERCISE 2
a) Write a C program to find the roots of a quadratic equation.
b) Write a C program to find both the largest and smallest number in a list of integers.

EXERCISE 3
a) Write a C program, which takes two integer operands and one operator from the user, performs the specified operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
b) Write a C Program to find the reverse of a given number.

EXERCISE 4
a) Write a C program to find the sum of individual digits of a positive integer.
b) Write a C program to generate the first 'n' terms of the Fibonacci sequence.
[**Note:** A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.]
c) Write a C program to generate all the prime numbers between 1 and n, where 'n' value is given by the user.
[**Note:** Develop each of the above programs by using different loop constructs supported by C language. (i.e., while, do while and for Loops)]

EXERCISE 5
   a) Write a C Program to mask the most significant digit of the given number.
   b) Write a program which Prints the following pattern

EXERCISE 6
   a) Write a C program to find all the even numbers in the given one dimensional array.
   b) Write a C program to print the elements of an array in reverse order.
   c) Write a C program to construct a pyramid of numbers.

EXERCISE 7
Write a C program to perform the following operations:
   a) Addition of Two Matrices
   b) Multiplication of Two Matrices
[Note: Use functions to implement the above specified operations]

EXERCISE 8
Write C programs that use both recursive and non-recursive functions
   a) To find the factorial of a given integer.
   b) To find the GCD (greatest common divisor) of two given integers.

EXERCISE 9
   a) Write a C Program to solve the Towers of Hanoi problem by using recursive function.
   b) Write a C Program to demonstrate the various storage classes, which are supported by the C language. [i.e., automatic, external, static and register]

EXERCISE 10
   a) Write a C Program to demonstrate that, how to pass an entire array as an argument to a function with a suitable example.
   b) Write a C Program to perform various operations on given two strings using string handling functions.

EXERCISE 11
   a) Write a C program that uses functions to perform the following operations:
      i)   To insert a sub-string in to a given main string from the specified position.
      ii) To delete '**n**' Characters from a given position in a given string.
   b) Write a C program to determine if the given string is a palindrome or not.

EXERCISE 12
   a) Write a C program that displays the position or index in the string 'S' where the string 'T' begins, or – 1 if 'S' doesn't contain 'T'.
   b) Write a C program to count the lines, words and characters in a given text.

EXERCISE 13
   a) Write a C program to reverse the first 'n' characters in a file.
   b) Write a C program to merge two files into a third file.

REFERENCE BOOKS
   1) Programming in C, Pradeep Dey, Manas Ghosh, Oxford Higher Education
   2) The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
   3) Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
   4) Computer Basics and C Programming, V. Raja Raman, PHI Publications

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0007202) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
For branches: CE, EEE, ME, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To familiarize the concepts of ordinary and partial differential equations.
- ❖ To equip the students to analyze vector differentiation and the evaluation of line, surface and volume integrals and their applications in electromagnetic theory, transmission lines etc.,

COURSE OUTCOMES:
After completion of the course the student will be able to:
- ❖ Obtain the knowledge of first and higher order differential equations and its use in solving Circuit analysis, heat transfer problems in engineering.
- ❖ Analyse solving higher order linear differential equations with variable coefficients and its applications.
- ❖ Understand about formation and solution of partial differential equations and importance in thermodynamics, continuum mechanics and fluid mechanics.
- ❖ Understand about vector differentiation and its applications in Electromagnetic theory.
- ❖ Apply the concept of vector integration to solve many problems in field theory, Electromagnetic theory and transmission lines.

MAPPING OF COS & POS:

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

UNIT-I
Differential equations of first order and first degree – Formation of ODEs – Solution of ODEs - Exact, Non – Exact, Linear and Bernoulli's equations – Applications of ODEs to L – R & C – R circuits.

UNIT – II
Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type, e^{ax}, Sin ax, Cos ax, Polynomials in x, $e^{ax} V(x)$, $xV(x)$, Method of Variation of parameters.

UNIT – III
Higher Order linear Differential Equations with variable coefficients: Cauchy's and Legendre's linear Differential equations, simultaneous linear differential equations with constant coefficients.

UNIT – IV
Partial Differential Equations of First order: First order partial differential equations, Formation of partial differential equations, solutions of first order linear and non – linear Partial differential equations. Method of separation of variables.

UNIT - V
Vector Differentiation: Introduction of Vector differentiation– Scalar and vector point functions – Gradient of scalar function– Directional derivatives – Divergence of a vector

function – Curl of a vector function – Properties of Grad, Div and Curl.

UNIT – VI
Vector integration: Line integral - Potential function – Area, Surface and volume integrals. Vector integral theorems: Green's theorem – Stoke's and Gauss Divergence Theorem (excluding their proof), Verification of Green's, Stoke's and Gauss Theorems.

TEXT BOOKS:
1) B. S. Grewal, Higher Engineering Mathematics, Khanna Publications.
2) R. K. Jain, S. R .K. Iyengar, Advanced Engineering Mathematics, Alpha Science.
3) T.K.V. Iyengar, B. Krishna Gandhi, A Text Book of Engineering Mathematics, Vol – 1, S. Chand & Company.

REFERENCES:
1) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2) (Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.
3) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0005201) MODERN ENGINEERING CHEMISTRY
For branches: EEE, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To understand the concepts of molecular structures and bonding.
- ❖ To explain the students on the principles and applications of electrochemistry.
- ❖ To demonstrate about the preparation and applications of polymers.
- ❖ To introduce the advanced concepts about nanomaterials.
- ❖ To introduce the basic principles of UV and IR spectroscopy.
- ❖ To familiarize about Surface chemistry and its applications.

COURSE OUTCOMES:
At the end of the course, the students will be able to
- ❖ Concept of Molecular Orbital Theory and Crystal Field Theory(L2)
- ❖ Explain about the conductance and role of electrodes in electrochemistry(L1)
- ❖ Explain the preparation, properties, and applications of thermoplastics & elastomers (L2)
- ❖ Explain the preparation, properties, and applications of Nano materials.
- ❖ Understanding the principles of UV-Visible & IR Spectroscopes(L2)
- ❖ Summarize the applications of adsorption in Industries (L2)

MAPPING OF COs & POs:

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

UNIT 1: Molecular Structure and Bonding
Molecular orbital theory – bonding in homo and heteronuclear diatomic molecules – Energy level diagrams of O_2 and NO–Crystal field theory and its salient features – splitting in octahedral and tetrahedral geometry - Band theory of solids – band diagrams for conductors, semiconductors and insulators.

UNIT 2: Electrochemistry and Applications
Introduction – Conductance, Specific conductance, Equivalent Conductance and molar conductance –Determination of equivalent conductance by Wheatstone bridge method – Conductometric titrations (acid-base titrations) – Numerical Problems on conductance - Electrodes –Reference electrode (Standard hydrogen electrode) – Daniel cell.

UNIT 3: Polymer Technology
Classification of polymers – Functionality – Chain growth, step growth polymerization and Copolymerization with specific examples– Mechanisms of additional polymerization.
Plastics: Preparation, properties and applications of PVC, Teflon and Bakelite.
Elastomers: Buna-S and Buna-Npreparation, properties and applications.

UNIT-4 Advanced Engineering Materials
Nanoparticles: Introduction, preparation methods – Sol-gel method, Chemical reduction method – properties and applications in Graphene and CNT.
Super capacitors: Definition, Classification – Engineering Applications.

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UNIT 5:   Instrumental Methods and Applications

Electromagnetic spectrum, Absorption of radiation: Beer-Lambert's law, UV-Visible Spectroscopy: Types of electronic transitions, Absorption and Intensity Shifts, Principle, Instrumentation and its applications. IR Spectroscopy: Types of Molecular vibrations, Principle, Instrumentation and its applications.

UNIT 6:   Surface Chemistry and Applications

Introduction to surface chemistry, Adsorption- Types of adsorption, Adsorption of gases on solids and its applications, Adsorption isotherm-Langmuir adsorption isotherm theory and postulates.

Colloids: Definition, micelle formation, synthesis of colloids (Chemical and Bredigs method with examples).

TEXT BOOKS:
1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

REFERENCE BOOKS:
1. K N Jayaveera, G V Subba Reddy and C Rama Chandraiah, Engineering Chemistry 1/e Mc Graw Hill Education (India) Pvt Ltd, New Delhi 2016
2. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
3. K Sesha Maheswaramma and Mridula Chugh, Engineering Chemistry Pearson India Education Services Pvt. Ltd

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0502202) DATA STRUCTURES
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To make students aware about structures and unions in C language.
- ❖ To provide exposure on various searching and sorting techniques.
- ❖ To provide exposure on various data structures like stacks, queues, circular queues and linked lists etc.,
- ❖ To develop solutions for various problems by using C Programming.

COURSE OUTCOMES:
At the end of this course, the student would be able to
- ❖ Develop programs with user defined data types.
- ❖ Apply various file handling techniques for better data management
- ❖ Apply stacks in various applications
- ❖ Apply queues in various applications and distinguish between stacks and queues.
- ❖ Analyse various dynamic data structures.
- ❖ Implement various searching and sorting techniques

MAPPING OF COS & POS:

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

UNIT I
Pointers: Pointer variable and its importance, Pointer variable declaration, initialization of pointer variables, how to access a value from a memory location through it's pointer variable. Arithmetic operations on pointer variables, Scale factor length. Pointers and functions - pointers as function arguments (i.e., call-by-reference), Pointers and Arrays, Pointers and Strings, Generic Pointers.
Learning Outcomes: Student should be able to
1) Explain different types of pointers and their usage. (L2)
2) Understand, solving of arithmetic operations on pointer variables (L2)
3) Apply pointers on functions, arrays and strings (L4)

UNIT II
Structure and Unions In C Language: Structures – Introduction, Features of Structures. Declaration and Initialization of Structures, Accessing structure members, structure initialization. Nested Structures, Array of Structures, Arrays within structures and Pointers to Structures, Structures and Functions, Unions, typedef. Example Programs on the topics mentioned above.
Learning Outcomes: Student should be able to
1) Use Structures and Unions in applications using C programming. (L3)
2) Apply the structures and union concepts to solve real world problems. (L2)

UNIT III
Introduction to Data Structures: Classification of data structures, dynamic memory allocation

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functions in C language. Stacks: Definition, Various representation methods, operations on stacks and their implementation in C language, applications of stacks.

Learning Outcomes: Student should be able to
1) Apply the concepts of Data structures to solve the real world problems (L4)
2) Understand the concepts of Stacks and also its applications (L2)
3) Describe the operations of Stacks. (L2)

UNIT IV
Queues: Definition, Various representation methods, operations on queues and their implementation in C language, applications of queues. Circular queues- operations on circular queues and their implementation in C language.
Learning Outcomes: Student should be able to
1) Understand the concepts of Queues and also its applications (L2)
2) Describe the operations of Queues. (L2)

UNIT V
Linked Lists: Definition, Various representation methods, operations on linked lists and their implementation in C language.
Learning Outcomes: Student should be able to
1) Understand the concepts of Linked list (L2)
2) Use the linked lists in various operations. (L3)

UNIT VI
Searching and Sorting Techniques: Searching Techniques - Linear search and Binary Search Techniques. Sorting techniques - Bubble Sort, Selection Sort, Insertion Sort. Implementation of all the above mentioned techniques in C language and trace them by giving different test data.
Learning Outcomes: Student should be able to
1) Design the different sorting techniques (L6)
2) Use Linear search and Binary search methods. (L3)

TEXT BOOKS:
1) PradipDey and ManasGhosh, Programming in C, Oxford University Press, 2nd Edition 2011.
2) B.A.Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming Approach Using C", Third edition, CENGAGE Learning, 2016

REFERENCE BOOKS:
1) Byron Gottfried, "Programming with C", Schaum's Outlines, 2nd Edition, TATA McGraw-Hill.
2) M.T.Somashekara, "Problem Solving Using C", PHI, 2nd Edition 2009.
3) A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press
4) Rajaraman V., "The Fundamentals of Computers", 4th Edition, Prentice Hall of India, 2006.
5) R S Bichker, "Programming in C", University Press, 2012.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0503202) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
For branches: CSE, CSE(DS) & CSE&BS

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

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

MAPPING OF COs & POs:

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

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

UNIT-II
Predicates: Rules of inference, Consistency, Predicate calculus: Free and bounded variable, Quantifiers: Universal Quantifiers, Existential Quantifiers.

UNIT-III
Relations: Relations, Properties of binary Relations, Types of relations: equivalence, compatibility and partial ordering relations, Hasse diagram. Lattices and its properties.
Functions: introduction to Functions, types of functions

UNIT-IV
Algebraic structures: Algebraic systems with examples and general properties, semi groups and monoids, groups & its types, Introduction to homomorphism and Isomorphism (Proof of

theorems are not required)

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

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

TEXT BOOKS:
1) Discrete Mathematical Structures with applications to computer science Trembly J.P. & Manohar. P, TMH, 2017 **(unit-1 to 4)**
2) Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker Prentice Hall, 2008. **(unit-5 to 6)**

REFERENCES:
1) Mathematical foundations of computer science Dr D.S.Chandrasekharaiah Prism books Pvt Ltd, 2012.
2) Discrete Mathematics, R.K. Bisht, H.S. Dhami, Oxford, 7th Edition, 2012.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

L	P	C
2	1	3

(A0003201) ENGLISH FOR ENGINEERS
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES
- ❖ English for Engineers is prescribed to make students communicate their thoughts, opinions and ideas freely in real life situations.
- ❖ To improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- ❖ To equip students with professional skills & soft skills
- ❖ Develop Communication skills in formal and informal situations.

COURSE OUTCOMES
- ❖ Students will be able to use creativity in writing such as E-mails, Reports, Resume writing and Info- Graphics to enhance engineering abilities
- ❖ Students will analyse the concepts of critical and analytical Reading skills to understand needs of engineering in society by using modern tools
- ❖ Students will be able to develop flair for any kind of writing with rich vocabulary to enhance communicative skills
- ❖ Students will understand the basic Grammar techniques and utilize it for language development
- ❖ Students will apply the strategies of Soft skills & Ethical components

MAPPING OF COS & POS:

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

UNIT- I
a) Reading: Skimming the text for theme
   Reading Text: Engineering in Society by Sarah Bell
b) Grammar: Types of Sentences - Demonstratives- Articles- Prepositions
c) Writing: Paragraph Writing & Practice
d) Vocabulary: Root words - Word lists from Word power Made Easy by Norman Lewis
   Method of Teaching: Analysing the theme of Reading Prescribed Text, Worksheets on Articles & Prepositions, Assignment on Short paragraphs, Vocabulary activities through worksheets.

UNIT- II
a) Reading: Scanning the text for specific details
   Reading Text: Sultana's Dream by Begum Rokeya
b) Grammar: Tenses & Usage
c) Writing: Formal Letters and E-mail writing – Tips & Practice
d) Vocabulary: Homonyms - Word lists & Practice
   Method of Teaching: Classroom discussion &critical appreciation of the Reading Lesson, Worksheets on Tenses, Practice of Formal Letters, Vocabulary Quizzes- Assignment.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

UNIT- III
   a) Reading: Note-making (identifying the main ideas and making notes)
      Reading text: Satya Nadella: When Empathy is Good for Business
      https://www.morningfuture.com
   b) Grammar: Framing questions - Wh Qs - Yes/No questions - Question Tags
   c) Writing: Resume & Cover letter Writing- Tips &Practice
   d) Vocabulary: Synonyms & Antonyms
      Method of teaching: Class room Discussions, Student Activity on Questions, E-mail writing, Vocabulary activities through games- Practice- Assignment.

UNIT – IV
   a) Reading: Summarizing
      Reading Text: Life is a Pizza by Richard Templar from Rules of Life
   b) Grammar: If Clauses – Usage & Practice
   c) Writing: Writing Definitions – Process of Writing - Tips & Practice
   d) Vocabulary: Idioms & Phrases- Practice
      Method of Teaching: Discussion & Assignment, If Clauses from Newspapers, Preparing profiles for Resume, Vocabulary activities through worksheets

UNIT – V
   a) Reading: Intensive reading (reading for every detail)
      Reading text: What is a Drone: Main Features & Applications of Today's Drones by Jack Brown
   b) Grammar: Active Voice –Passive Voice- Usage
   c) Writing: Report Writing- Types - Practice
   d) Vocabulary: Technical Terms- Word Lists- Practice
      Method of Teaching: Assignment on Drones, Worksheets on Active/ Passive voice, Watch a Documentary on social issues and draft a Report, Technical Terms- Quiz.

UNIT- VI
   a) Reading: Appreciating a poem (focus on genre)
      Reading text: Where the mind is without fear by Rabindranath Tagore
   b) Grammar: Direct & Indirect Speech - Common Errors- Practice
   c) Writing: Info-Graphics- Types- Practice
   d) Vocabulary: Foreign Derived Words- Word Lists from Norman Lewis Word Power Made Easy
      Method of teaching: Learner's interaction on the poem, Practicing Grammar through on line tests, practice reading and understanding graphs, Quiz & worksheets.

REFERENCE TEXTS:
   1) English Language & Communication Skills for Engineers (AICTE Syllabus) by Sanjay Kumar & Pushpa Latha, Oxford University Press, 2018
   2) Practical English Usage by Michael Swan, Oxford University Press.
   3) Technical Communication, Principles and Practice by Meenakshi Raman & Sangeetha Sharama, Oxford University Press, 2016
   4) Word Power Made Easy by Norman Lewis, Goyal Publications.
   5) 4000 Essential English Words 3 by Paul Nation, Compass Publishing, 2009.
   6) GRE/TOEFL Sources to teach vocabulary

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ONLINE SOURCES FOR PRESCRIBED READING TEXTS:

1. https://www.morningfuture.com
2. https://www.raeng.org.uk/publications/reports/engineering-in-society
3. https://digital.library.upenn.edu/women/sultana/dream/dream.html,
   https://www.mydronelab.com/blog/what-is-a-drone.html
4. https://www. Freealbaab.free.fr › The Rules of Life PDF
5. https://www.poetryfoundation.org ›Gitanjali 35 by Rabindranath Tagore | Poetry Foundation

ONLINE SOURCES FOR PRESCRIBED LISTENING SKILLS:

1. https://learnenglish.britishcouncil.org/skills/listening
2. https://agendaweb.org/listening/comprehension-exercises.html
3. https://www.123listening.com/
4. https://www.linguahouse.com/learning-english/skill-4-learners/listening
5. https://www.talkenglish.com/listening/listen.aspx
6. https://ed.ted.com/

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

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(A0010202) ENVIRONMENTAL SCIENCE
(Mandatory Learning Course)
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ Creating the awareness about environmental problems among people.
- ❖ Imparting basic knowledge about the environment and its allied problems.
- ❖ Developing an attitude of concern for the environment.
- ❖ Motivating public to participate in environment protection and environment improvement.
- ❖ Acquiring skills to help the concerned individuals in identifying and solving environmental problems.
- ❖ Environmental education should have an interdisciplinary approach by including physical, chemical, biological as well as socio-cultural aspects of the environment. It should build a bridge between biology and technology.

COURSE OUTCOMES:
- ❖ Understand environmental problems arising due to developmental activities.
- ❖ Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
- ❖ Identify the natural resources and suitable methods for conservation of environment.
- ❖ Identify the environmental pollutants and abatement devices.
- ❖ Adopt practices that help in promoting balance in nature by making judicious utilization of recourses.

UNIT I
MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL SCIENCE
Environment -Definition, Scope, Importance and Need for public awareness. Segments of Environment (Atmosphere, Lithosphere, Hydrosphere and Biosphere).

UNIT II
RESOURCES AND UTILIZATION
Renewable and Non-renewable resources.
  a) Natural Resources: Soil &Water sources (conflicts of over utilization of water Resources - Hydro power project-problems), forest & mineral resources – Utilization-problems.
  b) Non-conventional resources of energy(Solar Energy, wind energy and their applications)

UNIT III
  a) **CONCEPTS OF ECO-SYSTEM**
     Structure and functions of an ecosystem: Producers, Consumers and Decomposers-Interaction between biotic and abiotic factors in an ecosystem- Trophic levels- Food chain- Food web –Ecological Pyramid.
  b) **TYPES OF ECOSYSTEM**
     Understanding the types of ecosystem: (i) Terrestrial (forest)(ii) Aquatic – (Marine)

UNIT IV
BIODIVERSITY: Introduction – Definition – Value of biodiversity- Biodiversity at global, National and Local levels-India as a mega diversity nation-Hot-spots of biodiversity-Threats

to biodiversity- IUCN Red data book - Conservation of bio diversity (Insitu and Exsitu conservation methods).

UNIT V
ENVIRONMENTAL POLLUTION
Introduction- Causes, effects and control measures of
   a) Air pollution
   b) Water pollution
   c) Soil pollution
   d) Noise pollution
   e) Plastic pollution

Disaster management: Floods, Earthquake.

UNIT-VI
HUMAN POPULATION ISSUES
   a) Demography-problems related to Population explosion- Age structure-Family welfare and family planning programme
   b) Diseases- AIDS, Malaria, COVID, Cancer.
   c) Human rights, Fundamental duties and Value of education.

ENVIRONMENTAL ISSUES
   a) Climatic changes
   b) Greenhouse effect and global warming.
   c) Ozone layer depletion.
   d) Acid rain.

TEXT BOOKS:
   1) Deswal, S and Deswal A., (2004), A Basic Course in Environmental Studies, DhanpatRai& Co. Delhi.
   2) Anubha Kousik and C P Kousik., New age international publishers.

REFERENCES:
   1) Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
   2) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd.,
   3) Ahmedabad –380 013, India, Email:mapin@icenet.net (R)
   4) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
   5) Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

L	P	C
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(A0091201) DIGITAL ENGLISH LANGUAGE LAB
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

The Digital English Language Lab focuses on the production and practice of sounds of language and equips students with the use of English and vocabulary in everyday situations and contexts.

COURSE OBJECTIVES:
- ❖ To facilitate the students to use language effectively in everyday social conversations
- ❖ To expose the students to the blend of self-instructional and modes of language learning teacher assisted through digital lab
- ❖ To improve the fluency and intelligibility of student in spoken English and neutralize their mother tongue influences
- ❖ To help the students to participate in group discussions, to face interviews and shape the individual language learning

COURSE OUTCOMES:
- ❖ Social interactions, greetings, self-introductions and group talk
- ❖ Improving standard pronunciation patterns and neutralize the mother tongue impact
- ❖ Developing communication through listening, reading, speaking and writing activities
- ❖ Enhancing vocabulary and grammar to develop professional language
- ❖ Improving life skills through GD and role plays practices

MAPPING OF COS& POS:

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

Digital English Language Lab consists of two parts:
1) CALL (Lab): Computer Assisted Language Learning
2) ICS (Lab): Interactivity Communication Skills

EXERCISE-I
a) Introduction to Phonetics - Speech Sounds - Vowels - Phonetic Transcription -CALL Lab
b) Ice Breaking Activity - Self Introductions (SWOT) -Social Interactions -Pair work - ICS Lab

EXERCISE-II
a) Diphthongs - Consonants - Phonetic Transcription - CALL Lab
b) Just A Minute (JAM) - ICS Lab

EXERCISE-III
a) Listening Comprehension (audio) - IELTS Testing Exercises -CALL Lab
b) Speaking Activity - Group talk - ICS Lab

EXERCISE-IV
a) Vocabulary Building - Synonyms & Antonyms - Analogy - Testing Exercises -CALL Lab
b) Narration of a Story/Event/ Describing an Object - ICS Lab

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

EXERCISE-V
   a) Situational Dialogues - CALL Lab
   b) Role Play **-** ICS Lab

EXERCISE-VI
   a) Pronunciation Evaluation Testing Exercises through EPD - CALL Lab
   b) Group Discussion **-** ICS Lab
   - Any student based activities

PRESCRIBED SOFTWARE:
K-VAN Solutions (licensed software)
   1) Advance Communication Skills Lab
   2) English Language Communication Skills Lab
   3) Cambridge Advanced Learners' English Dictionary with CD
   4) IELTS Academic Preparation and Practice with CD

BOOKS SUGGESTED FOR DELL: (CENTRAL LIBRARY)
   1) Skill Pro – A Course in Communication Skills and Soft Skills by Prof. K. Sumakiran et.al, EMESCO.
   2) Skill Pro-I Foundation Course - 4 - by Dr. G. Gulam Tariq et.al, Maruthi Publications.
   3) Strengthen YourSteps – A Multimodal Course in Communication skills by Dr. M. Hari
   4) Prasad et.al
   5) English Pronouncing Dictionary Daniel Jones Current Edition with CD
   6) English Dictionary for Advanced Learners, (with CD) International edn.Macmillan 2009.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

L	P	C
0	3	1.5

(A0092201) ENGINEERING CHEMISTRY LAB
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ Verify the fundamental concepts with experiments

COURSE OUTCOMES:
At the end of the course, the students will be able to
- ❖ Learning the analytical skills while doing the experiments (L3)
- ❖ Prepare simple and advanced polymer materials (L2)
- ❖ Measure the concentration of the solutions by conductometric titrations (L3)
- ❖ Analyze the IR and UV-Visible Spectra of some organic compounds (L3)

MAPPING OF COs & POs:

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

LIST OF EXPERIMENTS:
1) Preparation of standard $K_2Cr_2O_7$ solution
2) Estimation of Hardness of Water by using Standard EDTA solution
3) Estimation of Copper by using Standard EDTA solution
4) Estimation of Magnesium by using Standard EDTA solution
5) Estimation of Ferrous Ion by Dichrometry.
6) Determination of Strength of given Hydrochloric Acid against standard sodium hydroxide solution by Conductometric titrations
7) Determination of Strength of given Acetic Acid against standard sodium hydroxide solution by Conductometric titrations
8) Determination of strength of mixture of acids against standard sodium hydroxide solution by conductometric method.
9) Verification of Beer-Lambert's law
10) Determine the strength of Cu(II) ion by colorimeter
11) Preparation of a simple polymer(PVC)
12) Preparation of Bakelite
13) Thin layer chromatography
14) Identification of simple organic compounds by IR and UV-Visible Spectroscopy graphs.
15) HPLC method in separation of liquid mixtures.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech, II-Sem (CSE)

L	P	C
0	3	1.5

(A0593202) DATA STRUCTURES LAB
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To understand how to use structures and unions as a compound data types
- ❖ To understand various basic file operations
- ❖ To understand various stack and queue operations
- ❖ To understand various linked list operations
- ❖ To understand basic searching and sorting techniques

COURSE OUTCOMES:
At the end of this course, the student would be able to
- ❖ Develop applications on user defined data types
- ❖ Apply dynamic memory allocation through pointers
- ❖ Use different data structures for create/update basic data files
- ❖ Implement linear data structures through stacks and queues
- ❖ Implement various searching and sorting techniques, Linked lists.

