SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(AUTONOMOUS)

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B.Tech - R23 Regulations

(Applicable for 2023-2024 Regular Students & 2024-2025 Lateral Students)

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

Academic Regulations (R23) for B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year 2023-2024 onwards)

1. AWARD OF THE DEGREE

(a) Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils the following:

   (i) Pursues a course of study for not less than four academic years and not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Eight years).

   (ii) Registers for ***160 credits*** *and* ***secures all 160 credits***.

(b) Award of B.Tech. degree with Honors
A student will be declared eligible for the award of the B.Tech. with Honors if he/she fulfils the following:

   (i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 160 credits.

   (ii) Registering for Honors is optional.

   (iii) Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil 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 and their admission stands cancelled. This clause shall be read along with clause 1 a) i).

3. ADMISSIONS

Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/University from time to time. Admissions shall be made either based on the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. PROGRAM RELATED TERMS

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

Credit definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hrs. Practical (Lab) per week	1 credit

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

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

5. SEMESTER/CREDITS:

i) A semester comprises 90 working days and an academic year is divided into two semesters.

ii) The summer term is for eight weeks during summer vacation. Internship/ apprenticeship / work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.

iii) Regular courses may also be completed well in advance through MOOCs satisfying prerequisites.

6. STRUCTURE OF THE UNDERGRADUATE PROGRAMME

All courses offered for the undergraduate program (B. Tech.) are broadly classified as follows:

S.No.	Category	Breakup of Credits (Total 160)	Percentage of total credits	AICTE Recommendation (%)
1.	Humanities and Social Science including Management (HM)	13	8 %	8 – 9%
2.	Basic Sciences (BS)	20	13 %	12 - 16%
3.	Engineering Sciences (ES)	23.5	14%	10 – 18%
4.	Professional Core (PC)	54.5	34 %	30 – 36%
5.	Electives – Professional (PE) & Open (OE); Domain Specific Skill Enhancement Courses (SEC)	33	21 %	19 - 23%
6.	Internships & Project work (PR)	16	10 %	8 – 11%
7.	Mandatory Courses (MC)	Non-credit	Non-credit	-

7. COURSE CLASSIFICATION:

All subjects/ courses offered for the undergraduate programme in Engineering & Technology (B.Tech. degree programmes) are broadly classified as follows:

S.No.	Broad Course Classification	Course Category	Description
1.	Foundation Core Courses	Foundation courses	Includes Mathematics, Physics and Chemistry. Fundamental engineering courses; humanities, social sciences, and management courses
2.	Core Courses	Professional Core Courses (PC)	Includes subjects related to the parent discipline / department / branch of Engineering.
3.	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include interdisciplinary Subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering
		Domain Specific skill Enhancement Courses (SEC)	Interdisciplinary/Job-oriented/domain courses which are relevant to the industry
4.	Project & Internships	Project	B.Tech. Project or Major Project
		Internships	Summer Internships – Community based and Industry Internships; Industry oriented Full Semester Internship
5.	Audit Courses	Mandatory non-credit Courses	Covering subjects of developing desired attitude among the learners

8. PROGRAMME PATTERN

i. Total duration of the of B. Tech (Regular) Programme is four academic years.

ii. Each academic year of study is divided into two semesters.

iii. Minimum number of instruction days in each semester is 90 days.

iv. 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., are included as per the guidelines issued by AICTE.
v. Health/wellness/yoga/sports and NSS /NSS /Scouts & Guides / Community service activities are made mandatory as credit courses for all the undergraduate students.
vi. Courses like Environmental Sciences, Indian Constitution, Technical Paper Writing & IPR are offered as non-credit mandatory courses for all the undergraduate students.
vii. Design Thinking for Innovation & Tinkering Labs are made mandatory as credit courses for all the undergraduate students.
viii. Increased flexibility for students through an increase in the elective component of the curriculum, with 05 Professional Elective courses and 04 Open Elective courses.
ix. Professional Elective Courses, include the elective courses relevant to the chosen specialization/branch. Proper choice of professional elective courses can lead to students specializing in emerging areas within the chosen field of study.
x. A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for B.Tech. Degree with a Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.
xi. While choosing the electives, students shall ensure that they do not opt for the courses with syllabus contents similar to courses already pursued.
xii. A pool of interdisciplinary/job-oriented/domain skill courses which are relevant to the industry are integrated into the curriculum of all disciplines. There shall be 05 skill-oriented courses offered during III to VII semesters. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain/interdisciplinary courses and the other shall be a soft skills course.
xiii. Students shall undergo mandatory summer internships, for a minimum of eight weeks duration at the end of second and third year of the programme. The internship at the end of second year shall be community oriented and industry internship at the end of third year.
xiv. There shall also be mandatory full internship in the final semester of the programme along with the project work.
xv. Undergraduate degree with Honors is introduced by the Institution for the students having good academic record.
xvi. Departments shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.

xvii. Institution shall assign a faculty advisor/mentor after admission to a group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.

xviii. Preferably 25% of course work for the theory courses in every semester shall be conducted in the blended mode of learning.

9. EVALUATION PROCESS

The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. Summer Internships shall be evaluated for 50 marks, Full Internship &Project work in final semester shall be evaluated for 200 marks, mandatory courses with no credits shall be evaluated for 30 mid semester marks.

A student has to secure not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester and end examination marks taken together for the theory, practical, design, drawing subject or project etc. In case of a mandatory course, he/she should secure 40% of the total marks.

Theory Courses:

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

i) For theory subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

ii) For practical subject, the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.

iii) If any course contains two different branch subjects, the syllabus shall be written in two parts with 3 units each (Part-A and Part-B) and external examination question paper shall be set with two parts each for 35 marks.

iv) If any subject is having both theory and practical components, they will be evaluated separately as theory subject and practical subject. However, they will be given same subject code with an extension of 'T' for theory subject and 'P' for practical subject.

a) Continuous Internal Evaluation

i) For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination shall be evaluated for 30 marks of which 10 marks for objective paper (20 minutes duration), 15 marks for subjective paper (90 minutes duration) and 5 marks for assignment.

ii) Objective paper shall contain for 05 short answer questions with 2 marks each or maximum of 20 bits for 10 marks. Subjective paper shall contain 3 either or type questions (totally six questions from 1 to 6) of which student has to answer one from each either-or type of questions. Each question carries 10 marks. The marks obtained in the subjective paper are condensed to 15 marks.

Note:

- The objective paper shall be prepared in line with the quality of competitive examinations questions.
- The subjective paper shall contain 3 either or type questions of equal weightage of 10 marks. Any fraction shall be rounded off to the next higher mark.
- The objective paper shall be conducted either online or offline by the respective institution on the day of subjective paper test.
- If conducted offline, the midterm examination shall be conducted first by distribution of the Objective paper, simultaneously marking the attendance, after 20 minutes the answered objective paper shall be collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet shall be distributed. After 90 minutes the answered booklets are collected back.
- Assignments shall be in the form of problems, mini projects, design problems, slip tests, quizzes etc., depending on the course content. It should be continuous assessment throughout the semester and the average marks shall be considered.

iii) If the student is absent for the mid semester examination, no re-exam shall be conducted and mid semester marks for that examination shall be considered as zero.

iv) First midterm examination shall be conducted for I, II units of syllabus with one either or type question from each unit and third either or type question from both the units. The second midterm examination shall be conducted for III, IV and V units with one either or type question from each unit.

v) Final mid semester marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage given to the better mid exam and 20% to the other.

For Example:

Marks obtained in first mid: 25 Marks
obtained in second mid: 20
Final mid semester Marks: (25x0.8) + (20x0.2) = 24

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

For Example:

Marks obtained in first mid: Absent
Marks obtained in second mid: 25
Final mid semester Marks: (25x0.8) + (0x0.2) =20

b) End Examination Evaluation:
End examination of theory subjects shall have the following pattern:

i) There shall be 6 questions and all questions are compulsory.
ii) Question I shall contain 10 compulsory short answer questions for a total of 20marks such that each question carries 2 marks.
iii) There shall be 2 short answer questions from each unit.
iv) In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
v) The questions from 2 to 6 shall be set by covering one unit of the syllabus for each question.

End examination of theory subjects consisting of two parts of different subjects, for Example: Basic Electrical & Electronics Engineering and Basic Civil & Mechanical Engineering shall have the following pattern:

i) Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35 marks each.
ii) In each part, question 1 shall contain 5 compulsory short answer questions for a total of 5 marks such that each question carries 1mark.
iii) In each part, questions from 2 to 4, there shall be either/or type questions of 10 marks each. Student shall answer any one of them.
iv) The questions from 2 to 4 shall be set by covering one unit of the syllabus for each question.

Practical Courses:

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

a) For practical courses, there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks.

b) Day-to-day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the regularity/record/viva and 15 marks for the internal test.

c) The end examination shall be evaluated for 70 marks, conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.

- Procedure: 20 marks
- Experimental Work & Results: 30 marks
- Viva voce: 20 marks.

In a practical subject consisting of two parts (Eg: Basic Electrical & Electronics Engineering Lab), the end examination shall be conducted for 70 marks as a single laboratory in 3 hours.
The end examination shall be evaluated 35 marks in each part. Mid semester examination shall be evaluated as above for 30 marks (day-to-day evaluation 15 marks and internal examination 15 marks) in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

d) For the subject having design and/or drawing, such as Engineering Drawing, the distribution of marks shall be 30 for mid semester evaluation and 70 for end examination.

Assessment Method	Marks
Continuous Internal Assessment (CIA)	30
Semester End Examination (SEE)	70
Total	100

Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class.

And there shall be two midterm examinations in a semester for duration of 2 hours each for 15 marks with weightage of 80% to better mid marks and 20% for the other. The subjective paper shall contain 3 either or type questions of equal weightage of 5 marks. There shall be no objective paper in mid semester examination. The sum of day-to-day evaluation and the mid semester marks will be the final sessional marks for the subject.

The end examination pattern for Engineering Graphics, shall consists of 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other subjects related to design/drawing, multiple branches, etc is mentioned along with the syllabus.

e) There shall be no external examination for mandatory courses with zero credits. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates for 30 marks satisfying the conditions mentioned in item 1 & 2 of the regulations.

f) The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

10. SKILL ORIENTED COURSES

i) There shall be five skill-oriented courses offered during III to VII semesters.

ii) Out of the five skill courses two shall be skill-oriented courses from the same domain. Of the remaining three skill courses, one shall be a soft skill course and the remaining two shall be skill-advanced courses from the same domain/Interdisciplinary/Job oriented.

iii) The course shall carry 100 marks and shall be evaluated through continuous assessments during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the class / laboratory shall be evaluated for 30 marks by the concerned teacher based on the regularity/assignments/viva/mid semester test. The end examination similar to practical examination pattern shall be conducted by the concerned teacher and an expert in the subject nominated by the principal.

iv) The Head of the Department shall identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, coordinator and a senior Faculty member nominated by the Head of the Department shall monitor the evaluation process. The marks/grades shall be assigned to the students by the above committee based on their performance.

v) 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 or any other accredited bodies. If a student chooses to take a Certificate Course offered by external agencies, the credits shall be awarded to the student upon producing the Course Completion Certificate from the agency. 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.

vi) The recommended courses offered by external agencies, conversions and appropriate grades/marks are to be approved by the University at the beginning of the semester. The principal of the respective college shall forward such proposals to the University for approval.

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 University.

11. MASSIVE OPEN ONLINE COURSES (MOOCS):

A Student has to pursue and complete one course compulsorily through MOOCs approved by the Institution. A student can pursue courses other than core through MOOCs and it is mandatory to complete one course successfully through MOOCs for awarding the degree. A student is not permitted to register and pursue core courses through MOOCs.

A student shall register for the course (Minimum of either 8 weeks or 12 weeks) offered through MOOCs with the approval of Head of the Department. The Head of the Department shall appoint one mentor to monitor the student’s progression. The student needs to earn a certificate by passing the exam. The student shall be awarded the credits assigned in the curriculum only by submission of the certificate. Examination fee, if any, will be borne by the student.

Students who have qualified in the proctored examinations conducted through MOOCs platform can apply for credit transfer as specified and are exempted from appearing internal as well as external examination (for the specified equivalent credit course only) conducted by the university.

Necessary amendments in rules and regulations regarding adoption of MOOC courses would be proposed from time to time.

12. CREDIT TRANSFER POLICY

Adoption of MOOCs is mandatory, to enable Blended model of teaching-learning as also envisaged in the NEP 2020. As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the University shall allow up to a maximum of 20% of the total courses being offered in a particular programme i.e., maximum of 32 credits through MOOCs platform.

i) The Institution shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses.

ii) Student registration for the MOOCs shall be only through the respective department of the institution, it is mandatory for the student to share necessary information with the department.

iii) Credit transfer policy will be applicable to the Professional & Open Elective courses only.

iv) The concerned department shall identify the courses permitted for credit transfer.

v) The University/institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer.

vi) The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.

vii) The university shall ensure no overlap of MOOC exams with that of the university examination schedule. In case of delay in results, the university will re-issue the marks sheet for such students.

viii) Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.

ix) The institution shall submit the following to the examination section of the university:

    a) List of students who have passed MOOC courses in the current semester along with the certificate of completion.
    b) Undertaking form filled by the students for credit transfer.

x) The institutions shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall be permitted to register for MOOCs offered through online platforms approved by the Institution from time to time.

13. ACADEMIC BANK OF CREDITS (ABC)

The Institution has implemented Academic Bank of Credits (ABC) to promote flexibility in curriculum as per NEP 2020 to

i) Provide option of mobility for learners across the universities of their choice
ii) Provide option to gain the credits through MOOCs from approved digital platforms.
iii) Facilitate award of certificate/diploma/degree in line with the accumulated credits in ABC
iv) Execute Multiple Entry and Exit system with credit count, credit transfer and credit acceptance from students' account.

14. MANDATORY INTERNSHIPS SUMMER INTERNSHIPS

Summer Internships: Two summer internships either onsite or virtual each with a minimum of 08 weeks duration, done at the end of second and third years, respectively are mandatory. It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Power projects, software MNCs or any industries in the areas of concerned specialization of the Undergraduate program. One of the two summer internships at the end of second year (Community Service Project) shall be society oriented and shall be completed in collaboration with government organizations/NGOs & others. The other internship at the end of third year is Industry Internship and shall be completed in collaboration with Industries. The student shall register for the internship as per course structure after commencement of academic year. The guidelines issued by the APSCHE / University shall be followed for carrying out and evaluation of Community Service Project and Industry Internship.

Evaluation of the summer internships shall be through the departmental committee. A student will be required to submit a summer internship report to the concerned department and appear for an oral presentation before the departmental committee comprising of Head of the Department, supervisor of the internship and a senior faculty member of the department.

A certificate of successful completion from industry shall be included in the report. The report and the oral presentation shall carry 50% weight age each. It shall be evaluated for 50 external marks. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the Institutions.

Full Semester Internship and Project work:
In the final semester, the student should mandatorily register and undergo internship (onsite/virtual) and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship.

The project report shall be evaluated with an external examiner. The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Presentation/Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the University and is evaluated for 140 marks.

The institution shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.

15. GUIDELINES FOR OFFERING A MINOR

To promote interdisciplinary knowledge among the students, the students admitted into B.Tech. in a major stream/branch are eligible to obtain degree in Minor in another stream.

i) The Minor program requires the completion of 12 credits in Minor stream chosen.
ii) Two courses for 06 credits related to a Minor are to be pursued compulsorily for the minor degree, but maybe waived for students who have done similar/equivalent courses. If waived for a student, then the student must take an extra elective course in its place. It is recommended that students should complete the compulsory courses (or equivalents)

before registering for the electives.

iii) Electives (minimum of 2 courses) to complete a total of 12 credits.

Note: A total of 04 Open Electives are offered in the curriculum. A student can complete the requirement for Minor within the 160 credits by opting for the courses offered through various verticals/tracks under Open Electives.

16. GUIDELINES FOR OFFERING HONORS

The objective of introducing B.Tech. (Hons.) is to facilitate the students to choose additionally the specialized courses of their choice and build their competence in a specialized area in the UG level. The programme is a best choice for academically excellent students having good academic record and interest towards higher studies and research.

i) Honors is introduced in the curriculum of all B. Tech. programs offering a major degree and is applicable to all B. Tech (Regular and Lateral Entry) students admitted in Engineering & Technology.

ii) A student shall earn additional 15 credits for award of B.Tech.(Honors) degree from same branch/department/discipline registered for major degree. This is in addition to the credits essential for obtaining the Undergraduate degree in Major Discipline (i.e., 160 credits).

iii) A student is permitted to register for Honors in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to the Honors from V Semester onwards.

iv) The concerned Principal of the college shall arrange separate class work and timetable of the courses offered under Honors program.

v) Courses that are used to fulfil the student's primary major may not be double counted towards the Honors. Courses with content substantially equivalent to courses in the student's primary Major may not be counted towards the Honors.

vi) Students can complete the courses offered under Honors either in the college or in online platforms like SWAYAM with a minimum duration of 12 weeks for a 3-credit course and 8 weeks duration for a 2-credit course satisfying the criteria for credit mobility. If the courses under Honors are offered in conventional mode, then the teaching and evaluation procedure shall be similar to regular B. Tech courses.

vii) The attendance for the registered courses under Honors and regular courses offered for Major degree in a semester are to be considered separately.

viii) A student shall maintain an attendance of 75% in all registered courses under Honors to be eligible for attending semester end examinations.

ix) A student registered for Honors shall pass in all subjects that constitute the requirement for the Honors degree program. No class/division (i.e., second class, first class and distinction, etc.) shall be awarded for Honors degree programme.

x) If a student drops or is terminated from the Honors program, the additional credits so far earned cannot be converted into open or core electives; they will remain extra. However, such students will receive a separate grade sheet mentioning the additional courses completed by them.

xi) The Honors will be mentioned in the degree certificate as Bachelor of Technology (Honors) in XYZ. For example, B.Tech. (Honors) in Mechanical Engineering

Enrolment into Honors:

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

ii) The enrolment of student into Honors is based on the CGPA obtained in the major degree program. CGPA shall be taken up to III semester in case of regular entry students and only III semester in case of lateral entry students. Students having 7 CGPA without any backlog subjects will be permitted to register for Honors.

iii) If a student is detained due to lack of attendance either in Major or in Honors, registration shall be cancelled.

iv) Transfer of credits from Honors to regular B. Tech degree and vice-versa shall not be permitted.

v) Honors is to be completed simultaneously with a Major degree program.

Registration for Honors:

i) The eligible and interested students shall apply through the HOD of his/her parent department. The whole process should be completed within one week before the start of every semester. Selected students shall be permitted to register the courses under Honors.

ii) The selected students shall submit their willingness to the principal through his/her parent department offering Honors. The parent department shall maintain the record of student pursuing the Honors.

iii) The students enrolled in the Honors courses will be monitored continuously. An advisor/mentor from parent department shall be assigned to a group of students to monitor the progress.

iv) There is no fee for registration of subjects for Honors program offered in offline at the respective institutions.

17. ATTENDANCE REQUIREMENTS:

i) A student shall be eligible to appear for the University external examinations if he/she acquires a minimum of 40% attendance in each subject and 75% of attendance in aggregate of all the subjects. b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee (CAC).

ii) Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.

iii) A stipulated fee shall be payable towards condonation of shortage of attendance to the Institution.

iv) 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.

v) A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester from the date of commencement of class work.

vi) If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

vii) If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

viii) For induction programme attendance shall be maintained as per AICTE norms.

18. PROMOTION RULES:

The following academic requirements must be satisfied in addition to the attendance requirements mentioned in section 16.

i) A student shall be promoted from first year to second year if he/she fulfils the minimum attendance requirement as per university norms.

ii) A student will be promoted from II to III year if he/she fulfils the academic requirement of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) up to in the subjects that have been studied up to III semester.

iii) A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.

iv) And in case a student is detained for want of credits for a particular academic year by ii) & iii) above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the V semester or VII semester respectively as the case may be.
v) When a student is detained due to lack of credits/shortage of attendance he/she may be re-admitted when the semester is offered after fulfilment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

19. GRADING:

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:
After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

(a) Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
90 & above	Superior	10
80 - 89	A (Excellent)	9
70 - 79	B (Very Good)	8
60 - 69	C (Good)	7
50 - 59	D (Average)	6
40 - 49	E (Pass)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

i) A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.
ii) For non-credit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.
iii) Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):
iv) The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA = \Sigma (Ci \times Gi)/\Sigma Ci$$

where, Ci is the number of credits of the i^{th} subject and Gi is the grade point scored by the student in the i^{th} course.

The Cumulative Grade Point Average (CGPA) will be computed in the same manner considering all the courses undergone by a student over all the semesters of a program, i.e.,

$$CGPA = \Sigma (C_i \times S_i)/ \Sigma C_i$$

where "S_i" is the SGPA of the i^{th} semester and C_i is the total numberof credits up to that semester.

Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by the letters S, A, B, C, D and F.

(b) Award of Class:

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

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5 (Without any Supplementary Appearance)
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 5.0 < 5.5

Note: * Students who have written supplementary examinations to fulfil the credit requirement will not be awarded First Class with Distinction. For such students the highest degree that is awarded will be First Class Only.

CGPA to Percentage conversion Formula – (CGPA – 0.5) x 10

20. WITH–HOLDING OF RESULTS

If the candidate has any dues not paid to the institution or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld in such cases.

21. MULTIPLE ENTRY / EXIT OPTION

(a) Exit Policy:

The students can choose to exit the four-year programme at the end of first/second/third year.

i) **UG Certificate in (Field of study/discipline)** - Programme duration: First year (first two semesters) of the undergraduate programme, 40 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

ii) **UG Diploma (in Field of study/discipline)** - Programme duration: First two years (first four semesters) of the undergraduate programme, 80 credits followed by an additional exit 10-credit bridge course(s) lasting two months, including at least 6- credit job-specific internship/ apprenticeship that would help the candidates acquire job-ready competencies required to enter the workforce.

iii) **Bachelor of Science (in Field of study/discipline)** i.e., **B.Sc. Engineering in (Field of study/discipline)**- Programme duration: First three years (first six semesters) of the undergraduate programme, 120 credits.

(b) Entry Policy:

Modalities on multiple entry by the student into the B.Tech. programme will be provided in due course of time.

Note: The Universities / Institution shall resolve any issues that may arise in the implementation of Multiple Entry and Exit policies from time to time and shall review the policies in the light of periodic changes brought by UGC, AICTE and State government.

22. GAP YEAR CONCEPT:

Gap year concept for Student Entrepreneur in Residence is introduced and outstanding students who wish to pursue entrepreneurship / become entrepreneur are allowed to take a break of one year at any time after II year to pursue full-time entrepreneurship programme/to establish startups. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The principal of the respective college shall forward such proposals submitted by the students to the University.

An evaluation committee constituted by the University shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not.

23. TRANSITORY REGULATIONS

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for re-joining into the succeeding year of their B. Tech from the date of commencement of class work, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

24. MINIMUM INSTRUCTION DAYS FOR A SEMESTER:

The minimum instruction days including exams for each semester shall be 90 days.

25. MEDIUM OF INSTRUCTION

The medium of instruction of the entire B. Tech undergraduate programme in Engineering &Technology (including examinations and project reports) will be in English only.

26. STUDENT TRANSFERS:

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

27. GENERAL INSTRUCTIONS:

a) The academic regulations should be read as a whole for purpose of any interpretation.
b) Malpractices rules-nature and punishments are appended.
c) Where the words “he”, “him”, “his”, occur in the regulations, they also include “she”, “her”, “hers”, respectively.
d) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the Institution is final.
e) The Institution may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Universities.
f) In the case of any doubt or ambiguity in the interpretation of the guidelines given, the decision of the Head of the institution is final.

Academic Regulations (R23) for
B. Tech (Lateral Entry Scheme)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2024-2025 onwards)

1. AWARD OF THE DEGREE

(a) **Award of the B.Tech. Degree / B.Tech. Degree with a Minor if he/she fulfils th following:**

(i) Pursues a course of study for not less than three academic years and not more than six academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would in addition to the maximum period permitted for graduation (Six years).

(ii) Registers for 120 credits and secures all 120 credits.

(b) **Award of B.Tech. degree with Honors**

A student will be declared eligible for the award of the B.Tech. with Honors if he/she fulfils the following:

(i) Student secures additional 15 credits fulfilling all the requisites of a B.Tech. program i.e., 120 credits.

(ii) Registering for Honors is optional.

(iii) Honors is to be completed simultaneously with B.Tech. programme.

2. Students, who fail to fulfil the requirement for the award of the degree within six consecutive academic years from the year of admission, shall forfeit their seat.

3. MINIMUM ACADEMIC REQUIREMENTS

The following academic requirements have to be satisfied in addition to the requirements mentioned in item no.2

(i) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the mid semester evaluation and end examination taken together.

(ii) A student shall be promoted from III year to IV year if he/she fulfils the academic requirements of securing 40% of the credits (any decimal fraction should be rounded off to lower digit) in the subjects that have been studied up to V semester.

And in case if student is already detained for want of credits for particular academic year, the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

4. COURSE PATTERN

(i) The entire course of study is three academic years on semester pattern.

(ii) A student 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 next supplementary examination offered.

(iii) When a student is detained due to lack of credits/shortage of attendance the student may be re-admitted when the semester is offered after fulfilment of academic regulations, the student shall be in the academic regulations into which he/she is readmitted.

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

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B.Tech R23 - COURSE STRUCTURE AND SYLLABI

Semester I (First Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23BSC111T	Applied Chemistry	2	1	0	3	30	70	100
2	23BSC113T	Engineering Physics	2	1	0	3	30	70	100
3	23BSC114T	Linear Algebra and Calculus	2	1	0	3	30	70	100
4	23ESC114T	Introduction to Programming	2	1	0	3	30	70	100
5	23ESC111T	Basic Civil and Mechanical Engineering	2	1	0	3	30	70	100
6	23BSC115L	Applied Chemistry Lab	0	0	2	1	30	70	100
7	23BSC117L	Engineering Physics Lab	0	0	2	1	30	70	100
8	23ESC115L	Computer Programming Lab	0	0	3	1.5	30	70	100
9	23ESC117L	Engineering Workshop	0	0	3	1.5	30	70	100
10	23HSM113L	Health and wellness, Yoga and Sports	0	0	1	0.5	-	-	100
Contact Hours per week			10	5	11	-	-	-	-
Total Hours per week			26			-	-	-	-
Total credits						20.5	-	-	-
Total Marks							270	630	1000

Semester II (First Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23HSM111T	Communicative English	2	0	0	2	30	70	100
2	23BSC121T	Differential Equations and Vector Calculus	2	1	0	3	30	70	100
3	23ESC112T	Basic Electrical and Electronics Engineering	2	1	0	3	30	70	100
4	23CSE121T	Data Structures	2	1	0	3	30	70	100
5	23ESC113T	Engineering Graphics	1	0	4	3	30	70	100
6	23HSM112L	Communicative English Lab	0	0	2	1	30	70	100
7	23ESC116L	Electrical and Electronics Engineering Workshop	0	0	3	1.5	30	70	100
8	23CSE122L	Data Structures Lab	0	0	3	1.5	30	70	100
9	23ESC118L	IT Workshop	0	0	2	1	30	70	100
10	23HSM114L	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5	-	-	100
Contact Hours per week			09	3	15	-	-	-	-
Total Hours per week			27			-	-	-	-
Total credits						19.5	-	-	-
Total Marks							270	630	1000

Semester III (Second Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23BSC232T	Discrete Mathematics and Graph Theory	2	1	-	3	30	70	100
2	23HSM234T	Universal Human Values – Understanding Harmony and Ethical Human Conduct	2	1	-	3	30	70	100
3	23CSE231T	Advanced Data Structures and Algorithm Analysis	2	1	-	3	30	70	100
4	23CSE232T	Object Oriented Programming Through Java	2	1	-	3	30	70	100
5	23CSD231T	Introduction to Data Science	2	1	-	3	30	70	100
6	23CSE234L	Object Oriented Programming	-	-	3	1.5	30	70	100
7	23CSD232L	Data Science Lab	-	-	3	1.5	30	70	100
8	23CSE235L	Python Programming (Skill Enhancement Course)	-	1	2	2	30	70	100
9	23MAC231U	Environmental Science	2	-	-	-	30	-	P
Contact Hours per week			12	06	08	-	-	-	-
Total Hours per week			26			-	-	-	-
Total credits						20	-	-	-
Total Marks							270	560	800

Semester IV (Second Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23BSC242T	Optimization Techniques	2	-	-	2	30	70	100
2	23ESC232T	Digital Logic and Computer Organization	2	1	-	3	30	70	100
3	23CSE241T	Database Management Systems	2	1	-	3	30	70	100
4	23CSD241T	Data Engineering	2	1	-	3	30	70	100
5	23CSD242T	Statistical Methods for Data Science	2	1	-	3	30	70	100
6	23CSD243L	Data Engineering Lab	-	-	3	1.5	30	70	100
7	23CSE245L	Database Management Systems Lab	-	-	3	1.5	30	70	100
8	23CSD244L	Exploratory Data Analysis with Python (Skill Enhancement Course)	-	1	2	2	30	70	100
9	23ESC241I	Design Thinking and Innovation	1	-	2	2	30	70	100
Contact Hours per week			11	05	10	-	-	-	-
Total Hours per week			26			-	-	-	-
Total credits						21	-	-	-
Total Marks							270	630	900
Mandatory Community Service Project Internship of 06-08 weeks duration during summer Vacation									

Semester V (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSE242T	Operating Systems	2	1	-	3	30	70	100
2	23CSE243T	Software Engineering	2	1	-	3	30	70	100
3	23CSM241T	Machine Learning	2	1	-	3	30	70	100
4	PE-I	Professional Elective – I	3	-	-	3	30	70	100
5	OE-I	Open Elective – I	3	-	-	3	30	70	100
6	23ESC351T	Introduction to Quantum Technologies and Applications	3	-	-	3	30	70	100
7	23CSM243L	Machine Learning Lab	-	-	3	1.5	30	70	100
8	23CSD352L	Operating Systems and Software Engineering Case Tools Lab	-	-	3	1.5	30	70	100
9	23CSE247L	Full Stack Development - I (Skill Enhancement Course)	-	1	2	2	30	70	100
10	23MAC351U	Technical Paper Writing & IPR	2	-	-	-	30	-	P
11	23CSD351P	Evaluation of Community Service Project	-	-	-	2	-	100	100
Contact Hours per week			17	04	10	-	-	-	-
Total Hours per week			29			-	-	-	-
Total credits						25	-	-	-
Total Marks							300	730	1000

Semester VI (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSM361T	Deep Learning	2	1	-	3	30	70	100
2	23CSD351A	Data Visualization	2	1	-	3	30	70	100
3	23CSD361T	Predictive Analytics	2	1	-	3	30	70	100
4	PE-II	Professional Elective – II	3	-	-	3	30	70	100
5	PE-III	Professional Elective – III	3	-	-	3	30	70	100
6	OE-I	Open Elective – II	3	-	-	3	30	70	100
7	23CSD363L	Deep Learning and Data Visualization Lab (Using Power BI / Tableau)	-	-	3	1.5	30	70	100
8	23CSD364L	Predictive Analytics Lab	-	-	3	1.5	30	70	100
9	23HSM241L	Soft Skills (Skill Enhancement Course)	-	1	2	2	30	70	100
10	23ESC352L	Tinkering Lab	-	-	2	1	30	70	100
11	23CSD361P	Domain Specific Workshop	-	-	-	-	50	-	-
Contact Hours per week			15	04	10	-	-	-	-
Total Hours per week			29			-	-	-	-
Total credits						24	-	-	-
Total Marks							350	700	1000

