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 & BUSINESS SYSTEMS

Regulations, Course Structure and Detailed Syllabus

RGM-R-2020

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

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI

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

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.		

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 4^{th} semester provided that the student must have acquired a minimum of 8.0 SGPA up to the end of 2^{nd} semester without any backlogs. In case of the declaration of the 3^{rd} semester results after the commencement of the 4^{th} 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).

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 4^{th} 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 2^{nd} semester without any history of backlogs. It is expected that the 3^{rd} semester results may be announced after the commencement of the 4^{th} semester. If a student fails to acquire 8 SGPA up to 3^{rd} 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 7^{th} 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 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

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.

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.

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 j^{th} semester and GPA_j is the Grade Point Average of the j^{th} semester. Both GPA and CGPA will be rounded off to the second digit after decimal and recorded as such.

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

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”.

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).

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 be a center of Excellence in Computer science & Management offering fundamental and advanced knowledge.

MISSION OF THE DEPARTMENT

- To impart knowledge in the state of art in Computer science & Management with relevant theoretical basics.
- To impart Quality education through well designed curriculum in tune with challenging Software needs of the industry.
- To facilitate the development of academic-industry Collaboration.

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.

Program Educational Objectives (PEOs)

PEO-1: To provide fundamental knowledge in Basic Sciences, Computer Sciences and Management Sciences.

PEO-2: To inculcate strong problem solving skills, to design, implement, test and maintain Software Systems.

PEO-3: To impart good ethical practices, right professional conduct and responsible team Leadership.

Program Specific outcomes (PSOs)

PSO-I: Ability to understand client requirements, apply appropriate business models and suggest solutions.

PSO-II: Ability to create innovative Software solutions for business situations and service orientations.

PSO-III: Ability to critique the role of information and analytics in supporting business processes and functions.

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	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY SUBJECT								
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
LABORATORIES								
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	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY SUBJECT								
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								
A0010202	Environmental Science	2	0	0	0	0	0	0
LABORATORIES								
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			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY SUBJECTS								
A0020203	Probability and Statistics	2	1	0	3	30	70	100
A0504203	Python 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
A3401203	Business Environment	2	1	0	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0012203	Design Thinking and Innovations	1	2	0	2	30	70	100
MANDATORY LEARNING COURSE								
A0014203	Indian Heritage & Culture	2	0	0	0	0	0	0
LABORATORIES								
A0571203	Python Programming Lab	0	0	3	1.5	25	50	75
A0595203	Database Management Systems Lab	0	0	3	1.5	25	50	75
A0596203	Unix and Shell Programming 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			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY SUJECTS								
A0406203	Digital Logic Design	2	1	0	3	30	70	100
A3202204	Essential Mathematics for Computational Sciences	2	1	0	3	30	70	100
A0509204	Java Programming	2	1	0	3	30	70	100
A3203204	Advanced Data Structures and Algorithms	2	1	0	3	30	70	100
A0021204	Management Science	2	1	0	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0019203	Aptitude Arithmetic Reasoning and Comprehension	1	2	0	2	30	70	100
LABORATORIES								
A0493203	Digital Logic Design Lab	0	0	3	1.5	25	50	75
A0597204	Java Programming Lab	0	0	3	1.5	25	50	75
A3291204	Advanced Data Structures and 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	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY SUBJECTS								
A3204205	Computer Organization & Operating System	2	1	0	3	30	70	100
A0519205	Full Stack Application Development	2	1	0	3	30	70	100
A0025205	Engineering Economics & Accountancy for Business Systems	2	1	0	3	30	70	100
OPEN ELECTIVE-I/JOB ORIENTED COURSE		2	1	0	3	30	70	100
A3402205	Data Visualization for Business Analysis							
A0520205	R Programming							
A3403205	Conversational Systems							
PROFESSIONAL ELECTIVE - I		2	1	0	3	30	70	100
A3404205	Introduction to Innovation, IP Management and Entrepreneurship							
A0521205	Data Warehousing and Mining							
A0522205	Compiler Design							
SKILL DEVELOPMENT COURSE								
A3209205	Working with Cloud Services	1	2	0	2	30	70	100
MANDATORY LEARNING COURSE								
A0022203	Constitution of India	2	0	0	0	0	0	0
LABORATORIES								
A3491205	Advanced Web Application Development Lab	0	0	3	1.5	25	50	75
A3492205	Data Visualization for Business Analysis Lab	0	0	3	1.5	25	50	75
A0583205	R Programming Lab							
A3405205	Conversational Systems 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	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY SUBJECTS								
A0516205	Computer Networks	2	1	0	3	30	70	100
A3438206	Software Engineering for Business Applications	2	1	0	3	30	70	100
A0536206	Big Data Analytics	2	1	0	3	30	70	100
OPEN ELECTIVE-II/JOB ORIENTED COURSE/MOOCs		2	1	0	3	30	70	100
A0525205	Android Programming							
A0537206	SAP-ABAP and Basic Applications							
A3446206	Software Application Development using DevOps							
PROFESSIONAL ELECTIVE – II		2	1	0	3	30	70	100
A0515205	Artificial Intelligence							
A0535206	Computer Graphics							
A3436206	Marketing Research and Marketing Management							
SKILL DEVELOPMENT COURSE								
A3437206	Business Communication and Value Sciences	1	2	0	2	30	70	100
LABORATORIES								
A3493206	Software Design and Testing Lab	0	0	3	1.5	25	50	75
A0586206	Android Programming Lab	0	0	3	1.5	25	50	75
A0590206	SAP-ABAP Application Development Lab							
A3494206	Software Application Development using DevOps 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-SEM COURSE STRUCTURE

Course Code	Name of the Subject	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
PROFESSIONAL ELECTIVE-III								
A3441207	Business Intelligence	2	1	0	3	30	70	100
A3218207	Decision Support Systems							
A3219207	IT Project Management							
PROFESSIONAL ELECTIVE-IV								
A3442207	Computational Finance and Modeling	2	1	0	3	30	70	100
A3443207	Personnel Management							
A3444207	Business Strategy							
PROFESSIONAL ELECTIVE-V/MOOCs								
A3225207	Augmented Reality and Virtual Reality	2	1	0	3	30	70	100
A3220207	Time Series Data Analysis							
A3210206	Natural Language Processing							
OPEN ELECTIVE-III/JOB ORIENTED ELECTIVE								
A3439207	Blockchain Business Models	2	1	0	3	30	70	100
A3440207	Machine Leaning for Finance							
A3216207	Fundamentals of Quantum Computing							
OPEN ELECTIVE-IV/JOB ORIENTED ELECTIVE								
A3228207	Cyber Security and Cyber Laws	2	1	0	3	30	70	100
A3211206	Deep Learning							
A3226207	Advanced Social, Text and Media Analytics							
SKILL DEVELOPMENT COURSE								
A3227207	Computer Vision with OpenCV	1	2	0	2	30	70	100
HUMANITIES AND SOCIAL SCIENCES								
A3445207	Rural Management and Technologies	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. I-SEM COURSE STRUCTURE

Course 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&BS)

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.
- Analyze 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.

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&BS)

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 behavior of a system at the microscopic level.
- Analyze 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.

UNIT VI: SEMICONDUCTOR PHYSICS & DEVICES

Introduction –Intrinsic and Extrinsic semiconductors–Fermi level (qualitative)– Carrier generation and recombination–Carriertransport: 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" AText book of EngineeringPhysics"- S. Chand Publications, 11thEdition 2019.
2) R. K. Gaur and S.C. Gupta, "Engineering Physics",DhanpatRai Publications, New Delhi.

REFERENCES

1) "Concepts of Modern Physics",ArthusBeiser 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. ChandPublishing,

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I B.Tech, I-Sem (CSE&BS)

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. Analyze 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 goto 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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I B.Tech, I-Sem (CSE&BS)

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 analyze 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 circuits 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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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

I B.Tech, I-Sem (CSE&BS)

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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

I B.Tech, I-Sem (CSE&BS) P 3 C 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.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

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 & BUSINESS SYSTEMS

I B.Tech, I-Sem (CSE&BS) P 3 C 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 by normal 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.
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&BS) P C
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 Heigher 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 & BUSINESS SYSTEMS

I B.Tech, II-Sem (CSE&BS)

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.

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 – 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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I B.Tech, II-Sem (CSE&BS)

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:

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

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 & BUSINESS SYSTEMS

I B.Tech, II-Sem (CSE&BS)

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 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.

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I B.Tech, II-Sem (CSE&BS)

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.

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I B.Tech, II-Sem (CSE&BS)

L	P	C
1	4	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 analyze 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:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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: Analyzing 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.

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

ONLINE SOURCES FOR PRESCRIBED READING TEXTS:

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

ONLINE SOURCES FOR PRESCRIBED LISTENING SKILLS:

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

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I B.Tech, II-Sem (CSE&BS)

L	T	C
2	0	0

(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)

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I B.Tech, II-Sem (CSE&BS) P C
3 1.5

(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

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.

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I B.Tech, II-Sem (CSE&BS) P C

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)
- Analyse the IR and UV-Visible Spectra of some organic compounds (L3)

MAPPING OF COs & POs:

CO	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.

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I B.Tech, II-Sem (CSE&BS) P C
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.

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II B.Tech, I-Sem (CSE&BS)

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 modeling in computer science engineering.
- Analyze statistics and its applications in simulation, data mining and reliability theory.
- Determine the process constructing linear and non-linear curves through the method of least square and understand its usage in binary mixtures.
- Identify the concept of statistical quality control in computer science and mechanical engineering.

MAPPING OF COs & POs:

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

UNIT – I:

Data classification and Representation – Diagrammatic and Graphical representation – Measures of Central Tendency, Dispersion and its importance.

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

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

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

TEXT BOOKS/REFERENCES:

1) Probability and Statistics, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company, 2012.
2) Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers, 2010.
3) Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2017.
4) Statistical methods by S.P.Gupta, S.Chand Publications, 2011.
5) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2017.
6) Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.
7) https://www.barnesandnoble.com/w/advanced-engineering-mathematics-kreyszig/1100520690

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II B.Tech, I-Sem (CSE&BS)

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		1
CO4	3	2	1	1	2				1	1		1	1		1
CO5	3	3	2	1	2	1			1	1		2	1	1	
CO6	3	3	2	1	2	2			1	1		2	1	1	

UNIT – I:
Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation. Overview on 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 file 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/

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech, I-Sem (CSE&BS)

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:

The students should be able to:

- Discuss about the need for Database, applications and its structure.
- Understand about storage and efficient retrieval of large Information, constraints and formal query languages.
- Apply the basic Queries and analyse the concepts primary key, foreign key and triggers on the given data.
- Illustrate the concepts about functional dependency and explain the need for schema refinement (normalization) to remove redundancy of data.
- Define and examine about transaction management concurrency Control on the data.
- Describe about various storage and indexing methods and RAID concepts.

MAPPING OF COs & POs:

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

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.

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, ElmasriNavathe 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 & BUSINESS SYSTEMS

II B.Tech, I-Sem (CSE&BS)

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:

The students should be able to:

- Understand abstract models of information processing machines and limits of digital computation.
- Prepare for the study of programming languages and compilers.
- Design structural description of language statements.
- Develop the skills of formal and abstract reasoning as needed; for example, when designing, analysing, and / or verifying complex software/hardware systems.
- Illustrate analytical and intuitively thinking for problem-solving situations in related areas of theory in computer science.

MAPPING OF COs & POs:

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

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-automata/9788131793510/xhtml/references.xhtml
5) https://www.ics.uci.edu/~goodrich/teach/cs162/notes/

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

II B.Tech, I-Sem (CSE&BS)

L	T	C
2	1	3

(A3401203) BUSINESS ENVIRONMENT
For branches: ECE & CSE&BS

COURSE OBJECTIVES:
- To understand the dynamics of business world and its environment
- To develop an understanding of the economic environment affecting business.
- To learn about the changing dimensions of laws and impact on business.
- To study about the impact of technology and cultural aspects and LPG on Indian industry
- To study the role of the Indian Financial system in business

COURSE OUTCOMES:
The students should be able to:
- Define how to practically visualize the factors relevant to business and economy.
- Identify the significance of the policies which govern the business environment in the country.
- Analyze the impact of changing dimensions of laws on political and legal environment of business
- Explain how LPG has brought drastic transformation in Indian business
- Enumerate the reasons for why the financial system is an important part in operating any business.

MAPPING OF COs & POs:

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

UNIT – I:
Introduction: Dynamics of business & its environment, Concept of business cycle, Significance, India as an emerging and mixed economy, Economic planning in India, NITI Aayog, Overview of GDP & Inflation

UNIT – II:
Economic Environment: Industrial policy in recent years – Fiscal policy – Monetary policy, Economic Reforms in India - Overview of Indian International trade - Bilateral and Multilateral trade agreements – Trade Blocks

UNIT – III:
Political & Legal environment of Business:
Critical elements of political environment – Government & Business – Changing dimensions of laws and impact on business– GST - MRTP & FEMA and Licensing Policy, Competition Act

UNIT – IV:
Technological and Socio-Cultural Environment: Impact of Technology on organizations, Process of Technology adoption and development, Patents, Technology assessment at government level, ISO standards and Bureau of Indian Standards, Cross Cultural environment, Social responsibility with respect to Indian Business.

UNIT – V:

Liberalisation in India: Liberalisation, Privatisation and Globalisation (LPG), EXIM policy and role of EXIM Bank, FDI policy, Role of WTO in promoting world trade –- Agreements reached in the Uruguay round including TRIPS, TRIMS and GATS, Disputes Settlement Mechanism - Dumping and Anti-dumping measures, Special Economic zones, Technology parks, Introduction to World bank & IMF.

UNIT –VI:

Capital Markets : Features and components of Indian Financial system, Objectives, Features and structure of Capital market and Money market, Recent developments - Stock Exchanges, Investor Protection and Role of SEBI, Legal Framework: SICA Act & Consumer Protection Act, 1986, BIFR, NCLT & NCLAT.

TEXT BOOKS:

1) Indian Economy, Dutt and Sundaram, S. Chand, New Delhi, 2009.
2) Essentials of Business Environment, K.Aswathappa, Himalaya, 2008.
3) Business Environment – Text and Cases, Justin Paul, TMH, 2009
4) Business Environment : Text & Cases, Francis Cherunilam, Himalaya Publishing, Latest edition

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech, I-Sem (CSE&BS)

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1	2	2

(A0012203) DESIGN THINKING AND INNOVATIONS

(Skill Development Course)

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

COURSE OBJECTIVES:

- To create awareness of design thinking among students of engineering
- To teach a systematic approach to identifying and defining a problem before brainstorming for a solution
- To instil a sense of significance towards applying creativity to product and service design
- To motivate students to apply design thinking while implementing a project focusing on local or global societal problems

COURSE OUTCOMES: After completion of this course, the student will be able to

- Identify design principles from an engineering perspective
- Cultivate sensitivity towards design aspects of Activities, Environments, Interactions, Objects, and Users (A-E-I-O-U) in daily life.
- Validate problem statements through user empathisation with societal and environmental consciousness
- Devise visual design and documentation to communicate more effectively
- Develop project management skills in a multidisciplinary environment

STUDENTS' RESPONSIBILITIES:

1. Forming diverse teams of 3–5 members each to work collaboratively throughout the semester.
2. Proactively engaging to observe the objects and interactions in their daily life and society from a design perspective.
3. Identifying general societal and social problems that may be effectively addressed using design thinking principles
4. Presenting and reporting the tasks to the concerned faculty members using their creative communication and people skills.

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	
CO2				1		2	1				1		2		1
CO3		1	1			2	1				1		1		2
CO4						1				1			1		1

UNIT – I

Introduction, *what is design thinking*, the traditional model of innovation, The model of design thinking, Design thinking is not old, Design thinking is to innovation, The sweet spot of design thinking.

Why design thinking now?: Products & Services, Multifaceted problems, fast becoming B2C, wide spread digitization, Customer knowledgeable, Clash of business models, Challenging markets.

UNIT – II

Key tenets of Design thinking, Human centric, Focus on subject not object, Problem solving with the customer not for the customer, Thinking beyond products, Striking balance, Think

Broad, Solution Generation, validation, root causes, What else, visualize your thinking, Fail often.
Inspire: Create a stretch, Get the design brief right, Adopt the power of metaphors, Widen the aperture, Bring on diversity, The learning personas, the organizing personas, the building personas,.

UNIT - III
Empathize and Define: The traditional market research is broken, Create new channels to listen to customers, Be the customer you wish to serve, Leverage technology, Get to the customers, Do not limit empathy to customers, Engineering empathy, Mind mapping, Stake holder map, Customer journey map, Empathy map, Picking problem worth solving, Framing problem sharply, Innovating in absence of customer.

UNIT - IV
Ideate: Ideas are like Lego blocks, Hybrid brain storming, Intersection of disciplines, Imitate with grace, Braking the pattern, Challenging assumptions, Value chain, Looking beyond current users, Designing for extreme, Analogous design, Triggering ideation.
Prototype and Test: The high cost of just doing it, seeking clarity, Be quick and dirty, Manageable hypotheses, Doing last experiment first, Visualize through storyboarding and scenarios, Engaging through stories, Is dogfooding enough?, Solicit feedback, Inventory prototypes.