MAPPING OF COs & POs:

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

RECOMMENDED SYSTEMS /SOFTWARE REQUIREMENTS:
Intel based desktop PC with ANSI C Compiler and Supporting Editors

EXERCISE 1
a) Write a C Program to perform various arithmetic operations on pointer variables.
b) Write a C Program to demonstrate the following parameter passing mechanisms:
   i) Call-by-value
   ii) Call-by-reference

EXERCISE 2
a) Write a C Program to copy the contents of one structure variable to another structure variable.
b) Write a C program to implement nested structure to store and display the student information. The structure student contains the field's S.no, name, and date. Date is the nested structure and it contains the fields day, month and year.

EXERCISE 3
a) Write a C program to add two distances which is in feet and inches
b) Write a C program to illustrate passing the whole structure as argument to a function.

EXERCISE 4
Write a C program that uses functions to perform the following operations:
a) Reading a complex number
b) Writing a complex number
c) Addition of two complex numbers

    d) Multiplication of two complex numbers (Note: represent complex number using a structure.)

EXERCISE 5
    a) Write a C program to implement Union Concept.
    b) Write a C program which copies last 'n' characters from one file to another.

EXERCISE 6
Write a C program to implement the following operations on Stack using array representation
    a) Push
    b) Pop
    c) Display

EXERCISE 7
Write a C program to implement the following operations on Queue using array representation
    a) Insert
    b) Delete
    c) Display

EXERCISE 8
Write a C program to implement the following operations on Singly Linked list using linked representation
    a) Insert
    b) Delete
    c) Display
    d) Search

EXERCISE 9
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order.
    a) Bubble sort
    b) Selection sort
    c) Insertion sort

EXERCISE 10
Write C program to implement the following searching methods to search an element in a given list of integers
    a) Linear Search
    b) Binary Search

REFERENCE BOOKS:
1) Programming in C, Pradeep Dey, Manas Ghosh, Oxford Heigher Education
2) Computer programming and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill. 2009 revised edition.
3) Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0018203) ENGINEERING ECONOMICS & ACCOUNTANCY
For branches: CSE & CSE(DS)

COURSE OBJECTIVES:
- ❖ To understand the principles of and techniques of managerial economics.
- ❖ To understand the business organizations.
- ❖ To understand the financial accounting and analysis.
- ❖ To understand maintain a particular product at the lowest cost while meeting the specifications of the customer

COURSE OUTCOMES:
- ❖ Students will able to analyse the demand in the present market.
- ❖ Students will able to know the product demand by using the demand forecasting techniques.
- ❖ Students will able to know how to fix product price and know how to reach Breakeven.
- ❖ Students will able to know the types of business organizations and economy of the country.
- ❖ Students will able to know how to prepare the cost sheet.
- ❖ Students will able to maintain the books by using the financial accounting.

MAPPING OF COs & POs:

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

UNIT-I
Introduction to managerial economics: Definition, Nature and scope of managerial economics, Demand analysis, Demand determinants, law of demand and its exceptions

UNIT-II
Elasticity of Demand: Definition types measurement and significance of elasticity of Demand. Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiment, judgmental approach to demand forecasting)

UNIT-III
Break even analysis and pricing strategies: Break even analysis-Determination of breakeven point (simple problems)- managerial significance and limitations of BEA.
Objectives and policies of pricing-methods of pricing: cost plus pricing, sealed bid pricing, going rate pricing, market skimming pricing, penetration pricing, Two part pricing, Block pricing, Bundling pricing, Peak oad pricing, cross subsidization.

UNIT-IV
Business and New economic policy: Characteristics of business, features and evaluation of forms of business organization based on ownership, Nature of the economy, structure of the economy, economic policies, new economic policy 1991, economic conditions.

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UNIT-V

Cost accounting: introduction- classification of costs –methods of costing – techniques of costing – preparationof cost sheet.

UNIT-VI

Accountancy: Accounting principles, procedure-Double entry system-journal-ledger, Trail balance –cash book-preparation of trading, profit and loss account-Balance sheet.

TEXT BOOKS:
1. Management Economics and Financial Analysis, Aryasri, 4/e, TMH, 2009.
2. Managerial Economics, Varshney & Maheswari, Sultan Chand, 2009.

REFERENCES:
1. Agarwal AN," Indian Economy "Wiley Eastern Ltd, New Delhi
2. Jain and Narang "Accounting part-1" Kalyani publishers
3. Arora,M.N. "Cost Accounting", Vikas publications
4. Ashwatappa. K "Business Environment"

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0504203) PYTHON PROGRAMMING
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
This course will enable students to:
- ❖ Learn Syntax and Semantics of various Operators used in Python.
- ❖ Understand about Various Input, Output and Control flow statements of Python.
- ❖ Understand Strings, List, Tuple, Set and Dictionary in Python.
- ❖ Implement Object Oriented Programming concepts in Python.
- ❖ Understand Exception handling and File I/O in Python.
- ❖ Understand Functions, Modules and Regular Expressions in Python.

COURSE OUTCOMES:
The students should be able to:
- ❖ Examine Python syntax and semantics and be fluent in the use of various Operators of Python.
- ❖ Make use of Flow Control statements, Input / Output functions and Strings of Python.
- ❖ Demonstrate proficiency in handling of data structures like List, Tuple, Set and Dictionary.
- ❖ Demonstrate the use of Functions, Modules and File I/O operations in in Python.
- ❖ Interpret the Concepts of Object-Oriented Programming in Python.
- ❖ Interpret the various issues of Exception handling mechanisms and Regular Expressions in Python.

MAPPING OF COs & POs:

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

UNIT – I:
Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation. Overview on Fundamental data types of Python.
Operators in Python: Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Shift Operators, Ternary operator, Membership Operators, Identity Operators, Expressions and order of evaluations. Illustrative examples on all the above operators.

UNIT – II:
Input and Output statements: input() function, reading multiple values from the keyboard in a single line, print() function, 'sep' and 'end' attributes, Printing formatted string, replacement operator ({{}}). **Control flow statements:** Conditional statements. Iterative statements. Transfer statements.
Strings: Operations on string, String slicing, important methods used on string.

UNIT – III:
Lists: Operations on List, important methods used on list. List comprehensions
Tuples: Operations on tuples, important methods used on tuple.

Sets: Operations on sets, important methods used on set.
Dictionaries: Operations on Dictionaries, important methods used on dictionaries.

UNIT – IV:
Functions - Defining Functions, Calling Functions, Types of Arguments - Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful functions, Scope of the Variables in a Function. Recursive functions.
Modules: Creating modules, import statement, from Import statement.
File I/O: Need of files concept, Types of files, Opening and Closing a Text file, Reading & Writing operations on files, Setting offsets in a file, Traversing a Text file.

UNIT – V:
Object Oriented Programming (OOP) in Python: Classes and Objects, 'self-variable', Types of Variables and Methods used in Classes, Constructor Method, Inheritance, Overriding Methods, Abstract Classes, Data hiding.

UNIT – VI:
Error and Exceptions: Difference between an Error and Exception, Types of Exceptions, Handling Exceptions, try, except, else and finally blocks, control flow in try-except-else-finally blocks, Raising Exceptions, Customized Exceptions.
Regular Expressions: Character matching in regular expressions, extracting data using regular expressions.

TEXT BOOKS
1. Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.
2. Martin C.Brown, "The Complete Reference: Python", McGraw-Hill, 2018**.**

REFERENCE BOOKS
1) R. Nageswara Rao, "Core Python Programming", 2nd edition, Dreamtech Press, 2019Core Python Programming, 2016 W.Chun, Pearson.
2) Introduction to Python, 2015 Kenneth A. Lambert, Cengages
3) https://www.w3schools.com/python/python_reference.asp
4) https://www.python.org/doc/

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II B.Tech, I-Sem (CSE)

L	T	C
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(A0505203) ADVANCED DATA STRUCTURES THROUGH C++

COURSE OBJECTIVES:
- ❖ This course explores fundamental data structures and the practical problems of implementing those structures in real programming languages and environments

COURSE OUTCOMES:
After the successful completion of this course, the students should:
Understand the basic principles of C++ to solve the problems.
- ❖ Apply Object oriented concepts to develop solutions for the given problem.
- ❖ Apply the appropriate generic Programming and Exception handling mechanisms to solve the problem.
- ❖ Implement the ADT for linear data structures.
- ❖ Implement the ADT for binary search tree operations.
- ❖ Describe the dictionaries and the hash functions concepts of collision resolutions.

MAPPING OF COs & POs:

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

UNIT I
C++ Programming Elements, Classes and Objects, Constructors and Destructors, Static Class Members, Dynamic Memory Allocation (new and delete), Passing Parameter Methods, Inline Functions, Friend Functions.

UNIT II
Inheritance in C++- Inheritance Types, Base class Access Control, Examples of Inheritance, Virtual Base Classes and Abstract Classes, Constructors in Derived Classes, Polymorphism - Types of Polymorphism, Function Overloading and Operator Overloading - Unary and Binary Operator Overloading.

UNIT III
Virtual Functions and Pure Virtual Functions, Templates – Class Templates, Function Templates, Templates with Multiple Parameters, Member Function Templates, Overloading of Template Functions, Exception Handling – Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Re-throwing an Exceptions and Specifying Exceptions.

UNIT IV
Overview of Data Structures, Implementation of Data Structures, Stack ADT, Queue ADT, List ADT, Circular Queue ADT, Priority Queue ADT, Double Linked List ADT and Implementation of ADT's using template classes in C++.

UNIT V
Binary Search Trees, Definition, ADT, Operations- Searching, Insertion and Deletion.

UNIT VI
Dictionaries, operations insertion, deletion and searching hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic

probing, double hashing, rehashing, extendible hashing.

TEXT BOOKS:
1) Object Oriented Programming Through C++, E. Balaguruswamy,6 Edition, 2013.
2) Data Structures and algorithms: Concepts, Techniques and Applications G A V Pai, 2017.

REFERENCES:
1) Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) pvt.Ltd, 3nd edition 2013, Universities Press Orient Longman Pvt. Ltd.
2) Object Oriented Programming with C++, Sourav Sahay, Oxford 3 Edition, 2012.
3) Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount, Wiley student edition, John Wiley and Sons, 2004.
4) Data structures and algorithms in C++, 3rd Edition, 2006, Adam Drozdek, Thomson.
5) Data structures using C and C++, 2rd Edition, 2006, Langsam, Augenstein and Tanenbaum, PHI.
6) http://www.cplusplus.com/reference/

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0406203) DIGITAL LOGIC DESIGN
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ Understand the different number system, its conversions and binary arithmetic.
- ❖ Know the fundamentals of Boolean algebra and theorems, Karnaugh maps including the minimization of logic functions to SOP or POS form.
- ❖ Analysis of logic circuits and optimization techniques to minimize gate count, signals, IC count, or time delay
- ❖ To strengthen the principles of logic design and use of simple memory devices, flip-flops, and sequential circuits.
- ❖ To fortify the documentation standards for logic designs, standard sequential devices, including counters and registers.
- ❖ To understand design of logic functions using PLDs (ROM, RAM, PAL, PLA).

COURSE OUTCOMES:
- ❖ Ability to differentiate between analog and digital representations.
- ❖ Ability to convert a number from one number system to its equivalent in of the other number system.
- ❖ Cite the advantages of the octal and hexa decimal number systems and to understand the difference between BCD and straight binary.
- ❖ Ability to perform the three basic logic operations and construct the truth tables for the different types of gates. And Implement logic circuits using basic AND, OR and NOT gates.
- ❖ Ability to Use De-Morgan's theorem to simplify logic expressions and describe the **concept of active LOW and active HIGH logic signals and Use Boolean algebra and K-** map as tool to simplify and design logic circuits and Design simple logic circuits without the help of truth tables.
- ❖ Ability to Construct and analyze the operation of flip-flop and troubleshoot various types of flip-flop circuits.

MAPPING OF COs & POs:

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

UNIT-I
BINARY SYSTEMS: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.
BOOLEAN ALGEBRA: Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions canonical and standard forms, other logic operations.

UNIT-II
LOGIC GATES AND GATE – LEVEL MINIMIZATION: Digital logic gates, and their integrated circuit numbers. The map method, Four-variable map, Five-Variable map, product of

sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – OR function.

UNIT - III

COMBINATIONAL LOGIC: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Substractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Introduction to HDLVHDL code for basic and universal logic gates, Half adder ,full adder circuits.

UNIT - IV

SYNCHRONOUS SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, State Reduction and Assignment, Design Procedure**.**

UNIT-V

ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, Analysis Procedure, Circuits with Latches, Design Procedure. Registers, shift Registers, Ripple counters synchronous counters other counters. Sequential Programmable Devices, VHDL code for Flip-flops, decade counter.

UNIT-VI

PROGRAMMABLE LOGIC DEVICES: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array, programmable Array logic, Sequential Programmable Devices.

TEXT BOOKS:
1) Digital Design –5 Edition, 2013, M.Morris Mano, Pearson Education/PHI.
2) Fundamentals of Logic Design, Roth, 7th Edition, 2020 Thomson.

REFERENCES:
1) Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2) Switching and Logic Design, C.V.S. Rao, Pearson Education 2005.
3) Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, 5 Edition, 2005.
4) Fundamentals of Digital Logic & Micro Computer Design, 5th Edition, 2005 M. Rafiquzzaman John Wiley**.**
5) https://www.computer.org/csdl/journal/lt/2015/02/06897963/13rRUxE04q2

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, I-Sem (CSE)　　　　　　　　　　　　　　L　　T　　C
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(A0506203) COMPUTER ORGANIZATION & ARCHITECTURE
For branches: EEE, ECE & CSE

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

COURSE OUTCOMES:
Upon the successful completion of the course, the student will be able:
- ❖ To understand the structure and various functional units of Computer System.
- ❖ To understand Register Transfer Language and how to explain the working of the functional units in terms of Microoperations.
- ❖ To Apply the Instruction Formats, and Addressing modes to the computer Arithmetic Operations
- ❖ To Design Computers understanding Design trade-offs between cost and performance as well selecting implementing Units in hardware and software: Memory Hierarchy, Addressing Mode, Different word sized Instruction Formats
- ❖ To evaluate concepts of Computer Architecture, design issues and circuits, Parallel Processing, IPC, Synchronizations & parallelism.
- ❖ To create and design systems with different Memory Sizes, Instruction Sets, Pipelining functional Units

MAPPING OF COs & POs:

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

UNIT-I
BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers.
DATA REPRESENTATION: Fixed Point Representation, Floating Point Representation. Error Detection codes.

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

UNIT-III

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

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

UNIT-IV

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

UNIT-V

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

UNIT-VI

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

TEXT BOOKS:
1) Computer Systems Architecture – M. Moris Mano, 10 Edition 2016, Pearson/PH
2) Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition 2011, McGraw Hill.

REFERENCES:
1) Computer Organization and Architecture–William Stallings Sixth Edition, 2012 Pearson/PHI
2) Dr. M. Usha, T. S. Srikanth, "Computer System Architecture and Organization", First Edition, Wiley- India.
3) "Computer Organization" by ISRD Group, Tata McGraw-Hill
4) https://en.wikipedia.org/wiki/Computer_architecture
5) https://onlinelibrary.wiley.com/doi/full/10.1002/9780470050118.ecse071

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II B.Tech, I-Sem (CSE)

L	T	C
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(A0019203) APTITUDE ARITHMETIC REASONING & COMPREHENSION
(Skill Development Course)
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To familiarize the students about the concepts of aptitude, arithmetic and reasoning
- ❖ To cope up the students to improve their employable skills

COURSE OUTCOMES:
After completion of the course the student will be able to:
- ❖ Understand number system which helps to become well trained for recruitment drives.
- ❖ Analyse permutations and combinations concept.
- ❖ Obtain the knowledge of coding and decoding concept.
- ❖ Understand the topics related to clock and probability.
- ❖ Identify the topics related to Venn diagrams, reasoning and Non-verbal reasoning.

MAPPING OF COs & POs:

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

UNIT I
Numbers, Number Systems, Simple Equations, Ratio, Proportion, Variation Quadratic Equations, Progressions, Percentages.

UNIT II
Profit and Loss, Partnerships, Averages, Mixtures & Allegations, Simple Interest, Compound Interest, Time and Work, Pipes, indices, surds, inequalities ,Cisterns Time and Distance Geometry and Mensuration.

UNIT III
Permutations and Combinations, Probability, Data Interpretation & Data Sufficiency.

UNIT IV
Number & Letter Series, Analogies, Coding and Decoding, Odd Man Out, Blood Relations.

UNIT V
Direction Sense, Symbols and Notations, Deductions & Connectives, Clocks, Calendars Analytical.

UNIT VI
Reasoning (Verbal and Non-Verbal), Venn Diagrams, Analytical Puzzles and Octal number system.

REFERENCES:
1) R.S.Agarwal. Quantitative Techniques. S.Chand Series.
2) Shankuntala Devi. Techniques of Reasoning. S.Chand Series.

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II B.Tech, I-Sem (CSE)

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(A0014203) INDIAN HERITAGE & CULTURE
(Mandatory Learning Course)
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

INTRODUCTION:

Indian Heritage is an ancient facet pertaining to bygone ages. It reflects strong ethical culture and embodiment of nature in life style. It had its deep roots in great Indian epics and Upanishads. It has been transformed and strengthened by many kings and queens. It is revived by erudite writers. The glory of Indian Heritage & culture have been ignored or distorted in wake of western culture. The present generation ought to know their indigenous culture and heritage and apply the wisdom to the current core working aspects.

COURSE OBJECTIVES:
- ❖ To enable the students to have an insight into and understanding of the great heritage and culture of
- ❖ India.
- ❖ To sensitize them towards preservation and progression of the composite culture of India
- ❖ To make students learn soft skills and life skills from ancient treatise
- ❖ Relevance of architecture & ancient principle to the current engineering scenario

COURSE OUTCOMES:
- ❖ Equip learners with knowledge of the heritage and culture of India.
- ❖ Acquire Leadership & Soft skills from great leaders of India
- ❖ Apply the ancient wisdom to become successful professionals
- ❖ To make them understand diversity of culture and national integrity

UNIT-I:
Origin of Indian Culture & Heritage –Indus valley Civilization - Time line of Indian empires - Cultural & social conditions of India under Mauryas, Guptas & the Sathavahanas

UNIT-II:
Influence of Islam on Indian Culture - Leadership skills from Akbar the Great & Krishnadeva Raya - World Heritage Sites in India

UNIT-III:
Great Indian Epics – Life skills from Ramayana and Mahabharata – Ethics from Upanishads &- Vedas - Pathanjali Yoga -Principles of Jainism, Buddhism & Sufism

UNIT-IV:
Indian Art Forms –Literature - Rabindranath Tagore - RK.Narayan - Sri Sri - Jashuva – Music - Saint Tyagaraja, Annamayya - Purandhara Das - Kabir Das- Dance Forms of India

UNIT-V:
Social awakening and Social reform movements -Theosophical Society - Emancipation of Women in pre-independent era

UNIT-VI:
Mahatma Gandhi - Non-violence and Satyagraha - Great leaders of Freedom struggle – Subhash Chandra Bose – Bhagath Singh –Moulana Abul Kalam Azad – B.R.Ambedkar - Post Independent Era.

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TEXT BOOK
1) Madanlal Malpani & Shamsunder Malpani (2009), **Indian Heritage and Culture,** New Delhi: Kalyani Publishers.

REFERENCE BOOKS
1) Romila Thapar (2018) , Indian Cultures as Heritage: Contemporary Pasts, India.
2) Anurag Mathur (2017), Indian Culture & Heritage , Create space independent publishing Platform, 2017.
3) P.R.Rao & P. Raghavendra , Indian Heritage and culture, Sterling Publication Pvt. Ltd.
4) Madhukar kumar Bhagat, Indian Heritage and culture, Access Publications.
5) Dhirendra Singh, Indian Heritage and culture , APH Publications.

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II B.Tech, I-Sem (CSE)

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(A0594203) ADVANCED DATA STRUCTURES THROUGH C++ LAB

COURSE OBJECTIVES:
❖ To make the student learn an object oriented way of solving problems.
❖ Learn how to implement some useful data structures.
❖ Understand the effect of data structures on an algorithm's complexity.
❖ To develop skills to design and analyze simple linear data structures
❖ To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
❖ To Gain knowledge in practical applications of data structures

COURSE OUTCOMES:
❖ Basic ability to analyse algorithms and to determine algorithm correctness and time efficiency class.
❖ Design, write, execute, and debug programs in C++.
❖ At the end of this lab session, the student will
❖ Be able to design and analyze the time and space efficiency of the data structure
❖ Be capable to identity the appropriate data structure for given problem
❖ Have practical knowledge on the application of data structures

MAPPING OF COs & POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2							1				1			
CO2	2	1				1									
CO3	2		1			1									
CO4	2			1		1									
CO5	2			1											
CO6	2											1			

WEEK 1:
Write C++ program that convert the given expression from Infix to prefix using templates.

WEEK 2:
Write a C++ program to evaluate the given Postfix expression.

WEEK 3:
Write C++ program that implement all the operations on Circular Queue with array representation with templates.

WEEK 4:
Write C++ program that implement all the operations on DE Queue with array representation with templates.

WEEK 5:
Write C++ programs to implement the following using an array representation with templates.
a) Min Heap   b) Max Heap

WEEK 6:
Write C++ programs to implement the following using an array representation with templates.
a) Ascending Priority Queue   b) Descending Priority Queue

WEEK 7:

Write C++ program to implement Doubly Linked List for all operations along with templates.

WEEK 8:

Write a C++ program to implement the following operations on Binary Tree
a) Insert   b) Delete   c) Search   d) Display

WEEK 9:

Write a C++ program to implement the following operations on Binary Search Tree
a) Insert   b) Delete   c) Search   d) Display

WEEK 10:

Write a C++ program to implement the following collision resolution techniques using templates.
a) Linear Probing   b) Quadratic Probing   c) Double Hashing

TEXT BOOKS:

1. Object Oriented Programming Through C++, E. Balaguruswamy 6 Edition, 2013.
2. Data Structures using C++, Oxford, Varsha H. Patil.
3. Classic Data Structures, Debasis Samanta, PHI Learning Pvt Ltd, 2nd edition.
4. Data Structures and Algorithms in C++, Third Edition, 2006 Adam Drozdek, Thomson.
5. Data Structures using C++, D.S. Malik, Thomson

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, I-Sem (CSE)

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(A0571203) PYTHON PROGRAMMING LAB
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To be able to introduce core programming basics and various Operators and flow control statements of Python programming language through proper practice.
- ❖ To demonstrate about various Python fundamental data structures such as int, float, complex, bool and strings.
- ❖ To demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries.
- ❖ To demonstrate about Functions, Modules and File Input - Output operations in Python programming language.
- ❖ To demonstrate about Object Oriented Programming in Python Programming.
- ❖ To understand about and Exception handling mechanisms and Regular Expressions in Python Programming.

COURSE OUTCOMES:
- ❖ Student should be able to understand the basic concepts of scripting and the contributions of scripting language.
- ❖ Student should be able to explore Fundamental data structures in Python.
- ❖ Student should be able to explore python data structures like Lists, Tuples ,Sets and dictionaries.
- ❖ Student should be able to explore Functions, Modules and File input – Output Operations in Python programming language.
- ❖ Student should be able to explore Object Oriented Programming in Python Programming.
- ❖ Student should be able to create practical and contemporary applications using Exception handling mechanisms and Regular Expressions.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	1			1				1	1		1	2	1	1
CO 2	3	3	2		2				1	1		1	1	1	1
CO 3	3	2	2	1	2				1	1		2	1	2	1
CO 4	3	2	1		2				1	1		1	1	2	
CO 5	3	3	1	1	1				1	1		2	2	2	2
CO 6	3	3	1	1	1				1	1		2	2	2	2

S.No	Name of the Experiment	Remarks
1	a) Demonstrate about Basics of Python Programming.	
	b) Demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types)	
	c) Demonstrate the working of following functions in Python. i) id( ) ii) type( ) iii) range( )	
	d) Write a Python program to demonstrate various base conversion functions.	
	e) Write a Python program to demonstrate various type conversion functions.	
2	a) Demonstrate the following Operators in Python with suitable examples. i) Arithmetic Operators ii) Relational Operators	

	iii) Assignment Operator iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators	

3	a) Write Python programs to demonstrate the following:
	    i) input( ) ii) print( )
	  iii) 'sep' attribute iv) 'end' attribute
	   v) replacement Operator ({ })	

	b) Demonstrate the following Conditional statements in Python with suitable examples.
	  i) if statement ii) if else statement
	  iii) if – elif – else statement	

	c) Demonstrate the following Iterative statements in Python with suitable examples. i) while loop ii) for loop	
	d) Demonstrate the following control transfer statements in Python with suitable examples. i) break ii) continue iii) pass	
4	Write Python programs to print the following Patterns:	
	i) A A B A B C A B C D A B C D E	
	ii) * * * * * * * * * * * * * * *	
	iii) E E E E E E E E D D D D D D D C C C C C B B B A	
	iv)	

	``
	      4
	     4 3
	    4 3 2
	   4 3 2 1
	  4 3 2 1 0
	   4 3 2 1
	    4 3 2
	     4 3
	      4
	``	

	v) ``` 4 3 4 2 3 4 1 2 3 4 0 1 2 3 4 1 2 3 4 2 3 4 3 4 4 ```	
	vi) ``` * * * * * * * * * * ```	
	vii) ``` * ```	

	viii)
	``
	        E
	       D E
	      C D E
	     B C D E
	    A B C D E
	     B C D E
	      C D E
	       D E
	        E
	``	

5	a) Write a Python program to demonstrate various ways of accessing the string.
	    i) By using Indexing (Both Positive and Negative)
	    ii) By using Slice Operator	

	b) Demonstrate the following functions/methods which operates on strings in Python with suitable examples:
	   i) len( ) ii) strip( ) iii) rstrip( ) iv) lstrip( )
	  v) find( ) vi) rfind( ) vii) index( ) viii) rindex()	

	ix) count( ) x) replace( ) xi) split( ) xii) join( ) xiii) upper( ) xiv) lower( ) xv) swapcase( ) xvi) title( ) xvii) capitalize( ) xviii) startswith() xix) endswith()	
6	a) Demonstrate the different ways of creating list objects with suitable example programs.	
	b) Demonstrate the following functions/methods which operates on lists in Python with suitable examples: i) list( ) ii) split( ) iii) len( ) iv) count( ) v) index ( ) vi) append( ) vii) insert( ) viii) extend() ix) remove( ) x) pop( ) xi) reverse( ) xii) sort( ) xiii) copy( ) xiv) clear( )	
	c) Demonstrate the following with suitable example programs: i) List slicing ii) List Comprehensions	
7	a) Demonstrate the different ways of creating tuple objects with suitable example programs.	

	b) Demonstrate the following functions/methods which operates on tuples in Python with suitable examples:
	  i) len( ) ii) count( ) iii) index( ) iv) sorted( )
	  v) min ( ) vi)max( ) vii) cmp( ) viii) extend()
	 ix) remove( ) x) pop( ) xi) reverse( ) xii) sort( )
	xiii) copy( ) xiv) clear( )	

8	a) Demonstrate the different ways of creating set objects with suitable example programs.	

	b) Demonstrate the following functions/methods which operates on sets in Python with suitable examples:
	  i) add( ) ii) update( ) iii) copy( ) iv) pop( )
	  v) remove( ) vi)discard( ) vii) clear( ) viii) union()
	 ix) intersection( ) x) difference( )	

9	a) Demonstrate the different ways of creating dictionary objects with suitable example programs.	

	b) Demonstrate the following functions/methods which operates on dictionary in Python with suitable examples:
	  i) dict( ) ii) len( ) iii) clear( ) iv) get( )
	  v) pop( ) vi)popitem( ) vii) keys( ) viii) values()
	 ix) items( ) x) copy( ) xi) update( )	

10	a) Demonstrate the following kinds of Parameters used while writing functions in Python. i) Positional Parameters ii) Default Parameters iii)Keyword Parameters iv) Variable length Parameters	
	b) Write a Python program to return multiple values at a time using a return statement.	
	c) Write a Python program to demonstrate Local and Global variables.	
	d) Demonstrate lambda functions in Python with suitable example programs.	
11	a) Python program to perform read and write operations on a file.	
	b) Python program to copy the contents of a file to another file.	
	c) Python program to count frequency of characters in a given file.	

	d) Python program to print each line of a file in reverse order.	
	e) Python program to compute the number of characters, words and lines in a file.	
12	Demonstrate various Object Oriented Programming Concepts in Python Programming with illustrative examples.	
13	Demonstrate about Exception Handling in Python Programming with illustrative examples.	
14	a) Demonstrate the following in-built functions to use Regular Expressions very easily in our applications. i) compile( )　ii) finditer( )　iii) match( )　iv) fullmatch( ) v) search( )　vi) findall( )　vii) sub( )　viii) subn( ) ix) split( )	
	b) Write a Regular Expression to represent all RGM language (Your own language) identifiers. **Rules**: 1. The allowed characters are a-z,A-Z,0-9,#. 2. The first character should be a lower case alphabet symbol from a to k. 3. The second character should be a digit divisible by 3. 4. The length of identifier should be at least 2. Write a python program to check whether the given string is RGM language identifier or not?	
	c) Write a Regular Expression to represent all 10 digit mobile numbers. **Rules:** 1. Every number should contains exactly 10 digits. 2. The first digit should be 7 or 8 or 9 Write a Python Program to check whether the given number is valid mobile number or not?	