Semester VII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSD471T	Big Data Analytics	2	1	-	3	30	70	100
2	MSE	Management Science Elective	2	-	-	2	30	70	100
3	PE-IV	Professional Elective – IV	3	-	-	3	30	70	100
4	PE-V	Professional Elective – V	3	-	-	3	30	70	100
5	OE-III	Open Elective – III	3	-	-	3	30	70	100
6	OE-IV	Open Elective – IV	3	-	-	3	30	70	100
7	23CSE356L	Full Stack Development - II (Skill Enhancement Course)	-	1	2	2	30	70	100
8	23CSD471P	Evaluation Industry Internship	-	-	-	2	-	100	100
9	23MAC471U	Gender Sensitization	2	-	-	-	30	-	P
Contact Hours per week			18	02	02	-	-	-	-
Total Hours per week			22			-	-	-	-
Total credits						21	-	-	-
Total Marks							240	590	800

Semester VIII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSD481P	Internship	-	-	24	4	-	100	100
2	23CSD482P	Project Work	-	-	-	8	30	70	100
Contact Hours per week			-	-	24	12	-	-	-
Total Hours per week			24			-	-	-	-
Total credits						12	-	-	-
Total Marks							30	170	200

Note:

1. *A student is permitted to register for Honours or a Minor in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to their Minor from V Semester onwards.*
2. *A student shall not be permitted to take courses as Open Electives / Minor / Honours with content substantially equivalent to the courses pursued in the student's primary major.*
3. *Minor & Honour tracks shall be offered for 18 credits over and above 163 Credits 05 theory courses of 3 credits each, practical courses of 1.5 credits each or project for 3 credits for Minors and Honours.*
4. *A student is permitted to select a Minor program only if the institution is already offering a Major degree program in that discipline.*
5. ***One Industry Visit** is Mandatory either in 3rd or 4th year*
6. *Student will undergo **ONE WEEK WORKSHOP** (domain specific) after the end of the FIFTH semester examination and it will be reflected in SIXTH semester for zero credits.*
7. ***One Expert Lecturer** in every semester (domain Specific) is mandatory.*

Professional Elective – I - Semester V (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSE351T	Automata Theory and Compiler Design	3	-	-	3	30	70	100
2	23CSE354B	Object Oriented Analysis and Design	3	-	-	3	30	70	100
3	23CSE354C	Internet of Things	3	-	-	3	30	70	100
4	23CSE354D	Soft Computing	3	-	-	3	30	70	100

Professional Elective – II - Semester VI (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSE352T	Computer Networks & Internet Protocols	3	-	-	3	30	70	100
2	23CSE362T	Cryptography & Network Security	3	-	-	3	30	70	100
3	23CSD362A	Social Network Analysis	3	-	-	3	30	70	100
4	23CSM363A	Recommender Systems	3	-	-	3	30	70	100

Professional Elective – III - Semester VI (Third Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSE361T	Cloud Computing	3	-	-	3	30	70	100
2	23CSE364A	Computer Vision	3	-	-	3	30	70	100
3	23CSE364D	Software Project Management	3	-	-	3	30	70	100
4	23CSM363C	Quantum Computing	3	-	-	3	30	70	100

Professional Elective – IV - Semester VII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSD472A	NoSQL Databases	3	-	-	3	30	70	100
2	23CSE363B	DevOps	3	-	-	3	30	70	100
3	23CSE471B	Block Chain Technology	3	-	-	3	30	70	100
4	23CSE471C	Software Architecture & Design Patterns	3	-	-	3	30	70	100

Professional Elective – V - Semester VII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23CSE472A	Agile Methodologies	3	-	-	3	30	70	100
2	23CSE472C	High Performance Computing	3	-	-	3	30	70	100
3	23CAI353T	Natural Language Processing	3	-	-	3	30	70	100
4	23CSM364B	Reinforcement Learning	3	-	-	3	30	70	100

Management Science Elective – Semester VII (Fourth Year)

S.No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23HSM471A	Business Ethics and Corporate Governance	3	-	-	3	30	70	100
2	23HSM471B	E-Business	3	-	-	3	30	70	100
3	23HSM471C	Management Science	3	-	-	3	30	70	100

Open Elective – I - Semester V (Third Year)

S.No	CourseCode	Offered Department	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE351A	CE	Green Buildings	3	-	-	3	30	70	100
2	23OCE351B		Construction Technology and Management	3	-	-	3	30	70	100
3	23OEE351A	EEE	Electrical Safety Practices and Standards	3	-	-	3	30	70	100
4	23OEC351A	ECE	Electronic Circuits	3	-	-	3	30	70	100
5	23OME351A	ME	Sustainable Energy Technologies	3	-	-	3	30	70	100
6	23OSH351A	Mathematics	Mathematics for Machine Learning and AI	3	-	-	3	30	70	100
7	23OSH351B	Physics	Materials Characterization Techniques	3	-	-	3	30	70	100
8	23OSH351C	Chemistry	Chemistry of Energy Systems	3	-	-	3	30	70	100
9	23OSH351D	Humanities	English for Competitive Examinations	3	-	-	3	30	70	100
10	23OSH351E		Entrepreneurship and New Venture Creation	3	-	-	3	30	70	100

Open Elective – II - Semester VI (Third Year)

S.No	CourseCode	Offered Department	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE361A	CE	Disaster Management	3	-	-	3	30	70	100
2	23OCE361B		Sustainability In Engineering Practices	3	-	-	3	30	70	100
3	23OEE361A	EEE	Renewable Energy Sources	3	-	-	3	30	70	100
4	23OEC361A	ECE	Digital Electronics	3	-	-	3	30	70	100
5	23OME361A	ME	Principles of Automation and Robotics	3	-	-	3	30	70	100
6	23OSH361A	Mathematics	Optimization Techniques for Engineers	3	-	-	3	30	70	100
7	23OSH361B		Mathematical Foundation Of Quantum Technologies	3	-	-	3	30	70	100
8	23OSH361C	Physics	Physics of Electronic Materials And Devices	3	-	-	3	30	70	100
9	23OSH361D	Chemistry	Chemistry of Polymers and Applications	3	-	-	3	30	70	100
10	23OSH361E	Humanities	Academic Writing and Public Speaking	3	-	-	3	30	70	100

Open Elective – III - Semester VII (Fourth Year)

S.No	CourseCode	Offered Department	Course Title	Scheme of Instructios Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE471A	CE	Building Materials and Services	3	-	-	3	30	70	100
2	23OCE471B		Environmental Impact Assessment	3	-	-	3	30	70	100
3	23OEE471A	EEE	Smart Grid Technologies	3	-	-	3	30	70	100
4	23OEC471A	ECE	Fundamentals of Microprocessors and Controllers	3	-	-	3	30	70	100
5	23OME471A	ME	3D Printing Technologies	3	-	-	3	30	70	100
6	23OSH471A	Mathematics	Wavelet transforms and its Applications	3	-	-	3	30	70	100
7	23OSH471B	Physics	Smart Materials and Devices	3	-	-	3	30	70	100
8	23OSH471C		Introduction to Quantum Mechanics	3	-	-	3	30	70	100
9	23OSH471D	Chemistry	Green Chemistry and Catalysis for Sustainable Environment	3	-	-	3	30	70	100
10	23OSH471E	Humanities	Employability Skills	3	-	-	3	30	70	100

Open Elective – IV - Semester VII (Fourth Year)

S.No	CourseCode	Offered Department	Course Title	Scheme of Instructios Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23OCE472A	CE	Geo-Spatial Technologies	3	-	-	3	30	70	100
2	23OCE472B		Solid Waste Management	3	-	-	3	30	70	100
3	23OEE472A	EEE	Electric Vehicles	3	-	-	3	30	70	100
4	23OEC472A	ECE	Transducers and Sensors	3	-	-	3	30	70	100
5	23OME472A	ME	Fundamentals of Quality Management	3	-	-	3	30	70	100
6	23OSH472A	Mathematics	Financial Mathematics	3	-	-	3	30	70	100
7	23OSH472B	Physics	Sensors And Actuators For Engineering Applications	3	-	-	3	30	70	100
8	23OSH472C	Chemistry	Chemistry Of Nanomaterial's and Applications	3	-	-	3	30	70	100
9	23OSH472D	Humanities	Literary Vibes	3	-	-	3	30	70	100
10	23OPEN472	OPEN	Introduction to Quantum Computing	3	-	-	3	30	70	100

S.No	Subject Area	Credit Mapping								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	**HSMC**	**0.5**	**3.5**	**3**	**-**	**-**	**-**	**2**	**-**	**9**
2	**BSC**	**11**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**19**
3	**ESC**	**9**	**8.5**	**-**	**5**	**3**	**1**	**-**	**-**	**26.5**
4	**PCC**	**-**	**4.5**	**12**	**12**	**12**	**12**	**3**	**-**	**55.5**
5	**SEC**	**-**	**-**	**2**	**2**	**2**	**2**	**2**	**-**	**10**
6	**PEC**	**-**	**-**	**-**	**-**	**3**	**6**	**6**	**-**	**15**
7	**OEC**	**-**	**-**	**-**	**-**	**3**	**3**	**6**	**-**	**12**
8	**PWC**	**-**	**-**	**-**	**-**	**2**	**-**	**2**	**12**	**16**
9	**AC**	**-**	**-**	**Y**	**-**	**Y**	**-**	**Y**	**-**	**-**
TOTAL		**20.5**	**19.5**	**20**	**21**	**25**	**24**	**21**	**12**	**163**

NOTE: ***HSMC*** *– Humanities, Social Science and Management Science Courses;* ***BSC*** *– Basic Science Courses;* ***ESC*** *– Engineering Science Courses;* ***PCC*** *– Professional Core Courses;* ***SEC*** *– Skill Enhancement Course;* ***PEC*** *– Professional Elective Courses;* ***OEC*** *– Open Elective Courses;* ***PWC*** *– Project Work Courses &* ***AC*** *– Audit Courses*

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B. Tech I Sem

23BSC111T	APPLIED CHEMISTRY	L	T	P	C
	(Common to EEE, ECE, CSE, CSE (AI&ML), CSE (AI) and CSE (DS))	2	0	0	2

COURSE EDUCATIONAL OBJECTIVES:

1. To train the students about the concept of Quantum Mechanics and Molecular Orbital theory.
2. To familiarize Knowledge and applications of modern engineering materials
3. To understand the concept of Electro Chemistry with its applications such as battery, fuel cells and sensors
4. To develop knowledge on the concept and applications of polymers
5. To introduce instrumental methods such as UV, IR and Chromatography with applications

UNIT-I:STRUCTURE AND BONDING MODELS (9)

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O2 and CO, etc. π- molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT-II:MODERN ENGINEERING MATERIALS (9)

Semiconductors, band diagram in solids, Semiconductor devices (p-n junction diode as rectifier and transistors)
Super conductors-Introduction basic concept, applications. Supercapacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

UNIT-III:ELECTROCHEMISTRY AND APPLICATIONS (9)

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).
Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.
Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT-IV:POLYMER CHEMISTRY (9)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.
Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.
Elastomers–Buna-S, Buna-N–preparation, properties and applications.
Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

UNIT-V:INSTRUMENAL METHODS AND APPLICATIONS (9)

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course the students will be able to		Pos
CO1	Demonstrate knowledge based on quantum mechanics and molecular orbital theory	PO1, PO2
CO2	Demonstrate knowledge on engineering materials with applications	PO1, PO2, PO6
CO3	Demonstrate knowledge on electrochemistry with analytical skills and applications such as battery, fuel cells and sensors	PO1, PO2, PO6
CO4	Demonstrate knowledge on polymers with applications related to society and sustainability	PO1, PO2, PO6,PO7
CO5	Demonstrate knowledge on principles and instrumentations of spectroscopy and chromatography	PO1, PO2

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.M. Lehn, Supra Molecular Chemistry, VCH Publications

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES (Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech I Sem

23BSC113T	ENGINEERING PHYSICS (Common to All Engineering Branches)	L	T	P	C
		2	1	0	3

COURSE EDUCATIONAL OBJECTIVES:

1. To study the intensity variation of light due to interference, diffraction and polarization
2. To understand the fundamental of crystals and their structures.
3. To recognize various types of polarization of dielectrics and classification of the magnetic materials.
4. To study the principles of quantum mechanics and implementing it the one-dimensional motion of particles and the band theory of solids.
5. To provide an overview of semiconductor and identification of type of semiconductor using Hall effect.

UNIT-I : WAVE OPTICS (9)

Interference: Introduction **-** Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.
Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit– Diffraction Grating -Applications
Polarization: Introduction -Types of polarization - Polarization by reflection, refraction andDouble refraction - Nicol's Prism -Half wave and Quarter wave plates. -Applications

UNIT-II :CRYSTALLOGRAPHY AND X-RAY DIFFRACTION (9)

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.
X- **ray diffraction:** Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods.

UNIT-III:DIELECTRIC AND MAGNETIC MATERIALS (9)

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation - complex dielectric constant – Frequency dependence of polarization – dielectric loss
Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT-IV:QUANTUM MECHANICS AND FREE ELECTRON THEORY (9)

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.
Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum freeelectron theory - Fermi-Dirac distribution - Density of states - Fermi energy.

UNIT-V:SEMICONDUCTORS (9)

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation - Hall effect and its applications

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Identify the importance and applications Wave Optics in various Streams of Engineering	PO1, PO2
CO2	Explain the fundamental of crystals and their structures	PO1, PO2
CO3	Elucidate the importance, properties and applications of Magnetic materials and dielectrics	PO1, PO2
CO4	Use ideas with mathematical solutions to Quantum mechanics and its applications in various atomic phenomena	PO1, PO2
CO5	Provide knowledge about semiconductor and different type of semiconductor using Hall effect.	PO1, PO2

TEXT BOOKS:

1. A Text book of Engineering Physics - M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy,
2. S. Chand Publications, 11th Edition 2019.
3. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).

REFERENCE BOOKS:

1. Solid State Physics, by Kittel, Wiley
2. Engineering Physics by Gaur and Gupta, Dhanpatrai Publications
3. Engineering Physics by K.Thyagarajan, McGraw Hill.

REFERENCE WEBSITE:

https://archive.nptel.ac.in/courses/122/107/122107035/

https://archive.nptel.ac.in/courses/112/106/112106293/

https://www.youtube.com/watch?v=6QUFuZpCgGw

https://archive.nptel.ac.in/courses/122/106/122106034/

https://www.youtube.com/watch?v=k6ZxP9Yr02E

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech I Sem

		L	T	P	C
23BSC114T	**LINEAR ALGEBRA & CALCULUS (Common to All Branches of Engineering)**	**2**	**1**	**-**	**3**

COURSE EDUCATIONAL OBJECTIVES:

1. To familiarize the concepts of matrices and mean value theorems and their applications in engineering.
2. To equip the students to solve various application problems in engineering through evaluation of multiple integrals etc.,
3. To equip the students with standard concepts and tools of mathematics to handle various real-world problems and their applications.

UNIT-I: MATRICES (9)

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method.Iterative methods: Jacobi and Gauss Seidel Methods.

UNIT-II:EIGEN VALUES, EIGEN VECTORS AND ORTHOGONAL TRANSFORMATION (9)

Eigen values, Eigenvectors and their properties, Diagonalization of a matrix, Cayley- Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley- Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: CALCULUS (9)

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT-IV:PARTIAL DIFFERENTIATION AND APPLICATIONS (MULTIVARIABLECALCULUS) (9)

Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT-V:MULTIPLE INTEGRALS(MULTIPLE VARIABLE CALCULUS) (9)

Double integrals, Triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas(by double integrals) and volumes (by double integrals and triple integrals).

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	To solve a system of homogenous and non-homogeneous linear equations	**PO1, PO2,PO3**
CO2	Develop and use of matrix algebra techniques that are needed by engineers for practical applications	**PO1, PO2,PO3**
CO3	Learn important tools of calculus in higher dimensions. Utilize mean value theorems to real life problems.	**PO1, PO2,PO3**
CO4	Familiarize with functions of several variables which is useful in optimization	**PO1, PO2,PO3**
CO5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.	**PO1, PO2,PO3**

TEXT BOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

REFERENCE BOOKS:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha ScienceInternational Ltd., 2021 5th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Micheael Greenberg, Pearson publishers, 9th edition
5. Higher Engineering Mathematics, H.K Das,Er.RajnishVerma,S.ChandPublications,2014, Third Edition (Reprint 2021)

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/110/105/111105111/
2. https://www.youtube.com/watch?v=8D3WViAyJvc
3. https://www.youtube.com/watch?v=fKzDtjq0ks4
4. https://www.youtube.com/watch?v=wMd4YRyBmjA
5. https://www.youtube.com/watch?v=ArkDa6d5h9I
6. https://www.youtube.com/watch?v=KgItZSst2sU
7. https://www.youtube.com/watch?v=-I3HUeHi1Ys

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech - I Sem

23ESC114T	**INTRODUCTION TO PROGRAMMING**	**L**	**T**	**P**	**C**
	(Common to all Branches)	**1**	**-**	**4**	**3**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce students to the fundamentals of computer programming.
2. To provide logical thinking and problem-solving skills using control structures.
3. To familiarize students with programming concepts such as data types, arrays and strings.
4. To introduce the concepts of pointers and user-define data types.
5. To encourage the students with functions and file handling mechanisms.

UNIT-1INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING (9)

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program-Algorithms, flowcharts. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operators and Expressions, Type Conversion, and Casting.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT-2CONTROL STRUCTURES (9)

Simple sequential programs, Conditional Statements (if, if-else, switch), Loops (for, while, do- while). Break and Continue.

UNIT-3ARRAYS AND STRINGS (9)

Arrays indexing, memory model, programs with array of integers, two dimensional arrays. Strings-Declaring and Initializing String Variables, Reading string from terminal, Writing string to the screen, String Handling Functions.

UNIT-4 POINTERS & USER DEFINED DATATYPES (9)

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers. User-defined data types-Structures and Unions.

UNIT-5 FUNCTIONS & FILE HANDLING (9)

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scopeand Lifetime of Variables. File Handling- Basic Operations on Files – File Handling Function.

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course the student will be able to,		**POs related to COs**
CO1	Understand basics of computers, the concept of algorithm and algorithmic thinking.	**PO1, PO2**
CO2	Analyze a problem and develop an algorithm and program using control structures to solve it.	**PO1, PO2, PO3**
CO3	Implement various programming concepts using arrays and strings.	**PO1,PO2, PO3,PO4**
CO4	Understand and implement more advanced features of pointers and user-defined data types.	**PO1, PO2, PO5**
CO5	Develop problem-solving using functions and file handling concepts.	**PO1, PO3,PO4, PO5**

TEXT BOOKS:

1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education,1996

REFERENCE BOOKS:

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, AProblem Solving Approach, Forouzan, Gilberg,Prasad,CENGAGE, 3rd edition

REFERENCE WEBSITES:

1. https://onlinecourses.swayam2.ac.in/cec22_cs11
2. https://onlinecourses.nptel.ac.in/noc22_cs40
3. https://www.geeksforgeeks.org

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech. - I Sem

		L	T	P	C
23ESC111T	**BASIC CIVIL AND MECHANICAL ENGINEERING (Part-B)**				
	(Common to All Branches)	2	1	-	3

(Part-A)

BASIC CIVIL ENGINEERING

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To study the Overview of civil engineering and basic concepts on construction materials.
2. To study the basic concepts in the field of surveying & Foundation Engineering
3. To study the basic transportation ,water resources and environmental engineering.

UNIT–1: INTRODUCTION TO CIVIL ENGINEERING (8)

BASICS OF CIVIL ENGINEERING: Overview of civil engineering — Civil engineering contributions to the welfare of society – Various disciplines of civil engineering – Basic concepts and scope of structural engineering, geo-technical engineering, transportation engineering, hydraulics , water resources engineering, and environmental engineering **CONSTRUCTION TECHNOLOGY:** Fundamental concepts of building planning for residential buildings and Sequences of Work in Building Construction – Introduction to Prefabricated construction Techniques & Green buildings concept **Construction Materials:** Cement – Aggregate – Bricks – Cement – Concrete – Steel – Timber – Modern materials. (Brief discussion only)

UNIT–2:SURVEYING & FOUNDATION ENGINEERING (8)

SURVEYING: Objectives of surveying – Horizontal measurements – Angular measurements – Introduction to bearings levelling instruments used for levelling – Simple problems on levelling and bearings– Contour mapping. (Brief discussion only) **FOUNDATIONS ENGINEERING:** Bearing capacity of soil, functions of foundations, types – shallow and deep- Load bearing and framed structures (Brief discussion only)

UNIT–3:TRANSPORTATION AND WATER RESOURCES AND ENVIRONMENTAL ENGINEERING (8)

TRANSPORTATION ENGINEERING: Importance of transportation in Nation's economic development – Types of highway pavements – Flexible pavements and rigid pavements – Simple differences– Basics concepts on harbor, tunnel, airport, and railway engineering. (Brief discussion only)

WATER RESOURCES AND ENVIRONMENTAL ENGINEERING: Introduction on water resources and environmental engineering – Sources of water – Quality of water and Specifications – Introduction to hydrology – Rainwater harvesting – Water storage and conveyance structures – Fundamental concepts on dams and reservoirs.
(Brief discussion only)

TOTAL HOURS: 24

(**Note:** The subject covers only the basic principles of Civil Engineering. The evaluation shall be intended to test only the fundamentals of the subject)

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.	**PO1, PO12**
CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying and Basics concepts of foundations engineering	**PO1, PO12**
CO3	Realize the importance of Transportation Water Resources and Environmental Engineering.	**PO1, PO12**

TEXT BOOKS:

1. G.Shanmugam and M.S.Palanichamy, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi , 1996.
2. Venugopal K,Prahu Raja V, "Basic Mechanical Engineering", Anuradha Publishers, Chennai, 2000.

REFERENCE BOOKS:

1. Materials Science and Engineering: An Introduction, William D. Callister, 9/e, 2014,Wiley India Pvt. Ltd.
2. Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology (SI Edition)", Pearson Education, New Delhi, 7/e, 2018.
3. Ian Gibson, David W.Rosen and Brent Stucker, "Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping and Direct Digital Manufacturing", Springer, 2/e, 2015.
4. V. Ganesan, "Internal Combustion Engines", Tata McGraw-Hill Education Pvt. Ltd., 4/e, 2012.
5. C P Arora, "Refrigeration and Air Conditioning", Tata McGraw-Hill Education Pvt. Ltd., Noida, 3/e, 2008.
6. M.Ehsani, Y.Gao,S.Gayand AliEmadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles" Fundamentals, Theory and Design", CRC Press, 2005
7. P.K.Nag, "Power Plant Engineering", McGraw-Hill Education Pvt. Ltd., New Delhi,4/e, 2014.
8. S.S.Rattan, "Theory of Machines and Mechanisms', Tata McGraw-Hill Education Pvt.Ltd, Noida, 5/e, 2019.
9. Industrial Robotics: Technology, Programming and Applications, Mikell P Groover, Mitchell Weiss, Roger N. Nagel, Nicholas G Odrey and Ashish Dutta 2/e, 2012, Tata McGraw-Hill Education Pvt. Ltd.,

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/112103316
2. https://nptel.ac.in/courses/112106293
3. https://nptel.ac.in/courses/112104290

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	1
CO.2	3	-	-	-	-	-	-	-	-	-	-	1
CO.3	3	-	-	-	-	-	-	-	-	-	-	1
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B.Tech. - I Sem

23ESC111T BASIC CIVIL AND MECHANICAL ENGINEERING L T P C

(Part-B)

(Common to All Branches) 3 - - 3

BASIC MECHANICAL ENGINEERING

(Part-B)

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To study the basic concepts materials, machining, and scope of mechanical engineering.
2. To study the basic concepts in the field of thermal engineering.
3. To study the basic principles of power plants, mechanical transmission system and fundamentals of robotics.

UNIT –1: INTRODUCTION TO MATERIALS & MANUFACTURING ENGINEERING(8)

Introduction to Mechanical Engineering: Role of mechanical engineering in industries and society – Technologies and scope in different sectors such as energy, manufacturing, design, automotive, aerospace, and marine. **Engineering Materials**: Introduction on metals-ferrous and non-ferrous, ceramics, composites, smart materials. **Manufacturing Processes:** Basic principles and applications of casting, forming, joining processes, and machining – Introduction to CNC machines, 3D printing, and smart manufacturing.

UNIT –2: INTRODUCTION TO THERMAL ENGINEERING (8)

Thermal Engineering: Working principle of boilers. **Refrigeration:** Refrigeration and air-conditioning cycles – Units of refrigeration – Refrigerants – Vapour-compression and absorption system. **Air Conditioning:** Terminology in air conditioning – Working principle of window, split, and central air conditioning system. **IC Engines:** Basic concepts on Otto cycle and Diesel cycle – Components of IC engines – SI/CI Engines – Working principle of two/four stroke petrol and diesel engines – Differences between petrol and diesel engines – Basic concepts on electric and hybrid vehicles.

UNIT –3: POWER PLANTS, MECHANICAL TRANSMISSION AND ROBOTICS (8)

Power Plants: Working principle of steam, diesel, hydro, gas turbine, and nuclear power plants. **Mechanical Power Transmission**: Belt drives, chain, rope drives, gear drives and their applications. **Introduction to Robotics**: Joints & links, configurations, and applications of robotics.

(**Note:** The subject covers only the basic principles of Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

TOTAL HOURS: 24

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the concepts of engineering materials and basic manufacturing process.	**PO1, PO2, PO3**
CO2	Describe the basic concepts of thermal engineering, refrigeration, air conditioning and IC engines.	**PO1, PO2, PO3**
CO3	Describe the working of different mechanical power transmission systems, power plants, and fundamentals of robotics.	**PO1, PO2, PO3**

TEXT BOOKS:

3. G.Shanmugam and M.S.Palanichamy, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi , 1996.
4. Venugopal K,Prahu Raja V, "Basic Mechanical Engineering", Anuradha Publishers, Chennai, 2000.

REFERENCE BOOKS:

1. Materials Science and Engineering: An Introduction, William D. Callister, 9/e, 2014,Wiley India Pvt. Ltd.
2. Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology (SI Edition)", Pearson Education, New Delhi, 7/e, 2018.
3. Ian Gibson, David W.Rosen and Brent Stucker, "Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping and Direct Digital Manufacturing", Springer, 2/e, 2015.
3. V. Ganesan, "Internal Combustion Engines", Tata McGraw-Hill Education Pvt. Ltd., 4/e, 2012.
4. C P Arora, "Refrigeration and Air Conditioning", Tata McGraw-Hill Education Pvt. Ltd., Noida, 3/e, 2008.
5. M.Ehsani, Y.Gao,S.Gayand AliEmadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles" Fundamentals, Theory and Design", CRC Press, 2005
6. P.K.Nag, "Power Plant Engineering", McGraw-Hill Education Pvt. Ltd., New Delhi,4/e, 2014.
7. S.S.Rattan, "Theory of Machines and Mechanisms', Tata McGraw-Hill Education Pvt.Ltd, Noida, 5/e, 2019.
8. Industrial Robotics: Technology, Programming and Applications, Mikell P Groover, Mitchell Weiss, Roger N. Nagel, Nicholas G Odrey and Ashish Dutta 2/e, 2012, Tata McGraw-Hill Education Pvt. Ltd.,

REFERENCE WEBSITE:

4. https://nptel.ac.in/courses/112103316
5. https://nptel.ac.in/courses/112106293
6. https://nptel.ac.in/courses/112104290

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	1
CO.2	3	-	-	-	-	-	-	-	-	-	-	1
CO.3	3	-	-	-	-	-	-	-	-	-	-	1
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B.Tech ISem

23BSC115L	APPLIED CHEMISTRY LAB (Common to EEE, ECE, CSE, CSE (AI&ML), CSE (AI) and CSE (DS))	L	T	P	C
		-	-	2	1

COURSE EDUCATIONAL OBJECTIVES:

1. Verify the fundamental concepts with experiments.
2. To provide solid foundation in chemistry laboratory to solve engineering problems
3. To apply theoretical principles in preparing polymers and nonmaterial's
4. To apply theoretical principles in estimating strength of acid, ferrous ion
5. To apply theoretical concept and principles in determining cell constant and conductance of solution, strength of acids by conduct metric titrations and PH metric titrations, redox potential,emf and viscosity
6. To experience the importance of theory by utilizing analytical tools such as pb-acid battery, colorimeter,ostwalds viscometer, potentiometer, conductivity meter and PH meter
7. To experience the importance of theory by performing spectroscopic investigations, using modern instrumental tools such as UV- spectrophotometer and IR spectrometer

LIST OF EXPERIMENTS:

1. Measurement of 10Dq by spectrophotometric method.
2. Conduct metric titration of strong acid (HCl) vs. strong base (NaOH)
3. Conduct metric titration of weak acid (CH3COOH) vs. strong base (NaOH)
4. Determination of cell constant and conductance of potassium chloride solutions
5. Potentiometry-determination of redox potentials and emfs (emf titration of Fe^{2+} with $cr2O7^{2-}$)
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a polymer (Bakelite).
8. Verification Lambert-Beer's law for KMnO4 by colorimetry.
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of ZnO nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry
13. Determination of molecular weight of a polymer using Ostwald viscometer
14. pH metric titration of strong acid (HCl) vs strong base (NaOH)

Note: Any TEN of the listed experiments are to be conducted, out of which any **TWO** experiments may be conducted in virtual mode.

REFERENCE BOOK:

1. "Vogel's Quantitative Chemical Analysis, 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar

COURSE OUTCOMES:

On the successful completion of the course students will be able to		**POs**
CO1	Demonstrate knowledge on preparation of bakerite and nanomaterial	**PO1**
CO2	Analyse ferrous iron colorimetry and ferrous iron by dichrometry, analyse acid in lead acid battery	**PO2**
CO3	Conduct investigations of lead in lead acid battery, wave length determination in spectrophotometer, conductometric titrations of acids and bases	**PO4**
CO4	Analyse using tools such as UV and IR spectrophotometers	**PO5**
CO5	Follow the ethical principles in implementing the programmes	**PO8**
CO6	Conduct experiments effectively as an individual and as a team member in a group	**PO9**
CO7	Communicate verbally and in written form the understanding about the	**PO10**

	experiments	
CO8	Continue updating their skill related to nanomaterials and battery and implementing programmes in future	**PO12**

CO-PO MAPPING:

CO/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**-**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech I sem

23BSC117L	ENGINEERING PHYSICS LAB (Common to All Engineering Branches)	L	T	P	C
		-	-	3	1.5

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. **To** Operate optical instruments like travelling microscope and spectrometer.
2. To Estimate the wavelengths of different colors using diffraction grating.
3. To Plot the intensity of the magnetic field of circular coil carrying current with distance.
4. To Calculate the band gap of a given semiconductor.
5. To verify the laws of stretched strings

LIST OF EXPERIMENTS

1. Determination of radius of curvature of a given Plano convex lens by Newton's rings.
2. Determination of thickness of a thin wire using wedge method
3. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
4. Determination of wavelength of Laser light using diffraction grating.
5. Determination of energy gap of a semiconductor using p-n junction diode.
6. Determination of particle size using laser source
7. Magnetic field along the axis of a current carrying circular coil by Stewart Gee'sMethod.
8. Determination of rigidity modulus of the material of the given wire using Torsionalpendulum.
9. Sonometer: Verification of laws of stretched string.
10. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration
11. Determination of temperature coefficients of a thermistor.
12. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any **TWO** experiments may be conducted in virtual mode.