UNIT - V
Scale: Keep the main thing as the main thing, cut some slack, Leaders must show up, Provide 'air cover', cultivate innovation evangelists, Measure for impact, Don't confuse empathy with good business sense.
Design Thinking in action: A two day Design thinking workshop, session objectives, Ground rules, workshop flow, mentoring programme, Build your own version of design thinking programme, offer avenues to practice design thinking, think beyond, Juggad, pay attention to the physical space, trust the process

UNIT - VI
How to be a Design Thinker Live curious, Listen with intent, observe with purpose, Defer your judgement, Hone multiple affiliations, Be a T-shaped person, develop failure tolerance.
Case studies of Design thinking like Chota Cool, Indian post box, Big Bazar, Reliance, royal Enfield etc. (Any other case studies may also be considered).

TEXT BOOKS:
1) Pavan Soni, Design your thinking, Penguin Random house India, 2020.
2) Vijay Kumar, "101 Design Methods: A Structured Approach for Driving Innovation in Your Organization", John Wiley & Sons (2012) (ISBN: 978-1118083468)
3) Jeanne Liedtka and Tim Ogilvie , Designing for Growth: A Design Thinking Tool Kit for Managers, Columbia Business School Publishing, E-ISBN 978-0-231-52796-5
4) B. K. Chakravarthy, Janaki Krishnamoorthi, Innovation By Design: Lessons from Post Box Design & Development, Springer India, 2013
5) Donald A. Norman, "The Design of Everyday Things", MIT Press, 2013 (ISBN: 978-0262525671)
6) Tom Kelly, Jonathan Littman, "The Art of Innovation", HarperCollins Business, 2002 (ISBN: 978-0007102938)

REFERENCE BOOKS:

1) Kishore Biyani, It happened in India: The story of Pantaloons, Big Bazar, Central and the Great Indian Consumer, Rupa Publications, New Delhi, 2007.
2) V. Kasturi Rangan and Mona Sinha, Hindustan Unilever's "Pureit" water purifier, a Harvard Business School case Study, 1 February 2011.
3) Kelley and Littman, The Ten Faces of Innovation: IDEO's Strategies for Beating the Devil's Advocate and Driving Creativity Throughout Your Organization
4) Ravi Arora, Igniting Innovation: The Tata Way, Harper Business, New Delhi, 2019.
5) Ashton, How to fly a Horse: The Secret History of Creation, Invention, and Discovery.
6) Kelley, The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm.
7) Rishika T. Krishnan, From Juggad to Systematic innovation: the challenge for India, The Utpreraka Foundation, 2010.
8) Eric Schmidt and Jonathan Rosenberg, How Google Works, Grand Central Publising, New York, 2014.

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

II B.Tech, I-Sem (CSE&BS)

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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

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	2			1		
CO3						2	1	1						1	
CO4						2	1		1						1

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.

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.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech. I-Sem (CSE&BS) P C

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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
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 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 & BUSINESS SYSTEMS

II B.Tech. I-Sem (CSE & BS) P C
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	1				1							1	1		
CO2	1											1	1	2	2
CO3	1	1	1	1								1	1	3	
CO4	2	1	1	1	1							1	1		1
CO5	1	1	1	1	1							1	1	1	1
CO6	2	1	1	1	1							1	1	1	1

RECOMMENDED SYSTEMS/SOFTWARE REQUIREMENTS:
- Intel based desktop PC
- Mysql /Oracle latest version Recommended.

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.
11) Illustrate how you can embed PL/SQL in a high-level host language such as C/Java, and demonstrates how a banking debit transaction might be done.

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.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech. I-Sem (CSE&BS) P C

3 1.5

(A0596203) UNIX AND SHELL PROGRAMMING LAB

For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:

Students are expected to know most aspects of UNIX commands that are needed by a program developer or UNIX user, and some system administration. Although it is not required for this course, students are encouraged to install Linux on their personal computers.

COURSE OUTCOMES:

The student will be able to:

- Discuss the development of UNIX system over time.
- Use line and screen text editors with regular expressions.
- Explain UNIX file system including advanced file processing.
- Practice pipelining and IO redirecting.
- Explain process concepts and cooperating processes.
- Manage UNIX base networks.

MAPPING OF COS & POS:

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

Week 1:

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

Week 2:

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

Week 3:

a) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.

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

Week 4:

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

Week 5:

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

Week 6:

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

Week 7:

Session 1

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

Session 2:

a) Write a shell program to perform the following operations insertion , deletion , searching and sorting on arrays.
b) Write a shell program to reverse the rows and columns of a matrix.

Week 8:

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

i. File type
ii. Number of links
iii. Time of last access (Note: Use stat/fstat system calls)

Week 9:
Write C programs that simulate the following unix commands: **mv, cp, ls**, (Use system calls)

Week 10:
(a) Write a C program to emulate the Unix ls –l command.
(b) Write a C program that demonstrates redirection of standard output to a file. Ex: ls > f1.
(c) Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.

Week 11:
(a) Write a shell program to demonstrate "at" command.
(b) Write a shell program to demonstrate "batch" command.

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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech, II-Sem (CSE&BS) | 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: The student should be able to:
- Differentiate between analog and digital representations.
- 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.
- 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.
- 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.
- 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		
CO2	1	1											1		1
CO3	1	1		1	1								1		1
CO4	2	2	2	1	1							1	1	1	
CO5	2	2	2	2	1							1	1	1	
CO6	2	1	1	1								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 HDL,VHDL 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

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech, II-Sem (CSE&BS)

L	T	C
2	1	3

(A3202204) ESSENTIAL MATHEMATICS FOR COMPUTATIONAL SCIENCES
For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- To understand fundamental concepts of Computational Science
- To demonstrate the proficiency on topics of linear algebra
- To learn optimization techniques for Computational Science
- To create & validate regression models & least square estimators

COURSE OBJECTIVES: After completion of the course the student will be able to:
- Understand the fundamental concepts of statistics that have numerous applications in data science.
- Apply the concept of linear algebra(Algebraic &Geometric View) in data science
- Analyse various optimization techniques for data optimization
- Determine the process simple linear regression and multi linear regression in the process of data optimization
- Identify the concepts of statistical quality control in data science and and computer science engineering.

MAPPING OF COs & POs:

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

UNIT-I:
Concepts of Linear Algebra: Matrices for Data Science – Data Representation with Example, Identification of independent Attributes, Rank, Linear relationships among attributes – Null space for Data Science, Data Matrix – Rank Nullity Theorem, Solving Linear equations – An Optimization perspective.

UNIT-II:
Vector Spaces and Eigen Value problems: Vectors, Vector Addition and Multiplication by a Scalar, Vector Spaces, Dot Product, Orthogonality, Linear Transformation, Eigen Values & Singular Value Decomposition. Dimensionality Reduction – Principle Component Analysis.

UNIT-III:
Linear Programming: Introduction of Linear Programming, Formation of Linear Programming problems. The Graphical Method, Simplex Method, Dual Simplex Method

UNIT-IV:
Optimization techniques: Unconstrained Optimizations, Constrained Multivariate optimization, Gradient and Descent methods, Multivariate Optimization.

UNIT-V:
Simple Linear Regression: Simple Linear Regression Model, Estimate Regression Coefficient, Problems, Statistical Properties of Least Square Estimators, Estimation of $\sigma 2$, Confidence Intervals and Test for $\beta 0$ & $\beta 1$, ANNOVA, Coefficient of Determination.

UNIT-VI:
Multiple Linear Regression: Estimation of Model Parameters, Properties of Least Square

Estimators, Test for Significance of Regression, Problems, Selecting the best Regression Model, Model Adequacy Checking.

TEXT BOOKS:

1) S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, 11th Edition, Sultan Chand & Sons.
2) S.P.Gupta, Statistical Methods, 33rd Edition, Sultan Chand & Sons.
3) Er. Prem Kumar Gupta, Dr. D. S. Hira, Operations Research, S. Chand Publications.

REFERENCE BOOKS:

1) S.P.Gupta, Statistical Methods, 33rd Edition, Sultan Chand & Sons.
2) Miller and John E Freund, Probability and Statistics for Engineers, 5th Edition.
3) Kanti Swarup, P.K.gupta and others, Operations Research, Sultan Chand & Sons.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech, II-Sem (CSE&BS)

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: After completion of the course the student should able to:
- Write programs using classes and objects for various client problems.
- Discover relationships among classes needed for a specific problem for understanding the inheritance, polymorphism and interfaces.
- Build directories and to develop programs that manage input/output streams.
- Understand various string handling function and error handling techniques.
- Understand to write multitasking programs by synchronization 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	3	1	1		2							1	3	1	1
CO2	2	2	2	1	1							1	1	1	
CO3	1	1	2	1	2							1	2	1	1
CO4	1	1											1	1	
CO5	1	1											1	1	
CO6	2	2	2	1	2							1	2	1	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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech, II-Sem (CSE&BS)

L	T	C
2	1	3

(A3203204) ADVANCED DATA STRUCTURES AND ALGORITHMS
For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:
The objectives of this course is students need to
- Learn asymptotic notations, and analyze the performance of different algorithms.
- Understand and implement linear and non-linear data structures.
- Give orientation on Linear Data Structures in Python
- Learn and implement greedy, divide and conquer, dynamic programming and backtracking algorithms using relevant data structures.
- Understand about non-deterministic algorithms, polynomial and non-polynomial problems.

COURSE OUTCOMES:
After completion of the course the student should able to:
- Learn and analyze the complexity of algorithms, able to apply asymptotic notations for any task.
- Apply linear data structure and non-linear data structure operations, hash table structure and hash functions.
- Understand and apply greedy, divide and conquer, and dynamic programming algorithms.
- Understand and apply back tracking algorithms, non-deterministic algorithms, polynomial and non-polynomial problems.

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					1	3	1	
CO2	1	2	2	1	1	1						1	1	2	1
CO3	1	2	2	1	1	1						1	1	2	1
CO4	1	2	2	1	1	1						1	1	2	1

UNIT I
Introduction to Algorithms: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh, Omega, Theta notation and Little oh notation, Polynomial Vs. Exponential Algorithms, Average, Best and Worst Case Complexities, Analyzing Recursive Programs.

UNIT-II
Linear Data Structures: Data Structure- Definition and Classification, Stack: Stack Operations and Applications, Queues: Operations of Queues, Circular Queues, Priority Queue, Deques, Applications of Queues, Linked Lists: Singly Linked Lists, Circularly Linked Lists, Doubly Linked Lists.

UNIT III
Non-Linear Data Structures: Trees and Binary Trees: Representation of Trees, Representation of Binary Trees, Binary Tree Traversals, BST -Searching, Insertion and Deletion, Graphs - Representations of Graphs, Graph Traversals.

Hash Tables:
Dictionaries, Hash Table Structure, Hash functions.
String Matching, Pattern Matching.

UNIT-IV

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

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

UNIT V

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

UNIT VI

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

Introduction to NP-Hard and NP-Complete problems: Basic Concepts, Non Deterministic algorithms.

TEXT BOOKS:

1) Data Structures and algorithms: Concepts, Techniques and Applications, G A V Pai
2) Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.

REFERENCE BOOKS:

1) Classic Data Structures by D. Samanta, 2005, PHI
2) Design and Analysis of Computer Algorithms by Aho, Hopcraft, Ullman 1998, PEA.
3) Introduction to the Design and Analysis of Algorithms by Goodman, Hedetniemi, TMG.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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II B.Tech, II-Sem (CSE&BS)

L	T	C
2	1	3

(A0021204) MANAGEMENT SCIENCE
For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- To understand the concept of management and approaches of a management.
- To understand the different types of organization structures.
- To understand the importance of Plant Location & Layout techniques, Quality Control, Work-study and Management of marketing strategies
- To study HRM by integrating Recruitment, Selection, Training & Development.
- To Study evaluation of PERT/CPM, Estimate Time/Costs & resource.
- To understand challenges faced by Women as an Entrepreneur.

COURSE OUT COMES: After completion of the course the student should able to:
- Apply the concepts & principles of management in real life industry.
- Design & develop organization chart & structure for an enterprise.
- Apply Work-study principles in real life industry and able to maintain Materials departments.
- Understand the concepts of HRM in various functions of organization.
- Develop PERT/CPM Charts for projects of an enterprise and estimate time & cost of project.
- Elevate the methods to resolve the issues and challenges of Women.

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	2		
CO2		1	2	1	1	1			1	2	1	1	1	1	1
CO3		1	2	1	1				1	2	2	1	1	1	2
CO4					1			1	1	1	2	1	1	1	1
CO5		1	2	1	1				2	2	2	1	1	2	1
CO6				1		1		2				1			

UNIT 1

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 Organization - Departmentation and Decentralization, Types of mechanistic and organic structures of organization (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organization, Cellular Organization, team structure, boundary less 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.
2) Stoner, Freeman, Gilbert, Management, Pearson Education.

REFERENCES:

1) Kotler Philip & Keller Kevin Lane: Marketing Management, PHI.
2) Koontz & Weihrich: Essentials of Management, MH.
3) Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra.
4) Kanishka Bedi, Production and Operations Management, Oxford University Press.
5) Memoria & S.V.Gauker, Personnel Management, Himalaya.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech, II-Sem (CSE&BS)

L	T	C
1	2	2

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

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.
- Analyze 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	PSO1	PSO2	PSO3
CO1		1										1	2		
CO2		1	1	1								1	1	1	1
CO3	1	1	1	1								1			
CO4	1	1		1								1	1	1	1
CO5	1	1	2	1	1							1	1	1	1

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

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

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

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

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

UNIT VI
Reasoning (Distribution+ Binary Logic + Puzzles) Cubes, Venn Diagrams Analytical Puzzles (Linear + Circular +Selections + Sequencing + Routes & Networks + Comparisons) and Octal number system.

REFERENCES:

1) R.S. Agarwal. Quantitative Techniques. S. Chand Series, 2017.
2) Shankuntala Devi. Techniques of Reasoning. S. Chand Series, 2016.
3) https://www.fresherslive.com/online-test/verbal-ability-test/questions-and-answers
4) https://www.fresherslive.com/online-questions/verbal-ability-test/arithmetic-reasoning

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

II B.Tech. II-Sem (CSE & BS) P C
3 1.5

(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:
- 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.
- 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.
- 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	1	1	1	1								1	1		
CO2	1	1	1	1	1							1	1		
CO3	1	1	1	1	1							1	1	1	
CO4	2	2	2	1	1							1	1	1	1

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 & BS) P 3 C 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

COURE OUTCOMES: After Completion of the Lab Course student should be able:
- Write programs using classes and objects.
- Develop the polymorphic behaviour of objects.
- Design software using object oriented approach.
- Implement the programs handling built in exceptions and creating custom Exceptions.
- Develop the Mutli thread programming.

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	3	1	1
CO2	2	2	2	1	1							1	1	1	
CO3	1	1	2	1	2							1	2	1	1
CO4	1	1											1	1	
CO5	1	1											1	1	

Level 1:
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 find both the largest and smallest number in a list of integers.
5. Write a Java program to multiply two given matrices
6. Write a Java program to implement all arithmetic operations with class methods for each operation. User must provide values from Keyboard.
7. Write a Java program to implement parameter passing techniques:
   a) call-by-value b) call-by-reference
8. Write a Java program to sort a list of names in ascending order.
9. Write a Java program that checks whether a given string is a palindrome or not.
   Ex: MADAM is a palindrome
10. Write a Java program that reads a file name from the user, 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.
11. 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

Level: 2
1. Write a Java program to find the volume of a box by creating objects.
2. Write a Java program to implement the following:
   a) Overloading methods b) overloading constructorsc) recursion

3. Write a Java program to implement multi-level inheritance and also demonstrate super keyword.
4. Write a Java program to demonstrate method overriding by implementing dynamic method dispatch?
5. 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.
6. Write a Java program to implement multiple-inheritance?
7. 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.
8. Write a Java program to handle multiple exceptions and also use finally?
9. Write a Java program to handle user-defined exceptions?
10. 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)
11. Write a Java program that correctly implements producer consumer problem using the concept of inter-thread communication
12. Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)
13. Write a Java program to retrieve the information from the given URL? (**Note:** Read the URL from Command Line Arguments).
14. Write a java program to create a sample TCP chat application where client and server can chat with each other?

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 & BUSINESS SYSTEMS

II B.Tech. II-Sem (CSE & BS) P C

3 1.5

(A3291204) ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVE:

The objectives of this course is students need to;

- Learn to create python applications using linear and non-linear data structures.
- Develop python applications for different operations of data structures by optimizing the performance.
- Learn to develop applications for greedy, divide and conquer, dynamic programming and backtracking algorithms using relevant data structures.

COURSE OUTCOMES:

After Completion of the Lab Course student should be able;

- Learn and analyze the complexity of algorithms, able to apply asymptotic notations.
- Apply linear data structure and non-linear data structure operations, hash table structure and hash functions.
- Understand and apply greedy, divide and conquer, and dynamic programming algorithms.
- Understand and apply back tracking algorithms, non-deterministic algorithms, polynomial and non-polynomial problems.