TEXT BOOKS
1. Learning Python, Mark Lutz, Orielly, 3 Edition 2007.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson, 2017.

REFERENCE BOOKS
1) Think Python, 2 Edition, 2017 Allen Downey, Green Tea Press
2) Core Python Programming, 2016 W.Chun, Pearson.
3) Introduction to Python, 2015 Kenneth A. Lambert, Cengages
4) https://www.w3schools.com/python/python_reference.asp
5) https://www.python.org/doc/

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, I-Sem (CSE)

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(A0493203) DIGITAL LOGIC DESIGN LAB
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ Know the fundamentals of Boolean algebra and theorems, Karnaugh maps including the minimization of logic functions to SOP or POS form.
- ❖ To strengthen the principles of logic design and use of simple memory devices, flip-flops, and sequential circuits.
- ❖ To fortify the documentation standards for logic designs, standard sequential devices, including counters and registers, combinational devices, includes decoder, multiplexer.

COURSE OUTCOMES:
- ❖ Ability to perform three basic logic operations and construct the truth tables for the different types of gates and implement logic circuits using basic AND, OR and NOT gates.
- ❖ Ability to use De-Morgan's theorem to simplify logic expressions and describe the concept of active LOW and active HIGH logic signals and use boolean algebra and K-map as tool to simplify and design logic circuits and Design simple logic circuits without the help of truth tables.
- ❖ Ability to Construct and analyze the operation of flip-flop and troubleshoot various types of flip-flop circuits, decoder, multiplexer.
- ❖ Analyze the operation of each IC in various logical systems.

MAPPING OF COs & POs:

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

EXPERIMENTS
1) Basic Logic Gates AND, OR,NOT and their applications
2) Universal gates NAND and NOR
3) Study of combinational circuits 1 Half Adder and Full Adder
4) Study of combinational circuits 1 Half Sub tractor and Full sub tractor.
5) Study of Flip flops   a) S-R F/F   b) J-K F/F   c) D-F/F   d)T - F/F
6) Design of four bit ring counter using Flip Flop
7) 3 – bit synchronous counter using Flip Flop
8) 4-bit Johnson Ring counter using Flip Flop
9) MOD-5 Synchronous counter using F/F
10) 2-4 decoder
11) 4 to 1 Multiplexer
12) 3 – bit up/down counter using F/F

REFERENCES:
1) Digital Design –5 Edition, 2013, M.Morris Mano, Pearson Education/PHI.
2) Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.

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II B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0509204) JAVA PROGRAMMING
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
After taking this course, the student should be able to:
- ❖ To understand the concepts and skills to apply OOP in Java programming in problem solving.
- ❖ To understand the concept of polymorphism, inheritance and abstraction.
- ❖ To understand the creation of user defined packages and input output streams.
- ❖ To learn java's exception handling mechanism, and various String operations.
- ❖ To learn java's multithreading by communicating different tasks.
- ❖ To learn the collection frame work implementation.

COURSE OUTCOMES:
- ❖ Use the syntax and semantics of java programming language and basic concepts of OOP.
- ❖ Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
- ❖ Implement APIs and to develop programs that manage input/output streams.
- ❖ Apply the concepts of Exception handling to develop efficient and error free codes and understanding of various string functions.
- ❖ Apply the concepts of Multithreading to develop the programs and get the knowledge on collection framework.
- ❖ Implement different forms of data structures with collection framework.

MAPPING OF COs & POs:

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

UNIT-I
Introduction To Java – Overview of Java, data types, type conversion and casting, enumerated types, scope and life time of variables, operators, expressions, control statements, command line arguments, arrays, overview of classes, creations of objects, instant variables and methods, use of static, constructors, access control, usage of this, overloading methods and constructors, garbage collection.

UNIT-II
Inheritance – overview, Super and Sub classes, Member access rules, types of Inheritance, super uses, method overriding, Dynamic method dispatch, abstract classes and methods, use of final, the Object class and its methods.
Interfaces – Interfaces vs. Abstract classes, defining interfaces, implementing and extending interfaces, allowing method definitions in interfaces (Java8).

UNIT-III
Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, access protection.

Input/ Output exploring of java.io: The Java I/O Classes and Interfaces, File class, The Byte Streams and Character Streams, The Console Class, Using Stream I/O, Serialization

UNIT-IV
Strings: Strings, string functions.
Exception handling: Fundamentals, exception types, usage of try, catch, throw, throws and finally, built in exceptions, creating your own exceptions subclasses.

UNIT-V
Multithreading – overview, Main thread, creating threads, thread life cycle, creating multiple threads, use of isAlive() & join(), thread priorities, thread synchronization, inter-thread communication.
Collections Framework-1: Collections Overview, Collection Interfaces: Collection, List, Set, Sorted-Set.

UNIT-VI
Collections Framework-2: Collection Classes: Array-List, Linked-List, Hash-set, Linked-Hash-Set, TreeSet Class. Accessing a Collection via Iterator, Sorting User-Defined Classes in Collections. working with Maps, HashMap, TreeMap, and Comparator. Brief on: Enumeration, Vector, and Stack.

TEXT BOOKS:
1) Java; the complete reference, 11th edition, 2018 Herbert Scheldt, TMH.
2) Understanding OOP with Java, updated edition, T. Budd, Pearson education.

REFERENCES:
1) An Introduction to programming and OO design using Java, 2015, J.Nino and F.A.Hosch, John Wiley & sons.
2) Programming in Java, Sachin Malhotra, Saurabh Choudhary, 6th Edition, 2018.
3) An Introduction to OOP,3 edition, 2001, T. Budd, Pearson education.
4) Introduction to Java programming 6th edition, Y. Daniel Liang, Pearson education.
5) An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
6) Core Java 2, Vol 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, seventh Edition, Pearson Education.
7) Core Java 2, Vol 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
8) https://www.w3schools.com/JSREF/DEFAULT.ASP
9) https://dzone.com/articles/top-10-websites-advanced-level

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0507203) DATABASE MANAGEMENT SYSTEMS
For branches: EEE, ECE, CSE, CSE(DS) & CSE&BS

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

COURSE OUTCOMES:
❖ Understand the basic concepts of database and various data model used in database design and ER modelling concepts and architecture.
❖ Use different integrity constraints in defining database objects
❖ understand and apply their knowledge in solving procedural and non-procedural language queries
❖ Create good relational schema by applying normalization methodologies
❖ Determine the significance of concurrency control mechanism in transaction
❖ Illustration of various File organization techniques and different storage mediums.

MAPPING OF COs & POs:

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

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

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

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

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UNIT IV

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

UNIT V

Overview Of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of transactions-Lock Based Concurrency Control, Performance of Locking, Transaction Support in SQL.
Concurrency Control: 2PL, Serializability and recoverability, Introduction Lock Management, Lock Conversions, Dealing with Deadlocks, Concurrency control without locking.

UNIT VI

Data on External Storage – File Organizations and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – The Memory Hierarchy, RAID, Disk Space Management, Buffer Manager, Files of Records, Page Formats, record Formats.

TEXT BOOKS:
1. Data base Management Systems, Raghu Ramakrishna, Johannes Gehrke, TATA McGraw Hill 3rd Edition 2017
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, 6 edition, 2013.

REFERENCES:
1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 11th Edition, 2016.
2. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
3. Introduction to Database Systems, C.J.Date Pearson Education.
4. https://www.oreilly.com/library/view/concepts-of-database/9789332537422/xhtml/bibliography.xhtml
5. https://en.wikipedia.org/wiki/Database
6. https://www.sanfoundry.com/best-reference-books-database-management-systems/

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, II-Sem (CSE)

	L	T	C
	2	1	3

(A0508203) FORMAL LANGUAGES AND AUTOMATA THEORY
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.
- ❖ Classify machines by their power to recognize languages.
- ❖ Employ finite state machines to solve problems in computing.
- ❖ Explain deterministic and non-deterministic machines.
- ❖ Comprehend the hierarchy of problems arising in the computer sciences.

COURSE OUTCOMES:
- ❖ To get the knowledge of formal Languages and automata theory concepts.
- ❖ To understand different types of Languages and their automaton
- ❖ To apply theoretical knowledge for the study of programming languages and compilers.
- ❖ To organize different types of automata's according to their computation levels
- ❖ To Evaluate the complexity of P and NP problems
- ❖ To generate Computational models using Turing machines

MAPPING OF COs & POs:

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

UNIT I:
Automata: Why study Automata Theory: introduction to FA, Structural Representations, Automata and complexity.
The central concepts of Automata: Alphabet, Strings, Language and Operations.
Deterministic finite automaton: definition, How DFA processes Strings, Simpler notations for DFA's, extending the transition Function to Strings, The Language of a DFA and minimization of FSM.

UNIT II:
Non deterministic finite automaton: An informal view of NFA, Definition, The extended Transition Function, The language of an NFA, Equivalence of DFA and NFA.
Finite Automata with € transitions: use of € transitions, Notation, Epsilon closures, Eliminating € Transitions: €-NFA to DFA conversion.
Finite Automata with output: Moore and Melay machines.

UNIT III:
Regular Languages: Regular expressions, identity rules for regular expressions, Arden's Theorem.
Finite Automata and regular expressions: Converting a regular expression to a finite automata, Converting finite automata to a regular expression, Converting DFA's to Regular Expressions by Eliminating States (state elimination method), Converting finite automata to a regular expression using Algebraic method (using Arden's theorem), Equivalence of two finite

automata. Pumping lemma of regular sets, Applications of pumping lemma, closure properties of regular sets (proofs not required).

UNIT IV:

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

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

Parse Trees: Constructing Parse Trees, Application of CFG.

Ambiguity in grammars and Languages: Ambiguous grammars.

UNIT V:

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

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

UNIT VI:

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

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

TEXT BOOKS:
1. "Introduction to Automata Theory Languages and Computation". John E. Hopcroft, Rajeev Motwani and Jeffery D. Ullman. Pearson Education – third edition 2008.
2. Formal Language and Automata Theory by KVN Sunitha, Tata McGraw Hill Education 2010

REFERENCES:
1. "Theory of Computer Science (Automata languages and computation)" K. L. P. Mishra and N. Chandra Shekaran, 2nd edition, 2006 PHI. (UNIT II)
2. Theory of Computation, Vivek Kulkarni, Oxford, 7 Edition
3. Formal Languages and Automata Theory, C.K. Nagpal.
4. https://www.oreilly.com/library/view/introduction-to
5. automata/9788131793510/xhtml/references.xhtml
6. https://www.ics.uci.edu/~goodrich/teach/cs162/notes/

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0510204) DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES:
- ❖ Significance of algorithms in the computer field.
- ❖ Various aspects of algorithm development.
- ❖ Qualities of a good solution.
- ❖ Significance and importance of program correctness.
- ❖ Various fields that constitute the subject of algorithms.
- ❖ Relationship between algorithms and other fields in the computer realm.
- ❖ Significance of algorithm efficiency.

COURSE OUTCOMES:
Students will be able to:
- ❖ Learn various performance characteristics of algorithms and able to define various algorithm design techniques.
- ❖ Understand how the choice of algorithm design methods impacts the performance of algorithms.
- ❖ Develop algorithms to solve various kinds of problems.
- ❖ Analyse and compare various algorithm design techniques.
- ❖ Demonstrate the procedures to solve problems using algorithm design methods.
- ❖ Create and propose new methods for solving variety of problems by improving the efficiency.

MAPPING OF COs & POs:

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

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

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

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

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

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

UNIT VI

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

TEXT BOOKS:
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, 2015 Galgotia publications pvt. Ltd.
2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, 2006 John wiley and sons.

REFERENCES:
1. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd. Pearson Education**.**
2. Design and Analysis of algorithms, S. Sridhar, Oxford, 2014.
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
4. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson Education.
5. https://www2.cs.duke.edu/courses/fall08/cps230/Book.pdf
6. http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0020203) PROBABILITY AND STATISTICS
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To familiarize the students with the foundations of probability and Statistical methods.
- ❖ To impart probability concepts and Statistical methods in various applications in Engineering.

COURSE OUTCOMES:
After completion of the course the student will be able to:
- ❖ Understand the basic probability concepts and random variables that have numerous applications in computer science.
- ❖ Apply the concept of distribution functions in web data and traffic network modelling in computer science engineering.
- ❖ Analyse statistics and its applications in simulation, data mining and reliability theory.
- ❖ Determine the process constructing linear and non-linear curves through the method of least square and understand its usage in binary mixtures.
- ❖ Identify the concept of statistical quality control in computer science and mechanical engineering.

MAPPING OF COS & POS:

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

UNIT - I
Data classification and Representation – Diagrammatic and Graphical representation – Measures of Central Tendency, Dispersion and its importance.
Basic concept of probability – Random variables – Discrete and continuous Random variables –Moment generating function - Expectation

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

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

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

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

UNIT – VI

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

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

TEXTBOOKS:
1) T.K.V. Iyengar, B. Krishna Gandhi and Others, Probability and Statistics, S. Chand & Company
2) S.P.Gupta, Statistical methods, S.Chand Publications
3) R.K.Jain and S.R.K.iyngar, Advanced Engineering Mathematics, Alpha science International limited,2016

REFERENCES:
1) Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons,2011.
2) B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers.
3) S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
4) Miller and John E Freund, Probability and Statistics for Engineers, 5th Edition

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, II-Sem (CSE)

	L	T	C
	1	2	2

(A0511204) USER INTERFACE TECHNOLOGIES
(Skill Development Course)

COURSE OBJECTIVES:
This course will enable students to:
- ❖ Insert a graphic, create a link, create a table, insert heading levels, insert ordered and unordered lists within a web page
- ❖ Apply cascading style sheets for web pages.
- ❖ Use Java script for dynamic effects and to validate form input entry.
- ❖ Make the web pages more responsive using Bootstrap.
- ❖ Represent the webpage in a structured hierarchical way using DOM.
- ❖ Use jQuery to reference and manipulate web page content

COURSE OUTCOMES:
The students should be able to:
- ❖ Make the user's interaction as very simple and most efficient.
- ❖ Use Cascading Style Sheets (CSS) to format Web pages.
- ❖ Use operators, variables, arrays, control structures, functions and objects in JavaScript.
- ❖ Understand the Bootstrap components to web page like button, menu, drop down and apply the knowledge of bootstrap grid to make a responsive web page.
- ❖ Write applications that manipulate the Document Object Model to fetch and display information using jQuery
- ❖ Create effective scripts using jQuery to enhance the end user experience.

MAPPING OF COS & POS:

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

UNIT – I:
Hyper Text Markup Language (HTML): Introduction to Web Applications, HTML Basics - Structure of HTML Page, HTML Comments, HTML Tags - Heading Tags, Paragraph tag, legacy tags, div and span Tags. HTML Lists - ordered list, unordered list, Nested lists. HTML Attributes, Table creation, Creation of HTML Forms. Creation of Labels for HTML Elements. Implementing Radio Buttons. Implementing Drop down box/select box.

UNIT – II:
Cascading Style Sheets (CSS): Basic Structure of CSS File, comments in CSS file, possible ways to specify color, Setting Background and Borders, Setting Background Image, Basic CSS Selectors, CSS Inheritance, CSS Specificity, Fonts and Text in CSS, How to use Custom Fonts in CSS, The Box Model.

UNIT – III:
JavaScript: Java Script Developer's Console, Basic JavaScript Primitive Data Types, Declaring variables with 'var' keyword. Operators, Conditional Statements, Iterative Statements, JavaScript Functions, JavaScript Scope, Higher Order Functions, Anonymous Functions, JavaScript Arrays, Important Methods related to JavaScript arrays, Retrieving

Elements of Array, JavaScript Objects, Nested Objects and Arrays, Object Methods, this keyword,

UNIT – IV:
Bootstrap: How to connect Bootstrap with HTML, Bootstrap Buttons, Bootstrap Forms, Form Development by using Bootstrap elements, Bootstrap Navbars, Bootstrap: Grid System, Nested Grids, Illustrative examples on all the above concepts.

UNIT – V:
Document Object Model (DOM): How to Display DOM objects on the console, Important DOM Attributes, Important methods of DOM, DOM: Content Interaction, Event Handling by using DOM, Illustrative examples on all the above concepts.

UNIT – VI:
jQuery: Purpose of jQuery, Advantages of jQuery, How to connect with jQuery, jQuery Selectors, Manipulating HTML Elements, The Most Commonly used jQuery Methods, Event Handling by using jQuery, Difference between keypress, keydown and keyup events, Event handling by using on() method, jQuery Effects,

TEXT BOOKS
1) Web programming "Building Internet Applications" Chris Bates, Wiley; 3rd edition 2006.
2) Web Design with HTML, CSS, JavaScript and jQuery by Jon Duckett Wiley; Pck edition, 2014 https://www.amazon.in/Web-Design-HTML-JavaScript-jQuery/dp/1118907442

REFERENCE BOOKS
1. Web Design with HTML, CSS, JavaScript and jQuery Set 1st Edition by Jon Duckett
2. JavaScript and JQuery: Interactive Front-End Web Development by Jon Duckett
3. Murach's JavaScript and jQuery (3rd Edition)
4. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics by Jennifer Robbins.

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II B.Tech, II-Sem (CSE)

L	P	C
0	3	1.5

(A0595203) DATABASE MANAGEMENT SYSTEMS LAB
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

Upon completion of the lab, the student should be able to:
- ❖ Map the model into a relational database system.
- ❖ Implement the given schema on a relational DBMS.
- ❖ Design, develop, and maintain Oracle Database Objects.
- ❖ Use a database language for manipulating and querying data.
- ❖ Develop advanced packages, stored procedures, and triggers.
- ❖ Develop various functions definitions and procedures using PL/SQL.

MAPPING OF COs & POs:

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

Recommended Systems/Software Requirements:
- ❖ Intel based desktop PC
- ❖ Mysql /Oracle latest version Recommended.

List of Experiments:

1) Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
   Example: Select the roll number and name of the student who secured fourth rank in the class.
3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4) Nested Queries and correlated nested queries
5) Table alterations
6) Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
7) Creating procedures
8) Creating functions and packages

---

9) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.
10) Introduction to ORACLE reports

REFERENCES:

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

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II B.Tech, II-Sem (CSE)

L	P	C
0	3	1.5

(A0597204) JAVA PROGRAMMING LAB
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To make the student operating systems.
- ❖ Learn object oriented way of solving problems.
- ❖ To teach the student to write programs in Java to solve the problems

COURSE OUTCOMES:
- ❖ Write Java application programs using OOP principles and proper program structuring.
- ❖ Develop Java program using packages, inheritance and interface
- ❖ Implement error handling techniques using exception handling and develop programs using class and inputs from keyboard.
- ❖ Create multithreaded programs.
- ❖ Demonstrate java programs on collection framework.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	1	2				1		2	2	2		2
CO2	2	1	3	2	2							3	1	2	1
CO3	1	2	2	1	1							2			2
CO4	1	2	1	1					2		2	2	2	2	1
CO5	2	2	2		2						1	2	2	1	2

LIST OF EXPERIMENTS:
1. Write a Java Program to find the reverse of a given number. And also check whether it is palindrome or not.
2. Write a Java Program to print Fibonacci sequence (rule: The first two values in the sequence are 0 and 1. Every subsequent value is the sum of the two values preceding it.)
3. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
4. Write a Java program to multiply two given matrices.
5. Write a Java program to find both the largest and smallest number in a list of integers.
6. Write a Java program to find the volume of a box by creating objects and also use this keyword.
7. Write a Java program to implement all arithmetic operations with static/class methods for each operation. User must provide values from Keyboard.
8. Write a Java program to implement parameter passing techniques:
   a) call-by-value   b) call-by-reference
9. Write a Java program to implement the following:
   a) Overloading methods   b) overloading constructors
10. Write a Java program to implement multi-level inheritance and also demonstrate super keyword.
11. Write a Java program to demonstrate method overriding by implementing dynamic method dispatch?
12. Write a Java program to create and abstract class called Shape which inherits Rectangle and triangle to calculate area of each shape by implementing abstract method of Shape class by implementing hierarchical inheritance.
13. Write a Java program to implement multiple-inheritance?

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14. Write a Java program to import user defined packages to display results for any mathematical operations like addition, subtractions, multiplications and division (class methods) from one package and also producing results square, cube and square-root of a given number (instant methods) from another package.
15. Write a Java program to sort a list of names in ascending order.
16. Write a Java program that checks whether a given string is a palindrome or not.
    Ex: MADAM is a palindrome
17. Write a Java program to handle multiple exceptions and also use finally?
18. Write a Java program to handle user-defined exceptions?
19. Write a Java program that reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
20. Write a Java program that displays the count of number of characters, lines and words in a text file.(user provide file using cmd line args)
21. Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays Welcome" every three seconds.
22. Write a Java program that correctly implements producer consumer problem using the concept of inter-thread communication.
23. Write a Java program to store student class objects in Array List and sort the ArrayList?
24. Write a Java program to create HashSet from ArrayList and remove duplicates and display results?
25. Create a class called Person, having name and age (Override toString() method).Write a java program to create at least 5 persons details in a Set/List and traversing elements w.r.t age and name in an ascending order. (Use TreeSet).
26. Write a java program to read data from the user as a name and mobile number from the user and display the associative names for mobile numbers using HashMap.

REFERENCES:
1. Java; the complete reference, 11th editon,2018 Herbert schildt, TMH.
2. An Introduction to programming and OO design using Java, 2015 , J.Nino and F.A. Hosch, John wiley & sons Programming in Java, Sachin Malhotra, Saurabh Choudhary, Second Edition.
3. An Introduction to OOP, second edition, T. Budd, pearson education.
4. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech, II-Sem (CSE)

L	P	C
0	3	1.5

(A0598204) DESIGN AND ANALYSIS OF ALGORITHMS LAB

COURSE OBJECTIVES:
- ❖ The principle objective of this course is to build solid foundation in algorithms and their applications.
- ❖ To implement various divide and conquer techniques examples.
- ❖ To implement various Greedy techniques examples.
- ❖ To implement various Dynamic Programming techniques examples.
- ❖ To implement Backtracking techniques examples.
- ❖ To provide a practical exposure of all algorithms.
- ❖ To understand the importance of algorithm and its complexities.

COURSE OUTCOMES:
- ❖ Students will be able to calculate the time complexity of algorithm.
- ❖ Students will be able to sort the given numbers using various sorting algorithms.
- ❖ Students will be able to write programs for the problems using Divide and Conquer.
- ❖ Students will be able to write programs for the problems using Greedy Method.
- ❖ Students will be able to write programs for the problems using Dynamic programming.
- ❖ Students will be able to write programs for the problems using Backtracking.

MAPPING OF COs & POs:

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

EXPERIMENTS
1) Write a program to perform operation count for a given pseudo code
2) Write a program to perform Bubble sort for any given list of numbers.
3) Write a program to perform Insertion sort for any given list of numbers.
4) Write a program to perform Quick Sort for the given list of integer values.
5) Write a program to find Maximum and Minimum of the given set of integer values.
6) Write a Program to perform Merge Sort on the given two lists of integer values.
7) Write a Program to perform Binary Search for a given set of integer values recursively and non- recursively.
8) Write a program to find solution for knapsack problem using greedy method.
9) Write a program to find minimum cost spanning tree using Prim's Algorithm.
10) Write a program to find minimum cost spanning tree using Kruskal's Algorithm.
11) Write a program to perform Single source shortest path problem for a given graph.
12) Write a program to find solution for job sequencing with deadlines problem.
13) Write a program for all pairs shortest path problem.
14) Write a program to solve N-QUEENS problem.
15) Write a program to solve Sum of subsets problem for a given set of distinct numbers.