REFERENCE BOOK:

1. A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. ChandPublishers, 2017.

WEB RESOURCE:

1. **URL**:www.vlab.co.in

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES (Autonomous)

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate Knowledge on measurement of various physical quantities using optical methods and fundamentals of magnetic fields	**PO1**
CO2	Identify different physical properties of materials like band gap, magnetic field intensity etc, for engineering and technological applications	**PO2**
CO3	Provide valid conclusions on phenomena Interference and Diffraction	**P04**
CO4	Follow the ethical principles in implementing the programs	**PO8**
CO5	Do experiments effectively as an individual and as a team member in a group.	**PO9**
CO6	Communicate verbally and in written form, the understanding about the experiments.	**PO10**
CO7	Continue updating their skill related to loops, pointers and files implementing programs in future.	**PO12**

CO-PO MAPPINNG:

CO/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	-
CO7	-	-	-	-	-	-	-	-	-	-	-	3
CO8	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**-**	**3**	**-**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech. – I Sem

		L	T	P	C
23ESC115L	**COMPUTER PROGRAMMING LAB**				
	(Common to All Branches)	**0**	**0**	**3**	**1.5**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge on flowchart and algorithm to the given problem
2. To exercise conditional and iterative statements to write C programs
3. To develop the skill of C programs using arrays, strings and functions.
4. To understand C programs using pointers, Structures and union.
5. To familiarize with file handling techniques.

Week 1
Familiarization with programming environment
i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
ii) Exposure to Turbo C, gcc
iii) Writing simple programs using printf(), scanf()

Week 2
Converting algorithms/flow charts into C Source code.
Developing the algorithms/flowcharts for the following sample programs
i) Sum and average of 3 numbers
ii) Conversion of Fahrenheit to Celsius and vice versa
iii) Simple interest Calculation

Week 3
Simple computational problems using arithmetic expressions.
i) Finding the square root of a given number
ii) Finding compound interest
iii) Area of a triangle using heron's formulae
iv) Distance travelled by an object

Week 4
Simple computational problems using the operator' precedence and associativity
i) Evaluate the following expressions.
   a. A+B*C+(D*E) + F*G
   b. A/B*C-B+A*D/3
   c. A+++B---A
   d. J= (i++) + (++i)
ii) Find the maximum of three numbers using conditional operator
iii) Take marks of 5 subjects in integers, and find the total, average in float

Week 5
Problems involving if-then-else structures.
i) Write a C program to find the max and min of four numbers using if-else.
ii) Write a C program to generate electricity bill.
iii) Find the roots of the quadratic equation.
iv) Write a C program to simulate a calculator using switch case.
v) Write a C program to find the given year is a leap year or not.

Week 6

Iterative problems e.g., the sum of series

i) Find the factorial of given number using any loop.
ii) Find the given number is a prime or not.
iii) Compute sine and cos series
iv) Checking a number palindrome
v) Construct a pyramid of numbers

Week 7

1D Array manipulation, linear search

i) Find the min and max of a 1-D integer array.
ii) Perform linear search on1D array.
iii) The reverse of a 1D integer array
iv) Find 2's complement of the given binary number.
v) Eliminate duplicate elements in an array.

Week 8

Matrix problems, String operations, Bubble sort

i) Addition of two matrices
ii) Multiplication two matrices
iii) Sort array elements using bubble sort
iv) Concatenate two strings without built-in functions
v) Reverse a string using built-in and without built-in string functions

Week 9

Pointers

i) Write a C program to find the sum of a 1D array using pointers
ii) Enter n students data using Pointers and display failed students list
iii) Demonstrate the arithmetic operations using pointers.
iv) Write a C Program using Pointers to Read in an Array of Integers and Print its Elements in Reverse Order

Week 10

Structures and Unions

i) Demonstrate the differences between structures and unions using a C program.
ii) Write a C program to find the total, average of n students using structures
iii) Write a C program to copy one structure variable to another structure of the same type.
iv) Write a C program to shift/rotate using bit fields.

Week 11

Simple functions using call by value, solving differential equations using Eulerstheorem.

i) Write a C function to calculate NCR value.
ii) Write a C function to find the length of a string.
iii) Write a C function to transpose of a matrix.
iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

Week 12

Recursive functions

i) Write a recursive function to generate Fibonacci series.
ii) Write a recursive function to find the GCD of two numbers.
iii) Write a recursive function to find the factorial of a number.

iv) Write a recursive function to find the sum of series.

Week 13

Simple functions using Call by reference.

i) Write a C program to swap two numbers using call by reference.
ii) Write a C program to copy one string into another using pointer.
iii) Write a C program to find no of lowercase, uppercase, digits and othercharacters using pointers.

Week 14

File operations

i) Write a C program to write and read text into a file.
ii) Write a C program to write and read text into a binary file using fread() and fwrite()
iii) Copy the contents of one file to another file.
iv) Write a C program to merge two files into the third
v) Write a C program to print last n characters of a given file.

Total Hours: 45

COURSE OUTCOMES:

After the successful completion of this course, the students able to:		POs related to COs
CO1	Read and understand the execution of programs written in C language.	**PO1**
CO2	Analyze the programs on control statements and arrays.	**PO2**
CO3	Design C programs which utilize memory efficiently using programming constructs like pointers.	**PO3**
CO4	Develop the programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C	**PO4**
CO5	Analyze and implement the advanced concepts on functions and File handling techniques.	**PO5**
CO6	Follow the ethical principles in implementing the programs	**PO8**
CO7	Do experiments effectively as an individual and as a team member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understanding about the experiments.	**PO10**
CO9	Continue updating their skill related to loops, pointers and files, implementing programs in future.	**PO12**

TEXT BOOKS:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

REFERENCE WEBSITES:

1. https://onlinecourses.swayam2.ac.in/cec22_cs11
2. https://onlinecourses.nptel.ac.in/noc22_cs40
3. https://www.geeksforgeeks.org.

CO-PO MAPPING:

CO-PO	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	
CO9												3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**		**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech. - I Sem

23ESC117L	**ENGINEERING WORKSHOP**	**L**	**T**	**P**	**C**
	(Common to All Branches)	**-**	**-**	**3**	**1.5**

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To provide exposure to the students with hands on experience on various basic engineering practices in civil, mechanical, and electrical engineering.

TRADE FOR EXERCISES:

1. **Demonstration:** Safety practices and precautions to be observed in workshop.
2. **Carpentry:** Familiarity with different types of woods and tools used in wood working and make following joints.
   a. Middle T lap joint or Half lap joint
   b. Mortise and tenon joint
   c. Dove tail joint or bridle joint
3. **Sheet Metal:** Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a. Tapered tray
   b. Conical funnel
   c. Elbow pipe
   d. Brazing
4. **Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.
   a. V fit
   b. Dove tail joint
   c. Semi-circular fit / Square fit
   d. Bicycle tire puncture
5. **House Wiring:** Familiarity with different types of basic electrical circuits and make the following connections.
   a. Parallel and series
   b. Two-way switch
   c. Godown lighting
   d. Tube light
   e. Three phase motor
   f. Soldering of wires
6. **Basic Machining:** Familiarity with different types of tools used in metal parts and practicing basic machining operation.
   a. Simple plain turning / simple step turning.
   b. Drilling and tapping
7. **Plumbing:** Familiarity with plumbing tools, Preparation of pipe joints with coupling for same diameter and with reducer for different diameters and make the following tap connections
   a. Single tap connections
   b. Multi tap connections.

TRADE FOR DEMONSTRATION:

1. **Foundry Trade:** Demonstration and practice on moulding tools and processes, preparation of green sand moulds for single and split patterns.

2. **Welding:** Demonstration and practice on Arc Welding and Gas welding Preparation of Lap joint and Butt joint.

TEXT BOOKS:

1. Serope Kalpak Jain and Steven R. Schmid, "Manufacturing Processing forEngineering Materials (SI Edition)", Pearson Education, New Delhi, 6/e, 2018.
2. P.N. Rao, "Manufacturing Technology - Foundry, Farming and Welding, Volume-I",Tata McGraw-Hill Education Pvt. Ltd., Noida, 5/e, 2018.

REFERENCE BOOKS:

1. Hajra Choudhury S.K and Nirjhar Roy, "Elements of Workshop Technology, Volume-I", Media Promoters and Publishers Pvt.Ltd, 15/e, 2010.
2. Roy A Lindberg, "Process and Materials of Manufacturing", Pearson Education, New Delhi, 4/e, 2015.
3. R.K. Jain, "Production Technology", Khanna publishers, New Delhi, 17/e, 2011.
4. R.K. Rajput, "A Textbook of Manufacturing Technology: Manufacturing Processes", Laxmi Publications (P) Ltd., New Delhi, 2/e, 2017.
5. "A Text book of Manufacturing Technology-I", P.C.Sharma, S.Chand& Company Pvt. Ltd., New Delhi, 1/e, 2011.

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/112/104/112104301/
2. https://nptel.ac.in/courses/112/107/112107219/

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate the knowledge on different tools used in carpentry, fitting, sheet metal, house wiring and plumbing sections and also basic machining process	PO1
CO2	Analyze the basic pipeline connection using different joints	PO2
CO3	Design and develop simple components by using different materials includes wood, GI sheet and MS plates	PO3
CO4	Apply basic electrical engineering tools on the house wiring practice	PO5
CO5	Follow the ethical principles in while doing the exercises.	PO8
CO6	Do the exercises effectively as an individual and as a team member in a group	PO9
CO7	Communicate verbally among team members and in written form, the understanding about the trade exercises.	PO10
CO8	Continue updating their skill related to trades.	PO12

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B.Tech I sem

23HSM113L	Health And Wellness, Yoga and Sports (Common to All branches of Engineering)	L	T	P	C
		0	0	1	0.5

COURSE EDUCATIONAL OBJECTIVES:

1. To maintain their mental and physical wellness upright and develop ability in them to cope up with the stress arising in the life.
2. To create space in the curriculum to nurture the potential of the students in sports/games/yoga etc.
3. To introduce a practice oriented introductory course on the subject.

COURSE OUTCOMES:

After completion of the course the student will be able to

1. Be Physical fit to perform daily routine without undue fatigue.
2. Be Mentally alert and Socially Cohesive
3. Consider success and failure equally.
4. Develop Positive Personality
5. Improve Leadership qualities

UNIT-I:

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

ACTIVITIES:

1. Organizing health awareness programmes in community
2. Preparation of health profile
3. Preparation of chart for balance diet for all age groups

UNIT- II:

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

ACTIVITIES:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT-III:

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

ACTIVITIES:

1. Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc.

   Practicing general and specific warm up, aerobics

2. Practicing cardio respiratory fitness, treadmill, run test, 9 min walk, skipping and running.

REFERENCE BOOKS:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, Inc.2014

GENERAL GUIDELINES:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

EVALUATION GUDIELINES:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.

A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

23BSC121T	**DIFFERENTIAL EQUATIONS AND VECTOR (COMMON TO ALL BRANCHES OF ENGINEERING)**	**L**	**T**	**P**	**C**
		2	**1**	**-**	**3**

COURSE EDUCATIONAL OBJECTIVES:

1. To enlighten the learners in the concept of differential equations and multivariable calculus.
2. To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications

UNIT-I: DIFFERENTIAL EQUATIONS OF FIRST ORDER AND FIRST DEGREE (9)

Linear differential equations – Bernoulli's equations - Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay, Electrical circuits.

UNIT-II:LINEAR DIFFERENTIAL EQUATIONS OF HIGHER ORDER (CONSTANT COEFFICIENTS) (9)

Definitions,homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskean, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT-III:PARTIAL DIFFERENTIAL EQUATIONS (9)

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method and Non-Linear (Standard forms) equations. Homogeneous Linear Partial differential equations with constant coefficients (Method of Separation of variables).

UNIT-IV: VECTOR DIFFERENTIATION (9)

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT-V:VECTOR INTEGRATION (9)

Line Integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Solve the first order differential equations related to various engineering fields	PO1, PO2,PO3
CO2	Solve the higher order differential equations related to various engineering fields.	PO1, PO2,PO3
CO3	Identify solution methods for partial differential equations that model physical processes.	PO1, PO2,PO3
CO4	Interpret the physical meaning of different operators such as gradient, curl and divergence.	PO1, PO2,PO3
CO5	Estimate the work done against a field, circulation and flux using vector calculus	PO1, PO2,PO3

TEXT BOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

REFERRENCE BOOKS:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. Ramana, , McGraw Hill Education, 2017

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/111/106/111106100/
1. https://www.youtube.com/watch?v=OBhZvyhc8JQ&t=982s
2. https://nptel.ac.in/courses/111/106/111106100/
3. https://www.youtube.com/watch?v=3zCdNO2xp3s
4. https://www.youtube.com/watch?v=GFKggEkKtLM
5. https://www.youtube.com/watch?v=SZCsFS9izfQ
6. https://www.youtube.com/watch?v=ma1QmE1SH3I

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech II sem

23HSM111T	COMMUNICATIVE ENGLISH (Common to All Branches of Engineering)	L	T	P	C
		3	0	0	3

COURSE EDUCATIONAL OBJECTIVES

The main objective of introducing this course, *communicative* English ,is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

UNIT-I: HUMAN VALUES-GIFT OF MAGI (SHORT STORY) (9)

Listening: Identifying the topic, the context and specific pieces of information bylistening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar to pics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces ofinformation.
Writing: Mechanics of Writing-Capitalization, Spelling Punctuation – Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures - forming questions
Vocabulary: Synonyms, Antonyms, Affixes(Prefixes/Suffixes),Root words.

UNIT-II: NATURE-THE BROOK BY ALFRED TENNYSON (POEM) (9)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audiotexts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices-linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones ,Homographs.

UNIT-III: BIOGRAPHY-ELON MUSK (9)

Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific to pics in pairs or small groups and reporting what is discussed
Reading: Reading at extindetailby making basic inferences-recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing,Note-making,paraphrasing
Grammar: Verbs-tenses;subject-verbagreement;Compoundwords,Collocations
Vocabulary: Compoundwords,Collocations

UNIT-IV: INSPIRATION-THE TOYS OF PEACE BY SAKI (9)

Listening: Making predictions while listening to conversations/ transactional dialogues without video;listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) –asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, revealtrends/patterns/relationships, communicate processes or display complicateddata.
Writing: Letter Writing:Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary: Words often confused, Jargons

UNIT-V: MOTIVATION-The Power of Intrapersonal Communication (An Essay) (9)

Listening: Identifying key terms,understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Writing: Writing structure dessayson specific topics.
Grammar: Editing short texts–identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
Vocabulary: Technical Jargons

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course the student will enable to		PO
CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues.	PO1
CO2	Apply grammatical structures to formulate sentences and correct word forms.	PO5
CO3	Analyzed is course markers to speak clearly on a specific topic in informal discussions	PO2
CO4	Evaluate reading/listening texts and To write summaries based On global comprehension of these texts.	PO6
CO5	Create a coherent paragraph,essay, and resume.	PO4

TEXT BOOKS:

1. Pathfinder:CommunicativeEnglishforUndergraduateStudents,1st Edition, Orient BlackSwan, 2023
2. Empowering with Language byCengagePublications,2023

REFERENCE BOOKS:

1. Dubey,ShamJi&Co. EnglishforEngineers, VikasPublishers,2020
2. Bailey,Stephen.Academicwriting:AHandbookforInternationalStudents.R outledge,2014
3. Murphy,Raymond.EnglishGrammarinUse,FourthEdition,CambridgeUniv ersityPress,2019.
4. Lewis,Norman.WordPowerMadeEasy-TheCompleteHandbookforBuildingaSuperiorVocabulary.Anchor,2014.

REFERENCE WEBSITES:

GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/

3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B.Tech- IISem

23ESC112T	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	L	T	P	C
	(Common to All branches of Engineering)	3	0	0	3

PART A: BASIC ELECTRICAL ENGINEERING

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Apply fundamental circuit theories to both DC and AC circuits, and analyze the complex circuit configurations.
2. Gain proficiency in understanding, operating, and analyzing electrical machines and their applications in various industries and understanding the concept of measuring instruments
3. Gain knowledge about various energy resources and understand the concept of electrical energy consumption, billing mechanism, and safety measures.

UNIT-1: DC & AC CIRCUITS:

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase and phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT-2: MACHINES AND MEASURING INSTRUMENTS:

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor (v) Alternator, Applications of electrical machines.
Measuring Instruments: Construction and working principle of Moving Coil and Moving Iron Instruments, Dynamometer Wattmeter, Energy meter and Wheat Stone bridge.

UNIT-3: ENERGY RESOURCES, ELECTRICITY BILL & SAFETY MEASURES:

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Thermal, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

COURSE OUTCOMES:

On successful completion of the course the student could be		PO
CO1	Demonstrate the ability to analyze and solve complex DC and AC circuits, and analyze the complex circuit configurations.	PO1, PO2, PO3,
CO2	Comprehend the construction, principles, and operation of DC and AC machines, and analyze the working principles of various measuring instruments	PO1, PO2, PO3,
CO3	Evaluate different energy resources and Calculate electricity bills and understand the importance of safety measures.	PO1, PO2, PO3,

TEXTBOOKS:

1. D. C. Kulshreshtha, Basic Electrical Engineering, Tata McGraw Hill, 2019, First Edition
2. P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, Power System Engineering, 2013
3. Rajendra Prasad, Fundamentals of Electrical Engineering, PHI publishers, 2014, Third Edition

REFERENCE BOOKS:

1. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Mc Graw Hill, 2019,FourthEdition
2. V.K. Mehtha, S.Chand Technical Publishers, “Principles of Power Systems”, 2020

3.M.S.Naidu,S.kamakshiah"Basic Electrical Engineering", Mc Graw Hill, 2019, Fourth Edition

4.T.K.Nagsarkar,M.S.Sukilja “Basic Electrical Engineering”, Oxford Higher education,

WEB RESOURCES:

1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

CO-PO MAPPING:

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

PART B: BASIC ELECTRONICS ENGINEERING

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Gain the knowledge on basic semiconductor devices
2. Acquire the knowledge on electronic circuits and instrumentation.
3. Understand the principles of digital electronics, combinational circuits and sequential circuits

UNIT-1: SEMICONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.

UNIT-2: BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT-3: DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

COURSE OUTCOMES:

On successful completion of the course the student could be		POs
CO1	Understand the concept and working of diodes, transistors, and their applications.	PO1, PO2, PO3, PO12
CO2	Analyze the electronic circuits and instrumentation	PO1, PO2, PO3, PO12
CO3	Familiarize with the number systems, codes, Boolean algebra and logic gates and understand the working of different combinational & sequential circuits.	PO1, PO2, PO3, PO12

TEXTBOOKS:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. 2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

REFERENCE BOOKS:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
3. S. Salivahanan, N. Suresh Kumar, Electronic Devices & Circuits, third edition.

WEB RESOURCES:

1. https://archive.nptel.ac.in/courses/108/101/108101091/
2. https://archive.nptel.ac.in/courses/117/103/117103063/
3. https://archive.nptel.ac.in/courses/117/107/117107095/
4. https://archive.nptel.ac.in/courses/122/106/122106025/
5. https://archive.nptel.ac.in/courses/122/106/122106026/

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	-	-	-	-	-	2
CO2	3	2	2	-	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**2**									**2**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B.Tech. – II Sem

23ESC113T	**ENGINEERING GRAPHICS**	**L T P C**
	(Common to All Branches)	**3 0 0 3**

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To expose them to national standards related to technical drawings and develop knowledge of basic engineering curves.
2. To develop drawing skills for communication of concepts, ideas and design of projections of points, lines and planes.
3. To develop geometrical shapes and multiple views of projections of solids.
4. To develop drawing skills for communication of concepts, ideas and design the development of surfaces of section of solids.
5. To develop geometrical shapes and multiple views of orthographic projections of isometric views.

UNIT –1: ENGINEERING CURVES AND SCALES (9)

Introduction: Introduction about lines, lettering and dimensioning – Geometrical constructions and constructing regular polygons by general methods. **Engineering Curves:** Construction of ellipse, parabola and hyperbola by general method – Construction of cycloids – Construction involutes – Drawing of tangents and normal to the above curves. **Scales:** Plain scales, and diagonal.

UNIT –2: PROJECTION OF POINTS, LINES AND PLANE SURFACES (12)

Projection of Points: Principles of orthographic projection – Reference lines and Plane – Projections of points. **Projection of Lines:** Projections of lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane – Determination of true lengths, true inclinations by rotating line and trapezoidal method. **Projection of Planes:** Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT –3: PROJECTION OF SOLIDS (12)

Projection of Solids: Types of solids – Projection of simple solids (prisms, pyramids, cylinder and cone) – Axis perpendicular to horizontal plane, axis perpendicular to vertical plane and axis parallel to both the reference planes, projection of solids with axis inclined to one reference plane and parallel to another plane.

UNIT –4: SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES (12)

Section of Solids: Sectioning of right regular solids like prisms, pyramids, cylinder and cone – Solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other plane – Obtaining true shape of section. **Development of Surfaces:** Development of Surfaces: Development of lateral surfaces of simple and sectioned solids like prisms, pyramids, cylinder and cone.

UNIT –5: ISOMETRIC PROJECTIONS AND ORTHOGRAPHIC PROJECTIONS (9)
Isometric Projection: Principles of isometric projection – Isometric scale – Isometric views of simple solids and truncated solids like prisms, pyramids, cylinder, sphere, and cone. **Orthographic Projections:** Visualization principles – Plane of projections – Representation of three-dimensional objects – Sketching of multiple views from pictorial views – Conversion of isometric views to orthographic views – Conversion of orthographic views to isometric views.

COMPUTER GRAPHICS (Not for Examination) (3)
Practicing of simple 2D and 3D drawings of objects using Auto CAD

Total Hours: 60

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Construct the Engineering curves and generate tangent and normal for those curves.	**PO1, PO2, P03, P10, PO12**
CO2	Draw the projection of points, lines and plane surfaces.	**PO1, PO2, P03, P10, PO12**
CO3	Draw the projection of solids, like prisms, pyramids, cylinder, and cone.	**PO1, PO2, P03, P10, PO12**
CO4	Draw the section of solids and development of surfaces.	**PO1, PO2, P03, P10, PO12**
CO5	Draw the isometric projections and orthographic views.	**PO1, PO2, P03, P10, PO12**

TEXT BOOKS:

1. N.D. Bhatt and V. M. Panchal, “Engineering Drawing”, Charotar Publishing House, 50th edition, 2010.
2. M.B.Shah and B.C.Rana , “Engineering Drawing”, Pearson Education, 2/e, 2009.

REFERENCE BOOKS:

1. K.L.Narayana and P.Kannaiah, “Engineering Drawing”, 2/e, 2012, Scitech Publishers.
2. Luzzader, Warren.J and Duff,John M, “Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production”, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
3. K.Venugopal and V.Prabhu Raja ,”Engineering Graphics", New Age International (P) Limited, 2008.
4. Basant Agarwal and C.M.Agarwal ,”Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, , 2008,
5. K.V.Natrajan , “A Text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai. 2009.
6. Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/112/102/112102304/
2. https://nptel.ac.in/courses/112/105/112105294/
3. https://nptel.ac.in/courses/112/103/112103019/
4. https://nptel.ac.in/courses/112/104/112104172/

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B.Tech. – II Sem

23CSE121T	DATA STRUCTURES	L	T	P	C
	(Common to CSE, CSE (AI&ML), CSE (AI) and CSE (DS))	2	1	0	3

PRE-REQUISITES: COMPUTER

PROGRAMMING COURSE

OBJECTIVES:
1. To provide the knowledge of basic data structures and their implementations.
2. To understand importance of data structures in context of linked list concept.
3. To develop skills to apply appropriate data structures in problem solving using stacks.
4. To understand and implement the data structures using queue concept.
5. To provide knowledge about trees and hashing concepts.

UNIT-1 **(9)**

Introduction to Linear Data Structures: Definition and importance of Linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexityanalysis for linear data structures. Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Insertion Sort

UNIT- 2 **(9)**

Linked Lists: Singly linked lists: representation and operations, doubly linked lists and circularlinked lists, Comparing arrays and linked lists, Applications of linked lists.

UNIT- 3 **(9)**

Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

UNIT- 4 **(9)**

Queues: Introduction to queues: properties and operations, implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.
Deques: Introduction to deques (double-ended queues), Operations on deques and their applications.

UNIT-5 **(9)**

Trees: Introduction to Trees, Binary Search Tree – Insertion, Deletion & Traversal
Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applicationsof hashing in unique identifier generation, caching, etc.

TOTAL HOURS: 45

COURSE OUTCOMES

	On the successful completion of this course, the student should be able to,	**POs related to COs**
CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.	**PO1, PO2**
CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.	**PO1,PO2**
CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems	**PO1,PO2 ,P O3,**

CO4	Apply queue-based algorithms for efficient task scheduling and breadth- first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.	**PO1, PO3,PO4**
CO5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.	**PO1,PO3, PO 4,PO5**

TEXT BOOKS:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

REFERENCE BOOKS:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick

REFERENCE WEBSITES:

1. https://nptel.ac.in/courses/106/102/106102064/
2. https://nptel.ac.in/courses/106/106/106106127/

CO-PO MAPPING:

CO-PO	PO1	PO 2	PO 3	PO4	PO 5	PO6	PO 7	PO8	PO9	PO1 0	PO1 1	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-		-	-	-	-	-	-	-
CO4	3	-	3	3	-	-	-	-	-	-	-	-
CO5	3	-	2	2	2	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**2**	**2**	**-**						

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech II Sem

23HSM112L	COMMUNICATIVE ENGLISH LAB (Common to all Branches of Engineering)	L	T	P	C
		-	-	2	1

COURSE EDUCATIONAL OBJECTIVES:

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning students will get trained in the basic communication skills and make them ready to face job interviews.

LIST OF TOPICS:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play, Conversational Practice and TED talks
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates-Methods & Practice
9. PPT Presentations/Poster Presentation
10. Interviews Skills

SUGGESTED SOFTWARES:

1. Walden Info tech
2. Young India Films

REEFERENCE BOOKS:

1. MeenakshiRaman,Sangeeta-Sharma.TechnicalCommunication.OxfordPress.2018.
2. GrantTaylor:EnglishConversationPractice,TataMcGraw-HillEducationIndia,2016
3. Hewing's,Martin.CambridgeAcademicEnglish(B2).CUP,2012.
4. T.Balasubramanyam,ATextbookofEnglishPhoneticsforIndianStudents,(3rdEd)TrinityPress.

WEB RESOURCES:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

COURSE OUTCOMES:

On successful completion of the course the student will be enable to		PO
CO1	UnderstandthedifferentaspectsoftheEnglishlanguageproficiency withemphasisonLSRWskills.	PO1
CO2	Apply communication skills through various language learning activities.	PO5
CO3	Analyze the English speech sounds, stress, rhythm, into nation and syllable division for better listening and speaking comprehension.	PO6
CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.	PO2
CO5	Create effective resonate and prepare themselves to face interviews in future.	PO10

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B.Tech II Sem

23ESC116L	**ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP**	**L T P C**
	(Common to All branches of Engineering)	**0 0 3 1.5**

COURSE EDUCATIONAL OBJECTIVES:

1. Gain the knowledge on basic laws
2. Acquire the knowledge on theorems and Characteristics.
3. Analyze the Power and Power factor measurement
4. Analyze various characteristics of electrical circuits, electrical machines and measuring instruments
5. Measurement of various electrical parameters; Household and commercial wiring

ACTIVITIES:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder,cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
   - Provide some exercises so that hardware tools and instruments are learned to be used by the students.
2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter,Power Supplies, CRO, DSO, Function Generator, Frequency counter.
   - Provide some exercises so that measuring instruments are learned to be used by the students.
3. Components: ☐ Familiarization/Identification of components (Resistors, Capacitors, Inductors,Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
   - Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

LIST OF EXPERIMENTS:

1. Verification of Ohms law, KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

COURSE OUTCOMES:

On successful completion of the course the student could be		POs
CO1	Understand the Electrical Circuit Design Concepts: Measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.	**PO1, PO2, PO3**
CO2	Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.	**PO1, PO2, PO3**
CO3	Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.	**PO1, PO2, PO3**
CO4	Analyze various characteristics of electrical circuits, electrical machines and measuring instruments.	**PO1, PO2, PO3,PO12**
CO5	Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.	**PO1, PO2, PO3,PO12**

REFERENCES:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

CO PO MAPPING:

CO/ PO	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**	**2**	-	-	-	-	-	-	-	-	**2**
CO4	**3**	**3**	**2**	-	-	-	-	-	-	-	-	**2**
CO5	**3**	**3**	**2**	-	-	-	-	-	-	-	-	**2**
CO	**3**	**2.6**	**2**	-	-	-	-	-	-	-	-	**2**

PART B: ELECTRONICS ENGINEERING LAB COURSE EDUCATIONAL OBJECTIVES:

1. Identify & testing of various electronic components.
2. Understand the usage of electronic measuring instruments.
3. Evaluate the performance of rectifiers
4. Study the characteristics of various electron devices
5. Obtain the operation of a digital circuit.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

LIST OF EXPERIMENTS:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

COURSE OUTCOMES:

On successful completion of the course the student could be		POs
CO1	Identify & testing of various electronic components.	PO1, PO2, PO3,
CO2	Understand the usage of electronic measuring instruments.	PO1, PO2, PO3,
CO3	Evaluate the performance of rectifiers	PO1, PO2, PO3,
CO4	Plot and discuss the characteristics of various electron devices	PO1, PO2, PO3, PO12
CO5	Obtain the operation of a digital circuit.	PO1, PO2, PO3, PO12

REFERENCES:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009 3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech. –II Sem

23ESC118L IT WORKSHOP L T P C

(Common to CSE, CSE (AI&ML), CSE (AI) and CSE (DS)) 0 0 3 1.5

PRE-REQUISITES: Nil COURSE OBJECTIVES:

1. To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables.
2. To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
3. To teach basic command line interface commands on Linux.
4. To teach the usage of Internet for productivity and self-paced life-long learning
5. To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

LIST OF EXPERIMENTS:

PC HARDWARE & SOFTWARE INSTALLATION:

1. Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.
2. Every student should disassemble and assemble the PC back to working condition. Labinstructors should verify the work and follow it up with a Viva. Also students need to go throughthe video which shows the process of assembling a PC. A video would be given as part of the course content.
3. Every student should individually install MS windows on the personal computer. Labinstructor should verify the installation and follow it up with a Viva.
4. Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva
5. Every student should install BOSS on the computer. The system should be configuredas dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

INTERNET & WORLD WIDE WEB

6. Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

7. Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

8. Search Engines & Netiquette: Students should know what search engines are and howto use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

9. Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customizetheir browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LATEX AND WORD

10. Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent(FOSS) tool Wordas word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Usinghelp and resources, rulers, format painter in word.
11. Using La TeX and Word to create a 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 both La TeXand Word.
12. Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

13. Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns,Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) 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 helpand resources.

14. Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

15. Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

16. Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

17. Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

18. Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

19. Master Layouts (slide, template, and notes), Types of views (basic, presentation, slideslotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – CHATGPT

20. Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentencesto see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: Whatis the capital of France?"

21. Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a funway to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

22. Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output tosee how accurate and fluent the translations are.

- Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

COURSE OUTCOMES:

On the successful completion of this course, the student should be able to,		POs related to COs
CO1	Acquire knowledge on computer system such as system unit, input devices, and output devices connected to the computer.	**PO1**
CO2	Demonstrate the booting process that includes switching on the system, execution of POST routine, then bootstrap loader, and loading of the operating system, and getting it ready for use.	**PO2**
CO3	Demonstrate the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers, web servers, mail-servers, etc.	**PO3**
CO4	Familiarize with parts of MS Office, To create and save a document, To set page settings, create headers and footers, To use various formatting features such as bold face, italicize, underline, subscript, superscript, line spacing, etc.	**PO4**
CO5	Prompt the diferent types of questions using CHATBOT	**PO5**
CO6	Follow the ethical principles in implementing the programs	**PO8**
CO7	Do experiments effectively as an individual and as a team member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understanding about the experiments	**PO10**
CO9	Continue updating their skill related to MS Office, Internet and Computer in future.	**PO12**

TEXT BOOKS:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech,2013, 3rd edition

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
2. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
3. LaTeX Companion, Leslie Lamport, PHI/Pearson.
4. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. – CISCO Press, Pearson Education, 3rd edition
5. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCOPress, Pearson Education, 3rd edition

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-		-	3
CO*	**3**	**3**	**3**	**3**	**3**	-	**-**	**3**	**3**	**3**	-	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
I B.Tech. – II Sem

23CSE122L	**DATA STRUCTURES LAB**	**L**	**T**	**P**	**C**
	(Common to CSE, CSE (AI&ML), CSE (AI) and CSE (DS))	**0**	**0**	**3**	**1.5**

PRE-REQUISITES: COMPUTER PROGRAMMING

COURSE OBJECTIVES:

1. To strengthen the ability of the students to identify the problem.
2. To apply the suitable datastructure for the given real-world problem.
3. To understand the knowledge about linear data structure.
4. To understand and analyze the data structure concepts using non-linear data structures.
5. To gain knowledge in practical applications of data structures.

LIST OF EXPERIMENTS:

1: Array Manipulation

i) Write a program to reverse an array.
ii) C Programs to implement the Searching Techniques – Linear & Binary Search
iii) C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

2: Linked List Implementation

i) Implement a singly linked list and perform insertion and deletion operations.
ii) Develop a program to reverse a linked list iteratively and recursively.
iii) Solve problems involving linked list traversal and manipulation.

3: Linked List Applications

i) Create a program to detect and remove duplicates from a linked list.
ii) Implement a linked list to represent polynomials and perform addition.
iii) Implement a double-ended queue (deque) with essential operations.

4: Double Linked List Implementation

i) Implement a doubly linked list and perform various operations to understand its properties and applications.
ii) Implement a circular linked list and perform insertion, deletion, and traversal.

5: Stack Operations

i) Implement a stack using arrays and linked lists.
ii) Write a program to evaluate a postfix expression using a stack.
iii) Implement a program to check for balanced parentheses using a stack.

6: Queue Operations

i) Implement a queue using arrays and linked lists.
ii) Develop a program to simulate a simple printer queue system.
iii) Solve problems involving circular queues.

7: Stack and Queue Applications

i) Use a stack to evaluate an infix expression and convert it to postfix.
ii) Create a program to determine whether a given string is a palindrome or not.
iii) Implement a stack or queue to perform comparison and check for symmetry.

8: Binary Search Tree

i) Implementing a BST using Linked List.

ii) Traversing of BST.

9: Hashing

i) Implement a hash table with collision resolution techniques.

ii) Write a program to implement a simple cache using hashing.

COURSE OUTCOMES:

On the successful completion of this course, the student should be able to,		POs related to COs
CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms	**PO1**
CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.	**PO2**
CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems	**PO3**
CO4	Apply queue-based algorithms for efficient task scheduling andbreadth-first traversal ingraphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges.	**PO4**
CO5	Recognize scenarios where hashing is advantageous, and design hash-based solutions forspecific problems.	**PO5**
CO6	Follow the ethical principles in implementing the programs	**PO8**
CO7	Do experiments effectively as an individual and as a team member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understandingabout the experiments.	**PO10**
CO9	Continue updating their skill related to loops, pointers and files, implementing programs in future.	**PO12**

TEXTBOOKS:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson- Freed, Silicon Press, 2008

REFERENCE BOOKS:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching,and Graph Algorithms by Robert Sedgewick.

REFERENCE WEBSITES:

1. https://nptel.ac.in/courses/106/102/106102064/
2. https://nptel.ac.in/courses/106/106/106106127/

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

I B.Tech -II Sem

		L	T	P	C
23HSM114L	**NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE**				
	(Common to All branches of Engineering)	**0**	**0**	**1**	**0.5**

COURSE EDUCATIONAL OBJECTIVES:

1. To impart discipline, character, and fraternity amongst young citizens
2. To train them to work in teams/groups to enhance their team spirit.
3. To enable the students to acquire leadership qualities.
4. To induce social consciousness among students through various activities.
5. To instill self-confidence and the ideals of selfless service
6. To engage students in responsible and challenging actions for the common good.

COURSE OUTCOMES:

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

1. Understand the importance of discipline, character and service motto.
2. Outline the needs and problems of the community
3. Solve some societal issues by applying acquired knowledge, facts, and techniques
4. Explore human relationships by analyzing social problems
5. Determine to extend their help for the fellow beings and downtrodden people
6. Develop leadership skills and civic responsibilities

UNIT-I: ORIENTATION

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:

1. Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
2. Conducting orientations programs for the students –future plans-activities-releasing road map etc.
3. Displaying success stories-motivational biopics- award winning movies on societal issues etc.
4. Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT-II: NATURE & CARE

Activities:

1. Best out of waste competition.
2. Poster and signs making competition to spread environmental awareness.
3. Recycling and environmental pollution article writing competition.
4. Organising Zero-waste day.
5. Digital Environmental awareness activity via various social media platforms.
6. Virtual demonstration of different eco-friendly approaches for sustainable living.
7. Write a summary on any book related to environmental issues.

UNIT-III:COMMUNITY SERVICE

Activities:

1. Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities-experts-etc.
2. Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
3. Conducting consumer Awareness. Explaining various legal provisions etc.
4. Women Empowerment Programmes - Sexual Abuse, Adolescent Health and Population Education.
5. Any other programmes in collaboration with local charities, NGOs etc.

REFERENCE BOOKS:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

GENERAL GUIDELINES:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students

EVALUATION GUIDELINES:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva-voce on the subject.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES (Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

II B. Tech III Sem

23BSC232T	DISCRETE MATHEMATICS & GRAPH THEORY	L	T	P	C
	(Common to All Engineering Branches)	2	1	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To gain the knowledge on connectives and relate the laws of logic to find the disjunctive normal form and conjunctive normal form of compound proposition.
2. To learn the various concepts related to predicate logic.
3. To understand the concept of groups, Abelian groups and group homomorphism and isomorphism.
4. To study the fundamentals of graphs, sub graphs, planar graphs, Hamiltonian graphs, Euler graphs, Spanning trees and graph traversals

UNIT-I: MATHEMATICAL LOGIC (9)

Introduction, Statements and Notation, Connectives, Well-formed formulas, Tautology, Duality law, Equivalence, Implication, Normal Forms, Functionally complete set of connectives, Inference Theory of Statement Calculus, Predicate Calculus, Inference theory of Predicate Calculus.

UNIT-II: SET THEORY (9)

The Principle of Inclusion- Exclusion, Pigeon hole principle and its application, Functions composition of functions, Inverse Functions, Recursive Functions, Lattices and its properties. Algebraic structures: Algebraic systems-Examples and General Properties, Semi groups and Monoids, groups, sub groups, homomorphism, Isomorphism

UNIT-III: ELEMENTARY COMBINATORICS (9)

Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems.

UNIT-IV: RECURRENCE RELATIONS (9)

Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence relations, Solving Recurrence Relations by Substitution and Generating functions, The Method of Characteristic roots, Solutions of Inhomogeneous, Recurrence Relations

UNIT-V: GRAPHS (9)

Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler’s Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs.

TOTAL HOURS: 45

COURSE OUTCOMES:

on successful completion of the course, students able to		Pos
CO1	Apply mathematical logic to solve problems.	**PO1,PO2,PO3**
CO2	Understand the concepts and perform the operations related to sets, relations andfunctions. Gain the conceptual background needed and identify structures of algebraic nature.	**PO1,PO2,PO3**
CO3	Apply basic counting techniques to solve combinatorial problems.	**PO1,PO2,PO3, PO4**
CO4	Formulate problems and solve recurrence relations.	**PO1,PO2,PO3**
CO5	Apply Graph Theory in solving computer science problems	**PO1,PO2,PO3**

TEXT BOOKS:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 2002.
2. Kenneth H. Rosen, Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7th Edition, McGraw Hill Education (India) Private Limited.

REFERENCE BOOKS:

1. Joe L. Mott, Abraham Kandel and Theodore P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd Edition, Pearson Education.
2. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science.

REFERENCE WEBSITE:

1. http://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.Tech III Sem

23HSM234T	UNIVERSAL HUMAN VALUES UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT (Common to All Engineering Branches)	L	T	P	C
		2	1	0	3

COURSE EDUCATIONAL OBJECTIVES:

1. To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. 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 TOPICS:

The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1- hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.
The Teacher’s Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

UNIT I INTRODUCTION TO VALUE EDUCATION (6 LECTURES AND 3 TUTORIALS FOR PRACTICE SESSION) (9)

Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture 2: Understanding Value Education
Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: self-exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – the Basic HumanAspirations
Tutorial 2: Practice Session PS2 Exploring Human Consciousness Lecture 5: Happiness and Prosperity – Current Scenario
Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT II HARMONY IN THE HUMAN BEING (6 LECTURES AND 3 TUTORIALS FOR PRACTICE SESSION) (9)

Lecture 7: Understanding Human being as the Co-existence of the self and thebody.
Lecture 8: Distinguishing between the Needs of the self and the body Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.
Lecture 9: The body as an Instrument of the self Lecture 10: Understanding Harmony in the self
Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self

Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and Health
Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT III HARMONY IN THE FAMILY AND SOCIETY (6 LECTURES AND 3 TUTORIALS FOR PRACTICESESSION) (9)

Lecture 13: Harmony in the Family – the Basic Unit of Human InteractionLecture 14: 'Trust' – the Foundational Value in Relationship Tutorial 7: Practice Session PS7 Exploring the Feeling of
Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect Lecture 16: Other Feelings, Justice in Human-to-Human Relationship Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT IV HARMONY IN THE NATURE/EXISTENCE (4 LECTURES AND 2 TUTORIALS FOR PRACTICESESSION) (9)

Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment amongthe Four Orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence

UNIT V IMPLICATIONS OF THE HOLISTIC UNDERSTANDING – A LOOK AT PROFESSIONAL ETHICS (6LECTURES AND 3 TUTORIALS FOR PRACTICE SESSION) (9)

Lecture 23: Natural Acceptance of Human Values Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order.

TOTAL HOURS: 45

Practice Sessions for UNIT I – Introduction to ValuEducation PS1
Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance

Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the difference of Needs of self and body
PS5 Exploring Sources of Imagination in the self
PS6 Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature (Existence)
PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

MODE OF CONDUCT:

Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.
Tutorial hours are to be used for practice sessions.
While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.
In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self- reflection and self- exploration.
Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values. It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department.
Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define the terms like Natural Acceptance, Happiness and Prosperity	**PO1, PO2, PO3PO4, PO5, PO6,PO7**
CO2	Identify one's self, and one's surroundings (family, society nature)	**PO1, PO2, PO3PO4, PO5, PO6,PO7**
CO3	Apply what they have learnt to their own self in different day-to-daysettings in real life	**PO1, PO2, PO3PO4, PO5, PO6,PO7**
CO4	Understand human values with human relationship and human society.	**PO1, PO2, PO3PO4, PO5, PO6,PO7**
CO5	Justify the need for universal human values and harmonious existence	**PO1, PO2, PO3 PO4,PO5,PO6,PO7**

TEXT BOOKS:

The Textbook

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

The Teacher's Manual

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. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

REFERENCE WEBSITE:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%2023.pdf
5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3 - S2A%20Und%20Nature-Existence.pdf
7. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023-25%20Ethics%20v1.pdf
8. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human- values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385 https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

CO-PO MAPPING

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

	II B. Tech III Sem				
23CSD231T	**INTRODUCTION TO DATA SCIENCE**	**L**	**T**	**P**	**C**
	CSE(DS)	**2**	**1**	**0**	**3**

PRE-REQUISITES: A course on Python Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Knowledge and expertise to become a data scientist.
2. Essential concepts of statistics and machine learning that are vital for data science;
3. Significance of exploratory data analysis (EDA) in data science.
4. Critically evaluate data visualizations presented on the dashboards
5. Suitability and limitations of tools and techniques related to data science process

UNIT-I: INTRODUCTION TO DATA SCIENCE (9)

Introduction to Data science, benefits and uses, facets of data, data science process in brief, big data ecosystem and data science

Data Science process: Overview, defining goals and creating project charter, retrieving data, cleansing, integrating and transforming data, exploratory analysis, model building, presenting findings and building applications on top of them.

UNIT-II: APPLICATIONS OF MACHINE LEARNING IN DATA SCIENCE (9)

Applications of machine learning in Data science, role of ML in DS, Python tools like sklearn, modelling process for feature engineering, model selection, validation and prediction, types of ML, semi-supervised learning

Handling large data: problems and general techniques for handling large data, programming tips for dealing large data, case studies on DS projects for predicting malicious URLs, for building recommender systems

UNIT-III: NOSQL MOVEMENT FOR HANDLING BIGDATA (9)

NoSQL movement for handling Bigdata: Distributing data storage and processing with Hadoop framework, case study on risk assessment for loan sanctioning, ACID principle of relational databases, CAP theorem, base principle of NoSQL databases, types of NoSQL databases, case study on disease diagnosis and profiling

UNIT-IV: TOOLS AND APPLICATIONS OF DATA SCIENCE (9)

Tools and Applications of Data Science**:** Introducing **Neo4j**for dealing with graph databases, graph query language **Cypher**, Applications graph databases, Python libraries like nltk and SQLite for handling Text mining and analytics, case study on classifying Reddit posts

UNIT-V: (9)

Data Visualization and Prototype Application Development**:** Data Visualization options, Crossfilter, the JavaScript MapReduce library, Creating an interactive dashboard with dc.js, Dashboard development tools. Applying the Data Science process for real world problem solving scenarios as a detailed case study.

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand significance of Data Science.	PO1,PO2,PO3
CO2	Analyze large data	PO1,PO2,PO3, PO4,PO5
CO3	Apply machine learning in Data Science	PO1,PO2,PO3
CO4	Perform Data reduction and apply visualization techniques.	PO1,PO2,PO3, PO4,PO5
CO5	Perform and Apply real world problems	PO1,PO2,PO3, PO4

TEXT BOOKS:

1. Davy Cielen, Arno D.B.Meysman, and Mohamed Ali, "Introducing to Data Science using Python tools", Manning Publications Co, Dreamtech press, 2016
2. Prateek Gupta, "Data Science with Jupyter" BPB publishers, 2019 for basics

REFERENCE BOOKS:

1. Joel Grus, "Data Science From Scratch", OReilly, 2019
2. Doing Data Science: Straight Talk From The Frontline, 1 st Edition, Cathy O'Neil and Rachel Schutt, O'Reilly, 2013

REFERENCE WEBSITE:

1. https://towardsdatascience.com
2. https://www.datacamp.com
3. https://www.coursera.org
4. https://www.datasciencecentral.com
5. https://www.analyticsvidhya.com
6. https://www.kdnuggets.com

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.Tech - III Sem

23CSE231T	**ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS**	**L T P C**
	(Common to CSE, CSM, CAI, CSD)	**2 1 0 3**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Provide knowledge on advance data structures frequently used in Computer Science domain
2. Develop skills in algorithm design techniques popularly used
3. Understand the use of various data structures in the algorithm design

UNIT 1: (9)

Introduction to Algorithm Analysis, Space and Time Complexity analysis, Asymptotic Notations.AVL Trees – Creation, Insertion, Deletion operations and Applications B-Trees – Creation, Insertion, Deletion operations and Applications

UNIT 2: (9)

Heap Trees (Priority Queues) – Min and Max Heaps, Operations and Applications Graphs – Terminology, Representations, Basic Search and Traversals, Connected Components and Biconnected Components, applicationsDivide and Conquer: The General Method, Quick Sort, Merge Sort, Strassen's matrix multiplication, Convex Hull

UNIT 3: (9)

Greedy Method: General Method, Job Sequencing with deadlines, Knapsack Problem, Minimum cost spanning trees, Single Source Shortest PathsDynamic Programming: General Method, All pairs shortest paths, Single Source Shortest Paths– General Weights (Bellman Ford Algorithm), Optimal Binary Search Trees, 0/1 Knapsack, String Editing, Travelling Salesperson problem

UNIT 4: (9)

Backtracking: General Method, 8-Queens Problem, Sum of Subsets problem, Graph Coloring, 0/1 Knapsack Problem
Branch and Bound: The General Method, 0/1 Knapsack Problem, Travelling Salesperson problem

UNIT 5: (9)

NP Hard and NP Complete Problems: Basic Concepts, Cook's theoremNP Hard Graph Problems: Clique Decision Problem (CDP), Chromatic Number Decision Problem (CNDP), Traveling Salesperson Decision Problem (TSP)NP Hard Scheduling Problems: Scheduling Identical Processors, Job Shop Scheduling
.

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Illustrate the working of the advanced tree data structures and their applications (L2)	PO1, PO2, PO3
CO2	Understand the Graph data structure, traversals and apply them in various contexts. (L2)	PO1, PO2, PO3
CO3	Use various data structures in the design of algorithms (L3)	PO1,PO2,PO3,PO4
CO4	Recommend appropriate data structures based on the problem being solved (L5)	PO1,PO2
CO5	Analyze algorithms with respect to space and time complexities (L4)	PO1, PO2,PO3,PO4

TEXT BOOKS:

1. Fundamentals of Data Structures in C++, Horowitz, Ellis; Sahni, Sartaj; Mehta, Dinesh, 2ndEdition Universities Press
2. Computer Algorithms in C++, Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, 2nd Edition University Press

REFERENCES:

1. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
2. An introduction to Data Structures with applications, Trembley& Sorenson, McGraw Hill
3. The Art of Computer Programming, Vol.1: Fundamental Algorithms, Donald E Knuth, Addison-Wesley, 1997.
4. Data Structures using C & C++: Langsam, Augenstein&Tanenbaum, Pearson, 1995
5. Algorithms + Data Structures & Programs:, N.Wirth, PHI
6. Fundamentals of Data Structures in C++: Horowitz Sahni& Mehta, Galgottia Pub.
7. Data structures in Java:, Thomas Standish, Pearson Education Asia

REFERENCE WEBSITE:

1. https://www.tutorialspoint.com/advanced_data_structures/index.asp
2. http://peterindia.net/Algorithms.html
3. https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_O

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	--	-	-	-	-	-	-	-	-
CO2	3	3	3	--	-	-	-	-	-	-	-	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	--	--	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	2.8	3	2.75	3	-	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.TECH - III Sem

23CSE232T	**OBJECT ORIENTED PROGRAMMING THROUGH JAVA**	**L T P C**
	(Common to CSE, CSM, CAI, CSD)	**2 1 0 3**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Identify Java language components and how they work together in applications
2. Learnthe fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
3. learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
4. understand how to design applications with threads in Java
5. understand how to use Java APIs for program development

UNIT 1: (9)

Object Oriented Programming: Basic concepts, Principles, **Program Structure in Java:** Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators :Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final,

Introduction to Operators, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements:Introduction, if Expression, Nested if Expressions, if–else Expressions, Ternary Operator?:, Switch Statement, Iteration Statements, while Expression, do–while Loop, for Loop, Nested for Loop, For–Each for Loop, Break Statement, Continue Statement.

UNIT 2: (9)

Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

UNIT 3: (9)

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two-dimensional Arrays, Arrays of Varying Lengths, Three-dimensional Arrays, Arrays as Vectors

Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super

Class- Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces, Annotations.

UNIT 4: (9)

Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, Java.lang Package and its Classes, Class Object, Enumeration, class Math, Wrapper Classes, Auto-boxing and Auto- unboxing, Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java.time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, Checked Exceptions.

Java I/O and File: Java I/O API, standard I/O streams, types, Byte streams, Character streams, Scanner class, Files in Java(Text Book 2)

UNIT5: (9)

String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Comparison, Modifying, Searching; Class String Buffer.

Multithreaded Programming: Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread-Creation of New Threads, Thread States, Thread Priority-Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.

Java Database Connectivity: Introduction, JDBC Architecture, Installing MySQL and MySQL Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, ResultSet Interface

Java FX GUI: Java FX Scene Builder, Java FX App Window Structure, displaying text and image, event handling, laying out nodes in scene graph, mouse events (Text Book 3)

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		**POs related to Cos**
CO1	Analyse problems, design solutions using OOP principles, and implement them efficiently in Java. (L4)	PO1, PO2, PO5
CO2	Design and implement classes to model real-world entities, with a focus on attributes, behaviours, and relationships between objects (L4)	PO1, PO4,PO5
CO3	Demonstrate an understanding of inheritance hierarchies and polymorphic behaviour, including method overriding and dynamic method dispatch. (L3)	PO1,PO3,PO4, PO5
CO4	Apply Competence in handling exceptions and errors to write robust and fault-tolerant code. (L3)	PO1,PO4, PO5

CO5	Perform file input/output operations, including reading from and writing to files using Java I/O classes, graphical user interface (GUI) programming using JavaFX.(L3)	PO1, PO2, PO4, PO5

TEXT BOOKS:

1) JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
2) Joy with JAVA, Fundamentals of Object Oriented Programming, DebasisSamanta, MonalisaSarma, Cambridge, 2023.
3) JAVA for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

REFERENCES:

1) The complete Reference Java, 11thedition, Herbert Schildt,TMH
2) Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

REFERENCE WEBSITE:

1) https://nptel.ac.in/courses/106/105/106105191/
2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012880464547618816347_shared/overview

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	2	-	-	-	-	-	-	-
CO2	2	-	-	3	3	-	-	-	-	-	-	-
CO3	3	-	3	3	3	-	-	-	-	-	-	-
CO4	3	-	-	3	3	-	-	-	-	-	-	-
CO5	2	3	-	3	3	-	-	-	-	-	-	-
CO*	**2.6**	**3**	**3**	**3**	**2.8**	**-**	**-**	**-**	**-**	**-**	**-**	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

II B.Tech III Sem

23CSD232L	**DATA SCIENCE LAB (CSE(DS))**	**L T P C** **0 0 3 1.5**

PRE-REQUISITES: A course on Python Programming

COURSE EDUCATIONAL OBJECTIVES:

1. The main objective of the course is to inculcate the basic understanding of Data Science and its practical implementation using Python.

LIST OF EXPERIMENTS

1. Creating a NumPy Array
   a. Basic ndarray
   b. Array of zeros
   c. Array of ones
   d. Random numbers in ndarray
   e. An array of your choice
   f. Imatrix in NumPy
   g. Evenly spaced ndarray
2. The Shape and Reshaping of NumPy Array
   a. Dimensions of NumPy array
   b. Shape of NumPy array
   c. Size of NumPy array
   d. Reshaping a NumPy array
   e. Flattening a NumPy array
   f. Transpose of a NumPy array
3. Expanding and Squeezing a NumPy Array
   a. Expanding a NumPy array
   b. Squeezing a NumPy array
   c. Sorting in NumPy Arrays
4. Indexing and Slicing of NumPy Array
   a. Slicing 1-D NumPy arrays
   b. Slicing 2-D NumPy arrays
   c. Slicing 3-D NumPy arrays
   d. Negative slicing of NumPy arrays
5. Stacking and Concatenating Numpy Arrays
   a. Stacking ndarrays
   b. Concatenating ndarrays
   c. Broadcasting in Numpy Arrays
6. Perform following operations using pandas
   a. Creating dataframe
   b. concat()
   c. Setting conditions
   d. Adding a new column
7. Perform following operations using pandas
   a. Filling NaN with string

   b. Sorting based on column values
   c. groupby()
8. Read the following file formats using pandas
   a. Text files
   b. CSV files
   c. Excel files
   d. JSON files
9. Read the following file formats
   a. Pickle files
   b. Image files using PIL
   c. Multiple files using Glob
   d. Importing data from database
10. Demonstrate web scraping using python
11. Perform following preprocessing techniques on loan prediction dataset
   a. Feature Scaling
   b. Feature Standardization
   c. Label Encoding
   d. One Hot Encoding
12. Perform following visualizations using matplotlib
   a. Bar Graph
   b. Pie Chart
   c. Box Plot
   d. Histogram
   e. Line Chart and Subplots
   f. Scatter Plot
13. Getting started with NLTK, install NLTK using PIP
14. Python program to implement with Python Sci Kit-Learn & NLTK
15. Python program to implement with Python NLTK/Spicy/Py NLPI.

TEXT BOOKS:

1. Python for Data Science for Dummies, 2ed, Luca Massaron John Paul Mueller.

REFERENCE BOOKS:

1. Python for Data Analysis Data Wrangling with Pandas, NumPy, and IPython, WesMcKinney
2. Introduction to Parallel Computing, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson; 2 edition (January 26, 2003), ISBN 978-0201648652 3. Big Data: Principles and best practices of scalable real-time data systems, 1st Edition, Nathan Marz, James Warren, ISBN 978-1617290343

REFERENCE WEBSITE:

1. https://realpython.com
2. https://www.datacamp.com
3. https://towardsdatascience.com
4. https://www.kaggle.com
5. https://www.analyticsvidhya.com
6. https://www.coursera.org
7. https://www.edx.org

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understanding and Applying NumPy Basics	**PO1**
CO2	Implement Advanced Array Manipulations with NumPy	**PO3**
CO3	Understand and implement stacking and concatenating arrays.	**PO5**
CO4	Implement Data Manipulation and Analysis with Pandas	**PO6**
CO5	Implement Read and manipulate various file formats including text files, CSV files, Excel files, and JSON files.	**PO2**
CO6	Follow the ethical principles in implementing the programs	**PO8**
CO7	Do experiments effectively as an individual and as a team member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understanding aboutthe experiments.	**PO10**
CO9	Continue updating their skill related to object oriented concepts and implementing programs in future.	**PO12**

CO-PO MAPPING:

CO/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	3	-		-	-	-	-
CO5	-	-	-	-	-	-	-	-		-	-	-
CO6	-	-	-	-	-	-	-	3	-		-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	3	-	-	-	-	-	-	-	3	-	-
C09												3
CO	**3**	**3**	**-**	**3**	**3**	**3**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

II B.TECH - III Sem

23CSE234L OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB L T P C
(Common to CSE, CSM, CAI, CSD) 0 0
31.5

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Practice object-orientedprogramming in the Java programming language
2. ImplementClasses, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
3. Illustrateinheritance, Exception handling mechanism,JDBC connectivity
4. Construct Threads, Event Handling, implement packages, Java FX GUI

EXPERIMENTS COVERING THE TOPICS:

- Object Oriented Programming fundamentals- data types, control structures
- Classes, methods, objects, Inheritance, polymorphism,
- Exception handling, Threads, Packages, Interfaces
- Files, I/O streams, JavaFX GUI

LIST OF EXPERIMENTS:

EXERCISE – 1:

a) Write a JAVA program to display default value of all primitive data type of JAVA
b) Write a java program that display the roots of a quadratic equation $ax^2+bx=0$. Calculate the discriminate D and basing on value of D, describe the nature of root.

EXERCISE - 2

a) Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
b) Write a JAVA program to sort for an element in a given list of elements using bubble sort
c) Write a JAVA program using StringBuffer to delete, remove character.

EXERCISE - 3

a) Write a JAVA program to implement class mechanism. Create a class, methods and invoke them inside main method.
b) Write a JAVA program implement method overloading.
c) Write a JAVA program to implement constructor.
d) Write a JAVA program to implement constructor overloading.

EXERCISE - 4

a) Write a JAVA program to implement Single Inheritance
b) Write a JAVA program to implement multi level Inheritance
c) Write a JAVA program for abstract class to find areas of different shapes

EXERCISE - 5

a) Write a JAVA program give example for “super” keyword.
b) Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?
c) Write a JAVA program that implements Runtime polymorphism

EXERCISE - 6

a) Write a JAVA program that describes exception handling mechanism
b) Write a JAVA program Illustrating Multiple catch clauses
c) Write a JAVA program for creation of Java Built-in Exceptions
d) Write a JAVA program for creation of User Defined Exception

EXERCISE - 7

a) Write a JAVA program that creates threads by extending Thread class.First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds,(Repeat the same by implementing Runnable)

b) Write a program illustrating **is Alive** and **join ()**

c) Write a Program illustrating Daemon Threads.

d) Write a JAVA program Producer Consumer Problem

EXERCISE – 8

a) Write a JAVA program that import and use the user defined packages

b) Without writing any code, build a GUI that display text in label and image in an ImageView (use JavaFX)

c) Build a Tip Calculator app using several JavaFX components and learn how to respond to user interactions with the GUI

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Demonstrate a solid understanding of Java syntax, including data types, control structures, methods, classes, objects, inheritance, polymorphism, and exception handling. (L2)	PO1, PO2, PO3, PO5
CO2	Apply fundamental OOP principles such as encapsulation, inheritance, polymorphism, and abstraction to solve programming problems effectively. (L3)	PO1, PO2, PO3, PO5, PO11
CO3	Familiar with commonly used Java libraries and APIs, including the Collections Framework, Java I/O, JDBC, and other utility classes. (L2)	PO2, PO3, PO5
CO4	Develop problem-solving skills and algorithmic thinking, applying OOP concepts to design efficient solutions to various programming challenges. (L3)	PO2, PO4, PO5
CO5	Proficiently construct graphical user interface (GUI) applications using JavaFX (L4)	PO1, PO2, PO5

REFERENCE BOOKS:

1. P. J. Deitel, H. M. Deitel, "Java for Programmers", Pearson Education, PHI, 4th Edition, 2007.
2. P. Radha Krishna, "Object Oriented Programming through Java", Universities Press, 2nd Edition, 2007
3. Bruce Eckel, "Thinking in Java", Pearson Education, 4th Edition, 2006.
4. Sachin Malhotra, Saurabh Chaudhary, "Programming in Java", Oxford University Press, 5th Edition, 2010.