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					1	3	1	
CO2	1	2	2	1	1	1						1	1	2	1
CO3	1	2	2	1	1	1						1	1	2	1
CO4	1	2	2	1	1	1						1	1	2	1

Level - 1

1. Write a python program to find Maximum and Minimum of the given set of integer values.
2. Write a python program to perform Binary Search for a given set of integer values recursively and non- recursively.
3. Write the python programs to perform following for the given list of integer values.
   a) Quick Sort b) Merge Sort
4. Write a python program to implement stack and queue using list and dequeue.
5. Write a python program that convert the given expression from Infix to prefix.
6. Write a python program to evaluate the given Postfix expression.

Level - 2

7. Write a python program that implement the operations on Circular Queue
8. Write a python program to implement the following Priority Queue.
9. Write python program to implement Doubly Linked List.
10. Write a python program to implement the following operations on Binary Tree
    a) Insert b) Delete c) Search d) Display
11. Write a python program to implement the following operations on Binary Search Tree
    a) Insert b) Delete c) Search d) Display
12. Write a python program to find solution for knapsack problem using greedy method.
13. Write a python program to find minimum cost spanning tree using following Algorithms.
    a) Prim's algorithm b) Kruskal's algorithm

14. Write python programs to find Single source shortest path problem for a given graph.
15. Write a python program to find solution for job sequencing with deadlines problem.
16. Write a python program to find solution for 0-1 knapsack problem using dynamic programming.
17. Write a python program to solve Sum of subsets problem for a given set of distinct numbers.

TEXT BOOKS:

1) Data Structures and algorithms: Concepts, Techniques and Applications, G A V Pai
2) Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.

REFERENCE BOOKS:

1) Y Daniel Liang, “Introduction to Programming using Python”, Pearson.
2) Benjamin Baka, David Julian, “Python Data Structures and Algorithms”, Packt Publishers,2017.
3) Rance D. Necaise, “Data Structures and Algorithms using Python”, Wiley Student Edition.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

III B.Tech, I-Sem (CSE&BS)

L	T	C
2	1	3

(A3204205) COMPUTER ORGANIZATION & OPERATING SYSTEM
For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- Conceptualize the basics of organizational and architectural issues of a digital computer and Classify and compute the performance of machines & to help students in understanding various memory devices
- Summarize the Instruction execution stages, how to design the pipeline for uniprocessor and multiprocessor systems & concepts associated with distributed, grid and cluster computing.
- Identify the role of Operating System & describe the various features of processes, including scheduling, creation, and termination.
- Understanding CPU Scheduling, Synchronization, Deadlock Handling and Comparing CPU Scheduling Algorithms. Solve Deadlock Detection Problem
- Describe the role of paging, segmentation and virtual memory in operating systems.
- Defining Device Management Policies and Secondary Storage Structure and Evaluation of various Disk Scheduling Algorithms.

COURSE OUTCOMES:
- Understand the theory and architecture of the central processing unit & analyse some of the design issues in terms of speed, technology, cost, and performance.
- Design a simple CPU by applying the theory concepts & Learn the concepts of parallel processing, pipelining, and interprocessor communication.
- Analyze the architecture and functionality of the central processing unit.
- Interpret the different services provided by the operating system at different levels.
- Apply the different process scheduling algorithms and synchronization techniques to avoid deadlock.
- Design paging, segmentation, and demand paging for an effective memory management

MAPPING OF COs & POs

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

UNIT-I

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

Introduction to Operating Systems- what operating systems do, process management, memory management, protection and security, distributed systems, special purpose systems.

UNIT-II:

Input/Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels and Processors.

The Memory System: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Size speed and cost, Cache Memories, Performance Considerations, Virtual Memories, Memory management requirements, secondary Storage

UNIT-III

Pipeline and vector processing: Parallel processing, Arithmetic pipeline, Instruction Pipeline, RISC Pipeline, Vector processing, Array Processors.

Multi Processors: Characteristics of Multiprocessors, Interconnection structures, Inter-processor arbitration, Inter-processor communication and Synchronization, cache coherence.

UNIT-IV

Process concepts - overview, process scheduling, operations on process, inter-process communication.

Process scheduling – basic concepts, scheduling criteria, process scheduling algorithms, algorithm evaluation.

UNIT-V

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-VI

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

TEXT BOOKS:

1. Computer Systems Architecture – M. Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
3. Operating System Concepts - Abreham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, John Wiley.
4. Computer Organization and Architecture - William Stallings 8th Edition, Pearson

REFERENCE BOOKS:

1. Structured Computer Organization - Andrew S. Tanenbaum, 4th Edition, PHI
2. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.

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III B.Tech. I-Sem (CSE&BS)

L	T	C
2	1	3

(A0519205) FULL STACK APPLICATION DEVELOPMENT
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	PSO1	PSO2	PSO3
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, XMLHttp 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, Mongo DB 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

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

III B.Tech. I-Sem (CSE&BS)

L	T	C
2	1	3

(A0025205) ENGINEERING ECONOMICS & ACCOUNTANCY FOR BUSINESS SYSTEMS

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 Break even.
- Students will able to know the types of business organizations and economy of the country.
- 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	PSO 1	PSO 2	PSO 3
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 and 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.

Pricing Strategies: 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 Load Pricing - Cross Subsidization.

UNIT IV

Management Information System: MIS Introduction - MIS Characteristics Advantages and Limitations of MIS – MIS Linkages With Other Inter Disciplines-Accounting - Human Resource And Marketing.

UNIT V

Capital Budgeting- The Investment Decision: Investment Decision Process – Project

Generation, Project Evaluation, Project Selection and Project Implementation - Capital Budgeting Methods - Traditional (PBP& ARR) and Modern - DCF Methods-(NPV)

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 A N, “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”
5. Aryasri, “Managerial Economics and Financial Accounting”
6. IM Panday “Financial Management”

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(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

III B.Tech. I-Sem (CSE&BS)

L	T	C
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(A3402205) DATA VISUALIZATION FOR BUSINESS ANALYSIS
(Open Elective-I)

COURSE OBJECTIVES
- To use the basics of data visualization concepts for exploratory data analysis.
- To Present data with visual representations for your target audience.
- To compare different visualization tools for various applications.
- To illustrate multiple versions of digital visualizations using various software packages.
- To work with different plotting libraries and get to know their strengths and weaknesses.

COURSE OUTCOMES:
After completion of this course the student would be able to:
- Design of data visualization plots and know their best use cases.
- Conduct statistical data analysis using data visualization tools.
- Illustrate the visualization plots with different layouts.
- Describe the density estimate plots for visualizing the univariate and multi-variated data distributions.
- Project the map data with advanced data visualization tools for effective presentation in data analysis tasks.

MAPPING OF COs & POs:

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

UNIT-I:
Introduction: Basics of Data Visualization, Data Visualization Techniques, Basic and Specialized Data Visualization Tools
Exploring the Libraries: Data Visualization with Matplotlib, Seaborn; NumPy and Pandas (Textbook2)

UNIT-II:
Statistics with NumPy and Pandas : Basic NumPy Operations-Indexing, Slicing, Splitting, Iterating, , Using NumPy to Compute statistics- Mean, Median, Variance, and Standard Deviation, Advanced NumPy Operations: Filtering, Sorting, Combining (vstack), Reshaping; Pandas: Advantages of pandas over NumPy, Basic Operations of Pandas, Using Pandas to Compute Statistics, Advanced Operations of Pandas. (Chapter 1 of Textbook1)

UNIT-III:
Visualization Plots Using Matplotlib: Pyplot Basics, Creating Figures, Basic Text and Legend Functions,
Stacked Area Chart, Histogram, Box Plot, Scatter Plot, Layout and Subplots.
Basic Image Operations: Plot Images with Matplotlib, Loading Image, Saving Image, Plotting Single and Multiple Images in a Grid (Chapter 3 of Textbook1)

UNIT-IV
Simplifying Visualizations Using Seaborn: Introduction, Advantages of Seaborn,Controlling

Figure Aesthetics, Contexts, Color Palettes, Categorical Color Palettes, Sequential Color Palettes

Interesting plots in Seaborn: Bar Plots, Kernel Density Estimation (univariate distribution) and Plotting Multi-Variate Distribution, Visualizing Pairwise Relationships (Chapter 4 of Textbook1)

UNIT-V:

Plotting Geospatial Data: Introduction to Geoplotlib, Design Principles of Geoplotlib, Geospatial Visualizations, Plotting Geospatial Data on a Map

UNIT-VI:

Web-Based Visualizations: Concepts of Bokeh, Interfaces-Plotting and Model Interfaces, Output, Bokeh Server, Presentation, Integrating – HTML Document and Bokeh Applications (Chapter 6 of Textbook 1)

TEXT BOOKS:

1. Mario Dobler, Tim Grobmann, “Data Visualization with Python”, O’Reilly, First Edition, 2019
2. Samuel Burns, “Python Data Visualization: An Easy Introduction to Data Visualization in Python with Matplotlip, Pandas, and Seaborn”, Kindle Edition, 2019

REFERENCE BOOKS:

1. Kristen Sosulski, “Data Visualization Made Simple”, Taylor & Francis, 2019
2. Robert Collins, “Data Visualization: Introduction to Data Visualization with Phyton, R and Tableau”, Kindle Edition, 2018
3. Robert Grant, “Data Visualization-Charts, Maps, and Interactive Graphs”, CRC Press, 2019

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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 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 purpose of R language and working with its tool
- learns about R objects, their data operations and descriptive statistical functions
- learns funtions to apply data distribution and hypothesis testing
- learns functions for applying data using graphs and complex statistics like anova
- learns functions to apply summarizing data and regression modelling
- learn to export graphs and writing the scripts

MAPPING OF COs & POs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
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
CO5	2	2	2	2								1	1	1	1
CO6	1				2							2	1	1	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.

LEARN TO WRITE R SCRIPTS:

BEGINNING TO R PROGRAM: Creating Simple Functions- One-Line Functions, Using Default Values in Functions, Simple customized Functions with multiple lines, Storing customized Functions; Making Source Code- displaying the Results of customized Functions and Scripts, Displaying Messages as Part of Script Output; Copy and Paste Scripts.

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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(A3403205) CONVERSATIONAL SYSTEMS
(Open Elective-I)
For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- To enable attendees to acquire knowledge on chatbots and its terminologies
- To work with ML Concepts and different algorithms to build custom ML Model
- To better understand on Conversational experiences and provide better customer experiences

COURSE OUTCOMES:
After completion of the course, the student should be able to
- Review, critically analyse and understand conversational systems.
- Synthesize conversational systems and natural language processing
- Apply appropriate methodologies for developing and evaluating conversational systems
- Carry out testing of an implemented conversational system
- Explain the purpose of virtual assistant agents effect on the development, deployment, and evaluation of conversational Systems

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	2
CO2	1	2	2	2		1							1		
CO3	2	1	1	2	2	1		1					2		
CO4	1	2	1	1	2	1		1						1	
CO5	1	2	1	1	2	1							1	1	1

UNIT-I
Introduction to Dialogue Systems: What is a Dialogue System?, A Brief History of Dialogue Systems- Text-Based and Spoken Dialogue Systems, Voice User Interfaces, Chatbots, Embodied Conversational Agents, Robots and Situated Agents, Limitations of Early Dialogue Systems; Present-Day Dialogue Systems- Dialogue Systems on Messaging Platforms, Dialogue Systems on Smartphones, Dialogue Systems on Smart Speakers and Other Devices, Dialogue Systems in Cars, How Current Dialogue Systems Are Different; Modeling Conversation in Dialogue Systems, Designing and Developing Dialogue Systems.

UNIT-II
Introduction to VUI: A Brief History of VUIs, Conversational User Interfaces, What Is a VUI Designer?
Voice-Enabled Devices: Devices- home assistants, watches/bands/earbuds, other devices; Cars and Autonomous Vehicles.
Basic Voice User Interface Design Principles: Designing for Mobile Devices Versus IVR Systems, Conversational Design, Setting User Expectations, Design Tools, Confirmations, Command-and-Control Versus Conversational, Conversational Markers, Error Handling, Don't Blame the User, Novice and Expert Users, Keeping Track of Context, Help and Other Universals, Latency, Disambiguation, Design Documentation, Accessibility.

UNIT-III
Speech Recognition Technology: Choosing an Engine, Barge-In, N-Best Lists, The Challenges of Speech Recognition, Data Privacy.

Advanced Voice User Interface Design: Branching Based on Voice Input, Disambiguation, Handling Negation, Capturing Intent and Objects, Dialog Management, Don't Leave Your User Hanging, Should the VUI Display What It Recognized?, Sentiment Analysis and Emotion Detection, Text-to-Speech Versus Recorded Speech, Speaker Verification, "Wake" Words, Context, Advanced Multimodal, Bootstrapping Datasets, Advanced NLU.

UNIT-IV

Rule-Based Dialogue Systems: A Typical Dialogue Systems Architecture - Automatic Speech Recognition (ASR), Natural Language Understanding (NLU), Dialogue Management, Natural Language Generation (NLG), Text-to-Speech Synthesis (TTS); Designing a Dialogue System, Tools for Developing Dialogue Systems- Visual Design Tools, Scripting Tools for Handcrafting Dialogue Systems, Advanced Toolkits and Frameworks, Research-Based Toolkits, Best Toolkits.

UNIT-V

Statistical Data-Driven Dialogue Systems: Motivating the Statistical Data-Driven Approach, Dialogue Components in the Statistical Data-Driven Approach - Natural Language Understanding, Dialogue Management, Natural Language Generation; Reinforcement Learning (RL) - Representing Dialogue as a Markov Decision Process, From MDPs to POMDPs, Dialogue State Tracking, Dialogue Policy, Problems and Issues with Reinforcement Learning and POMDPs.

UNIT-VI

End-to-End Neural Dialogue Systems: Neural Network Approaches to Dialogue Modeling, A Neural Conversational Model, Introduction to the Technology of Neural Dialogue- Word Embeddings, Recurrent Neural Networks (RNNs), Long Short-Term Memory Units, The Encoder-Decoder Network; Retrieval-Based Response Generation, Task-Oriented Neural Dialogue Systems.

Challenges and Future Directions: Multimodality in Dialogue, Visual Dialogue and Visually Grounded Language, Data Efficiency: Training Dialogue Systems with Sparse Data, Knowledge Graphs for Dialogue Systems, Dialogue with Social Robots, Dialogue and the Internet of Things, Social and Ethical Issues.

TEXT BOOKS:

1. Michael McTear, "Conversational AI: Dialogue Systems, Conversational Agents, and Chatbots", Second Edition, Moran and Claypool Publishers, 2020.
2. Cathy Pearl, "Designing Voice User Interfaces: Principles of Conversational Experiences", O'REILLY, 2016.

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(A3404205) INTRODUCTION TO INNOVATION, IP MANAGEMENT AND ENTREPRENEURSHIP
(Professional Elective-I)

COURSE OBJECTIVES:
- The students would be able to learn the basic concepts of Entrepreneurship with relevance to Innovation and IP
- To study the entire innovation process with respect to both technological and non-technological innovations and their applicability
- To know how IPR plays a significant role in sustainability of business
- To develop an awareness of Government support for innovation and entrepreneurship

COURSE OUTCOMES:
- The students would be able to start their own ventures by learning about the feasibility with the support of society
- To develop and create new concepts with relevance to feasibility practically with respect to the society
- To apply for the IPR protection based on the product novelty
- To optimally utilise the digital media services support provided by the government

MAPPING OF COs & POs:

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

UNIT I
Introduction to Entrepreneurship & Intellectual Property: Basic concepts & Definitions of Innovation, Entrepreneurship, Intrapreneurship & IP, Relationship of IP and Entrepreneurship, Types of Entrepreneurship.

UNIT II
Innovation & Entrepreneurship: Nature, characteristics and types of innovation, Innovative entrepreneurship, Agents of innovation, Strategies for Innovation, Difference Between Innovation and Invention, Open Innovation model, Role of innovation for sustainability.

UNIT III
Technological Innovation management: Introduction to Technological Innovation Management, Individual, Corporate and National perspective on Technological management, Challenges in Technological management, Technology Transfer and Commercialization Metrics, Innovation Management Techniques (IMTs).

UNIT IV
IPR & Entrepreneurship: Significance of Patent, Trademark, Copyright, Industrial design in business, Geographical Indication, Details of the IPR process and relation to Entrepreneurship.

UNIT VI
IP strategy & entrepreneurship: IP strategy for start-up and MSME, IP transaction – Introduction, IP valuation, bank loan, insurance, Success story and business model of a few start-ups.

UNIT VI

Entrepreneurship & IP - Government Initiatives: Incubators, Research parks, Various Government policies, Establishment of Centre of Excellence in Intellectual Property, Creation of IPR Awareness through Digital Media, Patent Analysis and Management System (PAMS).