REFERENCES:
1) Data Structures and Algorithms by G.A.V. Pai, 2017, TMH.
2) Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2nd edition, University Press.

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III B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0516205) COMPUTER NETWORKS
For branches: ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ An understanding of the overriding principles of computer networking, including protocol design, protocol layering, algorithm design, and performance evaluation.
- ❖ An understanding of computer networking theory, including principles embodied in the protocols designed for the application layer, transport layer, network layer, and link layer of a networking stack.
- ❖ An understanding of specific implemented protocols covering the application layer, transport layer, network layer, and link layer of the Internet (TCP/IP) stack
- ❖ An understanding of security issues.

COURSE OUTCOMES:
- ❖ To analyze the classification of network services, protocols and architectures.
- ❖ To understand key Internet applications and their protocols.
- ❖ To learn basic concepts of MAC protocols and demonstrates wireless Lan.
- ❖ To design and analysis of the routing Protocols.
- ❖ To demonstrate the connection oriented and connection less protocols.
- ❖ Investigate various design issues in Application layer.

MAPPING OF COS & POS:

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

UNIT I
Introduction: Network Hardware, Network Software, References Models. The Physical Layer: Guided Transmission Media, Communication Satellites, The public Switched Telephone Network- The Local Loop: Modern ADSL, and wireless, Trunks and Multiplexing, Switching.

UNIT II
The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, and Sliding Window Protocols.

UNIT III
The Medium Access Control Sublayer: Multiple Access protocols, Ethernet- Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sublayer Protocol. The Binary Exponential Backoff Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless LANs- The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC SubLayer Protocol, The 802.11 Frame Structure.

UNIT IV
The Network Layer: Network Layer Design Issues, Routing Algorithms (Shortest path, Flooding, Distance Vector, Link state and Hierarchical routing, Broad cast routing, Multicast routing), Congestion Control Algorithms, Internetworking, IPV4 Addresses.

UNIT V

The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP

UNTI VI

The Application Layer: DNS-The Domain Name System, Electronic Mail, The World Wide Web.

TEXT BOOKS:
1. Computer Networks, Andrew S. Tanenbaum, Fouth Edition, Pearson Education.
2. TCP/IP Protocol suite Fourth Edition- Behrouz A.Forouzan

REFERENCES:
1. Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning.
2. Computer Networks, Bhushan Trivedi, Oxford.
3. Computer Networks: Principles, Technologies and Protocols for Network Design, Natalia Olifer, Victor Olifer, Wiley India.
4. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill.
5. Understanding Communications and Networks, Third Edition, W.A.Shay, Cengage Learning.
6. Computer and Communication Networks, Nader F. Mir, Pearson Education
7. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W.Ross, Third Edition, Pearson Education.
8. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor and Francis Group.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0517205) OPERATING SYSTEMS

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

COURSE OUTCOMES:
- ❖ Students will learn about and understand services provided by and the design of an operating system
- ❖ Students will learn about system calls for managing processes, memory and the file system and various process management concepts including scheduling
- ❖ Students will learn about and understand synchronization, deadlocks
- ❖ Students will learn about and understand different approaches to memory management
- ❖ Students will learn about and understand the issues related to file system interface and implementation, disk management
- ❖ Students will learn about and understand secondary storage structure and tertiary storage devices.

MAPPING OF COs & POs:

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

UNIT I
Introduction - what operating systems do, computer system architecture, process management, memory management, protection and security, distributed systems, special purpose systems
System structure - operating system services, systems calls, types of system calls, system programs, operating system structure, operating systems generation, system boot.

UNIT II
Process concepts - overview, process scheduling, operations on process, inter-process communication.
Multithread Programming – overview, multithreading models
Process scheduling – basic concepts, scheduling criteria, process scheduling algorithms, algorithm evaluation.

UNIT III
Concurrency - Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors

Principles of deadlock: system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.

UNIT IV
Memory Management Strategies –back ground, Swapping, contiguous memory allocation, paging, , segmentation

Virtual memory management – background, demand paging, copy-on-write, page-replacement algorithms-FIFO, LRU, Optimal, LFU, MFU, Second chance algorithm

UNIT V
File system – file concept, Access Methods, Directory structure, protection.

File System implementation - File system structure, file system implementation, directory implementation, allocation methods, free-space management, Recovery.

UNIT VI
Secondary-storage structure- overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure

Tertiary storage devices- removable disks, tapes, future technology, performance issues.

TEXT BOOKS:
1) Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.

REFERENCES:
1) Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.
2) Principles of Operating Systems, Naresh Chauhan, Oxford

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III B.Tech, I-Sem (CSE)

L	T	C
2	1	3

(A0518205) SOFTWARE ENGINEERING

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

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

MAPPING OF COS & POS:

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

UNIT I
Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths. **A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

UNIT II
Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process. **Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

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

UNIT IV
Design Engineering: Design process and Design quality, Design concepts, the design model. **Creating an architectural design:** Software architecture, Data design, Architectural styles and patterns.

UNIT V
Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation. **Testing Strategies:** A strategic approach

to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

UNIT VI
Metrics for Process and Products: Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance**.** Software Quality, Software Measurement, Metrics for software quality. **Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, The ISO 9000 quality standards.

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

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

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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III B.Tech, I-Sem (CSE)

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(A0519205) FULL STACK APPLICATION DEVELOPMENT
(Open Elective-I)
For branches: CSE & CSE&BS

COURSE OBJECTIVES:
This course demonstrates
- ❖ An in-depth understanding of the front end and back end technologies.
- ❖ Design and development of effective user interface for applications.
- ❖ An understanding of server side technologies.
- ❖ Basic knowledge of database interfacing.

COURSE OUTCOMES:
Students will be able to:
- ❖ Design effective front end using technologies like HTML 5, CSS.
- ❖ Provide client side request handling using Node.js and Angular and AJAX.
- ❖ Understand the need of XML in the developing of Web applications.
- ❖ Design server side scripting and database interfacing using Servlets, JSP & JDBC.
- ❖ Learn basics of Mongodb, its necessity and various operations.
- ❖ Work with Django framework and connect to Mongodb using python.

MAPPING OF COS & POS:

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

UNIT I
HTML 5 – Introduction to HTML 5, HTML5 Semantics, HTML Formatting, Links & images, HTML Block level elements.
CSS - Basic CSS syntax, CSS Shadows, CSS Links, CSS Lists, CSS Tables, CSS Images, CSS Forms, CSS Buttons, CSS User Interface.

UNIT II
JavaScript - Introduction to Java Script, Event handling in Javascript, Data Validation using Java Script. **Node.js -** Getting Started with Node.js, Node.js environment set up, Modules, Node.js File system, Events. **Angular -** Getting Started with Angular, Angular Components.

UNIT III
XML - Document type definition, XML Schemas, Document Object model, Presenting XML.
AJAX – Introduction, How AJAX works, XML Http Request, Common steps AJAX will follow, AJAX Example.

UNIT IV
Java Web Application Development - What is a web application? Client-Server Architecture, Introduction to servlets, studying javax.servlet and javax.servlet.http packages, Reading servlet parameters, The Anatomy of a JSP Using Scripting Elements, Implicit JSP Objects, Cookies in JSP, Sharing Session and Application Data.
Database Access - Database Programming using JDBC, Types of JDBC Drivers, Accessing a Database from a JSP Page.

UNIT V

MongoDB - Introduction to MongoDB, MongoDB Environment, MongoDB Create Database, MongoDB Drop Database, MongoDB Create Collection, MongoDB Drop Collection, MongoDB Read Operations, MongoDB Write Operations, MongoDB Data Modelling.

UNIT VI

Python Application Development – Python web framework- DJango, Hello World! with Django, Working with Templates, Working with Models, Getting a Model's Data with Querysets, Working with Django Forms, Connect MongoDB with Python, Flask framework, DJango vs Flask.

TEXT BOOKS:
1. Learning Web Design, Fifth Edition A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics by Jennifer Niederst Robbins, O'Reilly.
2. Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB by Azat Mardan, Second Edition, Apress.
3. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
4. Django: Web Development with Python, by Samuel Dauzon,Aidas Bendoraitis,Arun Ravindran, Packt Publishing.

REFERENCE BOOKS:
1. Node.js, MongoDB and Angular Web Development, Second Edition by Brad Dayley, Brendan Dayley, Caleb Dayley, Pearson Education.
2. Web Technologies, Uttam K. Roy, Oxford.
3. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson.
4. Java Server Pages –Hans Bergsten, SPD O'Reilly

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III B.Tech, I-Sem (CSE)

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(A0513205) WEB PROGRAMMING
(Open Elective-I)
For branches: EEE, ECE, CSE & CSE(DS)

COURSE OBJECTIVES:
- ❖ In-depth learning of client side scripting like HTML, JavaScript and server side scripting like servlets, JSPs. Also focuses on XML and web servers and database interfacing.
- ❖ Use the "echo" and "print" to send output to the browser.
- ❖ Learn how to create and use PHP basic and advanced concepts.
- ❖ Write PHP programs that access form data

COURSE OUTCOMES:
- ❖ Student can able to demonstrate the HTML important tags and for designing static web pages and separate design from content using CSS.
- ❖ Able to design a webpage with more user interactivity using JavaScript and understand the need of XML in the developing of Web applications.
- ❖ Students able to understand the need of Server side scripting using Servlets and JSP along with database connectivity.
- ❖ Understand the syntax and basic concepts of PHP, conditional and looping statements, Arrays and Functions, strings and files
- ❖ Understand and develop programs on PHP object-oriented concepts and advanced concepts (cookies & sessions) and data and time functions.
- ❖ Be able to develop a form containing several fields and be able to process the data with database using html & PHP-based script.

MAPPING OF COs & POs:

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

UNIT I
Introduction to HTML - HTML common tags, HTML program structure, Attributes, List, Tables, images, forms, Frames, Cascading Style sheets

UNIT II
JavaScript - Introduction to Java Scripts, Data Validation using Java Script.
XML - Document type definition, XML Schemas, Document Object model, Presenting XML.

UNIT III
Web Servers and Servlets: Introduction to Servlets, Lifecycle of a Servlet, A Simple servlet, The Servlet API, Reading Servlet Parameters, Handling Http Request & Responses.
JSP Application Development - Using Scripting Elements, Implicit JSP Objects, Sharing Session and Application Data.
Database Access- Database Programming using JDBC, Types of JDBC Drivers, Accessing a Database from a servlets and JSP.

UNIT IV

Introduction to PHP: Features of php, Basic Syntax, Php variables, Php Data types, Type casting, Operators and Expressions, control statements and Lopping statements, introduction to arrays, array functions, stings-Its related library functions, functions- parameter passing techniques, Recursive functions.

UNIT V

Object oriented programming concepts, PHP Advanced Concepts- Cookies, Sessions.
Working with Date and Time-Displaying Human-Readable Dates and Times, Finding the Date for a Weekday, Getting the Day and Week of the Year, Determining Whether a Given Year Is a Leap Year, Obtaining the Difference Between Two Dates, Determining the Number of Days in the Current Month, Determining the Number of Days in Any Given Month.

UNIT VI

Creating and Using Forms- Understanding Common Form Issues, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.
PHP and Database Access- Connecting to a MYSQL database, performing basic database operations.

TEXT BOOKS:
1. HTML Black Book – Steve Holzner.
2. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
3. Java Server Pages –Hans Bergsten, SPD O'Reilly
4. Beginning PHP and MySQL, 3rdEdition, Jason Gilmore, Apress Publications (Dream tech.).
5. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.

REFERENCES:
1. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, CengageLearning Publications.
2. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.
3. Programming world wide web-Sebesta,Pearson.
4. Web Technologies, Uttam K. Roy, Oxford.
5. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson.
6. An Introduction to web Design and Programming –Wang-Thomson.

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III B.Tech, I-Sem (CSE)

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(A0520205) R PROGRAMMING
(Open Elective-I)
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ Understand the fundamentals of 'R' programming
- ❖ Learn how to carry out a range of commonly used statistical methods iincluding analysis of variance and linear regression.
- ❖ Explore data-sets to create testable hypotheses and identify appropriate statistical tests.

COURSE OUTCOMES:
After completing the course, students will able to
- ❖ Describe purpose of R language and working with its tool.
- ❖ Describe R objects, their data operations and descriptive statistical functions.
- ❖ Apply data distribution and hypothesis testing.
- ❖ Applying data using graphs and complex statistics like anova.
- ❖ Apply summarizing data and regression modeling.
- ❖ Learn to export graphs and writing the scripts.

MAPPING OF COs & POs:

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

UNIT-I
INTRODUCING R: Getting the Hand of R, Running the R Program, Finding Your Way with R, Command Packages.
BECOMING FAMILIAR WITH R: Reading and Getting Data into R, Viewing Named Objects, Types of Data Items, The Structure of Data Items, Examining Data Structure, working with History Commands, Saving your Work in R.

UNIT-II
WORKING WITH OBJECTS: Manipulating Objects, Viewing Objects within Objects, Constructing Data Objects, Forms of Data Objects: Testing and Converting.
Data: Descriptive statistics and tabulation: Summary Commands, Summarizing Samples, Summary Tables.

UNIT-III
Data: DISTRIBUTION: Looking at the Distribution of Data
SIMPLE HYPOTHESIS TESTING: Using the Student's t-test, The Wilcoxon U-Test (Mann-Whitney), Paired t- and U-Tests, Correlation and Covariance, Tests for Association.

UNIT-IV
INTRODUCTION TO GRAPHICAL ANALYSIS: Box-whisker Plots, Scatter Plots, Pairs Plots(Multiple Correlation Plots) Line Charts, Pie Charts, Cleveland Dot Charts, Bar Charts, Copy Graphics to Other Applications.
FORMULA NOTATION AND COMPLEX STATISTICS: Examples of Using Formula Syntax for Basic tests, Formula Notation in Graphics, Analysis of Variance (ANOVA).

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UNIT-V

MANIPULATING DATA AND EXTRACTING COMPONENTS: Creating Data for Complex Analysis, Summarizing Data.

REGRESSION (LINEAR MODELING): Simple Linear Regression, Multiple Regression, Curvilinear Regression, Plotting Linear Models and Curve Fitting, Summarizing Regression Models.

UNIT-VI

MORE ABOUT GRAPHS: Adding elements to existing plots, Matrix plots, multiple plots in one window, exporting graphs.

WRITING YOUR OWN SCRIPTS:

BEGINNING TO PROGRAM: Copy and Paste Scripts, Creating Simple Functions, Making Source Code.

TEXT BOOKS:

1. "Beginning R the statistical programming language" Dr.Mark Gardener, Wiley Publications, 2015.

REFERENCES BOOKS:

2. Hands-On Programming with R Paperback by Grolemund (Author), Garrett (Author), SPD, 2014.
3. The R Book, Michael J. Crawley, WILEY, 2012.

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III B.Tech, I-Sem (CSE)　　　　　　　　　　　　　　L　　T　　C
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(A0521205) DATA WAREHOUSING AND MINING
(Professional Elective-I)
For branches: CSE & CSE&BS

COURSE OBJECTIVES:
The main objective of this course is to provide students
  ❖ With the basic data warehousing and data mining concepts
  ❖ To learn mining rules in large databases
  ❖ To get idea on clustering analysis
  ❖ Applications that can enable them to set up and manage an industrial data warehousing and data mining system.
  ❖ To learn about OLTP and OLAP systems

COURSE OUTCOMES:
Upon completion of the course students should:
  ❖ Ability to do Conceptual, Logical, and Physical design of Data Warehouses
  ❖ Familiarity with Requirements Engineering for Data Warehouses
  ❖ OLAP applications and OLAP deployment
  ❖ Have a good knowledge of the fundamental concepts that provide the foundation of data mining.
  ❖ Learn broad classes of data mining technologies
  ❖ Understand how these concepts are engineered to use some of the basic data mining tools.

MAPPING OF COS & POS:

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

UNIT – I
Introduction: What Motivated Data Mining? Why is it Important?; What is Data Mining?; Data Mining-On What Kind of Data?; Data Mining Functionalities: What kinds of Data Can be Mined?; Are all of Patterns Interesting?; Classification of Data Mining Systems; Data Mining task primitives;

Data Warehouse and OLAP Technology: What is a Data Warehouse?; A Multidimensional Data Model: From Tables and Spreadsheet to Data Cubes, Stars, Snowflakes and Fact constellation schemas for Multidimensional Databases, Measures: Their Categorization and Computation, Concept Hierarchies, OLAP operations in the Multidimensional Data Model; Data Warehouse Architecture: Steps for the Design and Construction of Data Warehouses, A three-tier Architecture.

UNIT-II
Data Pre-processing: Why pre-process the data; Descriptive Data Summarization: Measuring the Central Tendency, Measuring the Dispersion of Data, Graphic Displays of Basic Descriptive Data Summaries; Data Cleaning: Missing values, Noisy Data Cleaning as a process; Data Integration and Transformation: Data Integration, Data Transformation, Data

Reduction: Data Cube aggregation, attribute subset selection; Dimensionality Reduction, Numerosity Reduction;

UNIT-III
Mining Frequent patterns, Associations, and Correlations: Basic Concepts; Efficient and Scalable Frequent Itemset Mining methods: The Apriori Algorithm, Generating Association Rules from Frequent Itemsets, Improving Efficiency of Apriori, Mining Frequent Itemsets without Candidate Generation; Mining various kinds of Association Rules: Mining multilevel & multi-dimensional association rules; From Association Mining to Correlation Analysis: Strong Rules are not necessarily Interesting, From Association analysis to Correlation analysis;

UNIT-IV
Classification I: Overview of Classification and Prediction: What is Classification, What is prediction?; Issues Regarding Classification and Prediction: Preparing data for Classification and Prediction, Comparing Classification and Prediction Methods; Bayesian Classification: Bayes' theorem, Naïve Bayesian Classification; Classification by Decision Tree Induction: Decision Tree Induction, Attribute Selection Measures, Tree Pruning, Scalability and Decision Tree Induction; Rule-Based Classification: Using IF-THEN rules for Classification, Rule Extraction from Decision Tree, Rule Induction using a Sequential Covering Algorithm; Classification by Back propagation: A Multilayer Feed-Forward Neural Network, Defining Network Topology, Back propagation;

UNIT-V
Classification II and Prediction: Support Vector Machines: The Case when the Data are Linearly Separable, The Case when the Data are Linearly Inseparable; Lazy Learners: k-Nearest-Neighbour Classifiers, Case-Based Reasoning; Prediction: Linear Regression, Nonlinear Regression; Accuracy and Error Measures: Classifier Accuracy Measures, Predictor Error Measures; Evaluating the Accuracy of a Classifier or Predictor: Holdout Method and Random sub sampling, Cross validation, Bootstrap;

UNIT-VI
Cluster Analysis: Overview of Cluster Analysis; Types of data in Cluster Analysis: Interval-Scaled Variables, Binary Variables, Categorical, Ordinal, and Ratio-Scaled variables, Variables of Mixed Types; A Categorization of Major Clustering Methods; Partitioning Methods: Classical Partitioning Methods: k-Means and k-Medoids, Partitioning Methods in Large Databases: From k-Medoids to CLARANS; Hierarchical Methods: Agglomerative and Divisive Hierarchical Clustering, BIRCH, ROCK; Density-Based Methods: DBSCAN; Grid-Based Methods: STING; Model-Based Clustering Methods: Expectation-Maximization;

TEXT BOOKS:
1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber Harcourt India, second Edition.

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

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(A0522205) COMPILER DESIGN
(Professional Elective-I)
For branches: CSE, CSE(DS) & CSE&BS

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

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

MAPPING OF COs & POs:

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

UNIT-I
Introduction to compilers: compilers, cousins of the compiler, phases of a compiler, interpreter, grouping of phases into pass, bootstrapping
Lexical analysis: role of the lexical analyzer, input buffering, a language for specifying lexical analyzers

UNIT-II
Syntax analysis: the role of the parser, context free grammars, writing a grammar: eliminating ambiguity, elimination of left recursion, elimination of left factoring
Top-down parsing: Recursive descent parsing, first and follow, predictive parsing, construction of predictive parsing table.

UNIT-III
Bottom up Parsing: handles, handle pruning, shift reduce parsing, viable prefixes, conflicts during shift reduce parsing
LR Parsers: SLR Parsing: LR (0) items, SLR Parse table. CLR Parser: CLR (1) Items, CLR (1) Parsing table. LALR (1) parser: LR (1) items, LALR (1) parsing table.

UNIT-IV
Semantic analysis: type checking: type checking of expressions, type checking of statements, type checking of functions, type conversions

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

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

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

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

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

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

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

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

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(A0523205) ADVANCED COMPUTER ARCHITECTURE
(Professional Elective-I)
For branches: ECE & CSE

COURSE OBJECTIVES:
- ❖ A broad understanding of computer architecture.
- ❖ To the extent possible, an understanding of the current state-of-the-art in uni-processor computer architecture.
- ❖ Study how to use technology to build the best computer/processor.
- ❖ To know different levels of parallelism.
- ❖ Issues in interconnection of networks and cluster design.

COURSE OUTCOMES:
Upon completion of this course, a student should have developed:
- ❖ Broad understanding of the design of computer systems, including modern architectures and alternatives.
- ❖ Understanding of the interaction amongst architecture, applications and technology.
- ❖ Understanding of a framework for evaluating design decisions in terms of application requirements and performance measurements.
- ❖ A historical perspective on computer system design.
- ❖ Develop applications for high performance computing systems.

MAPPING OF COS & POS:

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

UNIT -I
Fundamentals of computer design-Technology Trends, Cost, Measuring and reporting performance, Quantitative principles of computer design.

UNIT -II
Instruction set principle and examples - Classifying instruction set, Memory addressing, Addressing modes for signal processing, Operations in the instruction set, Instructions for control flow, encoding an instruction set, the role of the compiler.

UNIT –III
Instruction level parallelism-Over coming data hazards, Reducing branch costs, High performance instruction delivery, Hardware based speculation, Compiler techniques, Static branch prediction, H.W. vs S.W solutions, Limitations of ILP

UNIT –IV
Memory hierarchy design-Cache performance, Reducing cache miss penalty and miss rate, Virtual memory, Protection and examples of virtual memory.

UNIT –V
Multi processors and thread-level parallelism-symmetric shared memory architectures, Distributed -shared memory architectures, Synchronization, Multi-threading .

UNIT –VI
Storage systems Types of Storage Devices, RAID, Errors and failures in real time systems,
Interconnection Networks-: Interconnection network media, Practical issues for commercial interconnection of networks, Clusters, Designing a cluster.

TEXT BOOK:
1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)

REFERENCES:
1. "Computer Architecture and parallel Processing" Kai Hwang and A.Briggs International Edition McGraw-Hill.
2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.

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(A0524205) CLOUD FOUNDATIONS
(Skill Development Course)

COURSE OBJECTIVES:
- ❖ Define the AWS Cloud.
- ❖ Explain the AWS pricing philosophy.
- ❖ Identify the global infrastructure components of AWS.
- ❖ Describe security and compliance measures of the AWS Cloud including AWS Identity and Access Management (IAM).
- ❖ Create an AWS Virtual Private Cloud (Amazon VPC).
- ❖ Demonstrate when to use Amazon Elastic Compute Cloud (EC2), AWS Lambda and AWS Elastic Beanstalk.
- ❖ Differentiate between Amazon S3, Amazon EBS, Amazon EFS and Amazon S3 Glacier.
- ❖ Demonstrate when to use AWS Database services including Amazon Relational Database Service (RDS), Amazon DynamoDB, Amazon Redshift, and Amazon Aurora.
- ❖ Explain AWS Cloud architectural principles.
- ❖ Explore key concepts related to Elastic Load Balancing (ELB), Amazon CloudWatch, and Auto Scaling.

COURSE OUTCOMES
- ❖ Define the AWS Cloud, Explain the AWS pricing philosophy, Identify the global infrastructure components of AWS
- ❖ Describe the security and compliance measures of the AWS Cloud, including AWS Identity and Access Management (IAM)
- ❖ Create a virtual private cloud (VPC) by using Amazon Virtual Private Cloud (Amazon VPC)
- ❖ Demonstrate when to use Amazon Elastic Compute Cloud (Amazon EC2), AWS Lambda, and AWS Elastic Beanstalk
- ❖ Differentiate between Amazon Simple Storage Service (Amazon S3), Amazon Elastic Block Store (Amazon EBS), Amazon Elastic File System (Amazon EFS), and Amazon Simple Storage Service Glacier (Amazon S3 Glacier)
- ❖ Demonstrate when to use AWS database services, including Amazon Relational Database Service (Amazon RDS), Amazon DynamoDB, Amazon Redshift, and Amazon Aurora

MAPPING OF COS & POS:

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

UNIT-1
Introduction to cloud computing, Advantages of cloud computing, Introduction to Amazon Web Services (AWS), AWS Cloud Adoption Framework (AWS CAF)

Fundamentals of pricing, Total Cost of Ownership, AWS Organizations, AWS Billing and Cost Management, Technical Support

UNIT-2

AWS Global Infrastructure, AWS service and service category overview, AWS shared responsibility model, AWS Identity and Access Management (IAM), Securing a new AWS account, Securing accounts, Securing data on AWS, Working to ensure compliance

UNIT-3

Networking basics, Amazon VPC, VPC networking, VPC security, Amazon Route 53 , Amazon CloudFront

UNIT-4

Compute services overview, Amazon EC2, Amazon EC2 cost optimization, Container services, Introduction to AWS Lambda, Introduction to AWS , Elastic Beanstalk

UNIT-5

Amazon Elastic Block Store (Amazon EBS), Amazon Simple Storage Service (Amazon S3), Amazon Elastic File System (Amazon EFS), Amazon Simple Storage Service Glacier, Amazon Relational Database Service (Amazon RDS), Amazon DynamoDB, Amazon Redshift, Amazon Aurora

UNIT-6

AWS Well-Architected Framework, Reliability and high availability, AWS Trusted Advisor, Elastic Load Balancing, Amazon CloudWatch, Amazon EC2 Auto Scaling

REFERENCE: AWS Academy Website

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III B.Tech. I-Sem (CSE)

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(A0022203) CONSTITUTION OF INDIA
(Mandatory Learning Course)
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
Students will be able to
- ❖ Study the structure and composition of Indian Constitution
- ❖ Learn about the federalism in the Indian context.
- ❖ Study the Panchayati Raj Institutions as a medium of decentralization
- ❖ Learn about the three organs of the state in the contemporary scenario.