REFERENCE WEBSITE:

https://java-iitd.vlabs.ac.in/
http://peterindia.net/JavaFiles.html

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

II B.TECH - III Sem

23CSE235L	**PYTHON PROGRAMMING (SKILL ENHANCEMENT COURSE)**	**L T P C**
	(Common to CSE, CSM, CAI, CSD)	**0 1 2 2**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Introduce core programming concepts of Python programming language.
2. Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
3. Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications using these

UNTI-I:

History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook.
Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.
Control Flow Statements: if statement, if-else statement, if...elif…else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

SAMPLE EXPERIMENTS:

1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.

i) Arithmetic Operators ii) Relational Operators iii) Assignment Operatorsiv) Logical Operators
v) Bit wise Operators vi) Ternary Operator vii) Membership Operatorsviii) Identity Operators

5. Write a program to add and multiply complex numbers
6. Write a program to print multiplication table of a given number.

UNIT-II:

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.
Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.
Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

SAMPLE EXPERIMENTS:

7. Write a program to define a function with multiple return values.
8. Write a program to define a function using default arguments.
9. Write a program to find the length of the string without using any library functions.
10. Write a program to check if the substring is present in a given string or not.
11. Write a program to perform the given operations on a list:

i. additionii. insertioniii. slicing

12. Write a program to perform any 5 built-in functions by taking any list.

UNIT-III:

Dictionaries: Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Using zip() Function, Sets, Set Methods, Frozenset.

Sample Experiments:

13. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
14. Write a program to count the number of vowels in a string (No control flow allowed).
15. Write a program to check if a given key exists in a dictionary or not.
16. Write a program to add a new key-value pair to an existing dictionary.
17. Write a program to sum all the items in a given dictionary.

UNIT-IV:

Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules.

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism.

SAMPLE EXPERIMENTS:

18. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
19. Python program to print each line of a file in reverse order.
20. Python program to compute the number of characters, words and lines in a file.
21. Write a program to create, display, append, insert and reverse the order of the items in the array.
22. Write a program to add, transpose and multiply two matrices.
23. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

UNIT-V:

Introduction to Data Science: Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.

SAMPLE EXPERIMENTS:

24. Python program to check whether a JSON string contains complex object or not.
25. Python Program to demonstrate NumPy arrays creation using array () function.
26. Python program to demonstrate use of ndim, shape, size, dtype.
27. Python program to demonstrate basic slicing, integer and Boolean indexing.
28. Python program to find min, max, sum, cumulative sum of array
29. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows:

a) Apply head () function to the pandas data frame
b) Perform various data selection operations on Data Frame

30. Select any two columns from the above data frame, and observe the change in one attribute with respect to other attribute with scatter and plot operations in matplotlib

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Showcase adept command of Python syntax, deftly utilizing variables, data types, control structures, functions, modules, and exception handling to engineer robust and efficient code solutions. (L4)	PO1
CO2	Apply Python programming concepts to solve a variety of computational problems (L3)	PO2
CO3	Understand the principles of object-oriented programming (OOP) in Python, including classes, objects, inheritance, polymorphism, and encapsulation, and apply them to design and implement Python programs (L3)	PO3
CO4	Become proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas (L2)	PO4
CO5	Exhibit competence in implementing and manipulating fundamental data structures such as lists, tuples, sets, dictionaries (L3)	PO5

REFERENCE BOOKS:

1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2ndEdition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

REFERENCE WEBSITE:

1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B. Tech III Sem

23MAC231U	ENVIRONMENTAL SCIENCE (Common to All Engineering Branches)	L	T	P	C
		2	0	0	0

COURSE EDUCATIONAL OBJECTIVES:

1. To make the students to get awareness on environment.
2. To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life
3. To save earth from the inventions by the engineers

UNIT-I: (9)

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Needfor Public Awareness.

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT- II: (9)

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem.
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its Conservation : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

UNIT-III: (9)

Environmental Pollution: Definition, Cause, effects and control measures of :

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides

UNIT IV (9)

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act - Wildlife Protection Act – Forest Conservation Act - Issues involved in enforcement of environmental legislation – Public awareness.

UNIT V (9)

Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		**POs mapped with COs**
CO1	Grasp multidisciplinary nature of environmental studies andvarious renewable and nonrenewable resources.	**PO1, PO2, PO3 PO4, PO5, PO6,PO7**
CO2	Understand flow and bio-geo- chemical cycles and ecologicalpyramids.	**PO1, PO2, PO3 PO4, PO5, PO6,PO7**
CO3	Understand various causes of pollution and solid waste management and related preventive measures.	**PO1, PO2, PO3 PO4, PO5, PO6,PO7**
CO4	Understand concept of rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.	**PO1, PO2,PO3 PO4, PO5, PO6,PO7**
CO5	Causes of population explosion, value education and welfareprogrammes.	**PO1, PO2,PO3 PO4, PO5, PO6,PO7**

TEXTBOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
2. Palaniswamy, "Environmental Studies", Pearson education
3. S.Azeem Unnisa, "Environmental Studies" Academic Publishing Company
4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses asper UGC model syllabus", Scitech Publications (India), Pvt. Ltd.

REFERENCE BOOKS:

1. Deeksha Dave and E.Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
2. M.Anji Reddy, "Text book of Environmental Sciences and Technology", BS Publication.
3. J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.
4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prenticehall of India Private limited
5. G.R.Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House
6. Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering

and Science, Prentice hall of India Private limited.

REFERENCE WEBSITE:

1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

II B. Tech IV Sem

23BSC242T	OPTIMIZATION TECHNIQUES (Common to CSE, CSM, CAI, CSD)	L	T	P	C
		2	0	0	2

COURSE EDUCATIONAL OBJECTIVES:

1. To provide the basic knowledge about Optimization, importance, application areas of in the industry, Linear Programming.
2. To impart different optimization models under typical situations in the business organization like transportation, assignment.
3. To understand the process of sequencing in a typical industry.
4. To describe different game strategies under cut-throat competitive business environment
5. To develop networks of activities of projects and to find out optimal modes of completing projects using network modelling evaluation techniques

UNIT – I (9)

Introduction: Meaning, Nature, Scope & Significance of Optimization - Typical applications. The Linear Programming Problem – Introduction, Formulation of Linear Programming problem, Limitations of L.P.P, Graphical method, Simplex method: Maximization and Minimization model(exclude Duality problems), Big-M method and Two Phase method.

UNIT - II (9)

Transportation Problem: Introduction, Transportation Model, Finding initial basic feasible solutions, Moving towards optimality, Unbalanced Transportation problems, Transportation problems with maximization, Degeneracy.
Assignment Problem – Introduction, Mathematical formulation of the problem, Solution of an Assignment problem, Hungarian Algorithm, Multiple Solution, Unbalanced Assignment problems, Maximization in Assignment Model.

UNIT - III (9)

Sequencing – Job sequencing, Johnsons Algorithm for n Jobs and Two machines, n Jobs and Three Machines, n jobs through m machines, Two jobs and m Machines Problems.

UNIT - IV (9)

Game Theory: Concepts, Definitions and Terminology, Two Person Zero Sum Games, Pure Strategy Games (with Saddle Point), Principal of Dominance, Mixed Strategy Games (Game without Saddle Point), Significance of Game Theory in Managerial Application.

UNIT - V (9)

Project Management: Network Analysis – Definition –objectives -Rules for constructing network diagram- Determining Critical Path – Earliest & Latest Times – Floats - Application of CPM and PERT techniques in Project Planning and Control – PERT Vs CPM. (exclude Project Crashing).

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understanding Optimization and Formulation of Linear Programing	**PO1,PO2,PO3**
CO2	Formulate and Solve Transportation & Assignment Models	**PO1,PO2,PO3**
CO3	Formulate and Solve Transportation & Assignment Models	**PO1,PO2,PO3, PO4**
CO4	Sequencing of operations and optimizing	**P01,PO2,PO3**
CO5	Discuss the game theory and strategies	**PO1,PO2,PO3, PO4**

TEXTBOOKS:

1. Operations Research / R.Pannerselvam, PHI Publications.
2. Operations Research / S.D.Sharma-Kedarnath
3. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.
4. Engineering Optimization: Theory and practice / S.S.Rao, New Age International (P) Limited

REFERENCE BOOKS:

1. Quantitative Techniques in Management / ND Vohra, Tata McGraw Hill, 4th Edition, 2011.
2. Introduction to O.R/Hiller & Libermann (TMH).
3. Operations Research: Methods & Problems / Maurice Saseini, ArhurYaspan& Lawrence Friedman. Pearson
4. Quantitative Analysis For Management/ Barry Render, Ralph M. Stair, Jr and Michael E. Hanna/
5. Operations Research / Wagner/ PHI Publications.

REFERENCE WEBSITE:

1. https://onlinecourses.swayam2.ac.in/cec20_ma10/preview
2. https://onlinecourses.nptel.ac.in/noc20_ma23/preview
3. https://onlinecourses.nptel.ac.in/noc19_ma29/preview

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES (Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.Tech. - IV Sem

23CSD242T	**STATISTICAL METHODS FOR DATASCIENCE (CSD)**	**L T P C** **2 1 0 3**

PRE-REQUISITES:NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Understand and distinguish between discrete and continuous random variables, and their probability density functions.
2. Explore properties and applications of Binomial, Poisson, and Normal distributions.
3. Define population, sample, parameter, and statistic, and understand characteristics of a good estimator.
4. Grasp the concepts of consistency, unbiasedness, and sufficiency in estimators.
5. Explain the importance of these concepts in statistical inference.

UNIT I: BASIC CONCEPTS (9)

Random variables (discrete and continuous), probability density functions, properties, mathematical expectation. Probability distributions: Binomial, Poisson and Normal-their properties. Population, sample, parameter and statistic; characteristics of a good estimator; Consistency – Invariance property of Consistent estimator, Sufficient condition for consistency; Unbiasedness; Sufficiency.

UNIT 2: POINT ESTIMATION (9)

Point Estimation- Estimator, Estimate, Methods of point estimation – Maximum likelihood method (the asymptotic properties of ML estimators are not included), Large sample properties of ML estimator (without proof)- applications, Method of moments, method of least squares, method of minimum chi-square and modified minimum chi-square- Asymptotic Maximum Likelihood Estimation and applications

UNIT 3: INTERVAL ESTIMATION (9)

Confidence limits and confidence coefficient; Duality between acceptance region of a test and a confidence interval; Construction of confidence intervals for population proportion (small and large samples) and between two population proportions(large samples); Confidence intervals for mean and variance of a normal population; Difference between the mean and ratio of two normal populations.

UNIT 4: TESTING OF HYPOTHESES (9)

Types of errors, power of a test, most powerful tests; Neyman-Pearson Fundamental Lemma and its applications; Notion of Uniformly most powerful tests; Likelihood Ratio tests: Description and property of LR tests - Application to standard distributions.

UNIT 5: SMALL SAMPLE TESTS (9)

Student’s t-test, test for a population mean, equality of two population means, paired t-test, F- test for equality of two population variances, Chi-square test for goodness of fit and test for independence of attributes, $\chi 2$ test for testing variance of a normal distribution.

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TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the basic concepts of Statistics.	**PO1, PO2, P03,**
CO2	Analyze the data and draw conclusion about collection of data under study using Point estimation	**PO1, PO2, P03,**
CO3	Analyze data and draw conclusion about collection of data under study using Interval estimation.	**PO1, PO2, P03, PO4**
CO4	Analyze to test various hypotheses included in theory and types of errors for large samples.	**PO1, PO2, P03, PO4**
CO5	Apply the different testing tools like t-test, F-test, chi-square test to analyze the relevant real life problems.	**PO1, PO2, P03, PO4**

TEXTBOOKS:

1. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2. Manoj Kumar Srivastava and Namita Srivastava, Statistical Inference – Testing of Hypotheses, Prentice Hall of India, 2014

REFERENCE BOOKS:

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
2. S. Ross, a First Course in Probability, Pearson Education India, 2002.
3. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.
4. Robert V Hogg, Elliot A Tannis and Dale L.Zimmerman, Probability and Statistical Inference, 9th edition, Pearson publishers,2013.

RESOURCE WEBSITE

1. https://onlinecourses.nptel.ac.in/noc21_ma74/preview
2. https://onlinecourses.nptel.ac.in/noc22_mg31/preview

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.Tech. - IV Sem

23ESC232T	**DIGITAL LOGIC & COMPUTER ORGANIZATION**	**L T P C**
		2 1 0 3

PRE-REQUISITES:Nil

COURSE EDUCATIONAL OBJECTIVES:

1. provide students with a comprehensive understanding of digital logic design principles and computer organization fundamentals
2. Describe memory hierarchy concepts
3. Explain input/output (I/O) systems and their interaction with the CPU, memory, and peripheral devices

UNIT I: (9)

Data Representation: Binary Numbers, Fixed Point Representation. Floating Point Representation. Number base conversions, Octal and Hexadecimal Numbers, components, Signed binary numbers, Binary codes

Digital Logic Circuits-I: Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions. K-Map Simplification, Combinational Circuits, Decoders, Multiplexers.

UNIT 2: (9)

Digital Logic Circuits-II: Sequential Circuits, Flip-Flops, Binary counters, Registers, Shift Registers, Ripple counters

Basic Structure of Computers: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Computer Generations, Von- Neumann Architecture

UNIT 3: (9)

Computer Arithmetic : Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations

Processor Organization: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control and Multi programmed Control

UNIT 4: (9)

The Memory Organization: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage

UNIT 5: (9)

Input /Output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Differentiate between combinational and sequential circuits based on theircharacteristics and functionalities	**PO1, PO2**
CO2	Demonstrate an understanding of computer functional units.	**PO1,PO2**
CO3	Analyze the design and operation of processors, including instruction execution, pipelining, and control unit mechanisms, to comprehend their role in computer systems.	**PO1,PO2,PO3**
CO4	Describe memory hierarchy concepts, including cache memory, virtual memory, and secondary storage, and evaluate their impact on system performance and scalability	**PO1,PO2,PO3**
CO5	Explain input/output (I/O) systems and their interaction with the CPU, memory, and peripheral devices, including interrupts, DMA, and I/O mapping techniques	**PO1,PO2,PO3, PO4**

TEXTBOOKS:

1. Computer Organization, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 6th edition, McGraw Hill, 2023.
2. Digital Design, 6th Edition, M. Morris Mano, Pearson Education, 2018.
3. Computer Organization and Architecture, William Stallings, 11thEdition, Pearson, 2022.

REFERENCE BOOKS:

1. Computer Systems Architecture, M.Moris Mano, 3rdEdition, Pearson, 2017.
2. Computer Organization and Design, David A. Paterson, John L. Hennessy, Elsevier, 2004.
3. Fundamentals of Logic Design, Roth, 5thEdition, Thomson, 2003.

RESOURCE WEBSITE:

https://nptel.ac.in/courses/106/103/106103068/

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO1 2
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-
CO5	3	2	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.6**	**2.3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.Tech. - IV Sem

23CSE241T	**DATABASE MANGEMENT SYSTEM**	**L T P C**
	(Common to CSE, CSM, CAI, CSD)	**2 1 0 3**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. Discuss the basic Database concepts and the applications, data models and ER Model.
2. Understand the Relational database design principles
3. Master the basics of SQL and construct queries using SQL.
4. Understand the Normalization process in Database Management System.
5. Familiar with the basic issues of transaction processing and concurrency control.

UNIT –1: INTRODUCTION TO DATABASE MANAGEMENT SYSTEM AND ENTITY RELATIONSHIP MODEL (9)

Database system - Characteristics (Database Vs File System) - Database Users - Advantages of Database systems - Database applications - Brief introduction of different Data Models - Conceptsof Schema - Instance and data independence -Three tier schema architecture for data independence - Database system structure environment - Centralized and Client Server architecture for the database - Introduction to Entity Relationship Model - Representation of entities - Attributes - Entity set – Relationship - Relationship set – Constraints - Sub classes - super class - Inheritance- Specialization -Generalization using ER Diagrams.

UNIT –2: RELATIONAL MODEL (9)

Introduction to Relational model - Concepts of domain – Attribute – Tuple - Relation importance ofnull values - Constraints (Domain, Key constraints, integrity constraints) and their importance- Relational Algebra, Relational Calculus - BASIC SQL: Simple Database schema - Data Base Language - types- Table definitions (create, alter), different DML operations (insert, delete, update).

UNIT –3: INTRODUCTION TO STRUCTURED QUERY LANGUAGE (9)

Basic SQL querying (select and project) using where clause arithmetic & logical operations - SQL functions(Date and Time, Numeric, String conversion) - Creating tables with relationship, Implementation of key and integrity constraints - Nested queries, sub queries, grouping, aggregation, ordering - Implementation of different types of Joins, view (updatable and non- updatable) - Relational set operations.

UNIT –4: NORMALIZATION (9)

Purpose of Normalization and schema refinement - Concept of functional dependency - normal forms based on functional dependency - Lossless join and dependency preserving decomposition (1NF, 2NF and 3 NF), concept of surrogate key - Boyce-Codd normal form(BCNF)
- MVD - Fourth normal form(4NF) - Fifth Normal Form (5NF).

UNIT –5: TRANSACTION CONCEPT AND INDEXING CONCEPTS (9)

Transaction State - ACID properties - Concurrent Executions – Serializability - Recoverability, Implementation of Isolation - Testing for Serializability - Lock based - Time stamp based optimistic - Concurrency protocols – Deadlocks - Failure Classification - Storage, Recovery and Atomicity - Recovery algorithm - Introduction to Indexing Techniques - B+ Trees, operations on B+Trees - Hash Based Indexing

TOTAL HOURS: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		**Pos**
CO1	Demonstrate knowledge on Data models and Database Languages and Design Entity Relationship model for a database	**PO1, PO3**
CO2	Analyze the relational database theory, and be able to write relational algebra and relational calculus expressions for queries	**PO1, PO2**
CO3	Analyze and evaluate the database using SQL DML/DDL	**PO1, PO2, PO3, PO5**
CO4	Analyze databases using normal forms to provide solutions for real time applications	**PO1, PO2**
CO5	Understand the properties of transactions in a database system, analyze serializability and indexing techniques.	**PO1, PO3,PO4**

TEXT BOOKS:

1. Database Management Systems, 3rd edition, Raghurama Krishnan, Johannes Gehrke, TMH (For Chapters 2, 3, 4)
2. Database System Concepts,5th edition, Silberschatz, Korth, Sudarsan,TMH (For Chapter 1 and Chapter 5)

REFERENCE BOOKS:

1. Introduction to Database Systems, 8thedition, C J Date, Pearson.
2. Database Management System, 6th edition, RamezElmasri, Shamkant B. Navathe, Pearson
3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

REFERENCE WEBSITE:

1. https://www.w3schools.in/sql/database-concepts
2. https://www.javatpoint.com/dbms-tutorial
3. https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system- set-1/
4. https://nptel.ac.in/courses/106/105/106105175/
5. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012758066 6728202 2456_shared/overview

CO-PO MAPPING:

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO 6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO1 1**	**PO12**
CO.1	3	-	3	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	3	3	-	3	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	-	2	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**2.6**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.Tech. - IV Sem

23CSD241T	DATA ENGINEERING (CSD)	L T P C
		2 1 0 3

PRE-REQUISITES: Nil

COURSE OBJECTIVES:

- Explain basic concepts of Data Engineering
- Discuss bout Data Engineering Life Cycle
- How to design Good Data Architecture

UNIT-I (9)

Introduction to Data Engineering: Definition, Data Engineering Life Cycle, Evolution of Data Engineer, Data Engineering Versus Data Science, Data Engineering Skills and Activities,
Data Maturity, Data Maturity Model, Skills of a Data Engineer, Business Responsibilities, Technical Responsibilities, Data Engineers and Other Technical Roles.

UNIT-II (9)

Data Engineering Life Cycle: Data Life Cycle Versus Data Engineering Life Cycle, Generation: Source System, Storage, Ingestion, Transformation, Serving Data.
Major undercurrents across the Data Engineering Life Cycle: Security, Data Management, DataOps, Data Architecture, Orchestration, Software Engineering.

UNIT-III (9)

Designing Good Data Architecture: Enterprise Architecture,Data Architecture**,** Principles of Good Data Architecture, Major Architecture Concepts.
Data Generation in Source Systems: Sources of Data, Files and Unstructured Data, APIs, Application Databases (OLTP), OLAP, Change Data Capture, Logs, Database Logs, CRUD, Source System Practical Details.

UNIT-IV (9)

Storage: Raw Ingredients of Data Storage, Data Storage Systems, Data Engineering Storage Abstractions, Data warehouse, Data Lake, Data Lakehouse.
Ingestion: Data Ingestion, Key Engineering considerations for the Ingestion Phase, Batch Ingestion Considerations, Message and Stream Ingestion Considerations, Ways to Ingest Data

UNIT-V (9)

Queries, Modeling and Transformation: Queries, Life of a Query, Query Optimizer, Queries on Streaming Data, Data Modelling, Modeling Streaming Data, Transformations, Streaming Transformations and Processing.
Serving Data for Analytics, Machine Learning and Reverse ETL: General Considerations for serving Data, Business Analytics, Operational Analytics, Embedded Analytics, Ways to serve data for analytics and ML, Reverse ETL.

TOTAL HOURS:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand Data Engineering Life cycle	**PO1, PO2, P03, PO4**
CO2	Apply appropriate data modeling techniques for different types of data. (L3)	**PO1, PO2, P03, PO4**
CO3	Evaluate and select appropriate technologies and frameworks for specific dataengineering tasks. (L5)	**PO1, PO2, P03, PO4**
CO4	Implement data quality checks and governance processes to ensure data reliability andcompliance	**PO1, PO2, P03, PO4**
CO5	Understand Data Engineering Life cycle	**PO1, PO2, P03, PO4**

TEXTBOOKS:

1. Joe Reis, Matt Housley, Fundamentals of Data Engineering, O'Reilly Media, Inc.,June 2022,ISBN: 9781098108304

REFERENCE BOOKS:

1. Paul Crickard , Data Engineering with Python,Packt Publishing, October 2020.
2. Ralph Kimball, Margy Ross, The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, Wiley, 3rd Edition, 2013
3. James Densmore, Data Pipelines Pocket Reference: Moving and Processing Data for Analytics, O'Reilly Media, 1st Edition, 2021

CO-PO MAPPING

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

II B.Tech. - IV Sem

23CSE245L	**DATABASE MANAGEMENT SYSTEMS LAB**	**L T P C**
	(Common to CSE, CSM, CAI, CSD)	**0 0 3 1.5**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

This Course will enable students to

1. Populate and query a database using SQL DDL/DML Commands
2. Declare and enforce integrity constraints on a database
3. Writing Queries using advanced concepts of SQL
4. Programming PL/SQL including procedures, functions, cursors and triggers

EXPERIMENTS COVERING THE TOPICS:

1. DDL, DML, DCL commands
2. Queries, nested queries, built-in functions,
3. PL/SQL programming- control structures
4. Procedures, Functions, Cursors, Triggers,
5. Database connectivity- ODBC/JDBC

EXPERIMENTS :

1. Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc,round, to_char, to_date)
5. i. Create a simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records werefound)

   ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. Theprogram can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions,

RAISE1APPLICATION ERROR.

8. Programs development using creation of procedures, passing parameters IN and OUT ofPROCEDURES.

9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers andINSTEAD OF Triggers

12. Create a table and perform the search operation on table using indexing and non1indexingtechniques.

13. Write a Java program that connects to a database using JDBC

14. Write a Java program to connect to a database using JDBC and insert values into it

15. Write a Java program to connect to a database using JDBC and delete values from it

REFERENCE BOOKS:

1. Oracle: The Complete Reference by Oracle Press
2. Nilesh Shah, "Database Systems Using Oracle", PHI, 2007
3. Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007
4. Ramez Elmasri, Shamkant, B. Navathe," Database Systems,", Pearson Education, 6th Edition,2013.
5. Database Principles Fundamentals of Design Implementation and Management,10th edition, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning,2022

REFERENCE WEBSITE:

1. https://www.scoopworld.in
2. https://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php

COURSE OUTCOMES:

On successful completion of the course the student will be		POs
CO1	Demonstrate practical knowledge on creation and alteration of tables, insertion and Querying of data.	PO1
CO2	Analyze the database schemas for the different types of database	PO2
CO3	Design the databases using SQL DML/DDL Commands	PO3
CO4	Design the complex PL/SQL programs for different problems	PO4
CO5	Use the procedure, function, trigger and cursor concepts in PL/SQL	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to SQL Commands and Queries and implementing programs in future.	PO12

CO PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.Tech. - IV Sem

23CSD244L	**EXPLORATORY DATA ANALYSIS WITH PYTHON**	**L T P C**
	(Common to all Engineering Branches)	**0 1 2 2**

PRE-REQUISITES: A course on C and Data Structures

COURSE EDUCATIONAL OBJECTIVES:
1. This course introduces the fundamentals of Exploratory Data Analysis
2. It covers essential exploratory techniques for understanding multivariate data by summarizing it through statistical methods and graphical methods

UNIT I:

Exploratory Data Analysis Fundamentals: Understanding data science, The significance of EDA, Steps in EDA, Making sense of data, Numerical data, Categorical data, Measurement scales, Comparing EDA with classical and Bayesian analysis, Software tools available for EDA, Getting started with EDA.

Sample Experiments:
1. Download Dataset from Kaggle using the following link : https://www.kaggle.com/datasets/sukhmanibedi/cars4u
2. Install python libraries required for Exploratory Data Analysis (numpy, pandas, matplotlib,seaborn)
3. Perform Numpy Array basic operations and Explore Numpy Built-in functions.
4. Loading Dataset into pandas dataframe
5. Selecting rows and columns in the dataframe

UNIT 2:

Visual Aids for EDA: Technical requirements, Line chart, Bar charts, Scatter plot using seaborn, Polar chart, Histogram, Choosing the best chart

Case Study:EDA with Personal Email, Technical requirements, Loading the dataset, Data transformation, Data cleansing, Applying descriptive statistics, Data refactoring, Data analysis.

Sample Experiments:
6. Apply different visualization techniques using sample dataset
   a) Line Chart b) Bar Chart c) Scatter Plots d)Bubble Plot
7. Generate Scatter Plot using seaborn library for iris dataset
8. Apply following visualization Techniques for a sample dataset
   a) Area Plot b) Stacked Plot c) Pie chart d) Table Chart
9. Generate the following charts for a dataset.
   a) Polar Chart b)Histogram c)Lollipop chart
10. Case Study: Perform Exploratory Data Analysis with Personal Email Data

UNIT 3:

Data Transformation: Merging database-style dataframes, Concatenating along with an axis, Merging on index, Reshaping and pivoting, Transformation techniques, Handling missing data, Mathematical operations with NaN, Filling missing values, Discretization and binning, Outlier detection and filtering, Permutation and random sampling, Benefits of data transformation, Challenges.

Sample Experiments:
11. Perform the following operations
   a) Merging Dataframes
   b) Reshaping with Hierarchical Indexing
   c) Data Deduplication
   d) Replacing Values

12. Apply different Missing Data handling techniques
    a) NaN values in mathematical Operations
    b) Filling in missing data
    c) Forward and Backward filling of missing values
    d) Filling with index values
    e) Interpolation of missing values
13. Apply different data transformation techniques
    a) Renaming axis indexes b)Discretization and Binning
    c) Permutation and Random Sampling
    d) Dummy variables

UNIT 4:

Descriptive Statistics: Distribution function, Measures of central tendency, Measures of dispersion, Types of kurtosis, Calculating percentiles, Quartiles, Grouping Datasets, Correlation, Understanding univariate, bivariate, multivariate analysis, Time Series Analysis

Sample Experiments:

14. Study the following Distribution Techniques on a sample data
    a) Uniform Distribution
    b) Normal Distribution
    c) Gamma Distribution
    d) Exponential Distribution
    e) Poisson Distribution
    f) Binomial Distribution
15. Perform Data Cleaning on a sample dataset.
16. Compute measure of Central Tendency on a sample dataset
    a) Mean b)Median c)Mode
17. Explore Measures of Dispersion on a sample dataset
    a) Variance b) Standard Deviation c) Skewness d) Kurtosis
18.
    a) Calculating percentiles on sample dataset
    b) Calculate Inter Quartile Range(IQR) and Visualize using Box Plots
19. Perform the following analysis on automobile dataset.
    a) Bivariate analysis b)Multivariate analysis
20. Perform Time Series Analysis on Open Power systems dataset

UNIT 5:

Model Development and Evaluation: Unified machine learning workflow, Data preprocessing, Data preparation, Training sets and corpus creation, Model creation and training, Model evaluation, Best model selection and evaluation, Model deployment
Case Study: EDA on Wine Quality Data Analysis

Sample Experiments:

21. Perform hypothesis testing using statsmodels library
    a) Z-Test b)T-Test
22. Develop model and Perform Model Evaluation using different metrics such as prediction score, R2 Score, MAE Score, MSE Score.
23. Case Study: Perform Exploratory Data Analysis with Wine Quality Dataset

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define the concepts related to design thinking. (L1, L2)	**PO1**
CO2	Explain the fundamentals of Design Thinking and innovation (L1, L2)	**PO3**
CO3	Apply the design thinking techniques for solving problems in various sectors. (L3)	**PO5**
CO4	Analyse to work in a multidisciplinary environment (L4)	**PO6**
CO5	Evaluate the value of creativity (L5)	**PO2**
CO6	Formulate specific problem statements of real time issues (L3, L6)	**PO8**
CO7	Do experiments effectively as an individual and as a team member in a group.	**PO9**
CO8	Communicate verball and in written form,the understanding aboutthe experiments.	**PO10**
CO9	Continue updating their skill related to object oriented concepts andimplementing programs in future.	**PO12**

TEXTBOOK:

1. Suresh Kumar Mukhiya, Usman Ahmed, Hands-On Exploratory Data Analysis with Python, Packt Publishing, 2020.

REFERENCES:

1. Ronald K. Pearson, Exploratory Data Analysis Using R, CRC Press, 2020
2. RadhikaDatar,HarishGarg, Hands-On Exploratory Data Analysis with R: Become an expert in exploratory data analysis using R packages, Ist Edition, Packt Publishing, 2019

REFERENCE WEBSITE

1. https://github.com/PacktPublishing/Hands-on-Exploratory-Data-Analysis-with- Python
2. https://www.analyticsvidhya.com/blog/2022/07/step-by-step-exploratory-data- analysis-eda-using-python/#h-conclusion
3. https://github.com/PacktPublishing/Exploratory-Data-Analysis-with-Python- Cookbook

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO1 2
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	3	-		-	-	-	-
CO5	-	-	-	-	-	-	-	-		-	-	-
CO6	-	-	-	-	-	-	-	3	-		-	-
C07	-	-	-	-	-	-	-	-	3	-	-	-
C08	-	3	-	-	-	-	-	-	-	3	-	-
CO9												3
CO*	3	3	-	3	3	3	-	3	3	3	-	3

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B.Tech. - IV Sem

23CSD243L	**DATA ENGINEERING LAB**	**L T P C**
	(CSD)	**0 0 3 1.5**

PRE-REQUISITES: NIL COURSE OBJECTIVE:

- The main objective of this course is to teach how build data engineering infrastructureand data pipelines.