REFERENCES;

1. Elias G. Carayannis Elpida, T. Samara Yannis, L. Bakouros, "Innovation and Entrepreneurship Theory" Policy and Practice, Springer Publications
2. Ramakrishna .B and Anil Kumar H.S, "Fundamentals of Intellectual Property Rights", Notion Press,1st Edition, 2017
3. Khanka.S.S, "Entreptreneurial Development", S.Chand Publications
4. S.Anil Kumar, S.C.Poornima, Mini.K.Abhraham, K.jayashree, "Entrepreneurship Development", New Age International Publishers, 1st Edition, June,2021

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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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III B.Tech. I-Sem (CSE&BS)

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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	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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

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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(A3209205) WORKING WITH CLOUD SERVICES
(Skill Development Course)
For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- Explain the importance and benefits of Cloud computing and the need for its rapid adoption
- Explain roadmap for transformation from classic to cloud environment
- Identify and differentiate various infrastructure components of classic and virtualized data center
- Explain virtualization requirements and available tools at each layer of IT infrastructure
- Explain business continuity options in a virtualized environment
- Discuss effective cloud computing deployment model for businesses/IT organizations

COURSE OUTCOMES:
- Identify the global infrastructure components of AWS/Azure/GCP
- Describe security and compliance measures
- Create the Virtual Private Cloud (Amazon VPC) using various cloud services
- Demonstrate when to use Amazon Elastic Compute Cloud (EC2), and AWS Lambda, Amazon S3
- Explore key concepts to Elastic Load Balancing (ELB), and Auto Scaling

MAPPING OF COs & POs:

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

UNIT 1:
Introduction:
Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Biocomputing, Mobile Computing, Quantum Computing, Optical Computing, Nanocomputing, Network Computing.
Cloud Deployment Models: Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.
Cloud Service Models: Infrastructure as a Service, Platform as a Service, Software as a Service, Other Cloud Service Models.

UNIT 2:
AWS global infrastructure overview: AWS global infrastructure map, regions and availability zones, AWS data centres, data replication , communication, AWS infrastructure features: elasticity and scalability, fault tolerance, high availability, **AWS foundational services:** compute-virtual, automatic scaling, and load balancing; networking; storage-object, block, and archive
Management and Governance service category: AWS management console, AWS config.

UNIT 3:
AWS Compute service category: Amazon EC2, Amazon EC2 auto scaling, Amazon elastic container service- Amazon ECS, Amazon EC2 container registry, AWS elastic beanstalk, AWS lambda, Amazon elastic Kubernetes service, AWS Fargate, Compute services overview,

Amazon EC2, Amazon EC2 optimization, Container services, Introduction to AWS Lambda, Introduction to AWS Elastic Beanstalk

UNIT 4:

AWS Storage service category: Amazon simple storage service – Amazon S3, Amazon elastic block storage-Amazon EBS, Amazon elastic file system- Amazon EFS, Amazon simple storage service glacier, 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 RDS DB instances, Amazon RDS in a virtual private cloud, When to use Amazon RDS, Amazon RDS: Storage, Amazon RDS : Deployment and data transfer, Amazon DynamoDB, Amazon Redshift, Amazon Aurora

UNIT 5:

Microsoft Azure: Introduction to Azure core concepts and Services, Azure platform Services, Azure storage Services, Setting up a workspace, Microsoft Azure fundamental concepts and architectural components, Microsoft Azure Database, Analytics, & Compute Services: Azure Cosmos DB, Azure, SQL Database, Azure SQL Managed Instance, Azure Database for MySQL, and Azure, Database for PostgreSQL

UNIT 6:

Google Cloud Platform: Introduction to Google Cloud Platform (GCP) Services, Virtual Machines in the GC, Designing for Technical Requirements: High Availability, Scalability, Designing Compute Systems: Compute Services and Use Cases, Compute System Provisioning, Additional Design Issues, Designing Storage Systems: Overview of Storage Services, Object Storage with Google Cloud Storage, Network-Attached Storage with Google Cloud Filestore, Databases, Data Retention and Lifecycle Management, Networking and Latency.

REFERENCES:

1. Mark Wilkins , Learning Amazon Web Services (AWS): A Hands-On Guide to the Fundamentals of AWS Cloud, Addison-Wesley, First Edition, 2019
2. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 201
3. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
4. https://www.awsacademy.com
5. Official Google Professional Cloud Architect Study Guide by Dan Sullivan, Sybex, 1st edition.

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(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

III B.Tech. I-Sem (CSE&BS)

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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 Panchayathi 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	PSO 1	PSO 2	PSO 3
CO1		2	1							3			1	1	
CO2	1							3			2		2	3	1
CO3		1							2		1		2	1	
CO4				1			2						1		
CO5	2		1		3									1	2
CO6						1				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.

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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3 1.5

(A3491205) ADVANCED WEB APPLICATION DEVELOPMENT LAB

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:

- A working computer system with either Windows or Linux
- A web browser either IE or firefox
- Tomcat web server and Apache web server
- A database either Mysql or Oracle and Mongodb.
- 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

List of Experiments:

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.
5. 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.
6. Write a HTML to display a home page that shows an effective background and navigation bar. Use HTML and CSS.
7. Write a javascript to perform data validation for registration form.
8. Write javascript to perform data validation for login form.
9. Write a Node.js program that displays "Hello World!" In browser.
10. Write a Node.js that creates a module that returns current date and time.
11. Create a Node.js file that reads the HTML file, and return the content.
12. Create a Node.js file that writes an HTML form, with an upload field.
13. Write an XML that stores customer information of a super market and validate it using DTD.
14. Write an XML that stores student information. Retrieve the student's data and display it using DOM.
15. Write a servlet that reads parameters from the request.
16. Write a JSP for that creates and retrieves data from a cookie.

17. Write a JSP that shares data between pages using session.
18. Write a Servlet/JSP that retrieves data from database and displays it as a response.
19. Create database in Mongodb and perform read and write operations.
20. 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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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

III B.Tech. I-Sem (CSE&BS) P C

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(A3492205) DATA VISUALIZATION FOR BUSINESS ANALYSIS LAB

(Open Elective-I)

COURSE OBJECTIVES:

- To use the basics of data visualization concepts for exploratory data analysis
- To Present data with visual representations for your target audience
- To compare different visualization tools for various applications;
- To illustrate multiple versions of digital visualizations using various software packages
- To work with different plotting libraries and get to know their strengths and weaknesses

COURSE OUTCOMES:

- Apply the statistical functions for real-time data analysis
- Implement the visualization techniques using the matplotlib library
- Analyze the univariate and multi-variate data distributions for the density estimations
- Understand the basic operations of numpy and pandas for data design operations
- Create the color palettes using the library Seaborn in python
- Visualize the geo and spatial data patterns for the research study

MAPPING OF COs & POs:

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

List of Experiments:

1) Write python programs to implement indexing, slicing and splitting a list.
2) Write python programs to implement statistical functions like Mean, Median, Variance, and Standard Deviation using numpy.
3) Write python programs to implement Filtering, Sorting, Combining (vstack), Reshaping operations using numpy.
4) Write python programs to compute statistics using pandas.
5) Write python programs to Create Figures using Basic Text and Legend Functions, Stacked Area Chart, Histogram, Box Plot, Scatter Plot, Layout and Subplots using matplotlib.
6) Write python programs to create Controlling Figure Aesthetics, Contexts, Color Palettes, Categorical Color Palettes, Sequential Color Palettes using Seaborn.
7) Write python programs to implement Bar Plots, Kernel Density Estimation (univariate distribution) and Plotting Multi-Variate Distribution, Visualizing Pairwise Relationships using seaborn.
8) Write python program to plot Geospatial Data on a Map using Geoplotlib.
9) Write python program to implement web-based visualizations.

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III B.Tech. I-Sem (CSE&BS) P C

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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
3. 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. I-Sem (CSE&BS) P 3 C 1.5

(A3405205) CONVERSATIONAL SYSTEMS LAB

(Open Elective-I)

COURSE OBJECTIVES:

- To introduce basic concepts of NLP libraries
- To enable attendees to acquire knowledge on chatbots and its terminologies
- To work with ML Concepts and different algorithms to build custom ML Model
- To better understand on Conversational experiences and provide better customer experiences related to real time

COURSE OUTCOMES:

After completion of the course, the student should be able to

- Understand and apply various libraries required for building conversational system
- Implement a conversational system using appropriate software and tools
- Apply appropriate methodologies for testing conversational systems
- Build real time case studies for conversational systems

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	2
CO2	1	2	2	2		1							1		
CO3	2	1	1	2	2	1		1					2		
CO4	1	2	1	1	2	1		1						1	
CO5	1	2	1	1	2	1							1	1	1
CO6	1	2	1	2		1								1	2

Week 1 & 2:

Programs on NODE BASICS in python

Week 3 &4:

NLP using Python - Make use of any of the NLP libraries like NLTK, spaCy, StanfordNLP

Week 5 & 6:

Case study to build a Text Chat Bot

Week 7 & 8:

Case study to build a Voice Chat Bot

Week 9 & 10:

Case study to build a learning Chat Bot

Week 11 & 12:

Case study to build virtual assistant

Week 13 & 14:

Case Study to build a ML Model using LSTM/any RNN and integrate with chatbot

TEXT BOOKS:

1. Designing Voice User Interfaces: Principles of Conversational Experiences 1st
2. Edition by Cathy Pearl, O'Reilly
3. Bot Business 101: How to start, run & grow your Bot / AI business By Ekim Kaya
4. Designing Bots: Creating Conversational Experiences By Amir Shevat O'Reilly
5. Conversational Interfaces: Principles of Successful Bots, Chatbots & Messaging Apps By Mariya Yao
6. Designing Conversational Interfaces By Alper Çuğun

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III B.Tech. II-Sem (CSE&BS)

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

MAPPING OF COs & POs:

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

UNIT 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 & BUSINESS SYSTEMS

III B.Tech. II-Sem (CSE&BS)

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(A3438206) SOFTWARE ENGINEERING FOR BUSINESS APPLICATIONS

COURSE OBJECTIVES:

- Knowledge of basic SW engineering methods and practices, and their appropriate application & Describe software engineering layered technology and Process frame work.
- A general understanding of software process models such as the waterfall and evolutionary models, incremental models, agile models
- Understanding of software requirements and the SRS documents
- Understanding of different software architectural styles, design patterns, design interface analysis, interface design and evaluation steps
- Understand the concepts of agile team structure & Scrum concepts
- Understanding the testing strategies & quality control and how to ensure good quality software.

COURSE OUTCOMES:

- Understanding of the analysis and design of complex systems & Ability to apply software engineering principles and techniques.
- Develop, maintain and evaluate large-scale software systems for producing efficient, reliable, robust and cost-effective software solutions.
- Ability to work as an effective member or leader of software engineering teams.
- Manage time, processes and resources effectively by prioritising competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.
- Acquire strong fundamental knowledge in science, mathematics, fundamentals of computer science, software engineering and multidisciplinary engineering to begin in practice as a software engineer.
- Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.

MAPPING OF COs & POs:

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

Agile Development: What Is Agility?, Agility and the Cost of Change, What Is an Agile Process?,
Extreme Programming (XP), Other Agile Process Models.
Agile Development Roles: New Roles, Changed Roles.

UNIT III
Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

UNIT IV
Project Planning: Process planning, Effort Estimation, Project scheduling & staffing, SCM Plan, Risk Management, Project monitoring plan
Design Engineering: Design process and Design quality, Design concepts, the design model. Creating an architectural design: Software architecture, Data design, Architectural styles and patterns.
Performing User interface design: Golden rules.

UNIT-V
Agile Development Team Structure: Leading a Self-Organizing team, Sprints, Planning, Quality.
Scaling Scrum: Scaling the Product Owner, Working with a Large Product Backlog, Proactively Manage Dependencies, Coordinate Work among Teams, Scaling the Sprint Planning Meeting, Cultivate Communities of Practice, Scrum Does Scale.

UNIT-VI
Coding Practices: Programming principles & Guidelines, Coding Process, Verification, Metrics
Testing Strategies: Testing Fundamentals, Black box testing, White box testing, Testing Process, Defect Analysis & Prevention,

TEXT BOOKS:
1) Software Engineering: a practitioner's approach / Roger S. Pressman. — 7th ed., Pressman, Roger S., Published by McGraw-Hill.
2) Succeeding with Agile Software development using Scrum, Mike Cohn, Addison-Wesley Professional, 1st edition.

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III B.Tech. II-Sem (CSE&BS)

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(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 architecture of Hadoop and analyze the storage systems
- Create the HDFS clusters and manage the data in HDFS file system.
- Apply Hadoop MapReduce programming for handling Big Data
- Outline big data analytics with appropriate tools and techniques
- Design the queries using Pig Latin and Hive Scripts for effective big data management
- Analyze the data base tools for big data applications

MAPPING OF COs & POs:

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

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.

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

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III B.Tech. II-Sem (CSE&BS)

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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	P011	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 (AutoCompleteTextView, Spinner, ListView) Adapters (ArrayAdapter, Custom Adapter), Toast.

UNIT-III

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

UNIT-IV

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

UNIT-V

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

UNIT-VI

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

TEXT BOOKS:

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

REFERENCES:

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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

III B.Tech. II-Sem (CSE&BS)

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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:

- Understand and use the basic programming concepts of SAP ABAP.
- Design, develop the code, check, activate and run the programs and database tables using SAP ABAP Workbench tools.
- Understand and use the basic SAP ABAP application concepts to be able to develop the applications.
- After completing the course, participants should able to : Understand the advantage of ERP tools, working with SAP ABAP Workbench Tools, basic programming concepts in ABAP.
- Working with database through ABAP data dictionary, Open SQL and Internal Tables, Understand and develop the basic applications.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1		2	1							3			1	1	
CO2	1							3			2		2	3	1
CO3		1							2		1		2	1	
CO4				1			2						1		
CO5	2		1		3									1	2
CO6						1				2			2	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., DreamTech 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&BS)

L	T	C
2	1	3

(A3446206) SOFTWARE APPLICATION DEVELOPMENT USING DEVOPS

(Open Elective-II)

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
- Analyze 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	PSO 1	PSO 2	PSO 3
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

TEXT BOOKS:

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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III B.Tech. II-Sem (CSE&BS)

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(A0515205) ARTIFICIAL INTELLIGENCE
(Professional Elective-II)
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	PSO 1	PSO 2	PSO 3
CO1	2	2	1	2	1	1					2	1	1	1	2
CO2	2	3	1	2	1	1					2	1	1	1	2
CO3	3	2	2	2	1	1					2	2	1	1	2
CO4	1	2	1	1	1	1					1	1	1	1	1
CO5	2	2	3	1	1	1					1	1	1	1	1
CO6	2	2	2	2	1	1					1	1	1	1	1

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 basesd 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 Symantics 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 Uncertainity, 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, Ensembled 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, Informatioon Retrival, Informatioon 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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III B.Tech. II-Sem (CSE&BS)

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(A0535206) COMPUTER GRAPHICS
(Professional Elective-II)
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 colour 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.

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&BS)

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(A3436206) MARKETING RESEARCH AND MARKETING MANAGEMENT
(Professional Elective-II)

COURSE OBJECTIVES:
- To understand the concepts of marketing management.
- To learn about marketing process for different types of products and services.
- To understand the tools used by marketing managers in decision situations.
- To enhance the students understanding of the marketing research in Industry.
- To develop skills required by the researcher and understand different applications of Marketing Research.
- To explore different approaches of marketing research.

COURSE OUTCOMES:
- Students will understand strong conceptual knowledge in the functional area of marketing management.
- Students will learn relevant functional areas of marketing management and its application.
- Students will demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.
- Student understands the process of marketing research and its different processes
- Students identify sources of information and different research methods
- Students apply selected research methods

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	1				2						
CO2		3	2			2	2		2		2	2			
CO3	2		1	2	1	3		1	3	2			1		
CO4	2			2	2	2	2			3	2	2		1	
CO5	1			1	1			1		1		1		1	
CO6	3	1	1				1		1		2		1		

UNIT: I
Marketing: - Meaning - concept - functions - marketing Planning & implementation marketing Programmes - Marketing environment – Micro and Macro.

UNIT – II
Market Segmentation and consumer behaviour - Influencing factors - Decision process - Marketing Research - Marketing information system.

UNIT – III
Product and Pricing Strategies: Product planning - policies - positioning - New product development - pricing objectives – Setting and modifying the price – Initiating price changes and responding to price changes.

UNIT – IV
Promotion and Physical distribution: Promotion Mix - Advertisement - Message - copy writing - Media strategy -sales promotion - Personal selling and publicity -Physical Distribution and Strategies - Distribution Mix - Managing channel – Role of Intermediaries.

UNIT – V
Basic concepts - Scientific method - Types of Research - Introduction to marketing Research – marketing research as a tool of Management - Relevance of marketing research in the

Indian Context.

UNIT – VI

Data collection and the field force - Attitude measurement - Introduction to sampling – applications of sampling methods of marketing problems - Research report presentations.

REFERENCES:

1. Marketing Management. 12th ed. by Kotler, Philip, and Kevin Lane
2. Handbook of Marketing by Weitz, Barton A., and Robin Wensley.
3. The Handbook of Marketing Research: Uses, Misuses and Future advances by Grover, Rajiv and Marco Vriens
4. Fundamentals in Marketing Research, Authors: Scott Smith and Gerald Albaum.
5. Basic Concepts and Project Design: Books explaining the basic concepts and the essentials of marketing research (e.g. Research designs, methods, data collection process)
6. Defining Measurements: Handbooks with compilation of scales for the measurements of relevant marketing constructs.