COURSE OUTCOMES:
Students will be able to
- ❖ Understand historical background of the constitutional making and its importance for building a democratic India.
- ❖ Be aware of the History, features of Indian constitution, the role Governor and Chief Minister, role of state election commission, the decentralization of power between central, state and local self-government.
- ❖ Aware of Indian government, the structure of state government, the local Administration.
- ❖ Able to evaluate Preamble, Fundamental Rights and Duties, Zilla Panchayat, block level organization, various commissions.

MAPPING OF COS & POS:

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

UNIT I
History of Indian Constitution: History of Making of the Indian Constitution - History Drafting Committee - Composition & Working of Constitution.

UNIT II
Philosophy of the Indian Constitution: Preamble Salient Features of Indian Constitution.

UNIT III
Contours of Constitutional Rights & Duties: Fundamental Rights: Right to Equality - Right to Freedom - Right against Exploitation - Right to Freedom of Religion - Cultural and Educational Rights - Right to Constitutional Remedies - Directive Principles of State Policy.

UNIT IV
Organs of Governance: Parliament - Composition - Qualifications and Disqualifications Powers and Functions of Executive - President - Governor - Council of Ministers – Judiciary – Qualifications, Appointment and Transfer of Judges.

UNIT V
Local Administration: Role and Importance of Municipal Corporation Role and Importance Pachayati raj: Role and Importance Zilla Pachayat: Position and role - Village level: Role of Elected and Appointed officials - Importance of grass root democracy.

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UNIT VI
Election Commission: Role and Functioning of Election Commission Role and Functioning of Chief Election Commissioner and Election Commissioners - Role and Functioning of State Election Commission.

TEXT BOOKS
1) Introduction to Constitution of India, D.D. Basu, Lexis Nexus
2) The Constitution of India, PM Bhakshi, Universal Law

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III B.Tech, I-Sem (CSE)

L	P	C
0	3	1.5

(A0599205) COMPUTER NETWORKS AND OPERATING SYSTEMS LAB

COURSE OBJECTIVES:
- ❖ To understand the functionalities of various layers of OSI model
- ❖ Obtain Basic Knowledge of Operating Systems.

COURSE OUTCOMES:
Upon Completion of this lab student will be able to
- ❖ Illustrate network tools and network programming.
- ❖ Design a compiler for a concise programming language.
- ❖ Implement various modules for CPU scheduling algorithms
- ❖ Simulate Bankers algorithm for deadlock avoidance and prevention
- ❖ Implement various modules for PAGE replacement algorithms

MAPPING OF COS & POS:

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

COMPUTER NETWORKS LAB
1. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
4. Now obtain Routing table at each node using distance vector routing algorithm.

OPERATING SYSTEMS LAB
5. Simulate the following CPU scheduling algorithms
   a) FCFS   b) SJF   c) Priority   d) Round Robin
6. Simulate Bankers Algorithm for Dead Lock detection and deadlock Avoidance
7. Simulate the Simulate paging technique
8. Simulate page replacement algorithms
   a) LRU   b) Optimal
9. Simulate sequential and linked file allocation strategies

REFERENCES:
1. Compiler design: Theory, Tools and examples by seth D.Bergmann
2. Computer Networks- Andrew S. Tanenbaum, Fourth Edition, Pearson Education.
3. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.

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III B.Tech, I-Sem (CSE)

L	P	C
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(A0581205) FULL STACK APPLICATION DEVELOMENT LAB
(Open Elective-I)

COURSE OBJECTIVE:
❖ To create a fully functional website using front end and back end technologies.

COURSE OUTCOMES:
The student will be able to
❖ Design effective web pages using HTML 5 & CSS & validate them using Javascript.
❖ Work with Node.js to provide client side request handling.
❖ Design and validate XML documents & work with AJAX.
❖ Gain knowledge on server side scripting & database connections from application.
❖ Learn creation and updation of Mongodb.
❖ Learn Django framework to work with application development.

Hardware and Software required:
1. A working computer system with either Windows or Linux
2. A web browser either IE or firefox
3. Tomcat web server and Apache web server
4. A database either Mysql or Oracle and Mongodb.
5. JVM (Java virtual machine) must be installed on your system

MAPPING OF COS & POS:

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

1. Write a HTML that displays images of two students. When we click on any student image it has to open the corresponding student's details. Use HTML images and hyperlinks.
2. Write a HTML to display a home page that shows an effective background and navigation bar. Use HTML and CSS.
3. Write a HTML that displays Login page.
4. Write a HTML that displays registration form.
5. Write a javascript to perform data validation for registration form.
6. Write javascript to perform data validation for login form.
7. Write a Node.js program that displays "Hello World!" In browser.
8. Write a Node.js that creates a module that returns current date and time.
9. Create a Node.js file that reads the HTML file, and return the content.
10. Create a Node.js file that writes an HTML form, with an upload field.
11. Write an XML that stores customer information of a super market and validate it using DTD.
12. Write an XML that stores student information. Retrieve the student's data and display it using DOM.
13. Write a servlet that reads parameters from the request.
14. Write a JSP for that creates and retrieves data from a cookie.
15. Write a JSP that shares data between pages using session.

16. Write a Servlet/JSP that retrieves data from database and displays it as a response.
17. Create database in Mongodb and perform read and write operations.
18. Write a program to fetch the data from Mongodb using python.

REFERENCES:

1. HTML 5 Black Book – Steve Holzner.
2. Node.js, MongoDB and Angular Web Development, Second Edition by Brad Dayley, Brendan Dayley, Caleb Dayley, Pearson Education.
3. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert   Schildt. TMH
4. Django: Web Development with Python, by Samuel Dauzon,Aidas Bendoraitis,Arun Ravindran, Packt Publishing.
5. Java Server Pages –Hans Bergsten, SPD O'Reilly

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III B.Tech, I-Sem (CSE)

L	P	C
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(A0582205) WEB PROGRAMMING LAB
(Open Elective-I)

COURSE OBJECTIVE:
- ❖ In-depth learning of client side scripting like HTML, JavaScript and server side scripting like servlets, JSPs. Also focuses on XML and web servers and database interfacing.
- ❖ Use the "echo" and "print" to send output to the browser.
- ❖ Learn how to create and use PHP basic and advanced concepts.
- ❖ Write PHP programs that access form data

COURSE OUTCOMES:
- ❖ Student can able to demonstrate the HTML important tags and for designing static web pages and separate design from content using CSS.
- ❖ Able to design a webpage with more user interactivity using JavaScript and understand the need of XML in the developing of Web applications.
- ❖ Students able to understand the need of Server side scripting using Servlets and JSP along with database connectivity.
- ❖ Understand the syntax and basic concepts of PHP, conditional and looping statements, Arrays and Functions, strings and files
- ❖ Understand and develop programs on PHP object-oriented concepts and advanced concepts (cookies & sessions) and data and time functions.
- ❖ Be able to develop a form containing several fields and be able to process the data with database using html & PHP-based script.

MAPPING OF COS & POS:

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

Week 1
1. Write a HTML program to develop static Home Page using frames.
2. Write a HTML program to develop a static Registration Form.
3. Write a HTML program to develop a static Login Page.
4. Write HTML for demonstration of cascading style sheets.

Week 2
5. Write a javascript program to validate USER LOGIN page.
6. Write a javascript program for validating REGISTRATION FORM

Week 3
7. Write an XML for person information and access the data using XSL.
8. Write an XML for student information and access second student's data using DOM.

Week 4
9. Write a servlet for displaying a message.
10. Write a servlet that reads parameters from employee login page.

Week 5

11. Write a JSP that reads parameters from user login page.
12. Write a JSP that reads a value, creates a cookie and retrieves it.
13. Write a servlet that connects to the database and retrieves the data and displays it.

Week 6

14. Write a PHP program to perform arithmetic operations on variables.
15. Write a PHP programs on different controls and looping statements.

Week 7

16. Create a PHP program to demonstrate the different predefined functions in strings.

Week 8

17. Create a PHP program on Inheritance concept.
18. Create a PHP program on constructors and destructors.
19. Create a PHP program on interfaces.

Week 9

20. Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Use PHP script for programs 1 and 2.
    a) Create a Cookie and add these four user ID‟s and passwords to this Cookie.
    b) Read the User id and Passwords entered in the Login form and authenticate with the values (UserId and Passwords) available in the cookies.If he is a valid user (i.e., UserName and Password match) you should welcome him by name (UserName) else you should display "You are not an authenticated user‟‟.

Week 10

21. Write a PHP program to start a PHP Session.
22. Write a PHP program to destroy a PHP Session.
23. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

Week 11

24. Write a PHP program on date and time concepts.

Week 12

25. Write a PHP program on multiple forms using hidden fields.
26. Write a PHP program to prevent multiple submissions on client and server side.

Week 13

27. Write a PHP program to perform the following database operations :
    i. Create ii. Insert iii. Update iv. Delete
28. Write a PHP which does the following job: Authenticate the user when he submits the login form using the Username and Password.

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(A0583205) R PROGRAMMING LAB
(Open Elective-I)
For branches: CSE & CSE&BS

COURSE OBJECTIVES:
- ❖ Understand the fundamentals of 'R' programming
- ❖ Learn how to carry out a range of commonly used statistical methods including analysis of variance and linear regression.
- ❖ Explore data-sets to create testable hypotheses and identify appropriate statistical tests.

COURSE OUTCOMES:
After completing the course, students will able to:
- ❖ Learn the purpose of R language and working with its tool
- ❖ Learns about R objects, their data operations and descriptive statistical functions
- ❖ Learns to apply data distribution and hypothesis testing commands
- ❖ Learns functions for applying data analysis using graphs and complex statistics like anova, summarizing data and regression modelling

MAPPING OF COS & POS:

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

WEEK 1:
Perform following list of experiments to understand R programming environment
1. Installation of R Console and R Studio
2. Installing packages into current environment
3. Using R environment like a calculator
4. Reading and Getting Data into R

WEEK 2:
Execute the R commands for following list of experiments
1. Viewing Named Objects
2. Using data structures: Vector, Data frame, Matrix, List
3. Commands to examine Data Structures
4. Saving your Work in R

WEEK 3:
Execute the R commands for following list of experiments
1. Manipulating data objects: Vector, Data frame, Matrix, List.
2. Viewing Objects within Objects
3. Constructing Data Objects
4. Testing and Converting Data Objects.

WEEK 4:
Execute the R commands for following list of experiments
1. Basic summary commands
2. Summerizing Samples
   a) Summary statistics for vectors
   b) Cumulative Statistics

   c) Summary statistics for data frames
   d) Summary statistics for matrix objects
   e) Summary Tables

WEEK 5:
Execute R Commands for following Data Distribution concepts
1. Stem and Leaf plot
2. Histogram
3. Density function
4. Commands of different data distributions
5. Shapiro-Wilk Test for Normality
6. Kolmogorov-Smirnov Test
7. Quantile-Quantile Plots

WEEK 6:
Execute R commands to perform experiments on hypothesis testing
1. Student's t-test
2. Wilcoxon U-Test (Mann-Whitney)
3. Paired t- and U-Tests
4. Correlation and Covariance
5. Tests for Association

WEEK 7:
Execute R commands to generate following different types of graphs for data analysis
1. Box-whisker Plots
2. Scatter Plots
3. Pairs Plots (Multiple Correlation Plots)
4. Line Charts
5. Pie Charts
6. Cleveland Dot Charts
7. Bar Charts

WEEK 8:
Execute R commands to perform complex statistics on ANOVA for following concepts.
1. One-Way ANOVA
2. Simple Post-hoc Testing
3. Extracting Means from aov() Models
4. Two-Way ANOVA
5. Interaction Plots
6. More Complex ANOVA Models

WEEK 9:
Execute R commands to create data for Complex Analysis and Summarizing Data for following concepts:
1. Creating data for complex analysis for
   a) Data Frames
   b) Matrix objects
   c) Creating and setting factor data
   d) Making Replicate Treatment Factors
   e) Adding Rows or Columns
2. Simple Column and Row Summaries

3. Complex Summary Functions
    a) rowsum() Command
    b) apply() Command
    c) Using tapply() to Summarize Using a Grouping Variable
    d) aggregate() Command

WEEK 10:

Execute R commands to generate following linear models (Regression)

1. Simple Linear Regression
2. Multiple Regression
3. Curvilinear Regression
4. Plotting Linear Models and Curve Fitting
5. Summarizing Regression Models

TEXT BOOKS:

1. "Beginning R the statistical programming language"Dr.Mark Gardener, Wiley Publications,2015.

REFERENCES BOOKS:

1. Hands-On Programming with R Paperback by Grolemund (Author), Garrett (Author), SPD, 2014.
2. The R Book, Michael J. Crawley, WILEY,2012.

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III B.Tech, II-Sem (CSE)

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(A0534206) SOFTWARE TESTING METHODOLOGIES AND TOOLS
For branches: CSE & CSE(DS)

BACKGROUND:

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

COURSE OBJECTIVES:

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

COURSE OUTCOMES:
- ❖ To understand the basics of testing and classification of bugs.
- ❖ To learn various path testing techniques apply them on program structure to identify structural bugs.
- ❖ To understand the process of dataflow testing and its importance to identify data bugs.
- ❖ To design and analyze the logic using decision table structure and KV chart specification to perform logic-based testing.
- ❖ To learn the motivation of graph matrices in testing and demonstrate various tools for testing automation.

MAPPING OF COS & POS:

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

Detailed Syllabus:

UNIT I :

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

UNIT II:

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

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

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

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

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

TEXT BOOKS:
    1. Software testing techniques - Boris Beizer, 2nd Edition, Dreamtech.

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

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III B.Tech, II-Sem (CSE)

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(A0535206) COMPUTER GRAPHICS
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
- ❖ The interdisciplinary nature of computer graphics is emphasized in the wide variety of examples and applications.
- ❖ Course material is structured to meet the needs of both designers and users of interactive computer graphics systems
- ❖ Provide an understanding of how a computer draws the fundamental graphics primitives - lines and filled polygons in both 2-D and 3-D.
- ❖ Understand the fundamental mathematics involved in generating a 3-D scene. Includes coordinate systems, transformations, and vector operations.
- ❖ Understand the 3-D graphics pipeline, i.,e. the steps taken to transform and draw an object. This includes 3-D transformations, lighting and shading, rasterization and texture mapping. Programmable shaders will be introduced.

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

MAPPING OF COS & POS:

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

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

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

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

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UNIT IV

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

UNIT V

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

UNIT VI

3-D viewing: Viewing Pipeline, Viewing coordinates, Projections.

Computer Animation: Design of Animation Sequence, General Computer Animation functions, Raster Animation, Computer Animation Languages, Key-Frame systems, Motion Specifications.

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

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

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III B.Tech, II-Sem (CSE)

L	T	C
2	1	3

(A0536206) BIG DATA ANALYTICS
For branches: CSE & CSE&BS

COURSE OBJECTIVES:
- ❖ To understand Big Data Analytics for different systems like Hadoop.
- ❖ To learn the design of the Hadoop File System.
- ❖ To learn how to analyze Big Data using different tools.
- ❖ To understand the importance of Data in comparison with traditional data bases.

COURSE OUTCOMES:
After completion of the course, students will be able to
- ❖ Understand the capability of No-SQL systems
- ❖ Outline the importance of Big Data Analytics
- ❖ To gain knowledge about working on the Hadoop File System.
- ❖ Ability to analyze Big Data using different tools.
- ❖ Apply Hadoop MapReduce programming for handling Big Data

MAPPING OF COS & POS:

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

UNIT-1
Introduction to Big Data. What is Big Data? Why Big Data is Important. Meet Hadoop Data, Data Storage and Analysis, Comparison with other systems, Grid Computing. A brief history of Hadoop. Apache Hadoop and the Hadoop Ecosystem. Linux refresher, VMWare Installation of Hadoop.

UNIT-2
The design of HDFS. HDFS concepts. Command-line interface to HDFS. Hadoop File systems. Interfaces. Java Interface to Hadoop. Anatomy of a file read. Anatomy of a file writes. Replica placement and Coherency Model. Parallel copying with distcp, keeping an HDFS cluster balanced. Data integrity: Data Integrity in HDFS, Local Filesystem, Checksum Filesystem, Compression: Codecs, Compression and Input Splits

UNIT-3
Introduction. Analyzing data with Unix tools. Analyzing data with Hadoop. Java MapReduce classes(newAPI).Dataflow, combiner functions, Running a distributed Map Reduce Job. Configuration API. Setting up the development environment. Managing configuration. Writing a unit test with MRUnit. Running a job in local job runner. Running on a cluster, Launching a job. The MapReduce WebUl.

UNIT-4
Classic MapReduce. Job submission. Job Initialization. Task Assignment. Task execution Progress and status updates. Job Completion. Shuffle and sort on Map and reducer side. Configuration tuning. Map Reduce Types. Input formats. Output formats. Sorting. Map side and Reduce side joins.

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UNIT-5

Pig Latin: structures, statements, expressions, types, schemas, functions, macros, User-defined functions, Data processing operators, pig in practice. The Hive Shell. Hive services. Hive clients. The meta store. Comparison with traditional databases. Hive QI. Hbasics. Concepts. Implementation. Java and Map-reduce clients. Loading data, and web queries.

UNIT-6

Big data technologies and Databases: Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and NewSQL, Introduction to MongoDB and its needs, Characteristics of MongoDB, Introduction of apache cassandra and its needs, Characteristics of Cassandra

TEXT BOOKS
1. Tom White, Hadoop: the definitive Guide", 4th Edition, O'Reilly Publications, 2015.
2. Subhashini Chellappan Seema Acharya, "Big Data and Analytics", 2nd edition, Wiley Publishers, 2019

REFERENCES:
1. Dirkde Roos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, "Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", Indian Edition, TMH,2017.
2. R N Prasad, Seema Acharya, "Fundamentals of Business Analytics", 2nd edition, Wiley Publishers, 2016

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech, II-Sem (CSE)

L	T	C
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(A0525205) ANDROID PROGRAMMING
(Open Elective-II)
For branches: CSE, CSE(DS) & CSE&BS

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

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

MAPPING OF COS & POS:

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

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

UNIT-VI

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

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

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

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III B.Tech, II-Sem (CSE)

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(A0537206) SAP-ABAP AND BASIC APPLICATIONS
(Open Elective-II)
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ Student will learn about the SAP ABAP Programming Language and how to use the SAP ABAP Workbench tools to develop basic applications.
- ❖ The course objective is to understand the concepts of Procedure and Object-Oriented Programming in SAP ABAP to develop various applications, and to understand the concepts of ABAP Objects.
- ❖ It allows understanding the Data Dictionary and Open SQL which include in basic concepts of SAP ABAP to manipulate the data in database.

COURSE OUTCOMES:
- ❖ Students will learn the basics programming concepts of SAP ABAP.
- ❖ Students are able to Design, develop the code, check, activate and run the programs and database tables using SAP ABAP Workbench tools.
- ❖ Students will learn basic SAP ABAP application concepts to be able to develop the applications.
- ❖ Students are able to analyze the usage of forms, reports, custom screens based on customer business needs.
- ❖ Students will learn the knowledge of custom reports, interfaces and ABAP Workbench contains Script tools and forms.
- ❖ Students will learn the knowledge of relational database design and object-oriented concepts are necessary to create ABAP programs.

MAPPING OF COs & POs:

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

UNIT - I
What is ERP?, Why we need ERP?, Advantages of ERP, Major ERP Packages, What is SAP?, History & Features of SAP, SAP R/2 Architecture (Limitations of R/2 Architecture), SAP R/3 Architecture (Types of work processes), SAP R/3 Application Modules, SAP Landscape, What is ABAP?, Logon to SAP Environment, Transaction Codes. Programming Concepts: ABAP/4 Editor (SE38), Steps for Creating a Program, Elements in R/3 Screen, ABAP Syntax, Comments, Errors, Write Statements, Data, Data types, variables, parameters, system variables, control statements, string operations.

UNIT - II
ABAP Dictionary: Introduction, Exploring Domain, Data types, Types Groups, Database Tables, structures, append structures, views, and search helps, lock object, Primary key and foreign key. Internal Table: Introduction, types of internal table, Declaring Internal Table, Populating Internal Table, Processing Internal Table, Initializing Internal Tables, Control Break processing.

UNIT – III

OPEN SQL: Accessing Database Tables, Reading data using select statement, insert, update, modify, delete. Modularization Techniques: Working with subroutines, Macros, Function Modules.

UNIT - IV

REPORTS: Working with classical reports, interactive reports, ALV Reports.

UNIT – V

ABAP User Dialogues: Introduction, introducing dialog programming, screen painter, menu painter, working with selection screens. Forms in SAP: Exploring the SAP script tool, The SAP smart Forms Tool, Comparing SAP Script and smart Forms, migrating SAP script forms to smart Forms.

UNIT - VI

OOPS Concepts: Encapsulation, Abstract, Polymorphism, Inheritance, Defining OOPS Concepts local and Global.

TEXT BOOKS:

1. SAP ABAP/4, Covers SAP ECC 6.0 Black Book, Kogent Learning Solutions Inc., Dream Tech Press.
2. "Introduction to ABAP/4 programming for SAP" by Gareth M.de.Bruyn & Robert Lyfareff; Publisher: Golgotia pub.

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III B.Tech, II-Sem (CSE)

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(A0538206) COMPUTER VISION AND IMAGE PROCESSING
(Open Elective-II)

COURSE OBJECTIVES:
- ❖ To learn the fundamentals of Image Processing.
- ❖ To learn sampling and reconstruction procedures.
- ❖ To learn the various transforms used in image Processing.
- ❖ To study various concepts of image enhancement, reconstruction and image compression.
- ❖ To design image processing systems.

COURSE OUTCOMES:
- ❖ Understand Image Representation and modeling
- ❖ Apply Image Transformation methods
- ❖ Implement Image processing algorithms
- ❖ Implement Image Segmentation algorithms
- ❖ Apply the Image processing algorithms for object recognition and detection

MAPPING OF COS & POS:

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

UNIT - I
Digital Image Fundamentals -- image model, image sampling and quantization, basic relationships between pixels, neighbors, distance measures – linear and nonlinear operations.

UNIT - II
Image enhancement in the spatial domain: gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods.

UNIT – III
Image enhancement in the frequency domain: Fourier transform – one dimensional, two dimensional DFT, filtering – Smoothing frequency domain filters - lowpass filters – highpass filters – Homomorphic filtering.

UNIT-IV
Image restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner, constrained least squares filtering, geometric transforms.

UNIT - V
Image Compression: Fundamentals, image compression models, error-free compression, Lossy compression, Lossy predictive coding, transform coding, Wavelet Coding, image compression standards.

UNIT - VI
Image Segmentation: Detection of discontinuous, edge linking and boundary detection,

thresholding, region–based segmentation, segmentation by morphological watersheds.

TEXT BOOK:
1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education,2nd Education, 2002.
2. Digital image processing by S.Jayaraman, S.Esakkirajan & T.Veera Kumar, Tata McGraw Hill, 2010.

REFERENCES:
1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
3. Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.
4. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech, II-Sem (CSE)

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	2	1	3

(A0548206) NETWORK PROGRAMMING
(Professional Elective-II)

COURSE OBJECTIVES:
- ❖ Understand fundamental concepts of computer communication
- ❖ Understand sockets and ports
- ❖ To provide an opportunity to do network programming using TCP/IP.
- ❖ Create comprehensive network applications using sockets

COURSE OUTCOMES:
- ❖ Understand the key protocols that support the Internet;
- ❖ Develop programming interfaces for network communication;
- ❖ Have a detailed knowledge of the TCP/UDP Sockets
- ❖ Create applications using techniques such as multiplexing, forking, multithreading;
- ❖ I/O, non-blocking I/O and event driven I/O.
- ❖ Apply knowledge of Unix/Linux operating systems to build robust client and server software for this environment;
- ❖ Learn advanced programming techniques such as IPv6 Socket Programming, Broadcasting, Multicasting

MAPPING OF COs & POs:

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

UNIT-I
Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

UNIT-II
Sockets: Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT-III
TCP client server: Introduction, TCP Echo server functions, Normal start up, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

UNIT-IV
I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

UNIT-V
Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

Elementary name and Address conversions: DNS, get host by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

UNIT-VI
IPC: Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system V IPC, Message queues, Semaphores.

TEXT BOOKS:
❖ UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. - W.Richard Stevens, Pearson   Edn. Asia.
❖ UNIX Network Programming, 1st Edition, - W.Richard Stevens. PHI.

REFERENCES:
1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education.

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III B.Tech, II-Sem (CSE)

L	T	C
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(A0539206) PARALLEL PROCESSING
(Professional Elective-II)

COURSE OBJECTIVES:
- ❖ Implicit Parallelism Computing Platforms, Mapping Techniques
- ❖ Building blocks, Principles of Message-Passing Programming
- ❖ Dense Matrix Algorithms, Sorting, Graph Algorithms.

COURSE OUTCOMES:
- ❖ Students can able to Gain knowledge on parallel computing.
- ❖ Students will be able to Identify and understand various algorithms helpful in parallel computing.
- ❖ Students can understand the Issues in Sorting on parallel Computers
- ❖ To Understand Models of and issues in Concurrency in Computing
- ❖ To develop message –passing parallel programs using MPI

MAPPING OF COs & POs:

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

UNIT-I   Parallel Programming Platforms
Implicit Parallelism: Trends in Microprocessor Architectures - Limitations of Memory System Performance - Dichotomy of Parallel Computing Platforms - Physical Organization of Parallel Platforms -Communication Costs in Parallel Machines - Routing Mechanisms for Interconnection Networks - Impact of Process-Processor Mapping and Mapping Techniques.