EXPERIMENTS:

1. Installing and configuring Apache NiFi, Apache Airflow
2. Installing and configuring Elasticsearch, Kibana, PostgreSQL, pgAdmin 4
3. Reading and Writing files
   a. Reading and writing files in Python
   b. Processing files in Airflow
   c. NiFi processors for handling files
   d. Reading and writing data to databases in Python
   e. Databases in Airflow
   f. Database processors in NiFi
4. Working with Databases
   a. Inserting and extracting relational data in Python
   b. Inserting and extracting NoSQL database data in Python
   c. Building database pipelines in Airflow
   d. Building database pipelines in NiFi
5. Cleaning, Transforming and Enriching Data
   a. Performing exploratory data analysis in Python
   b. Handling common data issues using pandas
   c. Cleaning data using Airflow
6. Building the Data Pipeline
7. Building a Kibana Dash Board
8. Perform the following operations
   a. Staging and validating data
   b. Building idempotent data pipelines
   c. Building atomic data pipelines
9. Version Control with the NiFi Registry
   a. Installing and configuring the NiFi Registry
   b. Using the Registry in NiFi
   c. Versioning your data pipelines
   d. Using git-persistence with the NiFi Registry
10. Monitoring Data Pipelines
   a. Monitoring NiFi in the GUI
   b. Monitoring NiFi using processors
   c. Monitoring NiFi with Python and the REST API
11. Deploying Data Pipelines
   a. Finalizing your data pipelines for production
   b. Using the NiFi variable registry
   c. Deploying your data pipelines
12. Building a Production Data Pipeline
   a. Creating a test and production environment
   b. Building a production data pipeline
   c. Deploying a data pipeline in pr8oduction

COURSE OUTCOMES:

On the successful completion of this course, the student should be able to,		**Posrelated to COs**
CO1	Design and implement end-to-end data pipelines using technologies such as Apache Spark, Kafka, or similar frameworks.	**PO1**
CO2	Create and manage relational and NoSQL databases (e.g., MySQL, PostgreSQL, MongoDB) for storing and querying structured and unstructured data.	**PO2**
CO3	Develop Extract, Transform, Load (ETL) processes to integrate data from multiple sources into a unified format suitable for analysis and reporting.	**PO3**
CO4	Implement data quality checks and validation mechanisms to ensure accuracy, completeness, and consistency of data within pipelines and databases.	**PO4**
CO5	Deploy and manage data engineering solutions on cloud platforms (e.g., AWS, Azure, Google Cloud) for scalability and reliability.	**PO5**
CO6	Identify performance bottlenecks in data pipelines and databases, and apply optimization techniques to enhance throughput and efficiency.	**PO6**
CO7	Do experiments effectively as an individual and as a teammember in a group.	**PO7**
CO8	Communicate verbally and in written form, the understandingabout the experiments.	**PO8**
CO9	Continue updating their skill related to lists, tuples anddictionaries implementing programs in future.	**P09**

REFERENCE BOOKS:

1. Paul Crickard , Data Engineering with Python,Packt Publishing, October

CO-PO MAPPING:

CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
II B. Tech IV Sem

23ESC241T	**DESIGN THINKING & INNOVATION**	**L T P C**
	(Common to CSE, CSM, CAI, CSD)	**1 0 2 2**

COURSE EDUCATIONAL OBJECTIVES:

1. The objective of this course is to familiarize students with design thinking process as a toolfor breakthrough innovation.
2. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

UNIT – I INTRODUCTION TO DESIGN THINKING (9)

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT – II DESIGN THINKING PROCESS (9)

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT – III INNOVATION (9)

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT – IV PRODUCT DESIGN (9)

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies

Activity: Importance of modelling, how to set specifications, Explaining their own product design

UNIT – V DESIGN THINKING IN BUSINESS PROCESSES (9)

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs-Design thinking for Startups- Defining and testing Business Models and Business Cases-Developing & testing prototypes.

TOTAL HOURS: 45

Activity: How to market our own product, About maintenance, Reliability and plan for startup.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define the concepts related to design thinking. (L1, L2)	**PO1,PO2,PO3**
CO2	Explain the fundamentals of Design Thinking and innovation (L1, L2)	**PO1,PO2,PO3**
CO3	Apply the design thinking techniques for solving problems in various sectors. (L3)	**PO1,PO2,PO3**
CO4	Analyse to work in a multidisciplinary environment (L4)	**PO1,PO2,PO3**
CO5	Evaluate the value of creativity (L5)	**PO1,PO2,PO3**

TEXTBOOKS:

1. Tim Brown,Change by design, Harper Bollins (2009)
2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.

REFERENCE BOOKS:

1. David Lee, Design Thinking in the Classroom, Ulysses press
2. Shrutin N Shetty, Design the Future, Norton Press
3. William Lidwell,Universal Principles of Design- Kritinaholden, Jill Butter.
4. Chesbrough.H, The Era of Open Innovation – 2013.

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/110/106/110106124/
2. https://nptel.ac.in/courses/109/104/109104109/
3. https://swayam.gov.in/nd1_noc19_mg60/preview

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERIN-DATA SCIENCE

23CSE242T	**III B.Tech. - V Semester** **OPERATING SYSTEMS** **(DATA SCIENCE)**	**L T P C** **3 - - 3**

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection.
2. Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
3. Illustrate different conditions for deadlock and their possible solutions.

UNIT –1: OPERATING SYSTEMS OVERVIEW & SYSTEM STRUCTURES (9)

Operating Systems Overview: Introduction, Operating system functions, Operating systems operations, Computing environments, Free and Open-Source Operating Systems.

System Structures: Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure, Building and Booting an Operating System, Operating system debugging.

UNIT –2: PROCESSES, THREADS AND CONCURRENCY & CPU SCHEDULING (9)

Processes: Process Concept, Process scheduling, Operations on processes, Inter-process communication.

Threads and Concurrency: Multithreading models, Thread libraries, Threading issues. **CPU Scheduling:**Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling.

UNIT III: SYNCHRONIZATION TOOLS & DEADLOCKS (9)

Synchronization Tools: The Critical Section Problem, Peterson's Solution, Mutex Locks,Semaphores, Monitors, Classic problems of Synchronization.

Deadlocks: system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.

UNIT –IV: MEMORY-MANAGEMENT STRATEGIES & STORAGE MANAGEMENT (9)

Memory-Management Strategies: Introduction, Contiguous memory allocation, Paging,Structure of the Page Table, Swapping.**Virtual Memory Management:** Introduction, Demand paging, Copy-on- write, Pagereplacement, Allocation of frames, Thrashing.**Storage Management:** Overview of Mass Storage Structure, HDD Scheduling.

UNIT V: FILE SYSTEM& PROTECTION (9)

File System: File System Interface, File concept, Access methods, Directory Structure, File system Implementation, File-system structure, File-system Operations, Directory implementation, Allocationmethod, Free space management, File-System Internals: File System Mounting, Partitions and Mounting, File Sharing.

Protection: Goals of protection, Principles of protection, Protection Rings, Domain of protection, Access matrix.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Describe the basics of the operating systems, mechanisms of OS to handle processes, threads, and their communication. (L1)	PO1, PO2
CO2	Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection. (L2)	PO1, PO3, PO4
CO3	Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. (L3)	PO1,PO2, PO3,PO4,PO5
CO4	Illustrate different conditions for deadlock and their possible solutions. (L2)	PO1, PO2, PO4
CO5	Analyze the memory management and its allocation policies. (L4)	PO1, PO4

TEXT BOOKS:

1.Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2016.
2.Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (Topics: Inter- process Communication and File systems.

REFERENCE BOOKS:

1.Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.
2.Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition,Tata McGraw Hill, 2012.
3.Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009
4.Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004

REFERENCE WEBSITE:

1.https://nptel.ac.in/courses/106/106/106106144/
2.http://peterindia.net/OperatingSystems.html

CO-PO MAPPING

CO\ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	2	-	3	3	-	-	-	-	-	-	-	-
CO.3	2	2	3	2	3	-	-	-	-	-	-	-
CO.4	2	2	-	3	-	-	-	-	-	-	-	-
CO.5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	**2.4**	**2**	**3**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

III B.Tech. - V Semester

23CSE243T	SOFTWARE ENGINEERING (DATA SCIENCE)	L T P C
		3 - - 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. To learn the basic concepts of software engineering and life cycle models
2. To explore the issues in software requirements specification and enable to write SRS documents for software development problems
3. To elucidate the basic concepts of software design and enable to carry out procedural and object oriented design of software development problems
4. To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing
5. To reveal the basic concepts in software project management

UNIT –1: INTRODUCTION (9)

Introduction: Evolution, Software development projects, Exploratory style of software developments, Emergence of software engineering, Notable changes in software development practices, Computer system engineering.

Software Life Cycle Models: Basic concepts, Waterfall model and its extensions, Rapid applicationdevelopment, Agile development model, Spiral model.

UNIT –2: SOFTWARE PROJECT MANAGEMENT & REQUIREMENTS ANALYSIS AND SPECIFICATION (9)

Software Project Management: Software project management complexities, Responsibilities ofa software project manager, Metrics for project size estimation, Project estimation techniques, Empirical Estimation techniques, COCOMO, Halstead's software science, risk management.

Requirements Analysis And Specification: Requirements gathering and analysis, Software Requirements Specification (SRS), Formal system specification, Axiomatic specification, Algebraic specification, Executable specification and 4GL.

UNIT III: SOFTWARE DESIGN & AGILITY & FUNCTION-ORIENTED SOFTWARE DESIGN&USER-INTERFACE-DESIGN (9)

Software Design: Overview of the design process, How to characterize a good software design? Layered arrangement of modules, Cohesion and Coupling. approaches to software design. **Agility:** Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, Tool Set for the Agile Process (Text Book 2)

Function-Oriented Software Design: Overview of SA/SD methodology, Structured analysis, Developing the DFD model of a system, Structured design, Detailed design, and Design Review.
User Interface Design: Characteristics of a good user interface, Basic concepts, Types of user interfaces, Fundamentals of component-based GUI development, and user interface design methodology.

UNIT –IV: CODING AND TESTING & SOFTWARE RELIABILITY AND QUALITY MANAGEMENT (9)

Coding And Testing: Coding, Code review, Software documentation, Testing, Black-box testing, White-Box testing, Debugging, Program analysis tools, Integration testing**,** Testing object- orientedprograms, Smoke testing, and Some general issues associated with testing.**Software Reliability And Quality Management:** Software reliability. Statistical testing, Software quality, Software quality management system, ISO 9000. SEI Capability maturity model. Few other important quality standards, and Six Sigma**.**

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UNIT V:COMPUTER-AIDED SOFTWARE ENGINEERING & SOFTWARE MAINTENANCE & SOFTWARE REUSE **(9)**

Computer-Aided Software Engineering (Case): CASE and its scope, CASE environment,
CASE support in the software life cycle, other characteristics of CASE tools, Towards secondgeneration CASE Tool, and Architecture of a CASE Environment.

Software Maintenance: Characteristics of software maintenance, Software reverse engineering,Software maintenance process models and Estimation of maintenance cost.
Software Reuse: reuse- definition, introduction, reason behind no reuse so far, Basic issues inany reuse program, A reuse approach, and Reuse at organization level.

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Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Identify the key activities in managing a software project and can compare different process models.	PO1, PO2
CO2	Identify software requirements and design SRS document by analyzing the data flows.	PO1, PO3, PO4
CO3	Design class based components and conduct component level design based on architectural styles and patterns. Represent classes, responsibilities and states using UML notation and model structural concepts of the system. Model behavioral concepts of the system and analyze and document the requirements through use case driven approach	PO1,PO2, PO3,PO4,PO5
CO4	Identify various types of testing and development metrics for various phases of software development.	PO1, PO2, PO4
CO5	Identify the software risks and analyze the quality assurance activities, Represent classes,responsibilities and states using UML notation and model structural concepts of the system	PO1, PO4

TEXT BOOKS:

1.Rajib Mall, ―Fundamentals of Software Engineering‖, 5th Edition, PHI, 2018.

2.Pressman R, ―Software Engineering- Practioner Approach‖, McGraw Hill.

REFERENCE BOOKS:

1. Somerville, ―Software Engineering‖, Pearson 2.
2. Richard Fairley, ―Software Engineering Concepts‖, Tata McGraw Hill.
3. Jalote Pankaj, ―An integrated approach to Software Engineering‖, Narosa

REFERENCE WEBSITE:

1.https://nptel.ac.in/courses/106/105/106105182/
2.http://peterindia.net/SoftwareDevelopment.html

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	2	-	3	3	-	-	-	-	-	-	-	-
CO.3	2	2	3	2	3	-	-	-	-	-	-	-
CO.4	2	2	-	3	-	-	-	-	-	-	-	-
CO.5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	**2.4**	**2**	**3**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

III B.Tech. - V Semester

23CSM241T	MACHINE LEARNING	L T P C
		3 0 0 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. Define machine learning and its different types (supervised and unsupervised) and understand their applications.
2. Apply supervised learning algorithms including decision trees and k-nearest neighbors (k-NN).
3. Implement unsupervised learning techniques, such as K-means clustering.

UNIT I: INTRODUCTION TO MACHINE LEARNING (9)

Evolution of Machine Learning, Paradigms for ML, Learning by Rote, Learning by Induction, Reinforcement Learning, Types of Data, Matching, Stages in Machine Learning, Data Acquisition, Feature Engineering, Data Representation, Model Selection, Model Learning, Model Evaluation, Model Prediction, Search and Learning, Data Sets.

UNIT 2: NEAREST NEIGHBOUR-BASED MODELS (9)

Introduction to Proximity Measures, Distance Measures, Non-Metric Similarity Functions, Proximity Between Binary Patterns, Different Classification Algorithms Based on the Distance Measures ,K-Nearest Neighbor Classifier, Radius Distance Nearest Neighbor Algorithm, KNN Regression, Performance of Classifiers, Performance of Regression Algorithms.

UNIT 3: MODELS BASED ON DECISION TREES (9)

Decision Trees for Classification, Impurity Measures, Properties, Regression Based on Decision Trees, Bias–Variance Trade-off, Random Forests for Classification and Regression.

The Bayes Classifier: Introduction to the Bayes Classifier, Bayes" Rule and Inference, The Bayes Classifier and its Optimality, Multi-Class Classification | Class Conditional Independence and Naive Bayes Classifier (NBC)

UNIT 4: LINEAR DISCRIMINANTS FOR MACHINE LEARNING (9)

Introduction to Linear Discriminants, Linear Discriminants for Classification, Perceptron Classifier, Perceptron Learning Algorithm, Support Vector Machines, Linearly Non-Separable Case, Non-linear SVM, Kernel Trick, Logistic Regression, Linear Regression, Multi-Layer Perceptrons (MLPs), Backpropagation for Training an MLP.

UNIT 5: CLUSTERING (9)

Introduction to Clustering, Partitioning of Data, Matrix Factorization |Clustering of Patterns, Divisive Clustering, Agglomerative Clustering, Partitional Clustering, K-Means Clustering, Soft Partitioning, Soft Clustering, Fuzzy C-Means Clustering, Rough Clustering, Rough K-Means Clustering Algorithm, Expectation Maximization-Based Clustering, Spectral Clustering.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Identify machine learning techniques suitable for a given problem.	PO6, PO7, PO8, PO9, PO12
CO2	Solve real-world problems using various machine learning techniques.	PO6, PO7, PO8, PO9, PO12
CO3	Apply Dimensionality reduction techniques for data preprocessing.	PO6, PO7, PO8, PO9, PO12
CO4	Explain what is learning and why it is essential in the design of intelligentmachines.	PO6, PO7, PO8, PO9, PO12
CO5	Evaluate Advanced learning models for language, vision, speech, decisionmaking etc.	PO6, PO7, PO8, PO9, PO12

TEXT BOOKS:

1.“Machine Learning Theory and Practice”, M N Murthy, V S Ananthanarayana, Universities Press (India), 2024

REFERENCE BOOKS:

1.“Machine Learning”, Tom M. Mitchell, McGraw-Hill Publication, 2017.

2.“Machine Learning in Action”, Peter Harrington, DreamTech, 2012.

3.“Introduction to Data Mining”, Pang-Ning Tan, Michel Stenbach, Vipin Kumar, 7th Edition, 2019.

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERIN-DATA SCIENCE

III B.Tech. - V Semester

23CSE351T	**AUTOMATA THEORY AND COMPILER DESIGN**	**L**	**T**	**P**	**C**
		3	**-**	**-**	**3**

PRE-REQUISITES: A course on Software Engineering

COURSE OBJECTIVES:

1. Able to understand the concept of abstract machines, construct FA, Regular Expressions for the regular languages and equivalent FSMs.
2. Able to construct pushdown automata equivalent to Context free Grammars, construct Turing Machines and understand undecidability.
3. Emphasize the concepts learnt in phases of compiler, lexical analyser and Top-down parser.
4. Able to understand the concepts of Bottom-up parser, Intermediate Code Generation.
5. Able to understand the concepts of Code optimizer and Code Generation.

UNIT 1:INTRODUCTION TO AUTOMATA AND REGULAR EXPRESSIONS (9)

Introduction, Alphabets, Strings and Languages, Chomsky Hierarchy, Automata and Grammars, Regular Grammar and Language, Finite Automata, Deterministic finite Automata (DFA), Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Converting Regular Grammar and Expression into Finite Automata, Pumping lemma for regular sets, Closure properties of regular sets (Without proof).

UNIT -2: CONTEXT FREE GRAMMARS AND PUSHDOWN AUTOMATA (9)

Context Free Language, Context Free Grammar, Derivation and Parse tree, Ambiguity, Simplification of CFG's, Chomsky Normal Form, Greibach Normal Form, Push Down Automat (PDA), Design of PDA, Equivalence of PDA and CFL/CFG

UNIT -3: TURING MACHINES AND INTRODUCTION TO COMPILERS (9)

Turing Machine, TM Model, Language acceptance, Design of Turing Machine, Compilers, Phases of Compiler, The role of Lexical Analyzer, Input Buffering

UNIT -4: THE PARSERS AND INTERMEDIATE CODE GENERATION (9)

Parser, Top-Down parsers: Recursive Descent Parsers, Predictive Parsers Bottom-up Parsers: Shift-Reduce Parsing, LR parsers, Intermediate Code Generation: Three address codes.

UNIT -5: THE CODE OPTIMIZATION AND CODE GENERATION (9)

Code Optimization: Peephole optimization, Basic blocks and flow graphs, DAG, Principles of Source Code Optimization, Code Generation: Issues in Design of Code Generation, Simple Code Generator

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Identify the various bugs and correcting them after knowing the consequences of the bug.	**PO1, PO2**
CO2	Perform functional testing using control flow and transaction flow graphs.	**PO1, PO2, PO3**
CO3	Design the path expression and reduce them very well when needed.	**PO1, PO2, PO3**
CO4	Test logic or an application and identifying the nice and ugly domains.	**PO1, PO2, PO3, PO4**
CO5	Use appropriate software testing tools, techniques and methods for even more effective systems during both the test planning and test execution phases of a software development project.	**PO1, PO2, PO3, PO5**

TEXT BOOKS:

1. **Michael Sipser**, *Introduction to the Theory of Computation*, 3rd Edition, Cengage Learning, Reprint 2021.
2. **K. L. P. Mishra & N. Chandrasekaran**, *Automata Theory and Formal Languages*, Revised Edition 2022, PHI Learning
3. **John C. Martin**, *Theory of Computation*, 2021 Edition, McGraw-Hill.
4. **Aho, Lam, Sethi & Ullman**, *Compilers: Principles, Techniques and Tools*, 2nd Edition, Pearson, Reprint 2020–2023.
5. **K. V. N. Sunitha & N. Kalyani**, *Compiler Design*, Latest Edition 2021/2022, McGraw-Hill.

REFERENCE WEBSITE:

1. **GeeksforGeeks – Automata Theory** https://www.geeksforgeeks.org/automata-theory
2. **TutorialsPoint – Theory of Computation** https://www.tutorialspoint.com/automata_theory
3. **NPTEL – Theory of Computation (IIT Courses)** https://nptel.ac.in/courses/106/104/106104028
4. **GeeksforGeeks – Compiler Design** https://www.geeksforgeeks.org/compiler-design-tutorials
5. **TutorialsPoint – Compiler Design** https://www.tutorialspoint.com/compiler_design

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	2	3	3	-	-	-	-	-	-	-	-	-
CO.3	2	3	3	-	-	-	-	-	-	-	-	-
CO.4	2	3	3	3	-	-	-	-	-	-	-	-
CO.5	2	3	3	-	3	-	-	-	-	-	-	-
CO*	2.2	3	3	3	3	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERIN-DATA SCIENCE

III B.Tech. - V Semester

23CSE354B	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
		3	0	0	3

PRE-REQUISITES: Object-oriented programming concepts

COURSE EDUCATIONAL OBJECTIVES:

1.Describe the activities in the different phases of the object-oriented development lifecycle.

2.Understand the concepts of object-oriented model with the E-R and EER models.

3.Model a real-world application by using UML diagram.

4.Design architectural modelling.

5.Describing an application of UML.

UNIT –1: INTRODUCTION TO UML (9)

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

UNIT –2: BASIC STRUCTURAL MODELLING (9)

Basic Structural Modelling: Classes, Relationships, common Mechanisms, and diagrams. Advanced Structural Modelling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages. Class & Object Diagrams: Terms, concepts, modelling techniques for Class & Object Diagrams

UNIT –3: BASIC BEHAVIOURAL MODELLING (9)

Basic Behavioural Modelling-I: Interactions, Interaction diagrams.Basic Behavioural Modelling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT –4: ADVANCED BEHAVIORAL MODELLING (9)

Advanced Behavioral Modelling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Architectural Modelling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT –5: PATTERNS AND FRAMEWORKS (9)

Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	The importance of modelling in UML.	PO1, PO2, P03, PO4, PO5
CO2	Compare and contrast the object-oriented model with the E-R and EER models.	PO1, PO2, P03, PO4, PO5
CO3	Design use case diagram. Design an application using deployment diagram.	PO1, PO2, P03, PO4, PO5
CO4	Apply UML diagrams to build library application.	PO1, PO2, P03, PO4, PO5
CO5	Design and interpret artifact diagrams to visualize software architecture and deployment.	PO1, PO2, P03, PO4, PO5

TEXT BOOKS:

1.Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modelling Language User Guide, Pearson Education 2nd Edition.

2.Object-Oriented Analysis and Design with the Unified Process By John W Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.

REFERENCE BOOKS:

1.Meilir Page-Jones: Fundamentals of Object-Oriented Design in UML, Pearson Education.

2.Pascal Roques: Modelling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.

3.Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.

4.Mark Priestley: Practical Object-Oriented Design with UML, TMH.

5.Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and

6.Unified Process, Craig Larman, Pearson Education.

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc22_cs99/preview
2. https://www.classcentral.com/course/swayam-object-oriented-analysis-and- design-14215.
3. https://onlinecourses.nptel.ac.in/noc19_cs48/preview

CO-PO MAPPING:

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

III B.Tech. - V Semester

23CSE354C	INTERNET OF THINGS	L T P C
		3 - - 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the basics of Internet of Things and protocols.
2. Discuss the requirement of IoT technology
3. Introduce some of the application areas where IoT can be applied.
4. Understand the vision of IoT from a global perspective, understand its applications, determine its market perspective using gateways, devices and data management

UNIT- I INTRODUCTION TO IOT (9)

Definition and Characteristics of IoT, physical design of IoT, IoT protocols, IoT communication models, IoT Communication APIs, Communication protocols, Embedded Systems, IoT Levels and Templates

UNIT- II PROTOTYPING IOT OBJECTS USING MICROPROCESSOR/MICROCONTROLLER (9)

Working principles of sensors and actuators, setting up the board – Programming for IoT, Reading from Sensors, Communication: communication through Bluetooth, Wi-Fi.

UNIT-III IOT ARCHITECTURE AND PROTOCOLS (9)

Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, Protocols- 6LowPAN, RPL, CoAP, MQTT, IoT frameworks- Thing Speak.

UNIT- IV DEVICE DISCOVERY AND CLOUD SERVICES FOR IOT (9)

Device discovery capabilities- Registering a device, Deregister a device, Introduction to Cloud Storage models and communication APIs Web-Server, Web server for IoT.

UNIT- V UAV IoT (9)

Introduction to Unmanned Aerial Vehicles/Drones, Drone Types, Applications: Defense, Civil, Environmental Monitoring; UAV elements and sensors- Arms, motors, Electronic Speed Controller(ESC), GPS, IMU, Ultra sonic sensors; UAV Software –Arudpilot, Mission Planner, Internet of Drones(IoD)- Case study FlytBase.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand general concepts of Internet of Things.	**PO1**
CO2	Apply design concept to IoT solutions	**PO3, PO5**
CO3	Analyze various M2M and IoT architectures	**PO2, PO4**
CO4	Evaluate design issues in IoT applications	**PO2, PO6**
CO5	Create IoT solutions using sensors, actuators and Devices	**PO3, PO5, PO11**

TEXT BOOKS:

1. Vijay Madisetti and ArshdeepBahga, ―Internet of Things (A Hands-on-Approach)‖, 1st Edition, VPT, 2014.
2. Handbook of unmanned aerial vehicles, K Valavanis; George J Vachtsevanos, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.

REFERENCE BOOKS:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, ― From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence‖, 1st Edition, Academic Press, 2014.
2. ArshdeepBahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
3. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.

REFERENCE WEBSITE:

1. https://www.arduino.cc/
2. https://www.raspberrypi.org/
3. https://nptel.ac.in/courses/106105166/5
4. https://nptel.ac.in/courses/108108098/4

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B.Tech. - V Semester

23CSE354D	SOFT COMPUTING	L	T	P	C
		3	0	0	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES

1. Familiarize with soft computing concepts
2. Introduce and use the idea of fuzzy logic and use of heuristics based on human experience
3. Familiarize the Neuro-Fuzzy modelling using Classification and Clustering techniques
4. Learn the concepts of Genetic algorithm and its applications
5. Acquire the knowledge of Rough Sets.

UNIT - I

Introduction to Soft Computing: Evolutionary Computing, "Soft" computing versus "Hard" computing, Soft Computing Methods, Recent Trends in Soft Computing, Characteristics of Soft computing, Applications of Soft Computing Techniques.

UNIT- II

Fuzzy Systems: Fuzzy Sets, Fuzzy Relations, Fuzzy Logic, Fuzzy Rule-Based Systems

UNIT- III

Fuzzy Decision Making, Particle Swarm Optimization.

UNIT- IV

Genetic Algorithms: Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

UNIT- V

Rough Sets, Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques.

COURSE OUTCOMES:

On successful completion of the course, student will be able to		POs related to COs
CO1	Understand the concepts on Soft computing and methods and Characteristics.	PO1
CO2	Understand and develop Fuzzy Systems: Fuzzy Sets, Fuzzy Relations, Fuzzy Logic	PO5
CO3	Understand the concepts Fuzzy Decision Making, Particle Swarm Optimization	PO2
CO4	Understand concepts Genetic Algorithms: Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties	PO6
CO5	Understand the importance Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques	PO4

TEXT BOOK:

1.Soft Computing – Advances and Applications - Jan 2015 by B.K. Tripathy and J. Anuradha – Cengage Learning

REFERENCE BOOKS:

1. S. N. Sivanandam & S. N. Deepa, ―Principles of Soft Computing‖ , 2nd edition, Wiley India, 2008.
2. David E. Goldberg, ―Genetic Algorithms-In Search, optimization and Machine learning‖ , Pearson Education.
3. J. S. R. Jang, C.T. Sun and E.Mizutani, ―Neuro-Fuzzy and Soft Computing‖ , Pearson Education, 2004.

CO-PO MAPPING

CO-PO	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	2	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**2**	**3**	**2**	**-**	**-**	3	3	**2**	**-**	**3**

230CE351A	**GREEN BUILDINGS (OPEN ELECTIVE -I)**	**L T P C**
	(Civil Branch)	**3 0 0 3**

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. **To understand** the fundamental concepts of green buildings, their necessity, and sustainable features.
2. **To analyze** green building concepts, rating systems, and their benefits in India.
3. **To apply** green building design principles, energy efficiency measures, and renewable energy sources.
4. **To evaluate** air conditioning systems, HVAC designs, and energy modeling for sustainable buildings.
5. **To assess** material conservation strategies, waste management, and indoor environmentally quality in green buildings.

UNIT– I **(9)**

Introduction to Green Building– Necessity of Green Buildings, Benefits of Green Buildings, Green Building Materials and Equipment in India, Key Requisites for Constructing a Green Building, Important Sustainable Features for Green Buildings.

UNIT– II **(9)**

Green Building Concepts and Practices– Indian Green Building Council, Green Building Movement in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation; Green Building Opportunities and Benefits: Opportunities of Green Buildings, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy-Saving Approaches in Buildings, LEED India Rating System, and Energy Efficiency.

UNIT–III **(9)**

Green Building Design– Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximizing System Efficiency, steps to Reduce Energy Demand and Use Onsite Sources and Sinks, Use of Renewable Energy Sources, Eco-Friendly Captive Power Generation for Factories, Building Requirements.

UNIT– IV **(9)**

Air Conditioning– Introduction, CII Godrej Green Business Centre, Design Philosophy, Design Interventions, Energy Modeling, HVAC System Design, Chiller Selection, Pump Selection, Selection of Cooling towers, Selection of Air Handling Units, Pre-Cooling of Fresh Air, Interior Lighting Systems, Key Features of the Building, Eco-Friendly Captive Power Generation for Factories, Building Requirements.

UNIT– V **(9)**

Material Conservation– Handling of Non-Process Waste, Waste Reduction During Construction, Materials with Recycled Content, Local Materials, Material Reuse, Certified Wood, Rapidly Renewable Building Materials and Furniture. Indoor Environment Quality and Occupational Health– Air Conditioning, Indoor Air Quality, Sick Building Syndrome, tobacco Smoke.

Total Hours: 45

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to:		POS
CO1	Understand the importance of green buildings, their necessity, and sustainable features.	PO1,PO6,PO7
CO2	Analyze various green building practices, rating systems, and their impact on environmental sustainability.	PO2,PO5,PO7
CO3	Apply principles of green building design to enhance energy efficiency and incorporate renewable energy sources.	PO3,PO5,PO4, PO7
CO4	Evaluate HVAC systems, energy-efficient air conditioning techniques, and their role in sustainable building design.	PO3,PO5,PO4, PO7
CO5	Assess material conservation techniques, waste reduction strategies, and indoor air quality management in green buildings.	PO6,PO7,PO8, PO9

TEXT BOOKS:

1. Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air Conditioning Engineers, 2009.
2. Green Building Hand Book by to Molley and Skimming's, 2009.

REFRENCE BOOKS:

1. Complete Guide to Green Buildings by Trish riley
2. Standard for the design for High Performance Green Buildings by Kent Peterson, 2009
3. Energy Conservation Building Code–ECBC-2020, published by BEE

ONLINE LEARNING RESOURCES:

1. https://archive.nptel.ac.in/courses/105/102/105102195/

CO-PO MAPPING:

CO-PO	PO 1	PO 2	PO3	PO 4	PO5	PO6	PO7	PO 8	PO 9	PO10	PO 11	PO12
CO-1	3	-	-	-	-	2	3	-	-	-	-	-
CO-2	-	3	-	-	2	-	3	-	-	-	-	2
CO-3	-	-	3	3	3	-	3	-	-	-	-	-
CO-4	-	-	3	3	3	-	3	-	-	-	-	-
CO-5	-	-	-	-	-	3	3	3	2	-	-	-
CO	3	3										

230CE351B	CONSTRUCTION TECHNOLOGY AND MANAGEMENT (OPENELECTIVE– I)	L T P C
		3 0 0 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. **To understand** the fundamental concepts of green buildings, their necessity, and sustainable features.
2. **To analyze** green building concepts, rating systems, and their benefits in India.
3. **To apply** green building design principles, energy efficiency measures, and renewable energy sources.
4. **To evaluate** air conditioning systems, HVAC designs, and energy modeling for sustainable buildings.
5. **To assess** material conservation strategies, waste management, and indoor environmentally quality in green buildings.