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III B.Tech. II-Sem (CSE&BS)

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(A3437206) BUSINESS COMMUNICATION AND VALUE SCIENCE
(Skill Development Course)

COURSE OBJECTIVES:
- To understand the importance of Oral and Written communication and its applications in Business.
- To guide the learner in the quest for becoming an efficient and effective communication.
- To impart the correct practices of the strategies of Effective Business writing.
- To learn career skills like working collaboratively, observing business etiquette and employing ethical tools.

COURSE OUTCOMES:
- The Student applies the knowledge by speaking confidently and communicating effectively in different business situations.
- The student analyses the situation shows professionalism and displays a good Code of conduct at the workplace according to the need.
- The students develop writing skills and Presentation skills in terms of Business Scenario and Acquire Employability Skills.
- The students will Participate in team activities that lead to the development of collaborative work skills

MAPPING OF COs & POs:

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

UNIT-I
Concept of Communication: Significance - Communication Process-Barriers of Communication - Principles of Communication - Channels of Communication - Upward, Downward - Horizontal - Grapevine communication - Formal & Informal Communication.

UNIT - II
Non - Verbal Communication: Principles and strategies of Non-Verbal communication - Gestures - Postures - Kinesics-Proxemics - Oculsics - Haptics - Chronemics - Chromatics - Olfacts - Barriers to Effective Communication and ways to overcome - Business Etiquettes.

UNIT-III
Business Report: Introduction - Business Proposal - Executive Summary - Drafting an Analytical or Investigative Report - Individual or Committee/Sub-committee Report - memos, minutes, notices, circulars - Writing effective Business Reports.

UNIT-IV
Business Correspondence: Components - Types - Structure of a Business Letter -Layouts of a Business Letter - Principles of Business Letter Writing - Importance of Appearance of a Business Letter - Useful Tips for Business Letter Writing.

UNIT- V
Listening & speaking skills: Importance of Listening - Types of Listening - Listening

Theories - Barriers to Listening - Listening situations - Developing Listening Skills. Conducting Presentation - Oral presentation - Debates - Speeches - Group Discussion & Mock Interviews.

UNIT- VI

Diversity and Inclusion of Values Sciences**:** Socio-Cultural and Cross-Cultural Sensitivities at the Workplace - Learning disabilities at the workplace - Caste, class, regionalism, religion and poverty - Global diversity identities of race, religion, nationhood - Values of a good manager - Ethics in Business - Embodying organizational pride with grace.

REFERENCES:

1. Meenakshi Raman, "Business Communication", Oxford University Press, NewDelhi.
2. Philip Sunil Solomon, Word Power Vocabulary builder, Oxford University Press, New Delhi.
3. Sanjay kumar, Pushp latha, communication skills A work book, OUP, NewDelhi.
4. Monipally, M.M. (2013), Business Communication: From Principles to Practice, NewDelhi, McGraw- Hill Education.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

III B.Tech. II-Sem (CSE&BS) P C

3 1.5

(A3493206) SOFTWARE DESIGN AND TESTING LAB

COURSE OBJECTIVES:

Students are able to learn:

- Understand the meaning of UML notations.
- Apply case study of UML designs which is model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.
- 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.

COURSE OUTCOME:

- Analyze and model requirements and develop software using object-oriented analysis and design.
- Able to design a system as per the attributes given in the software requirement document.
- Apply software testing knowledge and engineering methods.
- Design and conduct a software test process for a software testing project.

MAPPING OF COs & POs:

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

SOFTWARE DESIGN EXPERIMENTS:

1. Familiarizing with Rational Rose
2. Introduction to UML and use case diagrams
3. Class Diagram
4. Flow of events and activity diagram
5. Interaction diagrams: sequence and collaboration diagrams
6. State Transition Diagram, Component and deployment diagrams

SOFTWARE TESTING EXPERIMENTS:

1. 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.
2. Write manual test cases for Gmail application.
3. Write manual test cases for ATM application.
4. Write manual test cases for Banking application.
5. Study of Quick Test Professional(QTP)
6. Study of Rational Functional Tester(RFT)
7. Study of SELENIUM

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III B.Tech. II-Sem (CSE&BS) P 3 C 1.5

(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 externalresources
- 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 andhardware features of the phone.
- Practice existing state of mobile app development via researching existing apps, meeting with industryprofessionals, 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	PSO 1	PSO 2	PSO 3
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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(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

III B.Tech. II-Sem (CSE&BS) P C

3 1.5

(A0590206) SAP-ABAP APPLICATION DEVELOPMENT LAB

(Open Elective-II)

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:

- Understand and use the basic programming concepts of SAP ABAP.
- Design, develop the code, check, activate and run the programs and database tables using SAP ABAP Workbench tools.
- Understand and use the basic SAP ABAP application concepts to be able to develop the applications.
- After completing the course, participants should able to : Understand the advantage of ERP tools, working with SAP ABAP Workbench Tools, basic programming concepts in ABAP.
- Working with database through ABAP data dictionary, Open SQL and Internal Tables, Understand and develop the basic applications.

MAPPING OF COS & POS

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1		2	1							3			1	1	
CO2	1							3			2		2	3	1
CO3		1							2		1		2	1	
CO4				1			2						1		
CO5	2		1		3									1	2
CO6						1				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. (1)IF-ENDIF (2) IF-ELSE-IF (3) 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.

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.
2) Create a internal table (ITAB) for KNA1 with five fields, KUNNAR, NAME1, ADRNR, ORTO1, LAND1.Dispaly 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).

WEEK-9

Create a report for MARA table with Four fields, MANTR, MTART, MATKL, MEINS.

1) Display the data in report and download the content to a file.
2) 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

Write a program to create ALV reports by using events.

WEEK-12

Develop a print program.

WEEK-13

Create local and global classes and write programs to show inheritance.

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3 1.5

(A3494206) SOFTWARE APPLICATION DEVELOPMENT USING DEVOPS LAB

(Open Elective-II)

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
- Perform web security and testing the code with appropriate tools

MAPPING OF COs & POs:

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

LIST OF EXPERIMENTS:

1. Introduction and setting up jenkins
2. Jenkins job, parameters, build, post-build actions and pipeline
3. Jenkins plugins
4. Use jenkins as a continuous integration server
5. Configuring jenkins with git plugin
6. Jenkins pipeline to poll the feature branch
7. Using docker
8. Creating a dockerfile
9. Writing playbooks using yaml
10. Deploy a non-trivial application using ansible
11. Working with roles to simplify and reuse playbooks.
12. Making playbooks run faster with ssh multiplexing, pipelining, and parallelism
13. Using ansible to create docker images and deploying docker containers.

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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
- Installation of VMWare to set up the Hadoop open environment and its ecosystems Perform setting up and Installing Hadoop in its following nodes.
- Single node
- Multi node

WEEK-2: MANAGE THE BIG DATA USING LINUX OPERATING SYSTEM
- Implementing the basic commands of LINUX Operating System–File / Directory creation, deletion, update operations.
- Create a directory in HDFS at given path(s).
- List the contents of a directory.
- Upload and download a file in HDFS.
- See contents of a file
- Copy a file from source to destination
- Copy a file from / To Local file system to HDFS
- Move file from source to destination.
- Remove a file or directory in HDFS

WEEK-3: LARGE FILE MANAGEMENT IN HADOOP
Implement the following file management tasks in Hadoop:
- Copy a file from/ To Local file system to HDFS
- Move file from source to destination.
- Remove a file or directory in HDFS.
- Display the aggregate length of a file.

Implement the following file management tasks in Hadoop:

- Adding files and directories
- Retrieving files
- Deleting files
- 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

- Implement a basic word count using the MapReduce Technique
- Implement matrix multiplication with Hadoop MapReduce

WEEK-5: MAPREDUCE PROGRAM FOR REAL TIME DATASET

- Write a Map Reduce program that mines weather data.
- 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

- Installation of PIG.
- Write the Pig Latin scripts for the sort, group, join, project, and filter operations to any sample dataset.

WEEK-7 PIG LATIN MODES, PROGRAMS

- Write the Pig Latin script to find Word Count
- Write the Pig Latin script to find a max temp for each and every year

WEEK-8: HIVE

- Installation of HIVE.
- Write the Hive script to create, alter, and drop databases, tables, views, functions, and indexes of the sample data

WEEK-9: CLUSTERING

- Implementation of K-means clustering using Map Reduce

WEEK-10: ASSOCIATION MINING AND CLASSIFICATION

- To implement the frequent item algorithm by MapReduce using pig.
- Implement and Execute Decision tree algorithm using pig

WEEK-11: BIG DATA ANALYSIS

- Create an application for data analysis using pig and generate graph for output using BigSheets.
- Implement an application that stores big data in Hbase / MongoDB / Pig using Hadoop

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(A3441207) BUSINESS INTELLIGENCE
(Professional Elective-III)
For branches: CSE & CSE&BS

COURSE OBJECTIVES:

Student should able to learn the following

- Provide an overview of the fundamental concepts, principles, and importance of business intelligence in modern organizations.
- Understand the architecture and design of data warehouses and data marts to support BI activities.
- Learn various data modeling techniques and methodologies used in BI, such as dimensional modeling and entity-relationship modeling.
- Explore methods and technologies for extracting, transforming, and loading (ETL) data from various sources into the data warehouse.

COURSE OUTCOMES:

- Demonstrate a comprehensive understanding of fundamental concepts and principles of business intelligence, including data warehousing, data modeling, data integration, and data visualization.
- Apply various data analysis techniques and BI tools to analyze data, generate reports, and present actionable insights to support decision-making processes.
- Develop proficiency in creating effective and visually appealing data visualizations, dashboards, and interactive reports to communicate complex information clearly.
- Apply data mining and predictive analytics techniques to discover patterns, trends, and relationships in data and make data-driven predictions for future events.
- Utilize popular BI tools and technologies effectively to gather, store, process, and visualize data for business purposes.
- Design and implement data warehouses and data marts, considering data modeling principles and data integration requirements.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1		2				2				3			1	
C02		3		2					1						2
CO3		3	2			1				3	2				2
C04	2			3			3						2	1	
C05		1		3					2		3			3	
C06	3				2				1					2	

UNIT-I: VALUE OF BUSINESS INTELLIGENCE & INFORMATION EXPLOITATION BUSINESS INTELLIGENCE & INFORMATION EXPLOITATION

Business Intelligence, The Information Asset, Exploiting Information, Business Intelligence & Program Success, What is Business Intelligence, Actionable Knowledge. VALUE OF BUSINESS INTELLIGENCE: Information Asset & Data Valuation, Return on Investment, Business Intelligence Applications, Intelligence Dash Board, Business Intelligence Adds value.

UNIT-II PLANNING FOR SUCCESS & INTELLIGENCE ENVIRONMENT

PLANNING FOR SUCCESS: Initiating a Program, Business/Information Technology Partnership, Business Intelligence Success Factors, Team Building, Strategic versus Tactical

Planning.

INTELLIGENCE ENVIRONMENT: The Business Case, The Business Intelligence Process, System Infrastructure, Information Access, Delivery, and Analysis, Services, Management Issues, Seek to Learn More.

UNIT-III BUSINESS MODELS AND INFORMATION FLOW & DATA WAREHOUSE

BUSINESS MODELS AND INFORMATION FLOW: The Business Case, Information Processing and Information Flow, The Information Flow Model, Usage in Practice, Modeling Frameworks, Management Issues, Learning More

DATA WAREHOUSE: The Business Case, Data Models, The Data Warehouse, The Data Mart, Online Analytical Processing, Metadata.

UNIT-IV BUSINESS RULES & DATA PROFILING BUSINESS RULES

The Business Case, The Business Rules Approach, What Is a Business Rule, What Is a Business Rule System, Sources of Business Rules DATA PROFILING: The Business Case, Data Profiling Activities, Data Model Inference, Attribute Analysis, Relationship Analysis.

UNIT-V DATA QUALITY AND INFORMATION COMPLIANCE & INTEGRATION

DATA QUALITY AND INFORMATION COMPLIANCE: The Business Case, More Than Just Names and Addresses, Types of Errors, Data Cleansing, Business Rule-Based Information Compliance.

INFORMATION INTEGRATION: The Business Case, ETL: Extract, Transform, Load, Enterprise Application Integration and Web Services, Record Linkage and Consolidation.

UNIT VI VALUE OF PARALLELISM & ALTERNATE INFORMATION CONTEXTS

VALUE OF PARALLELISM: Parallelism and Granularity, Parallel Processing Systems, Dependence, Parallelism and Business Intelligence.

ALTERNATE INFORMATION CONTEXTS: Psychographics and Demographics

Geographic Data, Web Behavior Intelligence.

TEXT BOOKS:

1. Business Intelligence: The Savvy Manager's Guide by DAVID LOSHIN.

REFERENCES:

1. Business Intelligence & Analytics by RAMESH SHARDA, DURSUN DELEN, EFRAIM TURBAN Tenth Edition.

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(A3218207) DECISION SUPPORT SYSTEMS

(Professional Elective-III)
For branches: CSE & CSE&BS

COURSE OBJECTIVES:
Student should able to learn the following

- Introduce students to the concepts, importance, and applications of decision support systems in different industries and decision-making contexts.
- Familiarize students with various types of decision support systems, such as model-driven DSS, data-driven DSS, knowledge-driven DSS, and communication-driven DSS.
- Teach students how to use mathematical, statistical, and optimization models to represent and analyze decision problems.
- Provide an understanding of data collection, storage, retrieval, and processing techniques required to support decision-making processes in DSS.

COURSE OUTCOMES:

- Understand the importance of data management in decision support systems, including data collection, storage, cleansing, and integration.
- Learn how to create decision models, such as mathematical models, simulation models, and optimization models, to support decision-making processes.
- Apply decision analysis techniques, such as cost-benefit analysis and risk analysis, to evaluate and compare different alternatives.
- Gain practical knowledge in designing, developing, and implementing decision support systems to meet specific organizational needs.
- Demonstrate a comprehensive understanding of the fundamental concepts, principles, and components of decision support systems.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01		2	3		1		2		1			2		3	2
C02		3		2		3	1			2			3	1	
CO3	1			1			2			2		1			2
C04		1			2	3	1		2		1		2		1
C05	3			1					1		2		3	1	
C06															

UNIT I MANAGEMENT SUPPORT SYSTEMS:

An Overview Managers and Decision-Making; Managerial Decision-Making and Information Systems; Managers and Computer Support; Computerized Decision Support and the Supporting Technologies; A Framework for Decision Support; The Concept of Decision Support Systems; Group Support Systems; Enterprise Information Systems; Knowledge Management Systems; Expert Systems; Artificial Neural Networks; Advanced Intelligent Decision Support Systems; Hybrid Support Systems

UNIT II DECISION-MAKING SYSTEMS, MODELING, AND SUPPORT DECISION-MAKING:

Introduction and Definitions; Systems; Models; Phases of the Decision- Making Process; Decision-Making: The Intelligence Phase; Decision-Making: The Design Phase; Decision-Making: The Choice Phase; Decision-Making: The Implementation Phase; How Decisions Are Supported; Personality Types, Gender, Human Cognition, and Decision Styles; the Decision-Makers

UNIT III MODELING AND ANALYSIS

MSS Modeling; Static and Dynamic Models; Certainty, Uncertainty, and Risk; Influence Diagrams; The Structure of MSS Mathematical Models; Mathematical Programming Optimization; Multiple Goals, Sensitivity Analysis, What-If, and Goal Seeking; Problem-Solving Search Methods; Heuristic Programming; Simulation; Visual Interactive Modeling and Visual Interactive Simulation; Quantitative Software Packages; Model Base Management

UNIT IV DECISION SUPPORT SYSTEM DEVELOPMENT

Introduction to DSS Development; the Traditional System Development Life Cycle; Alternative Development Methodologies; Prototyping: The DSS Development Methodology; Change Management; DSS Technology Levels and Tools; DSS Development Platforms; DSS Development Tool Selection; Team-Developed DSS; End User Developed DSS.

UNIT V INTELLIGENT DECISION SUPPORT SYSTEMS

Knowledge-Based Systems Concepts and Definitions of Artificial Intelligence; Evolution of Artificial Intelligence; The Artificial Intelligence Field; Basic Concepts of Expert Systems; Applications of Expert Systems; Structure of Expert Systems; How Expert Systems Work; Problem Areas Suitable for Expert Systems; Benefits and Capabilities of Expert Systems; Problems and Limitations of Expert Systems; Expert System Success Factors; Types of Expert Systems; Expert Systems on the Web

UNIT-VI INTELLIGENT SYSTEMS OVER THE INTERNET

Web-Based Intelligent Systems; Intelligent Agents: An Overview; Characteristics of Agents; Why Intelligent Agents?; Classification and Types of Agents; Internet-Based Software Agents; DSS Agents and Multi-Agents; Semantic Web: Representing Knowledge for Intelligent Agents; Web-Based Recommendation Systems; Managerial Issues of Intelligent Agents

TEXTBOOKS:

1. Peter G.W. Keen and Michael S. Scott Morton, 'Decision Support Systems: An Organizational Perspective' Addison-Wisely Publishing Company.