UNIT-II   Principles of Parallel Algorithm Design algorithms
Preliminaries - Decomposition Techniques - Characteristics of Tasks and Interactions - Mapping Techniques for Load Balancing - Methods for Containing Interaction Overheads - Parallel Algorithm Models

UNIT-III   Basic Communication Operations, algorithms
One-to-All Broadcast and All-to-One Reduction - All-to-All Broadcast and Reduction - All-Reduce and Prefix-Sum Operations - Scatter and Gather - All-to-All Personalized Communication - Circular Shift - Improving the Speed of Some Communication Operations

UNIT-IV   Analytical Modeling of Parallel Programs
Sources of Overhead in Parallel Programs - Performance Metrics for Parallel Systems - Effect of Granularity and Data Mapping on Performance - Scalability of Parallel Systems - Minimum Execution Time and Minimum Cost-Optimal Execution Time - Asymptotic Analysis of Parallel Programs - Other Scalability Metrics

UNIT-V   Programming Using the Message Passing Paradigm
Principles of Message-Passing Programming - The Building Blocks: Send and Receive Operations - MPI: The Message Passing Interface - Topologies and Embedding - Overlapping Communication with Computation - Collective Communication and Computation Operations - Groups and Communicators, Programming Shared Address Space Platforms Thread Basics

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Why Threads? - The POSIX Thread Application Programmer Interface - Synchronization Primitives in POSIX - Controlling Thread and Synchronization Attributes - Thread Cancellation - Composite Synchronization Constructs

UNIT-VI

Dense Matrix Algorithms - Matrix-Vector Multiplication - Matrix-Matrix Multiplication

Sorting-Issues in Sorting on Parallel Computers -Sorting Networks - Bubble Sort and its Variants - Quick sort

Graph Algorithms- Definitions and Representation - Minimum Spanning Tree: Prim's Algorithm - Single-Source Shortest Paths: Dijkstra's Algorithm - All-Pairs Shortest Paths

TEXTBOOKS:
1. Introduction to Parallel Computing Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar - Pearson Publication
2. Introduction to Parallel Processing M. SasiKumar, Dinesh Shikhare P.Raviprakash - PHI Publication

REFERENCES:
1. Introduction To Parallel Programming Steven Brawer
2. Introduction To Parallel Processing M.Sasikumar, Dinesh Shikhare And P. Ravi Prakash
3. Parallel Computers – Architecture And Programming V. Rajaraman And C. Siva Ram Murthy

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III B.Tech, II-Sem (CSE)   L   T   C
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(A0540206) INTERNET OF THINGS
(Professional Elective-II)
For branches: CSE & CSE&BS

COURSE OBJECTIVES:
The Students will learn the following:
- ❖ To understand how we make our surroundings smart with the help of internet
- ❖ To understand basic technologies and concepts behind smart world
- ❖ To understand the architecture and hardware technologies of Internet of Things (IoT)
- ❖ To understand practical examples for IoT

COURSE OUTCOMES:
Upon the successful completion of the course, the student will be able:
- ❖ To understand the architecture of Internet of Things and connected world
- ❖ To understand how to use various hardware, communication and sensing technologies to build IoT applications
- ❖ To understand real time IoT Environments that make our wored super smart.
- ❖ To understand of deploying various types of analytics on machine data to define context, find faults, ensure quality, and extract actionable insights.
- ❖ To understand IOT protocols for better connectivity.
- ❖ To understand challenges and future trends in IoT.

MAPPING OF COs & POs:

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

UNIT I:
Introduction to Internet of Things: Introduction, Definition of IoT, IoT Architectures-5G Architecture, Architecture IoT for using mobile Devices, layer Architecture for IoT, Protocal Architecture for IoT.

Internet of Things Applications: Smart Cities, Smart Energy and smart Grid, Traffic Management and Transportation, Smart Home, Smart Building and Infrastructure, Smart factory and smart manufacturing, Smart Healthcare, and Sports.

UNIT II:
Infrastructure and Services: Infrastructure Protocols, Bluetooth low energy, Device or Service Discovery for IoT, Protocols for IoT Service Discovery, Prominent IoT Service Discovery Products Available in the Market.

UNIT III:
The Integration Technologies and Tools for IoT Environments: IoT Communication Protocol Requirements, Smart Enterprises and Environments, Sensor and Actuator Networks, The IoT Device Integration Concepts, Standards, and Implementations, Device Profile for Web Services, Device Integration Protocols and Middleware**.**

UNIT IV:
The Enablement Platforms for IoT Applications and Analytics: The IoT Building Blocks, The Architectural Building-Blocks, IoT Applications and Platforms, The IoT Data Analytics

Platforms.

UNIT V:

IoT Protocols Convergence: Message Queue Telemetry Transport, Constrained Applications Protocol, Advanced Message Queuing Protocol, Java Message Service API, Data Distribution Service, Representational State Transfer, Extensible Messaging and Presence Protocol.

UNIT VI:

Future Trends and Research challenges: Open IoT- Project Design and Implementation, Execution and Implementation Issues, Project Results, Acceptance and Sustainability.
Related future Internet Technology: Cloud Computing, IoT and Semantic Technologies,

TEXT BOOKS:
1) Internet of Things – Principles and Paradigms, Rajkumar Buyya and Amir Vahid Dastjerdi, Toddgreen Publishers, 2016.
2) Internet of Things – From Research and Innovation to Market Deployment, Ovidiu Vermesan, Peter Friess, River Publishers, 2014

REFERENCES:
1) Internet of Things -Converging Technologies for Smart Environments and Integrated Ecosystems, Ovidiu Vermesan, Peter Friess
2) The Internet of Things: Key Applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi, Wiley, 2012
3) Building the Hyper connected Society, Ovidiu Vermesan, Peter Friess, River Publishers, 2015
4) M2M Communications: A Systems Approach, By David Boswarthick, Omar Elloumi, Olivier Hersent, Wiley, 2012
5) Designing the Internet of Things, Adrian McEwen, Hakim Cassimally, Wiley, 2014
6) Internet of Things in Industries: A Survey, Li Da Xu, Wu He and Shancang Li, IEEE Transactions on Industrial Informatics, vol. 10, no. 4, November 2014

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III B.Tech, II-Sem (CSE)

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(A0028206) PROFESSIONAL ETHICS AND SOFT SKILLS
(Skill Development Course)

COURSE OBJECTIVES:
- ❖ Increase the awareness of Ethical failures in Engineering and alertness of Ethical Codes
- ❖ Engineering decisions can impact public health, safety, business practices and politics
- ❖ The field examines and sets the obligations by engineers to society, to their clients, and to the profession
- ❖ Bring the awareness on Corporate Communication and major Global issues
- ❖ Outreach of the economic, social and cultural benefits of IPRs among all sections of society

COURSE OUTCOMES:
- ❖ To apply Ethical theories and Moral Reasoning to a good profession
- ❖ Understand the professional behavior and implementations of process of Communication
- ❖ To approach the Corporate Communication with problem solving techniques
- ❖ To have a practical orientation of interpersonal communication
- ❖ To analyze the Intellectual Property Rights

MAPPING OF COS & POS:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS2	POS3
CO1						2	2	3	3	3	1	2	2	2	
CO2						2	1	3	3	3	1	2			2
CO3						2	1	2	3	2	1	2	2		
CO4						2	1	3	2	2	1	3		3	
CO5						2	1	3	2	3	1	3		2	3

UNIT I
Engineering Ethics: Concept of Engineering Ethics – Moral Dilemma – Moral Autonomy – Moral Reasoning - Kohlberg's theory – Gilligan's theory - Utilitarianism – IEEE Ethical codes.

UNIT II
Corporate Communication: Concept of Communication - Upward and Down Communication - Business Deliberations - Negotiation Skills - Case Study.

UNIT III
Professional Etiquettes: Job Etiquettes - Email Etiquettes - Netiquettes - Kinesics – Proxemics - Chronemics – Chromatics - Haptics – Case study.

UNIT IV
Soft Skills: Interpersonal Communication – Johari Window – Daniel Goldman's Emotional Intelligence.

UNIT V
Global Issues: Multinational Corporations – Corporate Governance – Role of CEO -Corporate Social Responsibility - Climate change – case study.

UNIT VI
Intellectual Property Rights: Patents – Trademark – Geographical Indications (GI) – Industrial Design - Copy Rights.

TEXT BOOKS:
1. Professional Ethics by R. Subramanian, OXFORD
2. Business Communication, P.D. Chaturvedi, Mukesh Chaturvedi

REFERENCES:
1. The ACE of Soft Skills (Attitude, Communication and Etiquette for success) by – Gopalaswamy Ramesh & Mahadevan Ramesh, Pearson 2010.
2. Essentials of Business Communication, Rajendra Pal, JS.Korlahhi, S.Chand
3. Intellectual Property Right, Deborah E. BouchouxS, Cengage, 2005
4. Business Ethics and Professional Values, A.B. Rao, Excel,2009
5. M.P. Raghavan [2006], Professional Ethics and Human Values, Scitech Publications, Chennai.

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III B.Tech, II-Sem (CSE)	L	P	C
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(A0585206) SOFTWARE TESTING TOOLS LAB

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

COURSE OUTCOMES:
- ❖ To understand the control structure of C program, Test cases, Test criteria, Test strategies and Testing Tools.
- ❖ To analyze the comparative study of Various Testing Techniques, and Tools.
- ❖ To design and conduct Manual Test Cases for a software testing project.
- ❖ To apply software testing tool to support test automation.

MAPPING OF COS & POS:

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

LAB EXPERIMENTS:
1. Write programs in 'C' Language to demonstrate the working of the following constructs:
   i. do...while
   ii. while loop
   iii. if…else
   iv. switch
   v. for loop
2. "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.
3. Write manual test cases for Gmail application.
4. Write manual test cases for ATM application.
5. Write manual test cases for Banking application.
6. Study of Quick Test Professional (QTP):
7. Overview of QTP Components.
8. Record & Run Options.
9. Generating Basic Script.
10. Enhancement of Script.
11. Check Points.
12. Output Values.

13. Object Repository.
14. Writing Script manually.
15. Study of Rational Functional Tester (RFT).
16. Study of SELENIUM.

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

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B.Tech, II-Sem (CSE)

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(A0586206) ANDROID PROGRAMMING LAB
(Open Elective-II)
For branches: CSE & CSE&BS

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

COURSE OUTCOMES:
- ❖ Display proficiency in coding on a mobile programming platform.
- ❖ Understand the limitations and features of developing for mobile devices.
- ❖ Creating a complete Mobile app with a significant programming component, involving the sensors and hardware features of the phone.
- ❖ Practice existing state of mobile app development via researching existing apps, meeting with industry professionals, and formulating new ideas.
- ❖ Display proficiency in coding on a mobile programming platform.
- ❖ Good knowledge of economics and features of the app marketplace by offering the app for download.

MAPPING OF COs & POs:

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

EXPERIMENTS:
1. a) Create an android application to display RGMCET Text Message.
   b) Create an android application to display RGMCET Message by using Button.
2. Create an android application to call different activities by using Implicit and Explicit Intents.
3. a) Create an android application to select item from given list by using Auto Complete Text View (ACTV).
   b) Create an android application to display dropdown menu items and pick one item by using Spinner Component.
4. a) Create an android application to display internal storage data using Array Adapter.
   b) Create an android application to display internal storage data in vertical format by using Custom Adapter.
5. Create an android application to display WhatsApp videos in grid view by using Custom Adapter.
6. Create an android application to display webpage by using Web view Component.
7. Create an android application to display different webpages in fragments by using Fragments Component.

8. Create an android application to store the data by using Shared Preferences.
9. Create an android application to demonstrate concept of SQLite Database Storage method.
10. Create an android application to perform different types of operations (Send SMS, Making call and sending email) by using Telephony app.
11. Write an android program to develop Media player application.
12. a) Write an android program to develop Video view application
    b) Write an android program to develop Audio Recording application.
13. a) Write an android program to develop Video Recording application.
    b) Write an android program to develop Camera and Gallery application.
14. a) Create an android application to get latitude and longitude value by using Location Service.
    b) Create an android application to display X, Y Sensor values by using Sensor Service.
15. a) Create an android application to get the notifications on Notification Bar by Using Notification Service.
    b) Create an android application to display available Wi-Fi devices and Paired Wi-Fi devices by using Wi-Fi Service.
16. a) Create an android application to get the Bluetooth devices and list of devices using Bluetooth and Vibrator Service.
    b) Create an android application to get the System Announcements by using Broadcast Receiver.
17. Create an android application to share the data between multiple applications by using Content Provider.
18. Create an android application to display different Dialog Boxes.
19. Create an android application to display current location on Google maps by using Google-Maps Service.

REFERENCES:

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

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(A0587206) SAP ABAP APPLICATIONS LAB
(Open Elective-II)

COURSE OBJECTIVES:
- ❖ The Main Objective of the SAP ABAP is to understand the key concepts in the Object-Oriented Programming is to integrate it into SAP ABAP to implement the various applications.
- ❖ To understand the concepts of ABAP Objects and how to use them in Workbench tools.
- ❖ To develop their own business applications and to enhance the Standard SAP Software to meet specific customer requirements.
- ❖ ABAP is the main language used for build solid business application in the SAP Runtime environment.
- ❖ It is an interpreted and Object-Oriented programming language that runs in the SAP ABAP Runtime environment.

COURSE OUTCOMES:
- ❖ Students are able to Understand the business requirement from Customer.
- ❖ Design objects like forms, reports, custom screens based on customer business needs.
- ❖ Develop programs, forms etc. to enhance current business processes.
- ❖ Students are able to analyze business area and make a shift to Functional domains and become Business Consultant/ analyst after gaining sufficient experience.
- ❖ Good knowledge of to build custom reports and interfaces. ABAP Workbench contains different tools for editing programs.
- ❖ Good Knowledge of relational database design and preferably also of object-oriented concepts are necessary to create ABAP programs.

MAPPING OF COs & POs:

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

WEEK-1
1. Write a program to print semester details by using write keyword. 2. Write a program to display the list of modules in SAP (SD, MM, HR, PP, FI/CO, CRM, SEM). 3. Write a program to print the values in system variables. 4. Write a program to print the list of importance days in a year.

WEEK-2
1. Accept two integer values from selection screen and perform the following.
   a) Addition
   b) Subtraction
   c) Multiplication
   d) Division
   e) Modulo-Division.
2. Write a program to accept a number from user and print multiplication table of it.
3. Write a program to print week days by using selection screen

4. a) IF-ENDIF
    b) IF-ELSE-IF
    c) NESTED IF

WEEK-3

1. Write a program to print year of months by using CASE-ENDCASE statement.
2. Write a program to print even numbers by using DO and ENDDO statement.
3. Write a program to print sequence of numbers by using WHILE-END WHILE statement.
4. Write a character string program by using predefined operations.
5. a) TRANSLATE
    b) CONDENSE
    c) CONCATENATE
    d) SPLIT
    e) REPLACE
    f) STRLEN

WEEK-4

1. Create database table using the following fields by creating data elements and domains: Vendor number, name of the account holder, bank key, bank account number, bank city and country key.
2. Create the structure of some common fields: name, mobile no, street, city, country.
3. Create Employee table define domain EMPNO and remaining fields make use of INCLUDE structure.

WEEK-5

1. Create the database tables as following and make use of INCLUDE structure for common fields:
    a) Vendor Details: Vendor No (PK), Name, City, District, Street, Country
    b) Customer Details: Customer No (PK), Vendor No FK), City, District, Street, Country
    c) Company Details: Company Code (PK), Name, Customer No (FK), City, District, Street, Country.

WEEK-6

1. Write a program to find factorial of integer value using subroutine, macro and function module.
    a) Create a internal table (ITAB) for KNA1 with five fields, KUNNAR, NAME1, ADRNR, ORTO1,
    b) LAND1. Display the data in ITAB and download the content to a file.

WEEK-7

1. Select Options
2. Add records to internal table ITAB
3. Delete and Adjacent duplicates
4. Sort
5. Read
6. Modify

WEEK-8

1. Write a program to display the changing of database operation (Insert, Update, Delete).

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WEEK-9
1. Create a report for MARA table with Four fields, MANTR, MTART, MATKL, MEINS. Display the data in report and download the content to a file.
2. Inner Join
3. Loop AT
4. AT FIRST
5. AT NEW
6. AT END
7. AT LAST

WEEK-10
1. Write a program to create interactive report.
   a) ATLINE-SELECTION
   b) GET CURSOR
   c) HIDE
   d) BUTTON SELECTION.

WEEK-11
1. Write a program to create ALV reports by using events.

WEEK-12
1. Develop a print program.

WEEK-13
1. Create local and global classes and write programs to show inheritance.

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(A0588206) COMPUTER VISION AND IMAGE PROCESSING LAB
(Open Elective-II)

COURSE OJJECTIVES:
- ❖ To learn the fundamentals of Image Processing
- ❖ To learn sampling and reconstruction procedures
- ❖ To learn the various transforms used in image Processing
- ❖ To study various concepts of image enhancement, reconstruction and image compression
- ❖ To design image processing systems

COURSE OUTCOMES:
- ❖ Understand Image Representation and modeling
- ❖ Apply Image Transformation methods
- ❖ Implement Image processing algorithms
- ❖ Implement Image Segmentation algorithms
- ❖ Apply the Image processing algorithms for object recognition and detection

MAPPING OF COs & POs:

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

1. Simulation and Display of an Image, Negative of an Image (Binary & Gray Scale)
2. Implementation of Relationships between Pixels
3. Implementation of Transformations of an Image
4. Contrast stretching of a low contrast image, Histogram, and Histogram Equalization
5. Display of bit planes of an Image
6. Display of FFT (1-D & 2-D) of an image
7. Computation of Mean, Standard Deviation, Correlation coefficient of the given Image
8. Implementation of Image Smoothening Filters (Mean and Median filtering of an Image)
9. Implementation of image sharpening filters and Edge Detection using Gradient Filters
10. Image Compression by DCT, DPCM, HUFFMAN coding
11. Implementation of image restoring techniques
12. Implementation of Image Intensity slicing technique for image enhancement
13. Canny edge detection Algorithm

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(A0589206) BIG DATA ANALYTICS LAB
For branches: CSE & CSE&BS

COURSE OBJECTIVES:
- ❖ To understand Big Data Analytics for different systems like Hadoop.
- ❖ To learn the design of the Hadoop File System.
- ❖ To learn how to analyze Big Data using different tools.
- ❖ To understand the importance of Data in comparison with traditional data bases.

COURSE OUTCOMES:
After completion of the course, students will be able to
- ❖ Understand the capability of No-SQL systems
- ❖ Outline the importance of Big Data Analytics
- ❖ To gain knowledge about working on the Hadoop File System.
- ❖ Ability to analyze Big Data using different tools.
- ❖ Apply Hadoop MapReduce programming for handling Big Data

MAPPING OF COs & POs:

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

WEEK-1: HADOOP SETTING AND INSTALLATION
1. Installation of VMWare to set up the Hadoop open environment and its ecosystems
2. Perform setting up and Installing Hadoop in its following nodes.
3. Single node, multi node

WEEK-2: MANAGE THE BIG DATA USING LINUX OPERATING SYSTEM
1. Implementing the basic commands of LINUX Operating System–File / Directory creation, deletion, update operations.
2. Create a directory in HDFS at given path(s).
3. List the contents of a directory.
4. Upload and download a file in HDFS.
5. See contents of a file
6. Copy a file from source to destination
7. Copy a file from / To Local file system to HDFS
8. Move file from source to destination.
9. Remove a file or directory in HDFS

WEEK-3: LARGE FILE MANAGEMENT IN HADOOP
Implement the following file management tasks in Hadoop:
1. Copy a file from/ To Local file system to HDFS
2. Move file from source to destination.
3. Remove a file or directory in HDFS.
4. Display the aggregate length of a file.
Implement the following file management tasks in Hadoop:
5. Adding files and directories
6. Retrieving files, Deleting files

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7. Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

WEEK-4: MAPREDUCE PROGRAMS
1. Implement a basic word count using the MapReduce Technique.
2. Implement matrix multiplication with Hadoop MapReduce

WEEK-5: MAPREDUCE PROGRAM FOR REAL TIME DATASET
1. Write a Map Reduce program that mines weather data.
2. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with Map Reduce since it is semi structured and record-oriented.

WEEK-6: PIG LATIN LANGUAGE – PIG
1. Installation of PIG.
2. Write the Pig Latin scripts for the sort, group, join, project, and filter operations to any sample dataset.

WEEK-7 PIG LATIN MODES, PROGRAMS
1. Write the Pig Latin script to find Word Count.
2. Write the Pig Latin script to find a max temp for each and every year.

WEEK-8: HIVE
1. Installation of HIVE.
2. Write the Hive script to create, alter, and drop databases, tables, views, functions, and indexes of the sample data

WEEK-9: CLUSTERING
1. Implementation of K-means clustering using Map Reduce

WEEK-10: ASSOCIATION MINING AND CLASSIFICATION
1. To implement the frequent item algorithm by MapReduce using pig.
2. Implement and Execute Decision tree algorithm using pig

WEEK-11: BIG DATA ANALYSIS
1. Create an application for data analysis using pig and generate graph for output using Big Sheets.
2. Implement an application that stores big data in Hbase / MongoDB / Pig using Hadoop

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IV B.Tech. I-Sem (CSE)

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(A0515205) ARTIFICIAL INTELLIGENCE
(Professional Elective-III)
For branches: ECE, CSE & CSE&BS

COURSE OBJECTIVES:
This course is designed to:
- ❖ Learn different AI techniques and their implementation.
- ❖ Understand types of agents and the activities of agents.
- ❖ Learn problem solving using searching techniques, Problem characteristics and their implementations.
- ❖ Apply knowledge representation using pre-positional logic and First Order logic.
- ❖ Understand various learning algorithms

COURSE OUTCOMES:
- ❖ Understand and Learn Foundations of Artificial Intelligence.
- ❖ Learn Formulation of Problems as Search Problem and How to Solve Problems using Informed and Uninformed Techniques: Gradient Descent, Heuristic Search Strategies.
- ❖ Represent Knowledge using Logic. Interpret world using process of inference. Develop programs that extract Knowledge
- ❖ Handle Uncertainty using Probability Notations.
- ❖ Learning Agents: Inductive Learning, Learning Decision Trees, Neural Network Learning.
- ❖ Applying Probabilistic Language Processing Interface for Machines.

MAPPING OF COS & POS:

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

* 3: Strong   2: Medium   1: Week   0- NA

UNIT-I   INTRODUCTION TO AI
What is AI, Foundations of AI, History of AI, The State of Art. **Intelligent Agents**: Agents and Environments, The Concept of Rationality, The Nature of Environments: PEAS, properties of Task Environment, The Structure of Agents: 4 Types of Agents

UNIT-II   SOLVING PROBLEMS BY SEARCHING
Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies, **Informed search strategies,** Heuristic Search Strategies, Heuristic Functions, **Local & Heuristic Search Algorithms** and Optimization Problems: Hill Climbing search, Simulated Annealing, Genetic Algorithms. Constraint Satisfaction Problems.

UNIT-III   KNOWLEDGE REASONING AND INFERENCE
Knowledge based Agent, The Wumpus World Problem, **Logic**: Propositional Logic, First-Order Logic Knowledge and Reasoning: Inference in First-Order Logic: Propositional vs First Order inference.   First-Order Logic: Syntax and Semantics of First order Logic, Using First Order Logic, Unification and Lifting, Forward Chaining. **Planning**: The planning problem formulation, The Language of Planning Problems, Examples: Air Cargo Transport, Spare Tyres

UNIT-IV   UNCERTAINTY HANDLING

Acting under Uncertainty, Basic Probability Notation, Axioms of Probability, Inference using Full Joint Distribution, Bayes Rule and its Use, Probabilistic Reasoning Representing Knowledge in an Uncertain Domain, The semantics of Bayesian Networks.

UNIT-V   LEARNING

Forms of Learning, Inductive Learning, Learning Decision Trees, Ensemble Learning, Computational Learning. **Statistical Learning**: Instance Based Learning, Nearest neighbor Models, **Neural Networks**: Units in Neural Networks, Neural Network Structures, Single Layer Feed Forward Networks, Multilayer Feed Forward Neural Networks. Learning Neural Network structures.

UNIT-VI   LANGUAGE PROCESSING AND **PRESENT AND FUTURE OF AI**

Probabilistic Language Processing: Phrase structure grammars, Syntactic Analysis, Augmented Grammars and semantic Interpretation, Information Retrieval, Information Extraction, Machine Translation. **Philosophical foundations:** Weak AI, Strong AI, Ethics and Risks of AI, **AI Present and Future:** Agent Components**,** Agent Architectures, Are we going in the right direction, what if AI does succeed.

TEXTBOOK:
1. Stuart J.Russell, Peter Norvig, "Artificial Intelligence A Modern Approach", 3rd Ed, Pearson Education/ Prentice Hall 2019.

REFERENCES:
1. Nilsson, Nils J., and Nils Johan Nilsson. Artificial intelligence: a new synthesis. Morgan Kaufmann, 1998.
2. Elaine Rich, Kevin Knight and Shivashankar B. Nair, Artificial Intelligence, 3/e, McGraw Hill Education, 2008.
3. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI Learning, 2012.

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(A0543207) MACHINE LEARNING
(Professional Elective-III)
For branches: ECE, CSE & CSE(DS)

COURSE OBJECTIVES:
The main objective of this course is to provide students
- ❖ To better understand machine learning's fundamental principles.
- ❖ Being able to create machine learning issues that match to various applications.
- ❖ To comprehend a variety of machine learning algorithms and their advantages and disadvantages.
- ❖ Should be able to tackle somewhat complicated issues using machine learning methods.

COURSE OUTCOMES:
Upon completion of the course students should able to learn:
- ❖ Students will be able to apply well-defined learning tasks, basic machine learning ideas, and the corresponding algorithms.
- ❖ Students will be able to use and study artificial neural networks and decision tree learning.
- ❖ Students will get the opportunity to study about Bayesian learning, Bayesian networks, and evaluation of hypothesis theory.
- ❖ Learn and understand the basic concepts of Machine Learning, Linear Models and Neural Networks.
- ❖ Apply knowledge and understanding of neural networks for various applications

MAPPING OC COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	3	1	2	2	1	1	1	1	1	1		
CO2	3	3	2	2				1	1	2	2	1	1	1	1
CO3	3	2	1	1	1					1	1	1	1	1	2
CO4	3	2		1								3	1	1	2
CO5	2	3	3	3								3	1	2	

UNIT-I
Introduction and Decision Trees: Well-posed Learning problems. Designing a Learning System: Choosing the Training Experience, Choosing the Target Function, Choosing a Representation for the Target function, Choosing a Function Approximation Algorithm, The final Design. Persepective and Issues in Machine Learning: Issues in Machine Learning.

UNIT-II
Decision Tree Learning: Introduction, Decision Tree Representation, Appropriate Problems for Decision Tree Learning. The Basic Decision Tree Learning Algorithm: Which attribute is the best classifier, an illustrative example, Hypothesis Space Search in Decision Tree Learning?