UNIT– I (9)

Introduction: Project forms, Management Objectives and Functions; Organizational Chart of a Construction Company; Manager's Duties and Responsibilities; Public Relations; Leadership and Team - Work; Ethics, Morale, Delegation and Accountability

UNIT– II (9)

Man, and Machine: Man-Power Planning, Training, Recruitment, Motivation, Welfare Measures and Safety Laws; Machinery for Civil Engineering., Earth Movers and Hauling Costs, Factors Affecting Purchase, Rent, and Lease of Equipment, and Cost Benefit Estimation.

UNIT–III (9)

Planning, Scheduling and Project Management: Planning Stages, Construction Schedules and Project Specification, Monitoring and Evaluation; Bar-Chart, CPM, PERT, Network-formulation and Time Computation.

UNIT–IV (9)

Contracts: Types of Contracts, formation of Contract – Contract Conditions – Contract for Labour, Material, Design, and Construction – Drafting of Contract Documents Based On IBRD/ MORTH Standard Bidding Documents – Construction Contracts – Contract Problems – Arbitration and Legal Requirements Computer Applications in Construction Management: Software for Project Planning, Scheduling and Control.

UNIT– V (9)

Safety Management – Implementation and Application of QMS in Safety Programs, ISO 9000 Series, Accident Theories, Cost of Accidents, Problem Areas in Construction Safety, Fall Protection, Incentives, Zero Accident Concepts, Planning for Safety, Occupational Health and Ergonomics

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand project management fundamentals, organizational structures, and leadership principles in construction.	PO1,PO6,PO8,PO9
CO2	Analyze manpower planning, equipment management, and cost estimation in civil engineering projects.	PO2,PO5,PO12
CO3	Apply planning, scheduling, and project management techniques such as CPM and PERT.	PO3,PO5,PO4, PO10
CO4	Evaluate various contract types, contract formation, and legal aspects in construction management.	PO3,PO5,PO4, PO8
CO5	Assess safety management practices, accident prevention strategies, and quality management systems in construction.	PO6,PO7,PO8, PO9

TEXT BOOKS:

1.Construction Project Management, SK. Sears, GA. Sears, RH. Clough, John Wiley and Sons, 6th Edition, 2016.
2.Construction Project Scheduling and Control by Saleh Mubarak, 4th Edition, 2019
3.Pandey, I.M (2021) Financial Management 12th edition. Pearson India Education Services Pvt. Ltd.

REFRENCE BOOKS:

1. Brien, J.O. and Plotnick, F.L., CPMin Construction Management, McGraw Hill, 2010.
2. Punima, B.C., and Khandelwal, K.K., Project Planning and control with PERT and CPM, Laxmi Publications, 2002.
3. Construction Methods and Management: Pearson New International Edition 8th Edition Stephens Nominally.
4. Rhoden, M and Cato B, Construction Management and Organizational Behavior, Wiley-Blackwell, 2016.

ONLINE LEARNING RESOURCES:

1.https://archive.nptel.ac.in/courses/105/104/105104161/
2.https://archive.nptel.ac.in/courses/105/103/105103093/

CO-PO MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO-1	3	-	-	-	-	2	-	2	2	-	-	-	3	3
CO-2	-	3	-	-	2	-	-	-	-	-	-	2	3	3
CO-3	-	-	3	3	3	-	-	-	-	2	-	-	3	3
CO-4	-	-	3	3	3	-	-	2	-	-	-	-	3	3
CO-5	-	-	-	-	-	3	3	3	2	-	-	-	-	3

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

23OEE351A	ELECTRICAL SAFETY PRACTICES AND STANDARDS	L	T	P	C
		3	0	0	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the fundamentals of electrical safety, electric shock, and physiological effects of current on the human body.
2. To familiarize students with electrical safety components, protective equipment, and methods of protection against over-voltages and static electricity.
3. To explain the principles and practices of system grounding, equipment grounding, and safe earthing methods.
4. To develop awareness of safe operating procedures, first aid measures, and safety practices in various electrical installations and special locations.
5. To provide knowledge of national and international acts, rules, regulations, and standards related to electrical safety and statutory compliance.

UNIT –1: INTRODUCTION TO ELECTRICAL SAFETY: (9)

Fundamentals of Electrical Safety-Electric Shock- physiological effects of electric current -Safety requirements –Hazards of electricity- Arc - Blast- Causes for electrical failure.

UNIT –2: SAFETY COMPONENTS: (9)

Introduction to conductors and insulators- voltage classification -safety against over voltages- safety against static electricity-Electrical safety equipment's - Fire extinguishers for electrical safety.

UNIT –3: GROUNDING: (9)

General requirements for grounding and bonding- Definitions- System grounding- Equipment grounding -The Earth - Earthing practices- Determining safe approach distance-Determining arc hazard category.

UNIT –4: SAFETY PRACTICES: (9)

General first aid-Safety in handling handheld electrical appliances tools- Electrical safety in train stations-swimming pools, external lighting installations, medical locations-Case studies.

UNIT –5: STANDARDS FOR ELECTRICAL SAFETY: (9)

Electricity Acts- Rules & regulations- Electrical standards-NFPA 70 E-OSHA standards-IEEE standards-National Electrical Code 2005 – National Electric Safety code NESC-Statutory requirements from electrical inspectorate

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understanding the Fundamentals of Electrical Safety	PO1, PO2
CO2	Identifying and Applying Safety Components	PO1, PO2, P03
CO3	Analyzing Grounding Practices and Electrical Bonding	PO1, PO2, P03, PO4
CO4	Applying Safety Practices in Electrical Installations and Environments	PO1, PO2, P03, PO4
CO5	Evaluating Electrical Safety Standards and Regulatory Compliance	PO1, PO2, P03, PO4

TEXT BOOKS:

1. MassimoA.G. Mitolo,"ElectricalSafetyofLow-VoltageSystems",McGrawHill,USA,2009.
2. MohamedEl-Sharkawi,"ElectricSafety-PracticeandStandards",CRCPress,USA,2014
   REFERENCES:

REFERENCE BOOKS:

1. KennethG.Mastrullo, RayA.Jones,"TheElectricalSafetyProgramBook",Jonesand BartlettPublishers, London, 2nd Edition, 2011.
2. Palmer Hickman, "Electrical Safety-Related Work Practices", Jones & Bartlett Publishers, London,2009.
3. Fordham Cooper,W.,"Electrical Safety Engineering",Butterworth and Company, London, 1986.
4. JohnCadick, Mary Capelli-Schellpfeffer, Dennis K. Neitzel, "Electrical Safety Handbook, McGraw-Hill, New York, USA, 4th edition, 2012.

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3			-	-	-	-	-	-	-	-
CO.2	3	3	2		-	-	-	-	-	-	-	-
CO.3	3	3	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.6**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

III B.Tech. - V Semester

23OECE351A	**ELECTRONIC CIRCUITS**	**L T P C**
		3 0 0 3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:
1. To understand semiconductor diodes, their characteristics and applications.
2. To explore the operation, configurations, and biasing of BJTs.
3. To study the operation, analysis, and coupling techniques of BJT amplifiers.
4. To learn the operation, applications and uses of feedback amplifiers and oscillators.
5. To analyze the characteristics, configurations, and applications of operational amplifiers.

UNIT –1: SEMICONDUCTOR DIODES (9)

Semiconductor Diode and Applications: Introduction, PN junction diode – structure, operation and VI characteristics, Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Positive and Negative Clipping and Clamping circuits (Qualitative treatment only).

Special Diodes: Zener and Avalanche Breakdowns, VI Characteristics of Zener diode, Zener diode as voltage regulator.

UNIT –2: BJT AND ITS BIASING (9)

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch and Amplifier, Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias.

UNIT –3: SINGLE STAGE AMPLIFIER (9)

Single stage amplifiers: Classification of Amplifiers - Distortion in amplifiers, Analysis of CE, CC and CB configurations with simplified hybrid model.

UNIT –4: FEEDBACK AMPLIFIERS AND OSCILLATORS (9)

Feedback amplifiers: Concepts of feedback, Classification of feedback amplifiers, Effect of feedback on amplifier characteristics, Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations (Qualitative treatment only).

Oscillators: Classification of oscillators, Condition for oscillations, RC Phase shift Oscillators, Generalized analysis of LC Oscillators-Hartley and Colpitts Oscillators

UNIT –5: OPAMP AND ITS APPLICATIONS (9)

Op-amp: Classification of IC’S, basic information of Op-amp, ideal and practical Op-amp, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

Applications of op-amp: Summing, scaling and averaging amplifiers, Integrator, Differentiator, phase shift oscillator and comparator.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Understand semiconductor diodes, their characteristics and applications.	**PO1, PO2**
CO2	Explore the operation, configurations, and biasing of BJTs.	**PO1, PO2**
CO3	Gain knowledge about the operation, analysis, and coupling techniques of BJT amplifiers.	**PO1, PO2**
CO4	Learn the operation, applications and uses of feedback amplifiers and oscillators.	**PO1, PO2**
CO5	Analyze the characteristics, configurations, and applications of operational amplifiers.	**PO1, PO2**

TEXT BOOKS:

1. Electronics Devices and Circuits, J.Millman and Christos. C. Halkias, 3rd edition, Tata McGraw Hill, 2006.
2. Electronics Devices and Circuits Theory, David A. Bell, 5th Edition, Oxford University press. 2008.

REFERENCE BOOKS:

1. Electronics Devices and Circuits Theory, R.L.Boylestad, Lousis Nashelsky and K.Lal Kishore, 12th edition, 2006, Pearson, 2006.
2. Electronic Devices and Circuits, N.Salivahanan, and N.Suresh Kumar, 3rd Edition, TMH, 2012
3. Microelectronic Circuits, S.Sedra and K.C.Smith, 5th Edition, Oxford University Press.

REFERENCE WEBSITE:

1. https://archive.nptel.ac.in/courses/108/105/108105158/
2. https://archive.nptel.ac.in/courses/108/102/108102112/
3. https://archive.nptel.ac.in/courses/108/102/108102097/

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

III B.Tech. - V Semester

23OME351A	**SUSTAINBLE ENERGY TECHNOLOGIES**	**L T P C**
	(Mechanical Branch)	**3 0 0 3**

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. To demonstrate the importance the impact of solar radiation, solar PVmodules
2. To understand the principles of storage in PV systems
3. To discuss solar energy storage systems and their applications.
4. To get knowledge in wind energy and bio-mass
5. To gain insights in geothermal energy, ocean energy and fuel cells.

UNIT –1: SOLAR RADIATION: (9)

Roles and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems.

SOLAR PV MODULES AND PV SYSTEMS: PV Module Circuit Design, Module Structure, Packing Density, Interconnections, Mismatch and Temperature Effects, Electrical and Mechanical Insulation, Lifetime of PV Modules, Degradation and Failure, PV Module Parameters, Efficiency of PV Module, Solar PV Systems-Design of Off Grid Solar Power Plant. Installation and Maintenance

UNIT –2: STORAGE IN PV SYSTEMS: (9)

Battery Operation, Types of Batteries, Battery Parameters, Application and Selection of Batteries for Solar PV System, Battery Maintenance and Measurements, Battery Installation for PV System.

UNIT –3: (9)

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation.

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

UNIT –4: (9)

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

UNIT –5: (9)

GEOTHERMAL ENERGY: Origin, Applications, Types of Geothermal Resources, Relative Merits.
OCEAN ENERGY: Ocean Thermal Energy; Open Cycle & Closed Cycle OTEC Plants, Environmental Impacts, Challenges.
FUEL CELLS: Introduction, Applications, Classification, Different Types of Fuel Cells Such as Phosphoric Acid Fuel Cell, Alkaline Fuel Cell, PEM Fuel Cell, MC Fuel Cell.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define and explain the evolution and need for rapid prototyping in modern product development.	L1,L2,L6
CO2	Compare and contrast various 3D printing technologies based on working principles, materials, and limitations.	L2,L4
CO3	Apply knowledge of rapid tooling and reverse engineering techniques for industrial and design applications.	L3,L5,L6
CO4	Diagnose and interpret different types of errors encountered in 3D printing processes and recommend solutions.	L2,L3,L5,
CO5	Use RP-specific software tools to manipulate STL files and prepare models for printing in real-world scenarios.	L1,L3,L6

TEXT BOOKS:

1. Solar Energy – Principles of Thermal Collection and Storage/Sukhatme S.P. and J.K.Nayak/TMH
2. Non-Conventional Energy Resources- Khan B.H/ Tata McGraw Hill, New Delhi, 2006

REFERENCE BOOKS:

1. Frank W.Liou, ―Rapid Prototyping & Engineering Applications‖, CRC Press, Taylor & Francis Group, 2011.
2. Rafiq Noorani, ―Rapid Prototyping: Principles and Applicationsin Manufacturing‖,John Wiley&Sons, 2006.

REFERENCE WEBSITE:

1. Principles of Solar Engineering - D.Yogi Goswami, Frank Krieth& John F Kreider / Taylor & Francis
2. Non-Conventional Energy - Ashok V Desai /New Age International (P) Ltd
3. Renewable Energy Technologies -Ramesh & Kumar /Narosa
4. Non-conventional Energy Source- G.D Roy/Standard Publishers

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Data Science)

23OSH351A	MATHEMATICS FOR MACHINE LEARNING AND AI	L	T	P	C
	OPEN ELECTIVE-I(COMMON TO ALL)	3	-	-	3

PRE-REQUISITES:
COURSE EDUCATIONAL OBJECTIVES

1. To provide a strong mathematical foundation for understanding and developing AI/MLalgorithms.
2. To enhance the ability to apply linear algebra, probability, and calculus in AI/ML models.
3. To equip students with optimization techniques and graph-based method susedin AI applications.To develop critical problem-solvings kills for analysing mathematical formulations in AI/ML

UNIT I: LINEAR ALGEBRA FOR MACHINE LEARNING (9)

Review of Vector spaces, basis, linear independence, Vector and matrix norms, Matrix factorization techniques, Eigen values, eigen vectors, diagonalization, Singular Value Decomposition (SVD) and Principal Component Analysis (PCA).

UNIT II: PROBABILITY AND STATISTICS FOR AI (9)

Probability distributions: Gaussian, Binomial, Poisson. Bayes' Theorem, Maximum Likelihood Estimation (MLE), and Maximum a Posteriori (MAP).Entropy and Kullback - Leibler (KL) Divergence in AI, Cross entropy loss, Markov chains.

UNIT III: OPTIMIZATION TECHNIQUES FOR ML (9)

Multivariable calculus: Gradients, Hessians, Jacobians. Constrained optimization: Lagrange multipliers and KKT conditions. Gradient Descent and its variants (Momentum, Adam) Newton's method, BFGS method.

UNIT IV: VECTOR CALCULUS & TRANSFORMATIONS (9)

Vector calculus: Gradient, divergence, curl. Fourier Transform & Laplace Transform in ML applications.

UNIT V: GRAPH THEORY FOR AI (9)

Graph representations: Adjacency matrices, Laplacian matrices. Bayesian Networks & Probabilistic Graphical Models. Introduction to Graph Neural Networks (GNNs).

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Apply linear algebra concepts to ML techniques like PCA and regression.	PO1,PO2,PO3,PO4,PO5,PO12
CO2	Analyze probabilistic models and statistical methods for AI applications.	PO1,PO2,PO3,PO4,PO5,PO12
CO3	Implement optimization techniques for machine learning algorithms.	PO1,PO2,PO3,PO4,PO5,PO6,PO12
CO4	Utilize vector calculus and transformations in AI-based models.	PO1,PO2,PO3,PO4,PO5,PO12
CO5	Develop graph-based AI models using mathematical representations.	PO1,PO2,PO3,PO4,PO5,PO12

TEXT BOOKS:

1. Mathematics for Machine Learning by Marc Peter Deisenroth, A.Aldo Faisal, Cheng Soon Ong, Cambridge University Press, 2020.
2. Pattern Recognition and Machine Learning by Christop her Bishop, Springer.

REFERENCE BOOKS:

1. Gilbert Strang, Linear Algebra and Its Applications, Cengage Learning, 2016.
2. Jonathan Gross, Jay Yellen, Graph Theory and Its Applications, CRC Press, 2018.

REFERENCE WEBSITE:

1. MIT–MathematicsforMachineLearninghttps://ocw.mit.edu
2. StanfordCS229–MachineLearningCourse https://cs229.stanford.edu/
3. Deep AI–MathematicalFoundationsforAIhttps://deepai.org

CO-PO MAPPING

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B.TECH. - V SEMESTER

23OSH351B	MATERIALS CHARACTERIZATION TECHNIQUES (OPEN ELECTIVE-I)	L	T	P	C
	(Common to all branches)	3	0	0	3

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To provide **exposure** to various **characterization techniques**.
2. To explain the **fundamental principles** and analytical methods of different **spectroscopic t**echniques.
3. To **describe** the working principle, limitations, and applications of the Scanning Electron Microscope (**SEM**).
4. To **illustrate** the operation of the Transmission Electron Microscope (**TEM**), including Selected Area Electron Diffraction (**SAED**)patterns and its applications.
5. To **educate** on the use of **advanced electrical and magnetic instruments** in material characterization.

UNIT-I: STRUCTURE ANALYSIS BY POWDER X-RAY DIFFRACTION (9)

Introduction, Bragg's law of diffraction, Intensity of Diffracted beams, Factors affecting Diffraction, Intensities, Structure of polycrystalline Aggregates, Determination of crystal structure, Crystallite size by Scherer and Williamson-Hall (W-H) Methods, Small angle X-ray scattering (SAXS) (in brief).

UNIT-II: MICROSCOPY TECHNIQUE -1- SCANNING ELECTRON MICROSC OPY (SEM) (9)

Introduction, Principle, Construction and working principle of Scanning Electron Microscopy, Specimen preparation, Different types of modes used (Secondary Electron and Backscatter Electron), Advantages, limitations and applications of SEM.

UNIT-III: MICROSCOPY TECHNIQUE -2 - TRANSMISSION ELECTRON MICROSCOPY (TEM) (9)

Construction and Working principle, Resolving power and Magnification, Bright and dark fields, Diffraction and image formation, Specimen preparation, Selected Area Diffraction, Applications of Transmission Electron Microscopy, Difference between SEM and TEM, Advantage and Limitations of Transmission Electron Microscopy

UNIT-IV: SPECTROSCOPY TECHNIQUES (9)

Principle, Experimental arrangement, Analysis and advantages of the spectroscopic techniques – (i) UV-Visible spectroscopy (ii) Raman Spectroscopy, (iii) Fourier Transform infrared (FTIR) spectroscopy, (iv) X-ray photoelectron spectroscopy (XPS).

UNIT V ELECTRICAL & MAGNETIC CHARACTERIZATION TECHNIQUES (9)

Electrical Properties analysis techniques (DC conductivity, AC conductivity) Activation Energy, Effect of Magnetic field on the electrical properties (Hall Effect). Magnetization measurement by induction method, Vibrating sample Magnetometer (VSM) and SQUID.

COURSE OUTCOMES

	On successful completion of the course, students will be able to	PO2
CO1	Employ different analytical methods to analyze the crystal structure and crystallite sizes	PO1, PO2,PO3,PO4,PO5
CO2	Investigate the morphology of the sample by using a Scanning Electron Microscope	PO1, PO2,PO3,PO4,PO5
CO3	Analyze the morphology and crystal structure of the sample by using Transmission Electron Microscope	PO1, PO2,PO3,PO4,PO5
CO4	Describe the principle and experimental arrangement of various spectroscopic techniques	PO1, PO2,PO3,Po4
CO5	Understand the construction and working principle of various Electrical & Magnetic Characterization technique	PO1, PO2,PO3,PO4

CO-PO MAPPING

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

TEXTBOOKS:

1. Material Characterization: Introduction to Microscopic and Spectroscopic Methods – Yang Leng – John Wiley & Sons (Asia) Pvt. Ltd. 2013.
2. Microstructural Characterization of Materials - David Brandon, Wayne D Kalpan, John Wiley & Sons Ltd., 2008

REFERENCE BOOKS:

1. Fundamentals of Molecular Spectroscopy – IV Ed. – Colin Neville Banwell and Elaine M. McCash, Tata McGraw-Hill, 2008.
2. Elements of X-ray diffraction – Bernard Dennis Cullity& Stuart R Stocks, Prentice Hall , 2001 – Science.
3. Practical Guide to Materials Characterization: Techniques and Applications - Khalid Sultan – Wiley – 2021.
4. Materials Characterization Techniques **-**Sam Zhang, Lin Li, Ashok Kumar -CRC Press - 2008

REFERENCE LINK :

1.https://nptel.ac.in/courses/115/103/115103030/
2.https://nptel.ac.in/content/syllabus_pdf/113106034.pdf
3.https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-mm0S8/

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B Tech- V Semester

		L	T	P	C
23OSH351C	**CHEMISTRY OF ENERGY SYSTEMS** **OPEN ELECTIVE-I(COMMON TO ALL)**	**3**	**-**	**-**	**3**

PRE-REQUISITES:
COURSE EDUCATIONAL OBJECTIVES:

1. To make the student understand basic electrochemical principles such as standard electrode potentials, emf and applications of electrochemical principles in the design of batteries.
2. To understand the basic concepts of processing and limitations of Fuel cells & their applications.
3. To impart knowledge to the students about fundamental concepts of photo chemical cells, reactions and applications.
4. Necessarily of harnessing alternate energy resources such as solar energy and its basic concepts.
5. To impart knowledge to the students about fundamental concepts of hydrogen storage in different materials and liquification method.

UNIT-1: ELECTROCHEMICAL SYSTEMS (9)
Galvanic cell, Nernst equation, standard electrode potential, application of EMF, electrical double layer, polarization, Batteries- Introduction, Lead-acid, Nickel- cadmium, Lithium-ion batteries and their applications.

UNIT-2: FUEL CELLS (9)
Fuel cell- Introduction, Basic design of fuel cell, working principle, Classification of fuel cells, Polymer electrolyte membrane (PEM) fuel cells, Solid-oxide fuel cells (SOFC), Fuel cell efficiency and applications.

UNIT-3: PHOTO AND PHOTO ELECTROCHEMICAL CONVERSIONS (9)

Photochemical cells Introduction and applications of photochemical reactions, specificity of photo electrochemical cell, advantage of photoelectron catalytic conversions and their applications.

UNIT-4: SOLAR ENERGY (9)

Introduction and prospects, photovoltaic (PV) technology, concentrated solar power (CSP), Solar cells and applications. .

UNIT-5: HYDROGEN STORAGE (9)

Hydrogen storage and delivery: State-of-the art, Established technologies, Chemical and Physical methods of hydrogen storage, Compressed gas storage, Liquid hydrogen storage, other storage methods, Hydrogen storage in metal hydrides, metal organic frameworks (MOF), Metal oxide porous structures, hydrogel, and Organic hydrogen carriers.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Solve the problems based on electrode potential, Describe the Galvanic Cell Differentiate between Lead acid and Lithium-ion batteries, Illustrate the electrical double layer	PO1, PO2, PO2, PO4, PO5
CO2	Describe the working Principle of Fuel cell, Explain the efficiency of the fuel cell Discuss about the Basic design of fuel cells, Classify the fuel cell	PO1, PO2, PO2, PO4, PO6
CO3	Differentiate between Photo and Photo electrochemical Conversions, Illustrate the photochemical cells, Identify the applications of photochemical reactions, Interpret advantages of photoelectron catalytic conversion.	PO1, PO2, PO2, PO4, PO5
CO4	Apply the photo voltaic technology, Demonstrate about solar energy and prospects Illustrate the Solar cells, discuss about concentrated solar power	PO1, PO2, PO2, PO4, PO5
CO5	Differentiate Chemical and Physical methods of hydrogen storage, Discuss the metal organic frame work, Illustrate the carbon and metal oxide porous structures Describe the liquification methods.	PO1, PO2, PO2, PO4, PO5

TEXT BOOKS

1. Physical chemistry by Ira N. Levine
2. Essentials of Physical Chemistry, Bahl and Bahl and Tuli.
3. Inorganic Chemistry, Silver and Atkins

REFERENCE BOOKS:

1. Fuel Cell Hand Book 7th Edition, by US Department of Energy (EG&G technical services And corporation)
2. Hand book of solar energy and applications by Arvind Tiwari and Shyam.
3. Solar energy fundamental, technology and systems by Klaus Jagar et.al.
4. Hydrogen storage by Levine Klebonoff

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B Tech- V Semester

23OSH351D	ENGLISH FOR COMPETITIVE EXAMINATIONS	L	T	P	C
		3	0	0	3

PRE-REQUISITES:
COURSE OBJECTIVES:

1. To enable the students to learn about the structure of competitive English
2. To understand the grammatical aspects and identify the errors
3. To enhance verbal ability and identify the errors
4. To improve word power to answer competitive challenges To make the ready to crack Competitive exams

UNIT-I: GRAMMAR-1 (9)

Nouns-classification-errors-Pronouns-types-errors-Adjectives-types-errors-Articles-definite-indefinite-Degrees of Comparison-Adverbs-types- errors-Conjunctions-usage-repositions-usage- Tag Questions,types-identifying errors-Practice

UNIT-II: GRAMMAR-2 (9)

Verbs-tenses-structure-usages-negatives-positives-timeadverbs-Sequenceoftenses-IfClause-Voice-activevoiceandpassivevoice-reportedSpeech-Agreement-subjectandverb-Modals-SpottingErrors- Practices

UNIT-III:VERBALABILITY (9)

Sentence completion-Verbal analogies-Word Groups-Instructions-Critical reasoning-Verbal Deduction-Select appropriate pair - Reading Comprehension - Paragraph - Jumbles - Selecting the proper statement byreading a given paragraph.

UNIT-IV READING COMPREHENSION AND VOCUBULARY (9)

Competitive Vocabulary – Word building – Memory Techniques – Synonyms, Antonyms, Affixes - Prefixes&suffix–OneWord Substitutes–Compound words–Phrasal Verbs –Idioms and phrases-

Homophones – Linking words – Modifiers – Intensifiers – Mastering Competitive Vocabulary – Cracking the unknowing passage –Speed Read info Techniques–Skimming and Scanning- Types of answering – Elimination methods.

UNIT-V:WRITING FOR COMPETITIVE EXAMINATIONS (9)

Punctuations and Spelling rules –Word order–Sub skills of Writing –paragraph meaning –Salient features – types – Note making – Note taking- Summarizing - precise writing - Expansion of proverbs – Essay Writing – types.

COURSEOUTCOMES

On successful completion of the course, students will be able to		pos
CO1.	Identify the basics of English grammar and its importance	**PO2**
CO2.	Explain the use of grammatical structures in sentences	**PO5**
CO3.	Demonstrate the ability to use various concepts in grammar and vocabulary and the applications in every day use and in competitive exams	**PO6,PO10**
CO4.	Analyze an unknown passage and reach conclusions about it.	**PO10**
CO5.	Choose the appropriate form of verbs in framing sentences	**PO4**

TEXTBOOKS:

1. Wren Martin, English for competitive examinations, S. hand &Co,2021.
2. Objective English for competitive examinations, Tata McGrawHill, NewDelhi,2014.

REFERENCEBOOKS:

1. Hari Mohan Prasad objective English for competitive examination Tata McGrawhill, Delhi,2014.
2. Philip Sunil Solomon English for Success in competitive exams, Oxford 2016.
3. Shalini Verma, Word power made Handy S. Chand Publications.
4. Neira Anjann a Dev &Co, Creative Writing: A Beginner's Manual Pearson Education India, 2008.
5. Abhishek Jain, Vocabulary learning Techniques Vol I &IIRRGlobalPublishers2013.
6. Michael Swan, Practical English Usage, Oxford,2006.

ONLINE REFERENCE:

1. https://www.grammar.cl/English/partsofspeech.htm
2. https://academicguides.waldenu.edu/writingcenter/grammar/PartsofSpeech
3. https://learnEnglish.britishcouncil.org/grammar/enlgish-grammar—reference/actIve passive-voice.
4. https://www.languagetool.org/Insights/post/verb/tenses/
5. https://www.britishcouncil.in/blog/best/freeEnglish-learningresources-Britishcouncil
6. https://www.careerride.com/post/social-essays-for–competitive-exams-586.aspx

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES. (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

III B. Tech - V Semester

COURSE CODE	ENTREPRENEURSHIP AND NEW VENTURE CREATION	L	T	P
23OSH351E	(Open Elective-I)	4	0	0

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To foster an entrepreneurial mind-set for venture creation and intrapreneurial leadership.
2. To encourage creativity and innovation and also validating customer personas.
3. To enable the students about understand MVP development and validation techniques to determine product-market fit and initiate solution design, prototype for proof of concept.
4. To make the students to create a business plan, financial planning and feasibility analysis to assess the financial viability of a venture.
5. To enable the students to identify potential and aspiration for scale vis-à-vis your venture idea.

UNIT –1: ENTREPRENEURSHIP FUNDAMENTALS AND CONTEXT (9)

Meaning and concept, attributes and mindset of entrepreneurial and intrapreneurial leadership, role models and their role in economic development, an understanding of how to build an entrepreneurial mindset, skill sets, attributes, and networks while on campus.

Core Teaching Tool: Simulation, Game, Industry Case Studies (Personalized for students – 16industries to choose from), Venture Activity

UNIT –2: PROBLEM & CUSTOMER IDENTIFICATION (9)

Understanding and analysing the macro problem and industry perspective – technological, socioeconomic, and urbanization trends and their implications on new opportunities, identifying passion, identifying and defining the problem using design thinking principles, analysing the problem and validating with the potential customer, understanding customer segmentation, creating and validating customer personas.

Core Teaching Tool: Several types of activities including Class, game, Gen AI, Get out of the Building and Venture Activity.

UNIT –3: SOLUTION DESIGN, PROTOTYPING & OPPORTUNITY ASSESSMENT AND SIZING (9)

Understanding customer jobs-to-be-done and crafting innovative solution design to map to customer's needs and create a strong value proposition, understanding prototyping and Minimum Viable Product (MVP), developing a feasibility prototype with differentiating value, features, and benefits, assessing relative market position via competition analysis, sizing the market and assessing the scope and potential scale of the opportunity.

Core Teaching Tool: Venture Activity, no-code Innovation tools, Class activity

UNIT –4: BUSINESS & FINANCIAL MODEL, GO-TO-MARKET PLAN (9)

Introduction to business model and types, lean approach, 9-block canvas model, riskiest assumptions to business models, importance of Build-Measure-Learn approach. **Business**

Planning: components of business plan – sales plan, people plan, and financial plan. **Financial planning:** types of cost, preparing a financial plan for profitability using a financial template, understanding basics of unit economics, and analysing financial performance. Introduction to marketing and sales, selecting the right channel, creating digital presence, building customer acquisition strategy. Choosing a form of business organization specific to your venture, identifying sources of funds – debt and equity, mapping the start-up life cycle to funding options.