REFERENCES:

1. Mc Cosh, Andrew M, and Michael S. Scott Morton., "Management Decision Support Systems', The Mac Millan Press Limited, 1978.
2. Sprague, Ralf H., Carlson, Eric D., "Building Effective Decision Support Systems". Prentice Hall Inc., 1982.

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(A3219207) IT PROJECT MANAGEMENT
(Professional Elective-III)
For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:
- To understand IT Project Management concepts, project overview and feasibility studies
- To apply Project Cost Control and Scheduling techniques like PERT and CPM.
- To describe Agile Project management, Principles and Methodologies
- To be familiar with Agile methodologies and techniques like Scrum, DevOps, etc

COURSE OUTCOMES:
After completion of this course, the student should be able to
- Student will understand the concepts of Project, Project Management & Role of a project manager
- Student will understand how a project is monitored, stages of a project, Measuring the viability of project.
- Student can Understand how the project is planned, apply cost control Techniques like PERT, CPM.
- Student will learn how to apply scheduling techniques.
- Student will understand how to control the change management & have Knowledge about Quality criteria aspects
- Student have clear idea about what is Project organization.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	2	2		2		3	2	2	2	2	1	2	1	2	3
C02	1			2					2		1		2		3
CO3	2	2	1	1	1						3				
C04	2	1	2	1	1						3		3		
C05									2	2	2		2	2	
C06	2	2				3	3	3	2	2	2		2	3	3

UNIT-I INTRODUCTION TO PROJECT MANAGEMENT
Concept of project, Project Management, Program and Project Portfolio Management, Role of Project Manager, The Project Management Profession. The Management Spectrum, The People, The Product, The Process, The Project, The W5HH Principle.

UNIT-II PROJECTS & PROJECT WORK
Projects, Successful projects, Project Management, System Development Life Cycle, Project Management & Development Life Cycle, Elements of Project Management, Development Process Model, The Project Plan, The Business case, Implementation & Post-Implementation Strategies.

UNIT-III PROJECT PLANNING & MONITORING & CONTROL
PROJECT PLANNING: Approaches to planning, Product flow diagram, Activity planning, Resource allocation, Using software tools for planning, CPM, PERT Network.

MONITORING & CONTROL: The Project control life cycle, Monitoring Progress, Applying Control, Purpose and Types of Report Meetings, Taking Corrective action.

UNIT-IV SCHEDULING TECHNIQUES

Bar Charts, Network Analysis System, Network System, Work breakdown structure for bar chart & network analysis.

UNIT-V CHANGE CONTROL MANAGEMENT & QUALITY

CHANGE CONTROL MANAGEMENT: Definition of Change, Change management Roles & Responsibilities, The Change Management Process, Configuration Management.

QUALITY: Definition of Quality, Quality Characteristics, Quality Criteria, Quality Control vs Quality assurance, Quality plan.

UNIT-VI PROJECT ORGANIZATION

Programmes & Projects, Identifying Stake holders & concerns, Organizational Framework, Characteristics of Project Manager, Project team, Matrix Management, Team Building & Team Dynamics, Management Styles, communication Methods.

TEXT BOOKS:

1. Project Management for IT Related Projects. ISEB Foundation, BCS Publications.
2. Information Technology Project Management Eight Edition by Kathy Schwalbe
3. Software Engineering: A Practitioner's Approach by Roger S. Pressman. 7th Edition published by McGraw-Hill.

REFERENCES:

1. Mike Cohn, Succeeding with Agile: Software Development Using Scrum, 2015, 1stEdition Addison-Wesley Professional.
2. Agile Project Management with Scrum, Ken Schwaber, Microsoft Professional
3. Project Planning and Management with CPM and PERT, Kundan Singh and Mitthan Lal Kansal

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(A3442207) COMPUTATIONAL FINANCE AND MODELING
(Professional Elective-IV)

COURSE OBJECTIVES:
- To study financial data analysis and modeling
- To acquire quantitative finance skills, application of tools and techniques
- To advance knowledge in designing, developing and testing of computational finance models

COURSE OUTCOMES:
- Ability to analyse financial data
- Understand the mathematical foundations of finance
- Knowledge of financial markets and instruments
- Understand option pricing models and its applications
- Measuring and managing various types of financial risks
- Design and test computational finance models

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01		2			3			2			2		2	2	
C02	2	2	2		1		2		3				1		2
CO3	2	1		2			3	2		3		2			3
C04	1		2		2		3		3		1		1		2
C05	2	3		2		1					3			3	
C06	3		3				2								2

UNIT I:
Financial Markets and Instruments**:** Financial Products and Markets: Introduction to the financial markets and the products which are traded in them: Equities, indices, foreign exchange, and commodities. Options contracts and strategies for speculation and hedging-an introduction. Statistical Analysis of Financial Returns: Fat-tailed and skewed distributions, outliers, stylized facts.

UNIT II:
Mathematical Finance**:** Numerical methods relevant to integration, differentiation and solving the partial differential equations of mathematical finance: examples of exact solutions including Black Scholes and its relatives, finite difference methods including algorithms and question of stability and convergence, treatment of near and far boundary conditions, the connection with binomial models, interest rate models, early exercise, and the corresponding free boundary problems, and a brief introduction to numerical methods for solving multi-factor models

UNIT III:
Financial derivatives**:** Black-Scholes framework: Black-Scholes PDE: simple European calls and puts; put-call parity. The PDE for pricing commodity and currency options. Discontinuous payoffs - Binary and Digital options. The Greeks: theta, delta, gamma, vega& rho and their role in hedging. The mathematics of early exercise – American options: perpetual calls and puts; optimal exercise strategy and the smooth pasting condition. Volatility considerations - actual, historical, and implied volatility.

UNIT IV:
Data simulation and analysis**:** Simulation including random variable generation, variance reduction methods and statistical analysis of simulation output. Pseudo random numbers,

Linear congruential generator, Mersenne twister RNG. The use of Monte Carlo simulation in solving applied problems on derivative pricing discussed in the current finance literature. The technical topics addressed include importance sampling, Monte Carlo integration, Simulation of Random walk and approximations to diffusion processes, martingale control variables stratification, and the estimation of the "Greeks".

UNIT V:
Volatility Estimation: Volatility, implied volatility surface, and volatility estimation using high frequency data. Volatility estimation models- ARCH-GARCH-other advanced models. CBOE VIX and India VIX indices. Volatility smile.

Application areas include the pricing of American options, pricing interest rate dependent claims, and credit risk. The use of importance sampling for Monte Carlo simulation of VaR for portfolios of options.

UNIT VI:
Options and alternative models**:**Copulas, Hedging in incomplete markets, American Options, Exotic options, Electronic trading, Jump Diffusion Processes, High-dimensional covariance matrices, Extreme value theory, Statistical Arbitrage.

TEXT BOOK(S):

1. Paul Wilmott, Paul Wilmott on Quantitative Finance, 3 Volume Set, 2013, 2nd edition, wiley
2. JoergKienitz and Daniel Wetterau, Financial Modelling: Theory, Implementation and Practice with MATLAB, 2012, 1st edition, Wiley Finance Series.

REFERENCE BOOKS:

1. Dan Stefanica., A Primer for the Mathematics Of Financial Engineering, 2011, 2nd Edition FE Press, New York.
2. John C. Hull and Sankarshan Basu, Options, futures & other derivatives, 2018, 10th edition, Pearson India.
3. Tsay, Ruey S. Analysis of Financial Time Series, 2011, 3rd edition, John Wiley & Sons.
4. R. Seydel: Tools for Computational Finance, 2017, 6th edition, Springer.
5. David Ruppert, Statistics and Data Analysis for Financial Engineering, 2011, Springer.

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(A3443207) PERSONNEL MANAGEMENT
(Professional Elective-IV)

COURSE OBJECTIVES
- To apply the Human resources Management perspective.
- To make the students aware of the functions of Human Resource Management
- To identify the Management Development Techniques.
- To understand the process of Performance and compensation management
- To study the regulatory mechanism of industrial relations.
- To understand employee issues and evaluate the emerging issues in HRM.

COURSE OUTCOMES:
To be able to apply the concept of human resource management at the workplace
- The students are able to apply Techniques of Job Design and correlate to the workplace.
- To be able to develop a performance appraisal model relevant to the industry
- Able to understand the various methods of Training methods
- The student is able to implement the practices related to employee integration
- To be able to understand and apply the various aspects of industrial relations at the workplace.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2	PS03
C01	2		1	3	3	1	2			2	3		1		2
C02		2	1					1				1	2		3
CO3	2	3	2		2	3	2			2	2			2	
C04		2	1					2	3		1	3			
C05	1	2	3	3	2		2			2			2		
C06															

UNIT-I
Introduction**:** Evolution of Human Resource Management ,Human Resource Management vs Strategic Human Resource Management , Functions of HR department, Present HR trends and challenges and its impact on organizational growth, HRIS.

UNIT-II
Manpower Planning, Recruitment & Selection**:** Job analysis, Manpower Planning, Forecasting techniques of demand and supply of manpower Recruitment – Selection – Traditional and Contemporary techniques of recruitment and selection – Induction –Orientation - Socialization

UNIT –III
Training and Development**:** Training and Development, Competency based Training and Development, Methods of Training and Development, Evaluation of T& D

UNIT-IV
Performance Appraisal and Compensation management**:** Performance Appraisal, Performance appraisal methods, Team based performance Appraisal, Job Evaluation- Employees compensation - Laws and Rules Governing Employee Benefits and Welfare.

UNIT-V
Managing Industrial Relations**:** Regulatory Mechanism - Industrial Relations - Employee Discipline - Suspensions, Dismissal and retrenchment - Employee Grievance Handling - Trade Unionism - Employers' Association - Collective Bargaining - Industrial Conflict Resolution - Workers Participation in Management. Case studies

UNIT-VI

Contemporary Issues in HRM**:** Diversity management – Whistle blowing policy – Employee Empowerment – Employer branding, Employee engagement, Human Resource analytics, Glass Ceiling

REFERENCES:

1. Edwin B. Flippo : Personnel Management.
2. Dale Yoder Personnel Management and Industrial Relations.
3. Keith Davis; Human Resource Management.
4. Pigors & Mayers; Personnel Administrations.
5. C.B. Memoria, Personnel Management

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(A3444207) BUSINESS STRATEGY

(Professional Elective-IV)

COURSE OBJECTIVES:

- To enable the students to learn about the core concepts and framework of strategic management.
- To study the importance of environmental analysis and how to diagnose the Micro and Macro Environment.
- To learn the aspects relevant for underpinning of strategy formulation process, and the strategic choice
- To study about the different models of strategy analysis.

COURSE OUTCOMES:

- To be able to understand and describe the strategic management process and its challenges.
- To be able to demonstrate effective application of tools & techniques to diagnose the environment and solving organizational problems.
- To be able understand the proper application and execution of strategy
- To be able to correlate the different models of strategy in implementation.
- Students will be able to demonstrate effective application of tools & techniques to practical situations.
- Students will be able to develop their thinking capacity and execute strategically.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1					2			3			2			1
C02				1			3			2				1	
CO3		3			3					1			2		
C04	3				3		2				3			2	1
C05		2			2			3				1			
C06	3				2							2			

UNIT-I:

Introduction to Strategic Management: An Overview of Strategic Management Meaning & Concept of Strategy, the Role of Strategic Management Strategic Decision-Making Strategic Management Process Hierarchy of Strategic Intent.

UNIT II:

Environment Analysis**:** Strategic Formulation And Choice Environmental Appraisal & Organizational Appraisal - Corporate Level Strategies - Business Level Strategies - Functional Level Strategies.

UNIT-III:

Strategic Alternatives**:** Expansion – Stability – Retrenchment – Combination –Concentration – Integration – Diversification – Internationalization Strategies – Merger And Acquisition Strategies-Stability - Retrenchment - Turnaround - Combination Strategies, Take Overs And Joint Ventures – Strategic Alliance - Offensive Strategy – Defensive Strategy – Business Level Strategy – Cost Leadership – Differentiation Strategy – Focus Strategy.

UNIT- IV:

Strategic Analysis And Choice Factors Causing Unsuccessful Implementation of Strategy - Types of Implementation- Porter's 5 Force Analysis - BCG matrix - GE model-TOWS matrix - Market life cycle model and Experience Curve – Mckinsey's 7S framework-SWOT Analysis.

UNIT V:

Strategy Implementation**:** Strategy Implementation Managing Resource Allocation - Structural Implementation - Behavioural Implementation - Functional and Operational Implementation.

UNIT-VI:

Strategic Evaluation and Control**:** Introduction to Strategic Evaluation and Control- Strategic Control- Operational Control - Techniques of Strategic Evaluation and Control.

REFERENCES:

1. R.Srinivasan, Strategic Management -The Indian Context,4th Edition, Prentice Hall of India, 2012
2. Azhar Kazmi -Strategic Management and Business Policy, Tata McGraw Hill.
3. R.M.Srivastava -Management Policy and Strategic Management – Concepts, Skills and Practices Himalaya Publishing House.
4. S. Namakumari, Strategy: Text & Cases The Indian Concept Macmillan Business Books.
5. Thomas L. Wheelen Concepts in Strategic Management and J. David Hunger Business Policy
6. The Strategy Process by Mint burg, Quinn, and Ghosal, Publishing House: Prentice Hall
7. Fred R. David, Strategic Management Concept And Cases, PHI Learning Private Limited, New Delhi, 2008

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IV B.Tech. I-Sem (CSE&BS)

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(A3225207) AUGMENTED REALITY AND VIRTUAL REALITY

(Professional Elective-V)

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	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01		2				2		2		2			3		
C02	1		3	2		2		1						2	
CO3		3			2	3		2		3			3		1
C04	3		2	2		2				3				2	
C05	2	2					3				1				1
C06		1	1	3				2		2			3		

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 Large Scale Environments & Real Time Rendering -Development

Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard: Vega, MultiGen, Virtoolsetc

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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(A3220207) TIME SERIES DATA ANALYSIS
(Professional Elective-V)
For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVE:

- The objective of the "Time Series Data Analysis" course is to provide students with a solid understanding of time series analysis techniques and their application in various fields. The course aims to equip students with the knowledge and skills necessary to effectively analyse and interpret time series data, model time-dependent patterns, and make informed forecasts and predictions.

COURSE OUTCOMES:

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

- Understand the fundamental concepts and characteristics of time series data.
- Apply exploratory data analysis techniques to gain insights from time series data.
- Model and analyse time series data using appropriate statistical and mathematical techniques.
- Apply forecasting techniques to make accurate predictions and assess forecast accuracy.
- Explore advanced topics in time series analysis, such as nonlinearity, intervention analysis, and state space models.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1		3			3				2			1		
C02		1				2			2		1			2	
CO3			3		1				1				3		1
C04		3			2			2			3		3		
C05	2			2			3		2			1			3
C06															

UNIT I:

Introduction to Time Series Analysis - Overview of time series data and its characteristics, Stationary and its importance in time series analysis, Time series components: trend, seasonality, and noise, Exploratory data analysis techniques for time series data, Introduction to time series visualization and interpretation.

UNIT II:

Time Series Modeling Basics - Autocorrelation and partial autocorrelation functions, Moving average (MA) and autoregressive (AR) models, The concepts of white noise and random walk, Estimation and selection of model orders (ARIMA modeling), Model diagnostics and residual analysis.

UNIT III:

Advanced Time Series Models - Seasonal decomposition of time series (STL decomposition), Seasonal ARIMA (SARIMA) models for seasonal data, Exponential smoothing models (e.g., Holt-Winters method), State space models and the Kalman filter, Handling outliers and missing values in time series data.

UNIT IV:

Forecasting Techniques - Evaluation metrics for time series forecasting (e.g., MAE, RMSE), Simple forecasting methods (e.g., naïve, moving average), Exponential smoothing forecasting

techniques, ARIMA modeling for forecasting, Model selection and model validation techniques.

UNIT V:

Advanced Time Series Analysis - Time series regression analysis, Intervention analysis and change point detection, Dynamic regression models, Vector Autoregression (VAR) models, Granger causality and impulse response analysis.

UNIT VI:

Nonlinear Time Series Analysis - Nonlinear models for time series data (e.g., GARCH, ARCH), Chaos theory and its application in time series analysis, Nonlinear autoregressive exogenous (NARX) models, Introduction to state space models with nonlinearity, Nonlinear forecasting and prediction methods.

TEXT BOOKS:

1. "Time Series Analysis and Its Applications: With R Examples" by Robert H. Shumway and David S. Stoffer
2. "Forecasting: Principles and Practice" by Rob J. Hyndman and George Athanasopoulos

REFERENCES:

1. "Introductory Time Series with R" by Paul S.P. Cowpertwait and Andrew V. Metcalfe
2. "Time Series Analysis: With Applications in R" by Jonathan D. Cryer and Kung-Sik Chan
3. "Applied Time Series Analysis for Fisheries and Environmental Data" by J. Hampton and M. Scheuerell

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(A3210206) NATURAL LANGUAGE PROCESSING

(Professional Elective-V)

For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:

- To teach the fundamentals of NLP, and also to make them for understanding CFG, PCFG in NLP.
- To know the role of semantics of sentences and pragmatic.
- To teach the basic concepts of speech processing along with analysis and modeling.