UNIT-III
Inductive Bias in Decision Tree Learning: Restriction Biases and preference Biases, why prefer short Hypotheses. Issues in Decision Tree Learning: Avoding Over fitting the Data, Incorporating Continuous-valued Attributes, Alternative Measures for Selecting Attributes, Handling Training Examples with Missing Attribute Values, Handling Attributes with Differing Costs.

UNIT-IV

Bayesian Learning: Introduction, Bayes Theorem. Bayes Theorem Concept Learning: Brute-Force Bayes Concept Learning, MAP Hypothesis and Consistent Learners. Maximum Likelihood and Least-squared Error Hypotheses, Maximum Likelihood Hypothesis for predicting probabilities: Gradient Search to Maximize Likelihood in a Neural Net. Minimum Description Length Principle, Bayes Optimal Classifier.

UNIT-V

Bayesian Belief Networks: Conditional Independence, Representation, Inference, Learning Bayesian Belied Networks, Gradient Ascent Training of a Bayesian Networks, Learning the structure of Bayesian Networks. The EM Algorithm: Estimate Means of K Gaussians, General Statement of EM Algorithm, Derivation of the K Means Algorithm.

UNIT-VI

Artificial Neural Networks: Introduction, Neural Network Representations, Appropriate Problems for Neural Network Learning, Perceptron's, Multi-Layer Networks and BACK PROPAGATION Algorithm, Remarks on the BACK PROPAGATION Algorithm.

TEXT BOOKS:
1) Tom M.Mitchell ,"Machine Learning",McGraw Hill,1997
2) Peter Flach, Machine Learning, The and Science of Algorithms that make sense of data, Cambridge University Press, 2012.

REFERENCE BOOKS:
1) Ethem Alpaydin, "Introduction to Machine Learning", The MIT Press, (2010)
2) Stephen Marsland, "Machine Learning an Algorithmic Perspective", CRC Press,(2009)

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(A3441207) BUSINESS INTELLIGENCE
(Professional Elective-III)
For branches: CSE & CSE&BS

COURSE OBJECTIVES:
To give students
- ❖ Understand the role of BI in enterprise performance management and decision support.
- ❖ Understand the applications of data mining and intelligent systems in managerial work.
- ❖ Understand data warehousing and online analytical processing (OLAP) concepts,
- ❖ Including dimensional modelling, star and snowflake schemas, attribute hierarchies, Metrics, and cubes.
- ❖ Learn data analysis and reporting using available BI software.

COURSE OUTCOMES:
Students will be able to
- ❖ Appraise and apply evidence practice (EBP) to formulate effective solutions to deal with contemporary performance problems and issues associated with the delivery of business information systems.
- ❖ Create a consultant report that critically evaluates important design principles and operations involving business intelligence and that offers effective recommendations aimed at enhancing business outcomes.
- ❖ Demonstrate competence in oral, written, and visual communication in business reports and presentations.
- ❖ Develop small size reports in BI
- ❖ Focus on how Data Ware house and Data mining are used in BI.
- ❖ Get an exposure on BI software tools.

CO-PO MAPPING:

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

UNIT-I
Introduction to Business intelligence: Definition and History of BI, Transaction processing versus analytical processing, BI Implementation, Major tools and techniques of BI

UNIT-II
Data warehousing: Definition and concepts, Data warehouse architecture, ETL process, data warehouse development, Top down vs. Bottom up, Data Mart vs. EDW, Implementation issues, Real-time data warehousing

UNIT-III
Business performance management: Key performance indicators and operational metrics, balanced scorecard, Six Sigma, Dashboards and scorecards.

UNIT-IV
Data Mining for Business Intelligence: Data mining process, Data mining methods, ANN for Data Mining

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UNIT-V

Text and Web mining for Business intelligence: Text mining Applications, Process and Tools, Web content, structure and usage mining

UNIT-VI

BI implementation, Integration and emerging trends: Implementing BI, BI Application Life Cycle, Connecting BI to Enterprise systems, on- demand BI, Issues of legality, privacy and Ethics, Emerging topics in BI, Social Networking and BI, RFID and BI

TEXT BOOKS:
1. Business Intelligence: A Managerial Approach, 2nd Edition, PEARSON 2012 Authors: EfraimTurban, Ramesh Sharda, Dursun Delen, and David King ISBN-10: 0-13-610066-X ISBN-13: 978-0-13-610066-9
2. Oracle Business Intelligence Applications, McGraw Hill Education 2013 Authors : Simon Miller, William Hutchinson ISBN-10: 93-5134-153-4 ISBN-13: 978-93-5134-153-6

REFERENCE BOOKS:
1. Fundamentals of Business Analytics R.N Prasad, seema acharya, wiley (2011)
2. Getting Started with Business Analytics: Insightful Decision Making: David R Hardoon, galith shmueli, Chapman and Hall/CRC(2013)

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IV B.Tech. I-Sem (CSE)

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(A0532206) CYBER SECURITY
(Professional Elective-IV)
For branches: ECE & CSE

COURSE OBJECTIVES:
❖ This course provides insight knowledge about cyber crime and it portrays preventive measures the security policies and procedures that must be adapted to prevent the end user from cyber threats. It also conveys a basic knowledge on the how to analyze the cyber incidents through cyber forensic methods.

COURSE OUTCOMES:
❖ Students will be able to gain the knowledge on cyber crime and the challenges and threats in cyber security.
❖ Students will have knowledge on External and Internal reconnaissance through various tools.
❖ Students will have better understanding upon how the system is compromised and user identity is compromised.
❖ Students will have an effective knowledge on web and mobile security
❖ Students will be aware on the ethics and policy guidelines that must be followed.
❖ Students will be given a fundamental knowledge on Cyber Forensics

MAPPING OF COs & POs:

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

UNIT-I
Introduction to cybercrime- classification of cybercrime – Reasons for commission of cybercrime – Malware and its types – Kinds of cyber crime

Security Posture: The current threat landscape- Cyber security challenges- Enhancing your security posture- The Red and Blue Team

UNIT-II
Understanding the Cyber security Kill Chain: External reconnaissance - Internal reconnaissance - Access and privilege escalation – Sustainment – Assault –Obfuscation - Threat life cycle management.

UNIT-III
Compromising the System: Analyzing current trends –Phishing-Exploiting a vulnerability-Zero-day-Performing the steps to compromise a system
Chasing a User's Identity: Identity is the new perimeter- Strategies for compromising a user's identity -Hacking a user's identity

UNIT-IV
Web & Mobile security: Introduction – Fundamental concepts and approaches- Appification-Webification- sandboxing- permsission dialog based access control – Web PKI and HTTPS-Cookies – Password and Alternatives – Frequent software updates- Client side vulnerabilities

and mitigation: Phishing & clickjacking – client side storage- physical attacks. Server side vulnerabilities and mitigation

UNIT-V
Security Policy: Reviewing your security policy -Educating the end user-Policy enforcement-Monitoring for compliance

Legal issues and Ethics: Protecting programs and data – Information and Law-Rights of Employees and Employers- Computer Crime- Ethical issues in computer security.

UNIT-VI
Computer Forensics: What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Recourses/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists. Types of Computer Forensics Technology

TEXT BOOKS:
1. The Cyber Security Body of Knowledge, version 1.0 by Awais Rashid, The National Cyber Security Centre 2019.
2. Introduction to cybercrime, by Jeetendra Pande, Uttarakhand Open University, Haldwani
3. Security in computing by Charles p pfleeger, Pearson Education; Fifth edition
4. Computer Forensics, Computer Crime Investigation by John R,Vacca, Firewall Media, New Delhi

REFERENCE BOOKS:
1. Information Security and Auditing in the Digital Age: A Practical Managerial Perspective Amjad Umar
2. Cybersecurity: Attack and Defense Strategies: Infrastructure security with Red by Erdal Ozkaya and Yuri Diogenes
3. Cyber Security Audit A Complete Guide - 2020 by Gerardus Blokdyk
4. Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software By Michael Sikorski, Andrew Honig
5. Information Technology Control and Audit" by Angel R. Otero

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IV B.Tech. I-Sem (CSE)

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(A3216207) FUNDAMENTALS OF QUANTUM COMPUTING
(Professional Elective-IV)
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ The basic principles of quantum computing.
- ❖ The fundamental differences between conventional computing and quantum computing.
- ❖ Several basic quantum computing algorithms.
- ❖ The classes of problems that can be expected to be solved well by quantum computers.

COURSE OUTCOMES:
By the end of this course, you should be able to
- ❖ Analyse the behaviour of basic quantum algorithms
- ❖ Implement simple quantum algorithms and information channels in the
- ❖ quantum circuit model
- ❖ Simulate a simple quantum error-correcting code
- ❖ Prove basic facts about quantum information channels

MAPPING OF COs & POs:

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

UNIT-I [TB-1,2]

INTRODUCTION TO QUANTUM COMPUTING: History of quantum computation and quantum information, Future directions, Quantum bits, Quantum computation, Describing Quantum Computers, Entangled States, Visualizing Entanglement, Quantum algorithms, Experimental quantum information processing, Quantum information theory: example problems.

UNIT-II [TB-1,2]

QUANTUM CIRCUTS: Quantum algorithms, Single qubit operations, Controlled operations, Measurement, Universal quantum gates, Summary of the quantum circuit model of computation, Simulation of quantum systems. Investigating Quantum Hardware Using Quantum Circuits: Introduction to Quantum Error Correction using Repetition Codes, Measurement Error Mitigation, Randomized Benchmarking, Measuring Quantum Volume, The Density Matrix & Mixed States.

UNIT-III [TB-3]

QUANTUM ALGORITHMS: Circuit vs Query Complexity, Parity - Deutsch's Algorithm, Constant vs Balanced Functions- Deutsch-Jozsa Algorithm, Brute Force Searching - Grover's Algorithm, Factoring - Shor's Algorithm.

UNIT-IV [TB-1]

QUANTUM INFORMATION AND CRYPTOGRAPHY: Distinguishing quantum states and the accessible information, Data compression, Shannon's noiseless channel coding theorem, Classical information over noisy quantum channels, Quantum information over noisy quantum channels, Entanglement as a physical resource, Quantum cryptography.

UNIT-V   **[TB-3, IR]**
QUANTUM PROGRAMMING: IBM Quantum Experience, Quantum Assembly Language, Qisit, other quantum programming languages.
Quantum Computing Cloud Platforms: IBM Q Experience, Microsoft Azure Quantum, Amazon Braket, Google's Quantum Playground, D-Wave Leap.

UNIT-VI   **[IR]**
APPLICATIONS: Manufacturing and Industrial design, Logistics, Chemical Engineering, Artificial Intelligence & Machine Learning, Drug Design and Development, Cyber Security & Cryptography, Financial Modelling, Logistics Optimization, Weather Forecasting.

TEXT BOOKS:
1. Quantum Computation and Quantum Information, M. A. Nielsen and I. L. Chuang, Cambridge University Press
2. https://qiskit.org/learn/
3. Introduction to Classical and Quantum Computing, Thomas G. Wong.
4. https://research.aimultiple.com/quantum-computing-cloud/
5. https://www.computer.org/publications/tech-news/research/industry-applications-of-quantum-computing
6. https://analyticsindiamag.com/top-applications-of-quantum-computing-everyone-should-know-about/

REFERENCE BOOKS:
1. An Introduction to Quantum Computing, P. Kaye, R. Laflamme, and M. Mosca, Oxford University Press, New York.
2. Quantum Computer Science, N. David Mermin, Cambridge University Press.
3. Quantum Algorithms for Cryptographically Significant Boolean Functions - An IBMQ Experience, SAPV Tharrmashastha, D. Bera, A. Maitra and S. Maitra, Springer 2020.
4. Handbook of Applied Cryptography, A. J. Menezes, P. C. van Oorschot, and S. A. Vanstone, CRC Press.

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(A0554207) HUMAN COMPUTER INTERACTION
(Professional Elective-IV)

COURSE OBJECTIVES:
- ❖ To expose students to the central concepts of Human-Computer Interaction.
- ❖ Establish target users, functional requirements, and interface requirements for a given computer application.
- ❖ Describe and explain user interface design principles, and apply them to designing an interface.
- ❖ Evaluate user interface designs through usability inspection and user models.
- ❖ Develop user studies and analyze study data to gain information about users, tasks, and interface designs.

COURSE OUTCOMES:
The Student will be able to:
- ❖ Apply HCI principles and a user-centered approach to interaction design.
- ❖ Student can analyze user needs and requirements.
- ❖ They can able to Design and develop prototypes based on user assessments (needs and requirements), while applying HCI principles and models.
- ❖ Apply evaluation and usability testing methods to interactive products to validate design decisions.
- ❖ Categorize, design and develop information in proper architectural structures.
- ❖ Create interface design prototypes based on a range of design principles and user data, and user assessments.

MAPPING OF COs & POs:

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

UNIT-I

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

UNIT-II

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

UNIT-III

Design process – Understanding Human interaction with computers, Importance of human characteristics in design, Human consideration in Design, Human interaction speeds.

UNIT-IV

Screen Designing: Human Considerations in Screen Design – Interface Design Goals, Screen Meaning and purpose, organizing screen elements clearly and Meaningfully, Ordering of screen data and content – Screen navigation and flow – Visually pleasing composition – Amount of information – Focus and Emphasis – Presenting information simply and meaningfully – statistical graphics – Technological consideration in interface design.

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UNIT-V

Windows: Select the Proper Kinds of Windows: Window Characteristics, Components of a Window, Window Presentation Styles, Types of Windows, Window Management, Window Operations. Select the Proper Device-Based Controls: Characteristics of Device-Based Controls, Selecting the Proper Device Based Controls.

UNIT-VI

Components: Choose the Proper Screen-Based Controls – Operable Controls, Text Entry, Selection Controls, Combination Entry/selection controls, Other Operable Controls, Custom Controls, and Presentation Controls. Write Clear Text and Messages – Words, Sentences, Messages and Text, Text for Web Pages. Icons, Multimedia, Color-What Is It? Color Uses, possible problems with colors, choosing colors.

TEXT BOOKS:
1. The essential guide to user interface design, Wilbert O Galitz, 3rd Edition, Wiley India, 2007.

REFERENCES:
1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen, Pearson Education.

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IV B.Tech. I-Sem (CSE)
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(A3201203) FOUNDATIONS OF DATA SCIENCE
(Professional Elective-V)
For branches: CSE & CSE(DS)

COURSE OBJECTIVES:
- ❖ To provide fundamentals for data science and application areas related to data science and understand the underlying core concepts in data science.

COURSE OUTCOMES:
- ❖ Explore the fundamental concepts of data science.
- ❖ Understand data pre-processing and data analysis techniques for data oriented applications.
- ❖ Understand various model development algorithms used in data science.
- ❖ Visualize and present the inference using various tools
- ❖ Understand various measures to evaluate the model for decision support system.

MAPPING OF COs & POs:

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

UNIT-I   INTRODUCTION
Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields – Data Security Issues.

UNIT-II   DATA COLLECTION AND DATA PRE-PROCESSING
Data Collection Strategies – Data Pre-Processing Overview – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization.

UNIT-III   EXPLORATORY DATA ANALYTICS
Descriptive Statistics – Mean, Standard Deviation, Skewness and Kurtosis – Box Plots –Scatter Plot, Pivot Table – Heat Map – Correlation Statistics – ANOVA.

UNIT-IV   MODEL DEVELOPMENT
Simple and Multiple Regression – Model Evaluation using Visualization – Residual Plot – Distribution Plot – Polynomial Regression and Pipelines – Measures for In-sample Evaluation – Prediction and Decision Making.

UNIT-V   CLASSIFICATION:
Classification Vs. Prediction, preparing data for classification and prediction,
comparing classification and prediction methods, overview of classifiers (Bayes Classifier, Decision Tree Classification, Nearest Neighbour Classifier, Neural Networks). Definition of cluster, cluster requirements, types of data in cluster analysis, overview of clustering methods (K-Means).

UNIT-VI   MODEL EVALUATION
Generalization Error – Out-of-Sample Evaluation Metrics – Cross Validation – Overfitting – Under Fitting and Model Selection – Prediction by using Ridge Regression – Testing Multiple Parameters by using Grid Search

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TEXT BOOKS:
1) Jojo Moolayil, "Smarter Decisions: The Intersection of IoT and Data Science", PACKT, 2016.
2) Cathy O'Neil and Rachel Schutt , "Doing Data Science", O'Reilly, 2015.
3) David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics", EMC 2013.
4) Data Mining – Concepts and Techniques , Jiawei Han & Micheline Kamber, 3rd Edition, Elsevier,2011
5) Raj, Pethuru, "Handbook of Research on Cloud Infrastructures for Big Data Analytics", IGI Global.

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IV B.Tech. I-Sem (CSE)

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(A3446206) SOFTWARE APPLICATION DEVELOPMENT USING DEVOPS
(Professional Elective-V)
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
The course is designed to
- ❖ Explain the DevOps Concepts for business cases
- ❖ Prepare the model canvas for DevOps use cases
- ❖ Introduce the virtual machines and containers for designing of applications
- ❖ Familiar with cloud provisioning and management services
- ❖ Testing the code with various aspects in continuous deployment / development

COURSE OUTCOMES:
After completion of the course, students will be able to
- ❖ Understands the DevOps concepts in continuous delivery / development of applications
- ❖ Create the DevOps applications using various tools and technologies
- ❖ Examine the virtual machines and containers for managing the files
- ❖ Apply cloud services for deployment the applications in a real-time
- ❖ Analyse the web security and code testing with appropriate tools

MAPPING OF COs & POs:

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

UNIT-I   DEVOPS CONCEPTS
Understanding DevOps movement, DevOps with changing time, The water fall model, Agile Model, Collaboration, Why DevOps, Benefits of DevOps, DevOps life cycle- all about continuous, Build Automation, Continuous Integration, Continuous Management, Continuous Delivery / Continuous Development, The agile wheel of wheels

UNIT-II   DEVOPS TOOLS AND TECHNOLOGIES:
Code Repositories : Git, Differences between SVN and Git, Build tools – Maven, Continuous integration tools – Jenkins, Container Technology – Docker, Monitoring Tools – Zenoss, Continuous integration with Jenkins 2, Creating built-in delivery pipelines, Creating Scripts, Creating a pipeline for compiling and executing test units, Using the Build Pipeline plugin, Integrating the deployment operation, Getting started with Chef, Overview of hosted Chef, Installing and configuring a Chef workstation. Converging a Chef node using a Chef workstation, Installing software packages using cookbooks, Creating a Role

UNIT-III   DOCKER CONTAINERS:
Overview of Docker containers, Understanding the difference between virtual machines and containers, Installation and configuration of Docker on CentOS, Creating your first Docker container, Managing containers, Creating a Docker image from Docker file, An overview of Docker's elements, Creating a Dockerfile, Writing a Dockerfile, Building and running a container on a local machine, Testing a container locally, Pushing an image to Docker Hub

UNIT-IV   CLOUD PROVISIONING AND CONFIGURATION MANAGEMENT WITH CHEF

Chef and cloud provisioning, Installing knife plugins for Amazon EC2 and Microsoft Azure, Creating and configuring a virtual machine in Amazon Web Services, Creating and configuring a virtual machine in Microsoft Azure, Managing Docker containers with Chef, Prerequisite – deploying our application on a remote server, Deploying the application on AWS, Deploying the application on Microsoft Azure, Deploying the application in a Docker container.

UNIT-V   MANAGING CONTAINERS EFFECTIVELY WITH KUBERNETES
Kubernetes architecture overview, Installing Kubernetes on a local machine, Installing the Kubernetes dashboard, Kubernetes application deployment, Using AKS, Creating an AKS service, Configuring kubectl for AKS, The build and push of the image in the Docker Hub, Advantages of AKS, Creating a CI/CD pipeline for Kubernetes with Azure Pipelines

UNIT-VI   TESTING THE CODE
Manual testing, Unit testing, JUnit in general and JUnit in particular, A JUnit example, Automated integration testing, Docker in automated testing, Performance testing, Automated acceptance testing, Automated GUI testing, Integrating Selenium tests in Jenkins, JavaScript testing, Testing backend integration points, Test-driven development, A complete test automation scenario, Manually testing our web application, Security and Performance Tests: Applying web security and penetration testing with ZAP, Running performance tests with Postman

TEXTBOOKS:
1) Mitesh Soni, DevOps for Web Development, Packt Publishing, 2016
2) Mikael Krief , Learning DevOps- The complete guide to accelerate collaboration with Jenkins, Kubernetes, Terraform and Azure DevOps, Packt Publishing, 2019

REFERENCE BOOKS:
1) Joakim Verona , Practical DevOps, Packt Publishing, 2016
2) Michael Huttermann, DevOps for Developers, Apress publishers,2012.
3) Sanjeev Sharma, The DevOps Adoption Playbook, Published by John Wiley & Sons, Inc.2017.
4) Sanjeev Sharma & Bernie Coyne, DevOps for Dummies, Published by John Wiley & Sons, Inc

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(A0555207) ADVANCED DATABASES
(Professional Elective-V)

COURSE OBJECTIVES:
The first is study of the classical distributed database management
- ❖ Issues in Distribution design, distributed query processing, and distributed transaction management.
- ❖ To learn about Optimization in DDB
- ❖ Architectural Issues in DDB

COURSE OUTCOMES:
Upon completion of the course students are able to
- ❖ Understand distributed database management concepts.
- ❖ Get good knowledge of distribution transparency and they will know the architecture of distributed databases.
- ❖ Understand complex topics like Distribution design, distributed query processing.
- ❖ Find solutions to the some of the Architectural issues.
- ❖ Solve the problems of deadlocks and concurrency control.
- ❖ Give new examples of distributed database design.

MAPPING OF COs & POs:

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

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

UNIT II
Levels Of Distribution Transparency: Reference Architecture for Distributed Databases , Types of Data Fragmentation, Distribution transparency for read only applications, Distribution transparency for update applications, distributed database access primitives, Integrity Constraints in Distributed Databases.

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

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

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

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

TEXT BOOKS:
1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill

REFERENCES:
1. Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez – Pearson Education.

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(A0551207) DATA ANALYTICS WITH R-PROGRAMMING
(Open Elective-III)

COURSE OBJECTIVES:
- ❖ Understand the fundamentals of 'R'programming
- ❖ Learn how to carry out a range of commonly used statistical methods including analysis of variance and linear regression.
- ❖ Explore data-sets to create testable hypotheses and identify appropriate statistical tests.

COURSE OUTCOMES:
After completing the course, students will able to
- ❖ Describe purpose of R language and working with its tool.
- ❖ Describe R objects, their data operations and descriptive statistical functions.
- ❖ Apply data distribution and hypothesis testing.
- ❖ Applying data using graphs and complex statistics like anova.
- ❖ Apply summarizing data and regression modeling.
- ❖ Learn to export graphs and writing the scripts.

MAPPING OF COs & POs:

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

UNIT-I
INTRODUCING R: Getting the Hand of R, Running the R Program, Finding Your Way with R, Command Packages.
BECOMING FAMILIAR WITH R: Reading and Getting Data into R, Viewing Named Objects, Types of Data Items, The Structure of Data Items, Examining Data Structure, Working with History Commands, Saving your Work in R.

UNIT-II
WORKING WITH OBJECTS: Manipulating Objects, Viewing Objects within Objects, Constructing Data Objects, Forms of Data Objects: Testing and Converting.
Data: Descriptive statistics and tabulation: Summary Commands, Summerizing Samples, Summary Tables.

UNIT-III
Data: DISTRIBUTION: Looking at the Distribution of Data
SIMPLE HYPOTHESIS TESTING: Using the Student's t-test, The Wilcoxon U-Test (Mann-Whitney), Paired t- and U-Tests, Correlation and Covariance, Tests for Association.

UNIT-IV
INTRODUCTION TO GRAPHICAL ANALYSIS: Box-whisker Plots, Scatter Plots, Pairs Plots(Multiple Correlation Plots) Line Charts, Pie Charts, Cleveland Dot Charts, Bar Charts, Copy Graphics to Other Applications.
FORMULA NOTATION AND COMPLEX STATISTICS: Examples of Using Formula Syntax for Basic tests, Formula Notation in Graphics, Analysis of Variance (ANOVA).

UNIT-V

MANIPULATING DATA AND EXTRACTING COMPONENTS: Creating Data for Complex Analysis, Summarizing Data.

REGRESSION (LINEAR MODELING): Simple Linear Regression, Multiple Regression, Curvilinear Regression, Plotting Linear Models and Curve Fitting, Summarizing Regression Models.

UNIT-VI

MORE ABOUT GRAPHS: Adding elements to existing plots, Matrix plots, multiple plots in one window, exporting graphs.

WRITING YOUR OWN SCRIPTS:

BEGINNING TO PROGRAM: Copy and Paste Scripts, Creating Simple Functions, Making Source Code.

TEXT BOOKS:
1. "Beginning R the statistical programming language" Dr.Mark Gardener, Wiley Publications, 2015.

REFERENCES BOOKS:
1. Hands-On Programming with R Paperback by Grolemund (Author), Garrett (Author), SPD, 2014.
2. The R Book, Michael J. Crawley, WILEY, 2012.

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(A0552207) PHP PROGRAMMING
(Open Elective-III)

COURSE OBJECTIVES:
Learn How to:
- ❖ Write PHP programs that access form data.
- ❖ Use the "echo" and "print" to send output to the browser.
- ❖ Learn how to create and use PHP variables.
- ❖ Learn how to show PHP errors on web pages.

COURSE OUTCOMES:
The main learning outcomes are:
- ❖ Understand process of executing a PHP-based script on a webserver.
- ❖ Be able to develop a form containing several fields and be able to process the data provided on the form by a user in a PHP-based script.
- ❖ Understand basic PHP syntax for variable use, and standard language constructs, such as conditionals and loops.
- ❖ Understand the syntax and use of PHP object-oriented classes.
- ❖ Understand the syntax and functions available to deal with file processing for files on the server as well as processing web URLs.
- ❖ Understand the paradigm for dealing with form-based data, both from the syntax of HTML forms, and how they are accessed inside a PHP-based script.

MAPPING OF COs & POs:

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

UNIT-I
Introduction to PHP: Evaluation of PHP, Features of PHP, Basic Syntax, PHP variables, PHP Data types, Type casting, type juggling, Operators and Expressions.
working with flow control through control statement-If, If-else, If-else ladder, If-elseif-else, Switch.
working with flow control through control statement- For, While, Do-while, for each, Nesting of Loops

UNIT-II
Arrays-What is an Array, Creating an array, Accessing array Element, Types of arrays,array functions.
Functions-What is a function, Define a function, Call by value and Call by reference, Recursive functions

UNIT-III
Introduction to Strings-Creating and accessing String, String Related Library function.
File handling in PHP-Defining a File, different file operations.