COURSE OUTCOMES:

After Completion of the course, students should be able to:

- learn the fundamentals of natural language processing
- understand the use of CFG and PCFG in NLP
- understand the role of semantics of sentences and pragmatic
- Introduce Speech Production And Related Parameters Of Speech.
- Show The Computation And Use Of Techniques Such As Short Time Fourier Transform, Linear Predictive Coefficients and Other Coefficients in The Analysis Of Speech.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1		2		1		2				1			3	
C02		3			2		1			2			1		
CO3	1		2			1			2				2	2	3
C04		3				2				1					1
C05	2		3			1			3				3		
C06															

UNIT I:

Introduction**:** Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM – Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance

UNIT II:

Word Level Analysis**:** Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

UNIT III:

Syntactic Analysis**:** Context Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs – Feature structures, Unification of feature structures.

UNIT IV:

Semantics And Pragmatics**:** Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT V:

Basic Concepts of Speech Processing**:** Speech Fundamentals: Articulatory Phonetics – Production And Classification Of Speech Sounds; Acoustic Phonetics – Acoustics Of Speech Production; Review Of Digital Signal Processing Concepts; Short-Time Fourier Transform, Filter- Bank And LPC Methods.

UNIT VI:

Speech-Analysis: Features, Feature Extraction And Pattern Comparison Techniques: Speech Distortion Measures– Mathematical And Perceptual – Log–Spectral Distance, Cepstral Distances, Weighted Cepstral Distances And Filtering, Likelihood Distortions, Spectral Distortion Using A Warped Frequency Scale, LPC, PLP And MFCC Coefficients, Time Alignment And Normalization – Dynamic Time Warping, Multiple Time – Alignment Paths.

Speech Modeling**:** Hidden Markov Models: Markov Processes, HMMs – Evaluation, Optimal State Sequence – Viterbi Search, Baum-Welch Parameter Re-Estimation, Implementation Issues.

TEXT BOOKS:

1. Daniel Jurafsky, James H. Martin―Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.
2. Steven Bird, Ewan Klein and Edward Loper, ―Natural Language Processing with Python, First Edition, OReilly Media, 2009.
3. Lawrence Rabiner And Biing-Hwang Juang, "Fundamentals Of Speech Recognition", Pearson Education, 2003.
4. Daniel Jurafsky And James H Martin, "Speech And Language Processing – An Introduction To Natural Language Processing, Computational Linguistics, And Speech Recognition", Pearson Education, 2002.

REFERENCE BOOKS:

1. Frederick Jelinek, "Statistical Methods Of Speech Recognition", MIT Press, 1997.
2. Breck Baldwin, ―Language Processing with Java and LingPipe Cookbook, Atlantic Publisher, 2015
3. Richard M Reese, ―Natural Language Processing with Java, OReilly Media, 2015.
4. Nitin Indurkhya and Fred J. Damerau, ―Handbook of Natural Language Processing, Second Edition, Chapman and Hall/CRC Press, 2010.
5. Tanveer Siddiqui, U.S. Tiwary, ―Natural Language Processing and Information Retrieval, Oxford University Press, 2008.

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(A3439207) BLOCKCHAIN BUSINESS MODELS
(Open Elective-III)

COURSE OBJECTIVES:
To study the concepts and foundation of Blockchain Technology
- ❖ To understand security mechanism and Consensus in Blockchain
- ❖ To design use cases and architecture Blockchain Technology
- ❖ To study benefits, limitations and identify application area of Blockchain Technology

COURSE OUTCOMES: After completion of the course, students should be able to
- ❖ Gain a clear understanding of the concepts that underlie digital distributed ledger
- ❖ Understand key mechanisms like decentralization, transparency and trust, Immutability
- ❖ Understand and apply the concept of Hash Function and Related Hash algorithms for high secure and availability of systems
- ❖ Learn how to design and implement any application in Blockchain Technology

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS03
C01	2												2	2	3
C02					2		2			3		3			3
CO3	2				3										2
C04	2												1	2	3
C05															
C06															

UNIT-1 [TB-1,2]
Introduction: What blockchains do, Why blockchains matter, The Structure of Blockchains, Blockchain Applications, The Blockchain Life Cycle, The Driving Force of Blockchains, Current blockchain uses, Future blockchain applications, Where Blockchains Add Substance, Choosing a Solution.

Opportunities and Challenges: Disruptive Elements, Opportunities- Transformative Power of Blockchain, Transformative Opportunities, Challenges- Scope, Motivation, Governance, Technology.

UNIT-2 [TB-2]
Understanding the Technology Landscape: Blockchain: A Technical Perspective, Blockchain for Enterprises, Essential Maturity Imperatives for Enterprise Blockchain, Token Revolution, Understanding Digital Asset (Token) Fungibility: Opportunities and Challenges Related to Token Valuation and Blockchain Ecosystems, Considerations for Meaningful and Sustainable Blockchain-Powered Business Networks. Business of Business Models: Path to Blockchain Enterprise Adoption: A Prescriptive Approach, Business Modeling and Design, Business Model Considerations.

UNIT-3 [TB-2]
Governance Structure, Team building and Understanding Financial Models for Projects: Developing a Governance Structure for Blockchain Networks: Governance Structure and Landscape, SCTrustNet. Enterprise Structures in a Decentralized Economy, Roles of an Enterprise in a Blockchain Network, Building an Effective Team, An Example of a Blockchain Project Team, Understanding Blockchain Project Financial Fundamentals, Blockchain Investment Rubric, Proof of Concept or Design, Business Valuation, Return on Investment Modeling, Risk Modeling.

UNIT-4 [TB-1]

Further Knowledge: Bitcoin Blockchain: Getting a Brief History of the Bitcoin Blockchain, Debunking Some Common Bitcoin Misconceptions, Bitcoin: The New Wild West, Mining for Bitcoins, Making Your First Paper Wallet. Encountering the Ethereum Blockchain: Exploring the Brief History of Ethereum, Ethereum: The Open-Source World Wide Computer, Hacking a Blockchain, Getting Up and Running on Ethereum, Building Your First Decentralized Autonomous Organization, Uncovering the Future of DAOs. Regarding the Ripple Blockchain: Getting a Brief History of the Ripple Blockchain, Ripple: It's All About Trust, Seeing How Ripple Differs from Other Blockchains, Unleashing the Full Power of Ripple. Finding the Factom Blockchain: The purpose of the Factom blockchain: Publishing anything, Incentives of federation, Building on Factom. Digging into DigiByte: Getting Familiar with DigiByte: The Fast Blockchain, Mining on DigiByte, Signing Documents on DigiByte's DiguSign, Earning DigiBytes While Gaming.

UNIT-5 [TB-1]

Blockchain Platforms: Getting Your Hands on Hyperledger: Getting to Know Hyperledger: Dreams of a Hyper Future, Focusing on Fabric, Investigating the Iroha Project, Introducing Sumeragi: The new consensus algorithm, Developing mobile apps, Diving into Sawtooth Lake. Applying Microsoft Azure: Bletchley: The Modular Blockchain Fabric, Building in the Azure Ecosystem, Getting Started with Chain on Azure, Deploying Blockchain Tools on Azure.Getting Busy on IBM Bluemix: Business Blockchain on Bluemix, Watson's Smart Blockchain, Building Your Starter Network on Big Blue.

UNIT-6 [TB-1]

Business Models: Financial Technology: Future Banking Trends, Global Financial Products. Real Estate: Eliminating Title Insurance, Mortgages in the Blockchain World, Forecasting Regional Trends. Insurance: Precisely Tailoring Coverage, The Internet of Things- IoT projects in insurance, Implications of actionable big data, Taking Out the Third Party in Insurance. Government: The Smart Cities of Asia- Singapore satellite cities in India, China's big data problem, The Battle for the Financial Capital of the World, Securing the World's Borders. Lean Governments, The Trust Layer for the Internet, Oracle of the Blockchain.

TEXT BOOKS:

1. Blockchain For Dummies by Tiana Laurence, Published by: John Wiley & Sons, Inc., 2017.
2. Blockchain for Business, Jai Singh Arun, Jerry Cuomo, Nitin Gaur, Addison-Wisley.

REFERENCE BOOKS:

1. Kirankalyan Kulkarni, Essentials of Bitcoin and Blockchain, Packt Publishing.
2. Tiana Laurence, Blockchain for Dummies, 2nd Edition 2019, John Wiley & Sons.
3. Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks by Imran Bashir, Packt Publishing (2017).

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(A3440207) MACHINE LEARNING FOR FINANCE
(Open Elective-III)

COURSE OBJECTIVES: Students will learn to
- Compare ML for Finance with ML in Technology.
- Learn supervised and unsupervised learning models.
- Learn fundamentals of Neural Networks and FFNN
- Learn Reinforcement Learning and its implementations.

COURSE OUTCOMES:
- Understand the concepts of various machine learning strategies.
- Handle computational data and learn various estimation methods
- Solve real world applications by selecting suitable learning methods and trees.
- Boost the performance of the model by combining results from different approaches.
- Have basic knowledge about neural networks.
- Construct machine learning model for unseen data and can solve real world application.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS03
C01	2												3		
C02	2	2				3					2			1	
CO3	2	2	1	3					3						2
C04			3			3			2					3	
C05	1	2	2	2						2			2		
C06	2		3		2		3							3	1

UNIT-1 **[TB-1, TB-2]**

Introduction : Machine Learning, Examples of Machine Learning Applications, Big Data—Big Compute in Finance, Fintech, Machine Learning and Prediction, Entropy, Neural Networks, Financial Econometrics and Machine Learning, Over-fitting,

Supervised Learning: Learning a Class from Examples, Noise, Learning Multiple Classes, Regression, Model Selection and Generalization, Dimensions of a Supervised Machine Learning Algorithm.

Case Study: Fraud Detection and Loan Default Probability using Supervised Learning model.

UNIT-2 **[TB-1]**

Parametric Methods: Maximum Likelihood Estimation, Evaluating an Estimator: Bias and Variance, The Bayes' Estimator, Parametric Classification, Regression.

Multivariate Methods: Multivariate Data, Parameter Estimation, Estimation of Missing Values, Multivariate Normal Distribution, Multivariate Classification, Multivariate Regression.

Nonparametric Methods: Nonparametric Density Estimation, Kernel Estimator, k-Nearest Neighbor Estimator, Generalization to Multivariate Data,

Case Study: Predicting FOREX currencies by building a linear model.

UNIT-3 **[TB-1]**

Bayesian Decision Theory: Classification, Losses and Risks, Discriminant Functions, Association Rules.

Decision Trees: Univariate Trees, Classification Trees, Regression Trees, Pruning, Rule Extraction from Trees, Learning Rules from Data, Multivariate Trees, Random Forest.

Case Study: Tree-based Machine Learning techniques for stock prediction.

UNIT-4 **[TB-1]**

Dimensionality Reduction: Subset Selection, Principal Components Analysis, Linear Discriminant Analysis.

Clustering: Mixture Densities, k-Means Clustering, Supervised Learning after Clustering, Hierarchical Clustering.

Case Study: Segmenting the Banking Market Strategy by Clustering.

UNIT-5 **[TB-2]**

Neural Networks: Biological Neuron, Artificial Neuron, A Layer of Neurons, Multiple Layers of Neurons, Static vs. Dynamic Neural Networks, Training of Neural Networks, Multi-Layer Feed-Forward Neural Network (MLFFNN)- Forward Calculation, Training of Network Using Back-Propagation Algorithm, Steps to be Followed to Design a Suitable NN, Radial Basis Function Network (RBFN).

Case Study: Stock price prediction by using Artificial Neural Networks.

UNIT-6 **[TB-3]**

Reinforcement Learning: Elements of Reinforcement Learning, Markov Decision Processes, Dynamic Programming Methods, Reinforcement Learning Methods, G-Learning for Stock Portfolios, RL for Wealth Management.

TEXT BOOKS:

1. Alpaydin, Ethem. Introduction to Machine Learning. 2nd Edition, Cambridge, MA: MIT Press, 2010.
2. Soft Computing, Fundamentals and Applications, Dilip K. Pratihar, Alpha Science International Ltd., 2014.
3. Matthew F. Dixon, Igor Halperin, and Paul Bilokon: Machine learning in finance from theory to practice, 2021.

REFERENCE BOOKS:

1. Machine Learning, Tom M. Mitchell, McGraw-Hill.
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012.
3. https://www.coursera.org/specializations/machine-learning-reinforcement-finance.
4. https://www.udemy.com/course/machine-learning-for-finance/

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

IV B.Tech. I-Sem (CSE&BS)

L	T	C
2	1	3

(A3216207) FUNDAMENTALS OF QUANTUM COMPUTING

(Open Elective-III)

For branches: CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:

Students should able to learn:

- Fundamentals of quantum computing.
- Basics of quantum information theory and cryptography.
- Quantum algorithms, its implementation platforms and applications

COURSE OUTCOMES:

- To understand the fundamentals of quantum computation and circuits
- To learn basic quantum algorithms.
- To understand basics of quantum information theory and cryptography.
- To learn different platforms implementing basic applications.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1		2	2				3			2		2		2
C02		1				3			2		2	2	1	3	
CO3	2	2		3		2		3		1		2		2	
C04	1	2		3					2		2		2		

UNIT-1 **[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-2 **[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-3 **[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-4 **[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-5 **[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-6 **[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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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

IV B.Tech. I-Sem (CSE&BS)

L	T	C
2	1	3

(A3228207) CYBER SECURITY AND CYBER LAWS

(Open Elective-IV)

For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:

- Identify the key components of cyber security in network
- Describe risk management processes and practices
- Define types of service delivery process and storage management process
- Access additional external resources to supplement knowledge of cyber forensics and laws

COURSE OUTCOMES:

- Demonstrate a solid understanding of the core principles and concepts of cybersecurity, including confidentiality, integrity, availability, and non-repudiation.
- Understand the processes and methodologies for managing information security, risk assessment, and security policies.
- Explore network security technologies and protocols to protect data and communications from unauthorized access and attacks.
- Explain the principles of cryptography and encryption techniques used to secure sensitive data and communications.
- Identify common types of malware, cyber threats, and attack vectors and understand the methods to defend against them.
- Develop skills in incident response and handling, including detecting, analyzing, and mitigating cybersecurity incidents.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1		3	1		2			1		2	3	1		2
C02	1		1		2	1		1		2	1			1	
CO3		1		1			1			1	3		1		2
C04		1	3	2		1			2			3	2		1
C05		2		1	3			2				2	3		2
C06	2		1		2		1		2		1		3	1	

UNIT-I: INTRODUCTION TO CYBER CRIME

Introduction Cybercrime: Definition and Origins of the word, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, E-mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/ Salami Technique, Data Diddling, Forgery, Web Jacking, Newsgroup Spam/ Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Pornographic Offenses, Software Piracy, Computer Sabotage, E-Mail Bombing/Mail Bombs, Usernet Newsgroup as the Source of Cybercrimes, Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, Hacking and the Indian Law(s), A Global Perspective on Cybercrimes, Cybercrime and the Extended Enterprise.

UNIT-II: CYBER OFFENSES

How criminals plan them - Introduction, Categories of Cybercrime, How Criminals Plan the Attacks, Reconnaissance, Passive Attacks, Active Attacks, Scamming and Scrutinizing Gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, Classification of Social Engineering, Cyber stalking, Types of Stalkers, Cases Reported on Cyber stalking, How Stalking Works?, Real-Life Incident of Cybertstalking,

Cybercafe and Cybercrimes, Botnets: The fuel for Cybercrime, Botnet, Attack Vector, Cloud Computing, Why Cloud Computing?, Types of Services, Cybercrime and Cloud Computing.

UNIT- III: CYBERCRIME

Mobile and Wireless Devices- Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era: Types and Techniques of Credit Card Frauds, Registry Settings for Mobile Devices Authentication Service Security: Cryptographic Security for Mobile Devices, Attacks on Mobile/Cell Phones: Mobile Phone Theft, Mobile Devices: Security Implications for Organizations: Managing Diversity and Proliferation of Hand-Held Devices, Organizational Measures for Handling Mobile Devices-Related Security Issues: Encrypting Organizational Databases, Organizational Security Policies and Measures in Mobile Computing Era: Importance of Security Policies relating to Mobile Computing Devices Laptops: Physical Security Countermeasures.

UNIT-IV: TOOLS AND METHODS USED IN CYBER CRIME

Introduction, Proxy Servers and Anonymizers, Phishing, How Phishing Works, Password Cracking, Online Attacks, Offline Attacks, Strong, Weak and Random Passwords, Random Passwords, Keyloggers and Spywares, Software Keyloggers, Hardware Keyloggers, Antikeylogger, Spywares, Virus and Worms, Types of Viruses, Trojan Horses and Backdoors, Backdoor, How to Protect from Trojan and Backdoors, Steganography, Steganalysis, Dos and DDos Attacks, Dos Attacks, Classification of Dos Attacks, Types of Levels of Dos Attack, Tools Used to Launch Dos Attacks, DDos Attacks, How to protect from Dos/DDos Attacks, SQL Injection, Steps for SQL Injection Attack, How to Prevent SQL Injection Attacks.