UNIT-IV
Introduction to OOPS-Introduction Objects, Declaring a class, properties and methods,

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Inheritance, Polymorphism & encapsulation, constructor, Destructor, Extending classes, using $this, Using access specifiers, Abstract method and class, using interface.

UNIT-V
PHP Advanced Concepts- Using Cookies, Using HTTP Headers, Using Sessions, Using Environment and Configuration variables.
Working with Date and Time-Displaying Human-Readable Dates and Times, Finding the Date for a Weekday, Getting the Day and Week of the Year, Determining Whether a Given Year Is a Leap Year, Obtaining the Difference Between Two Dates, Determining the Number of Days in the Current Month, Determining the Number of Days in Any Given Month.

UNIT-VI
Creating and Using Forms- Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.
PHP and Database Access- Basic Database Concepts, Connecting to a MYSQL database, Performing basic database operations-create, Insert, Retrieving and Displaying results, Modifying, Updating and Deleting data.

TEXT BOOKS:
1. Beginning PHP and MySQL, 3rdEdition, Jason Gilmore, Apress Publications (Dream tech.).
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.

REFERENCES:
1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, CengageLearning Publications.
3. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.

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(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B.Tech. I-Sem (CSE)

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(A0546207) OBJECT ORIENTED ANALYSIS & DESIGN
(Open Elective-III)

COURSE OBJECTIVES:
- ❖ Building block of UML: things , relationships and diagrams
- ❖ Contents and common modeling techniques to model static aspects of any system using:Class diagrams, object diagrams, deployment diagram, usecase diagram
- ❖ Contents and common modeling techniques to model dynamic aspects of any system using:sequence diagram, collaboration diagram, activity diagram, state chart diagram
- ❖ Contents and common modeling techniques to model any system using component diagram toimplement physically.

COURSE OUTCOMES:
- ❖ Analyze system requirements and model problem domains
- ❖ Evaluate quality of analysis
- ❖ Design and build object oriented systems
- ❖ Designs based on design principles patterns and heuristics
- ❖ Object-oriented code to correctly implement a design
- ❖ Read and write analysis and design documentation the Unified Modeling language

MAPPING OF COs & POs:

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

UNIT – I
Introduction to UML: Importance of modeling, principles of modeling, object-Oriented modelling, Conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT - II
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles,Packages.

UNIT - III
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.
Basic Behavioral Modeling-: Interactions, Interaction
diagrams. Use cases, Use case Diagrams, 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.

UNIT - VI
Case Study: The Unified Library application, ATM application.

TEXT BOOKS:

1) Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, PearsonEducation.

REFERENCE BOOKS:

1) Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2) Pascal Roques: Modeling Software Systems Using UML2, WILEY Dreamtech India Pvt. Ltd.
3) AtulKahate: Object Oriented Analysis & Design, The McGraw – Hill Companies.
4) Mark Priestley: Practical Object-Oriented Design with UML,TATA McGraw Hill
5) Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and UnifiedProcess, Craig Larman, Pearson Education.
6) Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-DreamtechIndia Pvt. Ltd.

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IV B.Tech. I-Sem (CSE)

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(A0545207) LINUX SYSTEM ADMINISTRATION
(Open Elective-IV)

COURSE OBJECTIVES:
The Students will learn the following:
- ❖ To Understand and use essential tools, create simple shell scripts and Operate running systems
- ❖ To Configure local storage and File System
- ❖ To Deploy, configure, and maintain systems and manage basic networking
- ❖ To Manage users and groups
- ❖ To Manage security
- ❖ To Manage containers

COURSE OUTCOMES:
Upon the successful completion of the course, the student will be able to:
- ❖ Learn about Access a shell prompt Create and edit text files Create, delete, copy, and move files and directories, Create hard and soft links.
- ❖ Boot, reboot, and shut down a system normally, Adjust process scheduling, Securely transfer files between systems.
- ❖ List, create, delete partitions on MBR and GPT disks, Create and remove physical volumes and logical volumes.
- ❖ Configure time service clients Install and update software packages from Red Hat Network, a remote repository, or from the local file system.
- ❖ Create, delete, and modify local user accounts, passwords, group membership, super user access.
- ❖ Create and use file access control lists, restore default file contexts, perform basic container management such as running, starting, stopping, and listing running containers.

MAPPING OF COs & POs:

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

UNIT I:
Getting started with red hat enterprise linux: what is linux?, Describe and define open source, Linux distributions, and Red Hat Enterprise Linux. introduction to the bash shell, Log into a Linux system and run simple commands using the shell. Managing files from the command line: Linux file system, Copy, move, create, delete, and organize files while working from the bash shell, Hard Links and Soft Links.

UNIT II:
Get help in Red Hat Enterprise Linux: Resolve problems by using local help systems. Create, view, and edit text files. Manage local users and groups: Create, manage, and delete local users and groups, as well as administer local password policies Control access to files: Set Linux file system permissions on files and interpret the security effects of different permission settings. Monitor and manage Linux processes: Evaluate and control processes running on a Red Hat Enterprise Linux system.

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UNIT III:

Control services and daemons: Control and monitor network services and system daemons using systemd. Manage networking: Configure network interfaces and settings on Red Hat Enterprise Linux servers. Archive and transfer files: Archive and copy files from one system to another. Install and update software: Download, install, update, and manage software packages from Red Hat and yum package repositories.

UNIT IV:

Access Linux files systems: Access, inspect, and use existing file systems on storage attached to a Linux server, Run commands more efficiently by using advanced features of the bash shell, shell scripts, and various utilities provided by Red Hat Enterprise Linux. Schedule future tasks: Schedule commands to run in the future, either one time or on a repeating schedule.

UNIT V:

Tune system performance: Improve system performance by setting tuning parameters and adjusting scheduling priority of processes. Maintain basic storage: Create and manage storage devices, partitions, file systems, and swap spaces from the command line. Manage logical volumes: Create and manage logical volumes containing file systems and swap spaces from the command line.

UNIT VI:

Control the boot process: Manage the boot process to control services offered and to troubleshoot and repair problems. Manage network security: Control network connections to services using the system firewall and SELinux rules. Install Red Hat Enterprise Linux: Install Red Hat Enterprise Linux on servers and virtual machines.

TEXT BOOKS:
1. Red Hat Enterprise Linux 8.0 RH124 RED HAT SYSTEM ADMINISTRATION I Edition 1
2. Red Hat Enterprise Linux 8.0 RH134 RED HAT SYSTEM ADMINISTRATION II Edition 1

REFERENCES:
1. Red Hat Certified Engineer Study Guide Ansible Automation for the Red Hat Enterprise Linux 8 Exam.
2. Linux RHCSA Fast Track Study Guide EX200 Exam.
3. Red Hat RHCE 8 (EX294) Cert Guide (Certification Guide) 1st Edition.
4. The Linux System Administrator's Guide Version 0.9

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IV B.Tech. I-Sem (CSE)

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(A3225207) AUGMENTED REALITY AND VIRTUAL REALITY
(Open Elective-IV)
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES
- ❖ To make students know the basic concept and framework of virtual reality.
- ❖ To teach students the principles and multidisciplinary features of virtual reality.
- ❖ To teach students the technology for multimodal user interaction and perception in VR, in particular the visual, audial and haptic interface and behavior.
- ❖ To teach students the technology for managing large scale VR environment in real time.
- ❖ To provide students with an introduction to the VR system framework and development tools.

COURSE OUTCOMES:
On completion of the course, student will be able to:
- ❖ Design and implement the VR system.
- ❖ Implement the Augmented Reality software.
- ❖ Analyze and design the framework in VR using various software development tools in VR.
- ❖ Recognize the technologies used to manage the large scale VR environment in real time.
- ❖ Describe the principles and features of AR.
- ❖ Recognize the technologies used to manage the large scale AR environment in real time.

MAPPING OF COs & POs:

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

UNIT-I INTRODUCTION OF VIRTUAL REALITY
Fundamental Concept and Components of Virtual Reality- Primary Features and Present Development on Virtual Reality - VR systems - VR as a discipline-Basic features of VR systems-Architecture of VR systems-VR hardware -VR input hardware: tracking systems, motion capture systems, data gloves-VR output hardware: visual displays.

UNIT-II I/O INTERFACE AND TECHNIQUES IN VR
Multiple Modals of Input and Output Interface in Virtual Reality: Input --Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output -- Visual / Auditory / Haptic Devices, Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp.

UNIT-III VISUAL COMPUTATION IN VIRTUAL REALITY
Fundamentals of Computer Graphics-Software and Hardware Technology on Stereoscopic Display-Advanced Techniques in CG: Management of LargeScale Environments & Real Time Rendering -Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard: Vega, MultiGen, Virtoolsetc

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(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

UNIT-IV   APPLICATION OF VR IN DIGITAL ENTERTAINMENT

VR Technology in Film & TV Production, VR Technology in Physical Exercises and Games, Demonstration of Digital Entertainment by VR,3D user interfaces - Why 3D user interfaces, Major user tasks in VE, Interaction techniques for selection, manipulation and navigation, 3DUI evaluation.

UNIT-V   INTRODUCTION OF AUGMENTED REALITY

System Structure of Augmented Reality-Key Technology in AR-- AR software development - AR software, Camera parameters and camera calibration, Marker-based augmented reality,Pattern recognition, AR Toolkit

UNIT-VI   TOOLS AND APPLICATIONS OF AUGMENTED REALITY

Tools available for Augmented Reality and Recognition – Software Tools – Google Poly – Unity – software approaches – recognition types – native software solutions – ARKit – ARCore – software development kit - Cloud services - AR business applications – weather prediction – market prediction – smart cities - AR application for Education - AR application for Healthcare sector – Agriculture – Civil Engineering – Architecture – Archaeology – Crime and Security – Games – IoT - – Use cases – Social Media – Gaming – Education – Healthcare – Shopping and Business.

TEXT / REFERENCE BOOKS

1. Sherman, William R. and Alan B. Craig. Understanding Virtual Reality – Interface, Application, and Design, Morgan Kaufmann, 2002.
2. Fei GAO. Design and Development of Virtual Reality Application System, Tsinghua Press, March 2012.
3. Guangran LIU. Virtual Reality Technology, Tsinghua Press, Jan. 2011.
4. Burdea, G. C. and P. Coffet. Virtual Reality Technology, 2nd Edition. Wiley-IEEE Press, 2003/2006.

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IV B.Tech. I-Sem (CSE)

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(A0553207) MULTIMEDIA AND APPLICATION DEVELOPMENT
(Open Elective-IV)

COURSE OBJECTIVES:
- ❖ The skills have to be acquired across a range of careers in multimedia including games development, web application development, multimedia application development, computer based training, e-Learning application development, interactive multimedia development, software development, software analysis, project management.

COURSE OUTCOMES:
The student will be able to:
- ❖ Understand the fundamental concepts of multimedia.
- ❖ Identify the basic multimedia content types.
- ❖ Write the basic programs in Action Script 2.0
- ❖ Explain data compression algorithms.
- ❖ Learn action script programming skills.
- ❖ Understand different concepts in Digitization.

MAPPING OF COs & POs:

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

UNIT-I   FUNDAMENTAL CONCEPTS IN TEXT AND IMAGE
Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color Models in images.

UNIT-II   FUNDAMENTAL CONCEPTS IN VIDEO AND DIGITAL AUDIO
Types of video signals, analog video, digitization of sound, quantization and transmission of audio.

UNIT-III   ACTION SCRIPT I
Action Script Features, Object-Oriented Action Script, Data types and Type Checking, Action Script Classes: Defining classes, Constructor functions, Properties, Methods, Constructors, Completing Box Class.

UNIT-IV   ACTION SCRIPT II
Inheritance, Interfaces, Packages, Exceptions.

UNIT-V   APPLICATION DEVELOPMENT
An OOP Application Frame work, Using Components with Action Script 2.0.

UNIT-VI   FUNDAMENTALS OF MULTIMEDIA DATA COMPRESSION
Lossless compression algorithm: Introduction, Basics of Information Theory, Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Introduction, Distortion Measures, The rate distortion Theory, Quantization.

TEXT BOOKS:
1) Fundamentals of Multimedia by Ze-Nian Li and Mark S. First Edition, Drew PHI/Pearson   Education, 2003.
2) Essentials Action Script 2.0, Colin Moock, 2nd Edition, SPD O, REILLY, 2004.

REFERENCE BOOKS:
1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
2. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
3. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
4. Multimedia Basics by Weixel Thomson.
5. Multimedia Technology and Applications, David Hilman ,Galgotia

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IV B.Tech. I-Sem (CSE)

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(A0547207) BLOCK CHAIN TECHNOLOGY
(Skill Development Course)

COURSE OBJECTIVES
- ❖ Understand fundamentals of Blockchain Technology.
- ❖ To learn the concept of mining and forking.
- ❖ To be familiar with Blockchain security.
- ❖ To be familiar with Consensus Algorithm
- ❖ To learn about Dapps.
- ❖ Design, build, and deploy smart contracts and distributed applications.

COURSE OUTCOMES:
At the end of this course students will be able to…
- ❖ Explore the working of Blockchain technology.
- ❖ Describe the Mining and Forking.
- ❖ Illustrate the concepts of Blockchain security.
- ❖ Understand and explain consensus Algorithms
- ❖ Apply the learning of solidity and de-centralized apps on Ethereum (Apply)
- ❖ Understand and analyse the working of Hyperledger (Analyze).

MAPPING OF COs & POs:

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

UNIT-I   INTRODUCTION TO BLOCKCHAIN
Introduction to Blockchain: Blockchain, Digital Ledger Technology (DLT), Peer-to-Peer (P2P) Network, Centralized, Decentralized and Distributed Networks, Types of Blockchain-Public Blockchain, Private Blockchain, How blockchain dependent cryptocurrencies work, History of Bitcoin , Bitcoin Cryptocurrencies- Double-Spending, Double Spending problem and its avoidance in Blockchain.

UNIT-II   BLOCKCHAIN MINING AND FORKING
Permission, Permission less, Forking – Soft forking, Hard Forking, Cryptographic changes in forking, Merkle Tree, Bitcoin Mining, Mining Incentives Strategies.

UNIT-III   BLOCKCHAIN SECURITY
Cryptographic Hash Functions – Cryptographic Nonce, Transactions, Asymmetric Key Cryptography, Address and Address Derivation – Private Key Storage, Ledgers, Blocks, Chaining Blocks, Zero Knowledge System, Attacks – 51% attack, Sybill attack.

UNIT-IV   CONSENSUS ALGORITHM
Proof of Work Consensus Algorithm, Proof of Stake Consensus Algorithm, Round Robin Consensus Algorithm, Proof of Authority/Proof of Identity Consensus Algorithm, Proof of Elapsed Time Consensus Algorithm.

UNIT-V   DECENTRALIZED APPLICATIONS (DAPPS)
Decentralized Application Types – Ethereum Platform – Transactions in Ethereum – Ether wallet, Ether Accounts, Ether Gas, Gas Price, Gas Limit, Ether Tokens – ERC20 ethereum stands for Tokens, Mining in Ethereum and Awards.

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UNIT-VI   HYPERLEDGER

Hyperledger fabric components, Hyperledger Fabric Architecture, Hyperledger Fabric and Smart Contract – Solidity Language ,Chain Code design and Go Language.

REFERENCES

1. Arvind Narayanan,"Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction", Princeton University Press,July 19, 2016.
2. Don and Alex Tapscott, "Blockchain Revolution". Portfolio Penguin 2016.
3. William Mougayar, "Business Blockchain Promise, Practice and Application of the Next Internet Technology, John Wiley & Sons 2016.
4. Draft version of "S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, 'Blockchain Technology: Cryptocurrency and Applications', Oxford University Press, 2019.
5. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology

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(A0021204) MANAGEMENT SCIENCE
(Humanities and Social Sciences)
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ To know the concept of management administration and organization structure.
- ❖ To know the personnel management and human resource management concept.
- ❖ To understand present effective production techniques.
- ❖ To know the marketing concept and functions.
- ❖ To know the rules for network diagram,PERT and CPM,project crashing.
- ❖ To know the concept of women entrepreneurship.

COURSE OUTCOMES:
- ❖ Students are able to know importance of management   in different areas.
- ❖ Students are able to know what type of structures is using the present organization.
- ❖ Students are able to know how to design the plant layout and plant location.
- ❖ Students are able to know the importance of human resource department in organization.
- ❖ Students are able to know how to complete the project within the time by crashing the activities.
- ❖ Students are able to understand the importance of women playing a vital role in entrepreneurship.

CO-PO & PSO Mapping

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

UNIT-I
INTRODUCTION TO MANAGEMENT: Concepts of Management and organization-nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

UNIT-II
DESIGNING ORGANIZATIONAL STRUCTURES: Basic concepts related to Organisation - Departmentation and Decentralisation, Types of mechanistic and organic structures of organisation (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure) and their merits, demerits and suitability.

UNIT-III
OPERATIONS MANAGEMENT: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), materials management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores

Records-supply chain management, Marketing: functions of marketing, marketing mix, marketing strategies based on product life cycle, channels of distribution.

UNIT-IV
HUMAN RESOURCES MANAGEMENT (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs.PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

UNIT-V
PROJECT MANAGEMENT (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (simple problems)

UNIT-VI
WOMEN ENTREPRENEURSHIP: Scope of Entrepreneurship among women- promotional efforts in supporting women entrepreneurs in India-opportunities for women entrepreneurs – challenges or problems of women entrepreneurs-successful cases of women entrepreneurs.

TEXT BOOKS:
1) Aryasri: Management Science, TMH, 2004.
2) Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.

REFERENCES:
1) Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2005.
2) Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
3) Thomas N.Duening & John M.Ivancevich Management-Principles and Guidelines, Biztantra, 2003.
4) Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5) Memoria & S.V.Gauker, Personnel Management, Himalaya, 25/e, 2005

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(A0015203) UNIVERSAL HUMAN VALUES
(Mandatory Learning Course)
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- ❖ This course is developed to design a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- ❖ The main objective of this course is to help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
- ❖ To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

COURSE OUTCOMES:
- ❖ To create a holistic perspective based on self-exploration
- ❖ The students are able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.
- ❖ The students are able to see that they can enlist their desires and the desires are not vague.
- ❖ To strengthen the self-reflection.
- ❖ To develop the commitment and courage to act.
- ❖ The students become aware of their activities of 'I' and start finding their focus of attention at different moments. Also they are able to see that most of their desires are coming from outside (through preconditioning or sensation) and are not based on their natural acceptance.

MAPPING OF COs & POs:

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

UNIT 1:
Course Introduction - Need, Basic Guidelines, Content and Process for Value Education
Purpose and motivation for the course, recapitulation from Universal Human Values-I, Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facility- the basic requirements forfulfilment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfil the above human aspirations

UNIT II:
Understanding Harmony in the Human Being - Harmony in Myself!
Understanding human being as a co-existence of the sentient 'I' and the material'Body', Understanding the needs of Self ('I') and 'Body' - happiness and physical facility,

Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Health; correctappraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Health (Practice Exercises and Case Studies will be taken up in Practice Sessions)

UNIT III:
Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship (Part-I)
Understanding Harmony in the family–the basic unit of human interaction , Understanding values in human-human relationship; meaning of Justice (*Nyaya)* (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness (*Ubhay-tripti)*; Trust *(Vishwas)* and Respect *(Samman)* as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence.

UNIT IV:
Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship (Part-I)
Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals (Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals), Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha), Practice Exercises and Case Studies will be taken up in Practice Sessions

UNIT V:
Understanding Harmony in the Nature and Existence - Whole existence as Coexistence
Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence *(Sah-astitva)* of mutually interacting units in all- pervasive space, Holistic perception of harmony at all levels of existence, Practice Exercises and Case Studies will be taken up in Practice Sessions

UNIT VI:
Implications of the above Holistic Understanding of Harmony on Professional Ethics
Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order
b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations

TEXT BOOK
1. R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-

93- 87034-47-1

2. R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

REFERENCE BOOKS

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
2. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"
5. E. F Schumacher. "Small is Beautiful"
6. Slow is Beautiful –Cecile Andrews
7. J C Kumarappa "Economy of Permanence"
8. Pandit Sunderlal "Bharat Mein Angreji Raj"
9. Dharampal, "Rediscovering India"
10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland(English)
13. Gandhi - Romain Rolland (English)

In addition, the following reference books may be found useful for supplementary reading in connection with different parts of the course:

1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
2. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Publishers.
3. Sussan George, 1976, *How the Other Half Dies,* Penguin Press. Reprinted 1986, 1991
4. Ivan Illich, 1974, *Energy & Equity, T*he Trinity Press, Worcester, and HarperCollins, USA
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, limits to Growth, Club of Rome's Report, Universe Books.
6. Subhas Palekar, 2000, *How to practice Natural Farming,* Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
7. A Nagraj, 1998, *Jeevan Vidya ek Parichay,* Divya Path Sansthan, Amarkantak.
8. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
9. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.

Relevant websites, movies and documentaries

1. Story of Stuff, http://www.storyofstuff.com
2. Al Gore, An Inconvenient Truth, Paramount Classics, USA
3. Charlie Chaplin, Modern Times, United Artists, USA
4. IIT Delhi, Modern Technology – the Untold Story
5. Gandhi A., Right Here Right Now, Cyclewala Productions

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IV B.Tech, I-Sem (CSE)

L	T	C
0	0	1

(A0094207) COMPREHENSIVE VIVA-VOCE

There shall be comprehensive Viva-Voce examination at the end of 7th semester. Comprehensive Viva Examination shall be conducted by the committee consisting of senior faculty (based on the recommendation of HOD), an external Examiner from other institutions and HOD and evaluated for 50 marks.

COURSE OUTCOMES:
Comprehensive Viva-Voce enables a successful student to
- ❖ Demonstrate knowledge in the program domain.
- ❖ Present his views cogently and precisely.
- ❖ Exhibit professional etiquette suitable for career progression.

MAPPING WITH COs & POs:

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

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L	T	C
0	0	3

(A0095207) INDUSTRIAL / RESEARCH INTERNSHIP

COURSE OBJECTIVE:
- ❖ To develop competency of applying engineering knowledge to real life problems

COURSE OUTCOMES:
At the end of the project work the students are able to:
- ❖ Formulate prototype/models and/or experimental set-up and/or simulation and other systems capable of meeting the objectives.
- ❖ Identify methods and materials to carry out experiments/develop code
- ❖ Analyse the results to come out with concrete solutions.
- ❖ Write a technical report citing relevant information of the project apart from developing a presentation.

MAPPING OF COs & POs:

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

The student has to undergo research / industry internship in III year, II-Semester break for a period of two months in a reputed organization. The finalization of the summer internship organization will be done by HOD, two senior faculty members of the department and same will be recommended to the Principal for approval. The outcome of the research / industry internship will be evaluated during 7th semester which carries 3 credits. Certificate from the organization has to be submitted to this effect attested by HoD and Internship in charge to the academic section.

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L	T	C
0	0	1

(A0096208) TECHNICAL SEMINAR

COURSE OBJECTIVES:
- ❖ To understand the basic concepts of technical and practical issues of course specialization
- ❖ To import a well-organized report writing skill of technical writing

COURSE OUTCOMES:
At the end of the Seminar the students are able to:
- ❖ Identify and compare technical and practical issues related to the area of course specialization
- ❖ Outline annotated bibliography of research demonstrating scholarly skills
- ❖ Prepare a well-organized report employing elements of technical writing and critical thinking.
- ❖ Demonstrate the ability to describe, interpret and analyze technical issues and develop competence in presenting.

MAPPING OF COs & POs:

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

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L	T	C
0	0	5

(A0097208) INTERNSHIP IN INDUSTRY

COURSE OBJECTIVE:
- ❖ To develop competency of applying engineering knowledge to real life problems

COURSE OUTCOMES:
At the end of the project work the students are able to:
- ❖ Formulate prototype/models and/or experimental set-up and/or simulation and other systems capable of meeting the objectives.
- ❖ Identify methods and materials to carry out experiments/develop code
- ❖ Analyse the results to come out with concrete solutions.
- ❖ Write a technical report citing relevant information of the project apart from developing a presentation.

MAPPING OF COs & POs:

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

The student has to undergo 6 months internship in IV year, II-Semester for a complete period of 06 months in a reputed industry/organization. The finalization of the summer internship industry/organization will be done by HOD, two senior faculty members of the department and same will be recommended to the Principal for approval. The outcome of the industry internship will be evaluated during 8th semester which carries 05 credits. Certificate from the organization has to be submitted to this effect attested by HoD and Internship in charge to the academic section.

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L	T	C
0	0	6

(A0098208) PROJECT WORK

COURSE OBJECTIVE:
- ❖ To develop competency of applying engineering knowledge to real life problems

COURSE OUTCOMES:
At the end of the project work the students are able to:
- ❖ Formulate prototype/models and/or experimental set-up and/or simulation and other systems capable of meeting the objectives.
- ❖ Identify methods and materials to carry out experiments/develop code
- ❖ Analyse the results to come out with concrete solutions.
- ❖ Write a technical report citing relevant information of the project apart from developing a presentation.

MAPPING OF COs & POs:

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

The project topic should be approved by Internal Department Committee (IDC) / Identified by organization where the student is carrying out 6 months internship. Out of total 150 marks for the project work, 50 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The evaluation of project work shall be conducted at the end of the IV year II semester. The external project viva voce examination will be conducted by the committee consisting of an external Examiner from other institute, Head of the Department and the supervisor of the project. The Internal evaluation for 50 marks shall be on the basis of one technical seminars (25 marks) and remaining 25 for main project related activities. The Internal evaluation of the project work for 50 marks shall be conducted by the committee consisting of head of the Department or his nominee, senior faculty member and the supervisor of project.

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ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

S.No	Nature of Malpractices/Improper conduct *If the candidate:*	Punishment
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 the performance in that subject onlyof 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 withthe examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has beenimpersonated, shall be cancelled in all the subjects of the examination (including practicals and projectwork) 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 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 additionalsheet, 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 inthe answer paper or in letters to the	Cancellation of the performance in that subject.

	Examiners or writes to the Examiner requesting him to award pass marks.	
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 meansor misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students 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. The candidates also are debarred and forfeit their seats. 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 student of the college, who is not The candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned inclause 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 do 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 examinationhall.	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

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		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 and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Principal or College Academic committee for furtheraction to award suitable punishment.	