UNIT-V: UNDERSTANDING COMPUTER FORENSICS

Introduction, Historical Background of Cyberforensics, Digital Forensics Science, The Need for Computer Forensics, Cyberforensics and Digital Evidence, The Rules of Evidence, Forensics Analysis of E-Mail, RFC2822, Digital Forensics Life Cycle, The Digital Forensics Process, The Phases in Computer Forensics/Digital Forensics, Precautions to be Taken when Collecting Electronic Evidence, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Typical Elements Addressed in a Forensics Investigation Engagement Contract , Solving a Computer Forensics Case, Computer Forensics and Steganography, Rootkits, Information Hiding, Forensics and Socal Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Technical Challenges: Understanding the Raw Data and its Structure, The Legal Challenges in Computer Forensics and Data Privacy Issues, Special Tools and Techniques, Digital Forensics Tools Ready Reckenor, Special Technique: Data Mining used in Cyberforensics, Forensics Auditing.

UNIT-VI: CYBERCRIME AND CYBERTERRORISM

SOCIAL, POLITICAL, ETHICAL AND PSYCHOLOGICAL DIMENSIONS: Introduction, Intellectual Property in the Cyberspace, Copyright, Patent, Trademarks, Trade Secret, Trade Name, Domain Name, The Ethical Dimension of Cybercrimes, Ethical Hackers: Good Guys in Bad Land, The Psychology, Mindset and Skills of Hackers and Other Cybercriminals, Inside the Minds and Shoes of Hackers and Cybercriminals, Hackers and Cybercriminals: Evolution of Technical prowess and Skills, Ethical Hackers, Sociology of Cybercriminals, Personality Traits of Cybercriminals and Younger Generation's views about Hacking, Information Warfare: Perception or An Eminent Reality?, Cyberwar Ground is HOT.

TEXT BOOKS:

1. Cyber Security- Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley.

REFERENCES:

1. Management of Information Security, M. E. Whitman, H. J. Mattord, Nelson Education, CENGAGE Learning, 2011, 3rd Edition.
2. Guide to Computer Forensics and Investigations, B. Nelson, A. Phillips, F. Enfinger, C. Steuart, Nelson Education / CENGAGE Learning, 2010, 4th Edition

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

IV B.Tech. I-Sem (CSE&BS)

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(A3211206) DEEP LEARNING

(Open Elective-IV)

For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:

- To teach the basic neural network architectures along with various activation functions.
- To know the sequential steps in CNN, RNN and importance of auto encoders and decoders.
- To know the concepts of Reinforcement learning along with its applications.

COURSE OUTCOMES:

After Completion of the course, students should be able to:

Explain the basic principles behind neural networks and deep learning.

- Implement simple neural network algorithms.
- Compare modeling aspects of various neural network architectures
- Apply and evaluate deep learning on real data sets
- Understand the importance and need of encoders and decoders.
- Understand various case studies and applications of Deep Learning.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1		2			1		3			2		1		3
C02		2		1			2			3				2	
CO3			1		3		1			1		1			1
C04		1		2			2		3	2		2		2	
C05			2		1		3			1			3	1	
C06															

UNIT I:

Introduction: Introduction to machine learning- Linear models (SVMs and Perceptron, logistic regression)- Intro to Neural Nets: What a shallow network computes- Training a network: loss functions, back propagation and stochastic gradient descent- Neural networks as universal function approximates, Curse of Dimensionality.

UNIT II:

Introduction to Deep Learning & Architectures**:** Machine Learning Vs. Deep Learning, Representation Learning, Width Vs. Depth of Neural Networks, Activation Functions: RELU, LRELU, ERELU, Unsupervised Training of Neural Networks, Restricted Boltzmann Machines.

UNIT III:

Convolutional Neural Networks**:** Architectural Overview – Motivation - Layers – Filters – Parameter sharing – Regularization, Popular CNN Architectures: ResNet, AlexNet.

UNIT IV:

Sequence Modelling – Recurrent and Recursive Nets: Recurrent Neural Networks, Bidirectional RNNs – Encoder-decoder sequence to sequence architectures - BPTT for training RNN, Long Short Term Memory Networks.

UNIT V:

Auto Encoders: Under complete Autoencoders – Regulraized Autoencoders – stochastic Encoders and Decoders – Contractive Encoders.

Deep Generative Models**:** Deep Belief networks – Boltzmann Machines – Deep Boltzmann Machine - Generative Adversarial Networks.

UNIT VI:

Deep Reinforcement Learning: Deep Reinforcement Learning - Masters Atari Games-Markov Decision Processes-Policy Versus Value Learning.

Case Study and Applications**:** Image net- Detection-Audio Wave Net- Joint Detection Bioinformatics- Face Recognition- Scene Understanding- Gathering Image Captions.

TEXT BOOKS:

1. Ian Goodfellow, Yoshua Bengio and Aaron Courville, “Deep Learning”, MIT Press, 2017.
2. Josh Patterson, Adam Gibson "Deep Learning: A Practitioner's Approach", O'Reilly Media, 2017
3. Umberto Michelucci “Applied Deep Learning. A Case-based Approach to Understanding Deep Neural Networks” Apress, 2018.
4. Giancarlo Zaccone, Md. Rezaul Karim, Ahmed Menshawy "Deep Learning with TensorFlow: Explore neural networks with Python", Packt Publisher, 2017.
5. Antonio Gulli, Sujit Pal "Deep Learning with Keras", Packt Publishers, 2017.
6. Francois Chollet "Deep Learning with Python", Manning Publications, 2017.

REFERENCE BOOKS:

1. “Deep Learning: Methods and Applications (Foundations and Trends (R) in Signal Processing)”, Li Deng and Dong Yu, New Publishers, 2013.
2. “Advanced Data Analysis from an Elementary Point of View”, Cosma Rohilla Shalizi, Cambridge University Press, 2015.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

IV B.Tech. I-Sem (CSE&BS)

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(A3226207) ADVANCED SOCIAL, TEXT AND MEDIA ANALYTICS

(Open Elective-IV)

For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:

- To provide an overview of common text mining and social media data analytic activities
- To understand the complexities of processing text and network data from different data sources
- Understand and apply social media analytics tools.
- To enable students to solve complex real-world problems for sentiment analysis and recommendation systems.

COURSE OUTCOMES:

- Demonstrate a thorough understanding of social media data and the unique challenges and opportunities it presents for analysis.
- Learn various techniques for preprocessing and cleaning text data to prepare it for analysis, including tokenization, stemming, and stop-word removal.
- Understand the principles and methods of natural language processing, including part-of-speech tagging, named entity recognition, and syntactic parsing.
- Develop skills in sentiment analysis to determine the sentiment or emotion expressed in social media posts or text data.
- Learn how to extract and collect data from social media platforms, such as Twitter, Facebook, and Instagram, for analysis.

MAPPING OD COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1		2		1		2		2		1		2		1
C02			2	3			1		2			2		1	
CO3		1		1		2		1		3	3		1		1
C04	1		3		2		3	2		1		3	1	3	3
C05		1			1		1			2				2	
C06															

UNIT-1 **[TB-1]**

Text Mining : Introduction to Text Mining - Defining Text Mining, General Architecture of Text Mining Systems, Core Text Mining Operations,Using Background Knowledge for Text Mining, Text Mining Query Languages, Text Mining Preprocessing Techniques, Text mining applications

UNIT-2 **[TB-1**

Text Mining Essentials: Text Categorization, Clustering, Information Extraction, Probabilistic Models for Information Extraction, Visualization Approaches.

UNIT-3 **[TB-2]**

Web Mining: Introduction to Data Mining and Web Mining, Information Retrieval and Web Search- Information Retrieval Models, Text and Web Page Pre-Processing, Inverted Index and Its Compression, Latent Semantic Indexing, Web Search, Meta-Search: Combining Multiple Rankings, Web Spamming.

UNIT-4 **[TB-3]**

Web Analytics: Clickstream Analysis: Practical Solutions - A Web Analytics Primer, The Best Web Analytics Report, Foundational Analytical Strategies, Everyday Clickstream Analyses

Made Actionable, Measuring Success - Moving Beyond Conversion Rates, Measuring Success for a Non-ecommerce Website, Testing Options: A/B and MVT, Competitive Intelligence Analysis- Website Traffic Analysis, Search and Keyword Analysis, Audience Identification and Segmentation Analysis.

UNIT-5 **[TB-4]**

Social Media Analytics: Social Media Mining and Challenges, Network Models- Properties of Real-World Networks, Random Graphs, Small-World Model, Preferential Attachment Model, Community Analysis- Community Detection, Community Evolution, Community Evaluation, Herd Behavior, Information Cascades.

UNIT-6 **[TB-4]**

Applications of SMA: Influence and Homophily- Measuring Assortativity, Influence, Homophily, Distinguishing Influence and Homophily, Recommendation in Social Media- Classical Recommendation Algorithms, Recommendation Using Social Context, Evaluating Recommendations, Behavior Analytics- Individual Behavior, Collective Behavior.

TEXT BOOKS:

1. The Text Mining Handbook: Advanced Approaches in Analyzing Unstructured Data, Ronen Feldman and James Sanger, Cambridge University Press, 2006
2. Bing Liu, Web Data Mining-Exploring Hyperlinks, Contents, and Usage Data, Springer, Second Edition, 2011.
3. Web Analytics 2.0: The Art of Online Accountability, Avinash Kaushik, 2009
4. Reza Zafarani, Mohammad Ali Abbasi and Huan Liu, Social Media Mining-An Introduction, Cambridge University Press, 2014.

REFERENCE BOOKS:

1. Hansen, Derek., Shneiderman, Ben., Smith, Marc A.. Analyzing Social Media Networks with NodeXL: Insights from a Connected World. Netherlands: Elsevier Science, 2010.
2. Theories of Communication Networks, Monge P. R. & Contractor N. S, New York, 2003

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

IV B.Tech. I-Sem (CSE&BS)

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(A3227207) COMPUTER VISION WITH OPENCV

(Skill Development Course)

For branches: CSE(DS) & CSE&BS

COURSE OBJECTIVES:

- Gain a thorough understanding of computer vision principles, including image representation, feature extraction, object detection, and tracking.
- Become proficient in using the OpenCV library and its various functions and modules for image and video manipulation.
- Learn and apply essential image processing techniques, such as filtering, thresholding, and edge detection, to enhance and preprocess images.
- Understand feature detection algorithms (e.g., Harris corner detection, SIFT, ORB) and matching techniques to identify and track key points across images.

COURSE OUTCOMES:

- Develop a solid understanding of computer vision concepts, including image representation, color spaces, and image processing.
- Become proficient in using the OpenCV library for image and video processing tasks.
- Learn how to apply various image filters and enhancement techniques to improve image quality and clarity.
- Understand feature detection algorithms and techniques for identifying key points in images and matching them across multiple images.
- Learn how to detect and localize objects within images using techniques like Haar cascades, HOG (Histogram of Oriented Gradients), and deep learning-based methods.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1			2		3		1		2		1		3	2
C02			1		3		2			2			2		2
CO3		2			1		2	3		1			2		
C04				2				2			3	2		1	
C05			1	3		1			1						1
C06		1			1			2			1		3		

UNIT I:

Introduction: Load and show an image, What's a pixel, Save an image, Capture live video, Add an overlay, Add a trackbar, Compose an RGB color, Catch mouse events, Draw with the mouse, Access a slice of the image, Object-Oriented Programming, Patterns.

UNIT II:

Drawing Shapes: Using Numpy, Define colors, Draw a line, Select thickness with a trackbar, Select color with a trackbar, Select end point with the mouse, Draw a complete line, Draw multiple lines, Draw a rectangle, Draw multiple rectangles, Draw an ellipse, Draw a polygon, Draw a filled polygon, Draw a polygon with the mouse, Draw text.

UNIT III:

Color spaces: Sliding through the color cube, The HSV colorspace, Extracting an object based on hue Image transformation: Translation, Rotation, Scale, Flipping, Image arithmetic, Bitwise operations, Masking, Splitting channels, Merging channels, Color spaces, Affine transformation.

UNIT IV:

Histograms: Grayscale histogram, Color histogram, Blurring Filters and convolution: Simple

thresholding, Binary thresholding, To zero, Adaptive thresholding, 2D convolution, Morphological Transformations, Image gradient – Laplacian, Canny edge detection.

UNIT V:

Creating an application: Shortcut keys, Create the Window class, Handle the mouse, Create the Object class, Drawing an object, Adding new windows and new objects, Passing the mouse click to an object, Select an object, Moving an object, Add window custom options, Displaying information in the status bar, Create the Text class, Send key events to windows and objects, Use the tab key to advance to the next object, Use the escape key to unselect, Toggle between upper case and lower case, Update size of the text object, Creating the Node class.

UNIT VI:

Detect faces: Use trackbars to select parameters, Video face detection.

YOLO - object detection: Load the YOLO network, Identify objects, 3 Scales for handling different sizes, Detecting objects, Sources.

Widgets: Trackbar, Text, Button, Entry, Combobox, Listbox.

REFERENCES:

1. OpenCV tutorial Documentation by Raphael Holzer.
2. OpenCV with Python – Tutorialspoint.
3. https://opencv-tutorial.readthedocs.io/en/latest/intro/intro.html#catch-mouse-events

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

IV B.Tech. I-Sem (CSE&BS)

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(A3445207) RURAL MANAGEMENT AND TECHNOLOGIES
(Humanities and Social Science)

COURSE OBJECTIVES:
- Demonstrate a thorough understanding of social media data and the unique challenges and opportunities it presents for analysis.
- Learn various techniques for preprocessing and cleaning text data to prepare it for analysis, including tokenization, stemming, and stop-word removal.
- Understand the principles and methods of natural language processing, including part-of-speech tagging, named entity recognition, and syntactic parsing.
- Develop skills in sentiment analysis to determine the sentiment or emotion expressed in social media posts or text data.

COURSE OUTCOMES:
- Provide students with a comprehensive understanding of rural development concepts, challenges, and opportunities.
- Introduce sustainable development practices that promote social, economic, and environmental well-being in rural areas.
- Develop project management skills specific to rural development projects, including planning, implementation, and evaluation.
- Teach students how to conduct needs assessments and involve local communities in the development process.
- Understand the importance of microfinance and rural credit systems in supporting rural livelihoods and entrepreneurial activities.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PS0 3
C01	1	2			1		1	2	1		2		1		1
C02	2		1	3		1		2		1		1	2		1
CO3		1	1		1		1		2		1		2	1	
C04	1		1		2			1			2		3		2
C05		3		1			3			1		3		1	
C06															

UNIT I:
Introduction to Rural Society – concept of village, Definition, Nature, Strategies and Scope of Rural Development; Need for Rural Development, Causes of Rural Backwardness. Principles of Rural Economic development, Assets Distribution, Income Distribution; Expenditure Pattern, Agriculture and Rural Development, Economic growth in Rural; Pattern and Structure

UNIT II:
e-Governance: Meaning, features, scope; Decentralization and Rural Governance: Panchayat Raj Institutions and its role in Rural Governance, Administrative structure at Village, Panchayat, Block and District levels; District Planning Committee: Composition, Functions and Significance.

UNIT III:
Entrepreneurship Development Programme - Role of SHG in Promoting entrepreneurship, Linkage between rural and Urban enterprises, Cottage industries, traditional crafts and handloom, Skill development through entrepreneurship, Rural cluster, Rural tourism, Startup village entrepreneurship, Entrepreneurial motivation, competencies, mobility. Training for entrepreneurship.

UNIT IV:

Human Resource Development: Meaning, objectives, importance and Dimensions of H.R.D. in Rural Development- Community, Health, Education, Energy, Agriculture and Allied Activities, improving productivity.

UNIT V:

ICT for Rural Development: Definition, Use, Organization; Techniques/methods of data selection process; Transaction processing, Batch processing, Online processing, Word and text processing, Graphics and Office automation, Facsimile transmission, Message passing, Public data services, Information systems for rural development at various levels, Information providers.

UNIT VI:

Computers and telecommunication, Smart phone technologies in handling information: Storage, Retrieval and dissemination of information, Tele-medicine, Tele-banking, TeleCounseling, e-Library. Role of RuTAG (Rural Technology Action Group), E-Business – Architecture, E Business Strategy and Productivity, E-Commerce – Meaning, Concept and Scope, Types of E-Commerce, Applications of E-Commerce: E Banking, E Trading and E Payment.

REFERENCE BOOKS:

1. Koontz and Weihrich-Essentials of Management, McGraw-Hill
2. George R. Terry, Stephen G. Franklin: Principles of Mangement, A I T B S Publishers & Distributors
3. IT For Management – Making Connections For Strategic Advantage – Turban Mclean And Wetherbe
4. IT Systems Management – Rich Schiesser
5. Daft Richard L. – Management – Thomson.
6. Certo-Modern Management prentice hall
7. L.M. Prasad-Principles of Management
8. R.M. Srivastara-Principles of Management
9. Peter Drucker- Essentials of management

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IV B.Tech. I-Sem (CSE&BS)

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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

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & BUSINESS SYSTEMS

IV B.Tech, I-Sem (CSE&BS)

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.

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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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IV B.Tech, II-Sem (CSE&BS)

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

		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.	