Core Teaching Tool: Founder Case Studies –Samaand Securely Share; Class activity and discussions; Venture Activities.

UNIT –5: SCALE OUTLOOK AND VENTURE PITCH READINESS (9)

Understand and identify potential and aspiration for scale vis-à-vis your venture idea. Persuasive storytelling and its key components. Build an investor-ready pitch deck.

Core Teaching Tool: Expert talks; Cases; Class activity and discussions; Venture Activities.

Total Hours: 45

COURSE OUTCOMES:

COs	On successful completion of the course, students will be able to	POs
CO1	Develop an entrepreneurial mindset and appreciate the concept of entrepreneurship	PO9, PO12
CO2	Comprehend the process of problem-opportunity identification through design thinking, identify market potential and customers while developing a compelling value proposition solution	PO2, PO4, PO5, PO9, PO11, PO12
CO3	Build a prototype for proof of concept and validate the MVP of their practice venture idea	PO3, PO4, PO5,PO6, PO9, PO11, PO12
CO4	Analyze and refine business models to ensure sustainability and profitability of a venture	PO7, PO9,PO10, PO11, PO12
CO5	Prepare and deliver an investible pitch deck of their practice venture to attract stakeholders	PO9, PO11, PO12

TEXT BOOKS:

1. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Sabyasachi Sinha. Entrepreneurship, McGraw Hill, 11th Edition (2020).
2. Ries, E. The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Crown Business (2011).
3. Osterwalder, A., & Pigneur, Y. Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. John Wiley & Sons (2010).

REFERENCE BOOKS:

1. Simon Sinek. Start with Why. Penguin Books Limited (2011).
2. Brown, Tim. Change by Design Revised & Updated: How Design Thinking Transforms Organizations and Inspires Innovation. Harper Business (2019).
3. Namita Thapar. The Dolphin and the Shark: Stories on Entrepreneurship. Penguin Books

Limited (2022).
4. Saras D. Sarasvathy. *Effectuation: Elements of Entrepreneurial Expertise*. Elgar Publishing Ltd. (2008).

REFERENCE WEBSITE:

1.Ignite 5.0 Course – Wadhwani Platform (Includes 200+ components of custom-created modular content and 500+ components of the most relevant curated content).

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	-	-	2	-	-	3
CO.2	-	3	-	3	2	-	-	-	3	-	2	3
CO.3	-	-	3	2	3	2	**-**	-	3	-	2	3
CO.4	-	-	-	-	-	-	2	-	3	3	2	3
CO.5	-	-	-	-	-	-	-	-	3	-	2	3
CO*	**-**	**3**	**3**	**2.5**	**2.5**	**2**	**2**	**-**	**2.8**	**3**	**2**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES. (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

COURSE CODE	INTRODUCTION TO QUANTUM TECHNOLOGIES AND APPLICATIONS	L	T	P	C
23ESC351T		3			3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. Introduce fundamental quantum concepts like superposition and entanglement.
2. Understand theoretical structure of qubits and quantum information.
3. Explore conceptual challenges in building quantum computers.
4. Explain principles of quantum communication and computing.
5. Examine real-world applications and the future of quantum technologies.

UNIT–1: INTRODUCTION TO QUANTUM THEORY AND TECHNOLOGIES (9)

The transition from classical to quantum physics, Fundamental principles explained conceptually: Superposition, Entanglement, Uncertainty Principle, Wave-particle duality, Classical vs Quantum mechanics – theoretical comparison,Quantum states and measurement: nature of observation,Overview of quantum systems: electrons, photons, atoms,The concept of quantization: discrete energy levels,Why quantum? Strategic, scientific, and technological significance,A snapshot of quantum technologies: Computing, Communication, and Sensing,National and global quantum missions: India’s Quantum Mission, EU, USA, China

UNIT–2: THEORETICAL STRUCTURE OF QUANTUM INFORMATION SYSTEMS (9)

What is a qubit? Conceptual understanding using spin and polarization, Comparison: classical bits vs quantum bits, Quantum systems: trapped ions, superconducting circuits, photons (non-engineering view),Quantum coherence and decoherence – intuitive explanation, Theoretical concepts: Hilbert spaces, quantum states, operators – only interpreted in abstract,The role of entanglement and non-locality in systems, Quantum information vs classical information: principles and differences,Philosophical implications: randomness, determinism, and observer role

UNIT–3: BUILDING A QUANTUM COMPUTER – THEORETICAL CHALLENGES AND REQUIREMENTS (9)

What is required to build a quantum computer (conceptual overview)?,Fragility of quantum systems: decoherence, noise, and control, Conditions for a functional quantum system: Isolation, Error management, Scalability, Stability, Theoretical barriers:

Why maintaining entanglement is difficult,Error correction as a theoretical necessity, Quantum hardware platforms (brief conceptual comparison),Superconducting circuits, Trapped ions, Photonics, Visionvs reality: what's working and what remains elusive,The role of quantum software in managing theoretical complexities.

UNIT–4: QUANTUM COMMUNICATION AND COMPUTING – THEORETICAL PERSPECTIVE (9)

Quantum vs Classical Information, Basics of Quantum Communication, Quantum Key Distribution (QKD),Role of Entanglement in Communication,The Idea of the Quantum Internet – Secure Global Networking,Introduction to Quantum Computing,Quantum Parallelism (Many States at Once),Classical vs Quantum Gates, Challenges: Decoherence and Error Correction,Real-World Importance and Future Potential

UNIT–5: APPLICATIONS, USE CASES, AND THE QUANTUM FUTURE (9)

optimization, Quantum sensing and precision timing, Industrial case studies: IBM, Google, Microsoft, PsiQuantum,Ethical, societal, and policy considerations, Challenges to adoption: cost, skills, standardization,Emerging careers in quantum: roles, skillsets, and preparation pathways,Educational and research landscape – India's opportunity in the global quantum race

Total Hours:45

COURSEOUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Explain core quantum principles in a non-mathematical manner.	**PO1, PO2**
CO2	Compare classical and quantum information systems.	**PO1, PO2, PO3**
CO3	Identify theoretical issues in building quantum computers.	**PO1, PO2, PO4**
CO4	Discuss quantum communication and computing concepts.	**PO1, PO2, PO5,**
CO5	Recognize applications, industry trends, and career paths in quant technology.	**PO2,PO3,PO5**

TEXTBOOKS:

1. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 10th Anniversary Edition, 2010.
2. Eleanor Rieffel and Wolfgang Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
3. Chris Bernhardt, Quantum Computing for Everyone, MIT Press, 2019.

REFERENCE BOOKS:

1. David McMahon, Quantum Computing Explained, Wiley, 2008.
2. Phillip Kaye, Raymond Laflamme, Michele Mosca, An Introduction to Quantum Computing, Oxford University Press, 2007.
3. Scott Aaronson, Quantum Computing Since Democritus, Cambridge University Press, 2013.
4. Alastair I.M. Rae, Quantum Physics: A Beginner's Guide, Oneworld Publications, Revised Edition, 2005.
5. Eleanor G. Rieffel, Wolfgang H. Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
6. Leonard Susskind, Art Friedman, Quantum Mechanics: The Theoretical Minimum, Basic Books, 2014.
7. Bruce Rosenblum, Fred Kuttner, Quantum Enigma: Physics Encounters Consciousness, Oxford University Press, 2nd Edition, 2011.
8. GiulianoBenenti, GiulioCasati, GiulianoStrini, Principles of Quantum Computation and Information, Volume I: Basic Concepts, World Scientific Publishing, 2004.
9. K.B. Whaley et al., Quantum Technologies and Industrial Applications: European Roadmap and Strategy Document, Quantum Flagship, European Commission, 2020.
10. Department of Science & Technology (DST), Government of India, National Mission on Quantum Technologies & Applications – Official Reports and Whitepapers, MeitY/DST Publications, 2020 onward.

REFERENCE BOOKS

1. IBM Quantum Experience and Qiskit Tutorials
2. Coursera – Quantum Mechanics and Quantum Computation by UC Berkeley
3. edX – The Quantum Internet and Quantum Computers
4. YouTube – Quantum Computing for the Determined by Michael Nielsen
5. Qiskit Textbook – IBM Quantum

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	3	3	2	3	3	-	-	-	-	-	-	-
CO.3	2	3	-	2	3	-	-	-	-	-	-	-
CO.4	2	3	-	3	2	-	-	-	-	-	-	-
CO.5	2	-	-	-	-	-	-	-	-	-	-	-
CO*	**2.4**	**2.8**	**2**	**2.6**	**2.6**	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES. (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

COURSE CODE	MACHINE LEARNING LAB	L	T	P	C
23CSM243L					

PRE-REQUISITES: A course on Python Programming

COURSE EDUCATIONAL OBJECTIVES:

1. To learn about computing central tendency measures and Data preprocessing techniques
2. To learn about classification and regression algorithms
3. To apply different clustering algorithms for a problem.

SOFTWARE REQUIRED FOR ML: PYTHON/R/WEKA

List of Experiments

Lab should cover the concepts studied in the course work, sample list of Experiments:

1. Compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion: Variance, Standard Deviation.
2. Apply the following Pre-processing techniques for a given dataset.
   a. Attribute selection
   b. Handling Missing Values
   c. Discretization
   d. Elimination of Outliers
3. Apply KNN algorithm for classification and regression
4. Demonstrate decision tree algorithm for a classification problem and perform parameter tuning for better results
5. Demonstrate decision tree algorithm for a regression problem
6. Apply Random Forest algorithm for classification and regression
7. Demonstrate Naïve Bayes Classification algorithm.
8. Apply Support Vector algorithm for classification
9. Demonstrate simple linear regression algorithm for a regression problem
10. Apply Logistic regression algorithm for a classification problem
11. Demonstrate Multi-layer Perceptron algorithm for a classification problem
12. Implement the K-means algorithm and apply it to the data you selected. Evaluate performance by measuring the sum of the Euclidean distance of each example from its class center. Test the performance of the algorithm as a function of the parameters K
13. Demonstrate the use of Fuzzy C-Means Clustering
14. Demonstrate the use of Expectation Maximization based clustering algorithm.
15. Real-time case studies / Micro projects.

REFERENCE BOOKS:

a. Python Machine Learning Work book for beginners,AI Publishing,2020.
b. Anuradha Srinivasaraghavan and Vincy Joseph,"Machine Learning", Wiley Publisher, 2019.
c. SaikatDutt,Subramanian Chandramouli and Amit Kumar Das, "Machine Learning", Pearson, 2019.
d. Alpaydin Ethem, "Introduction to Machine Learning",3rd Edition,PHI learning private limited, 2019.

REFERENCE WEBSITE:

a. Machine Learning A-Z(Python & R in Data Science Course) | Udemy
b. Machine Learning | Coursera

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Understand the python libraries.	**PO1**
CO2	Analyze the use of data sets in implementing ML algorithms	**PO2**
CO3	Understand the different searching algorithms for solving problems, Analyze and identify the problem solving techniques.	**PO3**
CO4	Identify and implement appropriate unsupervised learning algorithm for solving complex problems.	**PO4**
CO5	Identify the appropriate tools and data sets for real-time implementation.	**PO5**
CO6	Follow the ethical principles in implementing the programs	**PO8**
CO7	Do experiments effectively as an individual and as a team member in a group	**PO9**
CO8	Communicate verbally and in written form, the understanding about the experiments	**PO10**
CO9	Continue update skill related to Python and Weka Tool and implementing programs in future	**PO12**

CO- PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	
CO5	-	-	-	-	3	-	-					
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	-	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES. (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

COURSE CODE	OPERATING SYSTEMS AND SOFTWARE ENGINEERING TOOLS LAB	L	T	P	C
23CSD352L				3	1.5

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. Make use of Data sets in implementing the machine learning algorithms
2. Implement the machine learning concepts and algorithms in any suitable language of choice.

TRADE FOR EXERCISES

1. Simulate the following CPU scheduling algorithms a) Round Robin b) SJF c) FCFS
   i. d) Priority
2. Assume that there are five jobs with different weights ranging from 1 to 5. Implement round robin algorithm with time slice equivalent to weight.
3. Control the number of ports opened by the operating system with a) Semaphore b) Monitors.
4. Simulate how parent and child processes use shared memory and address space.
5. Simulate dining philosopher‶s problem.
6. Simulate producer-consumer problem using threads.
7. Implement the following memory allocation methods for fixed partition a) First fit b) Worst fit c) Best fit
8. Simulate the following page replacement algorithms a) FIFO b) LRU c) LFU etc.,
9. Simulate Paging Technique of memory management
10. Simulate Bankers Algorithm for Dead Lock avoidance and prevention
11. Simulate the following file allocation strategies a) Sequential b) Indexed c) Linked
12. Simulate all File Organization Techniques a) Single level directory b) Two level c) Hierarchical

LIST OF EXPERIMENTS:

Do the following Ten exercises for any two projects given in the list of mini projects:

1. Development of problem statement.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing
3. Phase related documents.
4. Preparation of Software Configuration Management and Risk Management related documents.
5. Study and usage of any Design phase CASE tool
6. Performing the Design by using any Design phase CASE tools.

7. Draw a complete class diagram and object diagrams using Rational tools.
8. Reverse Engineer any object-oriented code to an appropriate class and object diagrams.
9. Develop test cases for unit testing and integration testing
10. Develop test cases for various white box and black box testing techniques.

SUGGESTED DOMAINS FOR MINI-PROJECT:

1. ATM System
2. Library Management System
3. Hospital Management System
4. College Management System
5. E-ticketing

SUGGESTED SOFTWARE TOOLS:

ArgoUML, Eclipse IDE, Visual Paradigm, Visual case and Rational Suite

TEXT BOOKS:

1. Operating System Concepts‖, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth Edition, John Wiley.
2. Operating Systems: Internals and Design Principles‖, Stallings, Sixth Edition–2009, Pearson Education
3. Roger S. Pressman, "Software Engineering A Practitioner
4. Approach", 1996, MGH.
5. Ian Sommerville, "Software Engineering" 5th edition, Pearson Edu, 1999.
6. Pankaj Jalote , "An Integrated Approach to software engineering",
7. Narosa, 1991.
8. Grady Booch, "Object- Oriented Analysis and Design with Applications", 2nd edition, Pearson Education, New Delhi, India, 2007.

REFERENCE BOOKS:

1. Operating System Concepts‖, Abraham Silberchatz, Peter B. Galvin,

   Greg Gagne, Eighth Edition, John Wiley.

2. Operating Systems: Internals and Design Principles‖, Stallings,

   Sixth Edition–2009, Pearson Education

3. Modern Operating Systems‖, Andrew S Tanenbaum, Second Edition, PHI.

4. Operating Systems‖, S.Haldar, A.A.Aravind, Pearson Education.
5. Principles of Operating Systems‖, B.L.Stuart, Cengage learning, India

   Edition.2013- 2014

6. Operating Systems‖, A.S.Godbole, Second Edition, TMH.

7. An Introduction to Operating Systems‖, P.C.P. Bhatt, PHI.

REFERENCE WEBSITE:

1. https://www.cse.iitb.ac.in/~mythili/os/ http://peterindia.net/OperatingSystems.html

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Practice and demonstrate usage of basic UNIX commands and system calls.	**PO1**
CO2	Develop simulations of UNIX internal commands and system-level programming with process management.	**PO2**
CO3	Implement and analyze various CPU scheduling algorithms.	**PO3**
CO4	Implement memory management schemes and page replacement algorithms.	**PO5**
CO5	Demonstrate concurrency using semaphores, monitors, shared memory, and thread programming.	**PO8**
CO6	Simulate deadlock handling and file allocation strategies.	**PO9**
CO7	Analyze and simulate file organization and memory management techniques used in modern operati1n8g systems.	**PO10**
CO8	Work in teams to design and implement OS-level components and evaluate their effectiveness in real-time scenarios.	**PO12**

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

COURSE CODE	FULL STACK DEVELOPMENT-I (SOC)	L	T	P	C
23CSE247L			1	2	2

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1.Make use of HTML elements and their attributes for designing static web pages

2.Build a web page by applying appropriate CSS styles to HTML elements

3.Experiment with JavaScript to develop dynamic web pages and validate forms

EXPERIMENTS COVERING THE TOPICS

1. Lists, Links and Images
2. HTML Tables, Forms and Frames
3. HTML 5 and Cascading Style Sheets, Types of CSS
4. Selector forms
5. CSS with Color, Background, Font, Text and CSS Box Model
6. Applying JavaScript - internal and external, I/O, Type Conversion
7. JavaScript Conditional Statements and Loops, Pre-defined and User-defined Objects
8. JavaScript Functions and Events

SAMPLE EXPERIMENTS

1.LISTS, LINKS AND IMAGES

a. Write a HTML program, to explain the working of lists.

i. Note: It should have an ordered list, unordered list, nested lists and ordered list in an unordered list and definition lists.

b. Write a HTML program, to explain the working of hyperlinks using <a> tag and href, target Attributes.

c. Create a HTML document that has your image and your friend�similar image with a specific height and width. Also when clicked on the images it should navigate to their respective profiles.

d. Write a HTML program, in such a way that, rather than placing large images on a page, the preferred technique is to use thumbnails by setting the height and width parameters to something like to 100*100 pixels. Each thumbnail image is also a link to a full sized version of the image. Create an image gallery using this technique

2.HTML TABLES, FORMS AND FRAMES

a. Write a HTML program, to explain the working of tables. (use tags: <table>,
i. <tr>, <th>, <td> and attributes: border, rowspan, colspan)
ii. Write a HTML program, to explain the working of tables by preparing a timetable. (Note: Use
iii. <caption> tag to set the caption to the table & also use cell spacing, cell padding, border, rowspan, colspan etc.).

b. Write a HTML program, to explain the working of forms by designing Registration form. (Note: Include text field, password field, number field, date of birth field, checkboxes, radio buttons, list boxes using <select>&<option> tags, <text area> and two buttons ie: submit and reset. Use tables to provide a better view).

c. Write a HTML program, to explain the working of frames, such that page is to be divided into 3 parts on either direction. (Note: first frame → image, second frame
1. paragraph, third frame → hyperlink. And also make sure of using ―no frame‖
ii. attribute such that frames to be fixed).

3.HTML 5 AND CASCADING STYLE SHEETS, TYPES OF CSS

a. Write a HTML program, that makes use of <article>, <aside>, <figure>,
b. <figcaption>, <footer>,
c. <header>, <main>, <nav>, <section>, <div>, <span> tags.
d. Write a HTML program, to embed audio and video into HTML web page.
e. Write a program to apply different types (or levels of styles or style specification formats) - inline, internal, external styles to HTML elements. (identify selector, property and value).

4.SELECTOR FORMS

a.Write a program to apply different types of selector forms
b.Simple selector (element, id, class, group, universal)
c.Combinator selector (descendant, child, adjacent sibling, general sibling
d.Pseudo-class selector
Pseudo-element selector
e.Attribute selector

5.CSS WITH COLOR, BACKGROUND, FONT, TEXT AND CSS BOX MODEL

a. Write a program to demonstrate the various ways you can reference a color in CSS.
b. Write a CSS rule that places a background image halfway down the page, tilting it horizontally. The image should remain in place when the user scrolls up or down.
c. Write a program using the following terms related to CSS font and text:
i. font-size ii. font-weight iii. font-style
iii. text-decorationv. text-transformation vi. text-alignment

d. Write a program, to explain the importance of CSS Box model using

i. Content ii. Border iii. Margin iv. padding

6.APPLYING JAVASCRIPT - INTERNAL AND EXTERNAL, I/O, TYPE CONVERSION

a. Write a program to embed internal and external JavaScript in a web page.
b. Write a program to explain the different ways for displaying output.
c. Write a program to explain the different ways for taking input.
d. Create a webpage which uses prompt dialogue box to ask a voter for his name and age. Display the information in table format along with either the voter can vote or not

7.JAVA SCRIPT PRE-DEFINED AND USER-DEFINED OBJECTS

a. Write a program using document object properties and methods.
b. Write a program using window object properties and methods.
c. Write a program using array object properties and methods.
d. Write a program using math object properties and methods.
e. Write a program using string object properties and methods.
f. Write a program using regex object properties and methods.
g. Write a program using date object properties and methods.
h. Write a program to explain user-defined object by using properties, methods, accessors, constructors and display.

8.JAVA SCRIPT CONDITIONAL STATEMENTS AND LOOPS

1. Write a program which asks the user to enter three integers, obtains the numbers from the user and outputs HTML text that displays the larger number followed by the words —LARGER NUMBER‖ in an information message dialog. If the numbers are equal, output HTML text as —EQUAL NUMBERS

a. Write a program to display week days using switch case.
b. Write a program to print 1 to 10 numbers using for, while and do-while loops.
c. Write a program to print data in object using for-in, for-each and for-of loops

2. Develop a program to determine whether a given number is an _ARMSTRONG NUMBER' or not. [Eg: 153 is an Armstrong number, since sum of the cube of the digits is equal to the number i.e.,13 + 53+ 33 = 153]
3. Write a program to display the denomination of the amount deposited in the bank in terms of 100's, 50's, 20's, 10's, 5's, 2's & 1's. (Eg: If deposited amount is Rs.163, the output should be 1-100's, 1- 50's, 1- 10's, 1-2's & 1-1's)

9. JAVA SCRIPT FUNCTIONS AND EVENTS

a. Design a appropriate function should be called to display
b. Factorial of that number
c. Fibonacci series up to that number
d. Prime numbers up to that number
e. Is it palindrome or not
f. Design a HTML having a text box and four buttons named Factorial,

Fibonacci, Prime, and Palindrome. When a button is pressed an appropriate function should be called to display

i. Factorial of that number
ii. Fibonacci series up to that number
iii. Prime numbers up to that number
iv. Is it palindrome or not
v. Write a program to validate the following fields in a registration page
vi. Name (start with alphabet and followed by alphanumeric and the length should not be less than 6 characters)
vii. Mobile (only numbers and length 10 digits)
viii. E-mail (should contain format like xxxxxxx@xxxxxx.xxx)

10.JAVASCRIPT DATABASE CONNECTIVITY

a.Introduction to server-side JavaScript with Node.js

b.Connecting JavaScript applications to MySQL and Mongo DB databases

TEXT BOOKS:

1.John Dean, Web Programming with HTML5, CSS and JavaScript, Jones & Bartlett Learning, 2019.

REFERENCE BOOKS:

1. Programming the World Wide Web, 7thEdition, Robet W Sebesta, Pearson, 2013.
2. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node, Vasan Subramanian, 2nd edition, APress, O'Reilly.

REFERENCE WEBSITE:

i. https://www.w3schools.com/html
ii. https://www.w3schools.com/css
iii. https://www.w3schools.com/js/
iv. https://www.w3schools.com/nodejs
v. https://www.w3schools.com/typescript

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Understand and apply basic HTML elements to create structured web pages using lists, links, images, tables, forms, and frames.	**PO1**
CO2	Design and develop responsive and well-structured web pages using HTML5 semantic tags and incorporate multimedia content.	**PO2**
CO3	Apply Cascading Style Sheets (CSS) to enhance the appearance of web pages using different types of selectors and styling techniques.	**PO3**
CO4	Use CSS properties to control layout, positioning, colors, text formatting, and implement the CSS box model effectively.	**PO5**
CO5	Implement interactivity in web pages using JavaScript, including internal/external scripts, input/output, and type conversions.	**PO8**
CO6	Work with JavaScript pre-defined and user-defined objects to perform computations, manipulations, and validations.	**PO9**
CO7	Demonstrate the use of JavaScript functions, control structures, loops, and events to handle real-time web interactivity.	**PO10**
CO8	Develop simple client-server applications using Node.js and connect to MySQL or MongoDB for data persistence.	**PO12**

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

COURSE CODE	TECHNICAL PAPER WRITING&IPR	L	T	P	C
23MAC351U		2	0	0	0

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To enable the students to practice the basic skills of research paper writing
2. To make the students understand the importance of IP and to educate the month basic concepts of Intellectual Property Rights.
3. To practice the basic skills of performing quality literature review
4. To help the min knowing the significance of real life practice and procedure of Patents.
5. To enable them learn the procedure of obtaining Patents, Copyrights &Trade Marks.

UNIT–I: 09

Principles of Technical Writing: styles in technical writing; clarity, precision, coherence and logical sequence in writing-avoiding ambiguity- repetition, and vague language -highlighting your findings- discussing your limitations -hedging and criticizing -plagiarism and paraphrasing.

UNIT–II: 09

Technical Research Paper Writing: Abstract – Objectives – Limitations Review of Literature-Problems and Framing Research Questions- Synopsis.

UNIT–III: 09

Process of research publication mechanism –types of journals – indexing - seminars-conferences - Proofreading– plagiarism style seminar & conference paper writing Methodology-discussion- results- citation rules.

UNIT–IV: 09

Intro Intellectual property - Introduction, types of intellectual property, International organizations ,agencies and ties, importance of intellectual property right side Marks-Purpose and function of trademarks , acquisition of trademarks rights ,protectable matter , selecting and uniting trade mark, trade mark registration processes.

UNIT-V 09

Law of copy rights- Fundamentals of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents -Foundation of patent law , patent searching process , ownership rights and transfer. Patent law , intellectual property audits.

COURSE OUTCOMES:

On Successful Completion Of This Course, The Students Will Be Able To:		POS
CO1	Identify key secondary literature related to their proposed technical paper writing.	PO1,PO2
CO2	Explain various principles and styles in technical writing.	PO5
CO3	Use the acquired knowledge in writing are search/technical paper.	PO2,PO5
CO4	Analyze rights and responsibilities of holder of Patent, Copy right, trademark, International Trademark etc.	PO6
CO5	Evaluate different forms of IPR available at national & international level.	PO4
CO6	Develop skill of making search of various forms of IPR by using modern tools and techniques.	PO4

TEXTBOOKS:

1. Deborah. E. Bouchoux, *Intellectual Property Rights*, Cengage LearningIndia,2013
2. Meenakshi Raman, Sangeeta Sharma. *Technical Communication: Principles and practices.*Oxford.

REFERENCE BOOKS:

1. R. Myneni, *Law of Intellectual Property*,9th Ed, Asia law House, 2019.
2. Prabuddha Ganguli ,*Intellectual Property Rights* Tata Mcg raw Hill, 2001
3. P. Naryan, *Intellectual PropertyLaw*,3rdEd, EasternLawHouse,2007.
4. Adrian Wall work. *English for Writing Research Papers* Second Edition. Springer Cham Heidelberg New York ,2016
5. Dan Jones, Sam Drag ga, *Technical Writing Style*

ONLINE RESOURCES

1. https://theconceptwriters.com.pk/principles-of-technical-writing/
2. https://www.ewh.ieee.org/soc/emcs/acstrial/newsletters/summer10/TechPaperWriting.html
3. https://www.ewh.ieee.org/soc/emcs/acstrial/newsletters/summer10/TechPaperWriting.html
4. https://www.manuscriptedit.com/scholar-hangout/process-publishing-research-paper-journal/
5. https://www.icsi.edu/media/website/IntellectualPropertyRightLaws&Practice.pdf
6. https://lawbhoomi.com/intellectual-property-rights-notes/
7. https://www.extension.purdue.edu/extmedia/ec/ec-723.pdf

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES. (AUTONOMOUS)

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. TECH.-VI SEMESTER

23CSM362T	**DEEP LEARNING**	**L T P C** **3 - - 3**

PRE-REQUISITES: MACHINE LEARNING BASICS

COURSE EDUCATIONAL OBJECTIVES:

1. Demonstrate the major technology trends driving Deep Learning
2. Build, train, and apply fully connected deep neural networks
3. Implement efficient (vectorized) neural networks
4. Analyze the key parameters and hyper parameters in a neural network's architecture
5. Demonstrate the sequence modeling and Networks of Deep Learning

UNIT-I: LINEAR ALGEBRA, PROBABILITY AND NUMERICAL COMPUTATION (9)

Linear Algebra: Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis.

Probability and Information Theory: Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory. **Numerical Computation:** Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

UNIT-II: MACHINE LEARNING AND DEEP FEED FORWARD NETWORKS

Machine Learning: Basics and Under fitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning.

Deep Feed forward Networks: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms.

UNIT-III: REGULARIZATION AND OPTIMIZATION OF DL MODELS (9)

Regularization for Deep Learning: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier.

Optimization for Training Deep Models: Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms.

UNIT-IV: CONVOLUTIONAL NETWORKS (9)

Convolutional Networks: The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks.

UNIT-V: SEQUENCE MODELING (9)

Sequence Modeling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate the mathematical foundation of neural network	**PO1, PO2, P03, PO4**
CO2	Describe the machine learning basics	**PO1, PO2, P03, PO4**
CO3	Differentiate architecture of deep neural network	**PO1, PO2, P03, PO4**
CO4	Build a convolutional neural network	**PO1, PO2, P03, PO4**
CO5	Build and train RNN and LSTMs	**PO1, PO2, P03, PO4**

TEXT BOOKS:

1. Ian Goodfellow, YoshuaBengio, Aaron Courville, "Deep Learning", MIT Press,2016.
2. Josh Patterson and Adam Gibson, "Deep learning: A practitioner's approach", O'Reilly Media, First Edition,2017.

REFERENCE BOOKS:

1. Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O'Reilly, Shroff Publishers,2019.
2. Deep learning Cook Book, Practical recipes to get started Quickly, Douwe Osinga, O'Reilly, Shroff Publishers, 2019.

ONLINE LEARNING RESOURCES:

1. https://keras.io/datasets/
2. http://deeplearning.net/tutorial/deeplearning.pdf
3. https://arxiv.org/pdf/1404.7828v4.pdf
4. https://www.cse.iitm.ac.in/~miteshk/CS7015.html
5. https://www.deeplearningbook.org
6. https://nptel.ac.in/courses/106105215

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. TECH.-VI SEMESTER

23CSD351A DATA VISUALIZATION

L	T	P	C
3	-	-	3

PRE-REQUISITES:NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Discuss the importance of Data Visualization
2. Demonstrate story telling
3. Explain the environment of Tableau

UNIT –I: (9)

Introduction, the importance of Context, Choosing and effective visual

UNIT-II: (9)

Clutter is your enemy, Focus your audience 's attention, Lessons in Storytelling

UNIT-III: (9)

Communicating data: A step in the process, a model of communication, Three types of communication problems, six principles of communicating data. Introduction to Tableau: Using Tableau, Tableau products, connecting to data. How much and How many: Communicating how much, communicating how many Ratios and Rates: Ratios, Rates

UNIT-IV: (9)

Proportions and Percentages: Part to whole, current to historical, actual to target. Mean and Median Variation and Uncertainty: Respecting variation, Variation over Time-Control charts, Understanding uncertainty

UNIT-V: (9)

Multiple Quantities: Scatter plots, Stacked Bars, Regression and Trend Lines, The Quadrant Chart Changes over time: The origin of time charts, the line chart, the dual axis line chart, the connected scatter plot, the date filed type and seasonality, the timeline, the slope graph Maps and Location: One special map, circle maps, filled maps, dual encoded maps.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the importance of context and the principles of effective visual design for data communication.	**PO1, PO2**
CO2	Identify and eliminate visual clutter to enhance audience focus and storytelling in data presentations.	**PO2, PO3**
CO3	Apply principles of effective communication to interpret and present data using visual and narrative techniques in Tableau.	**PO2, PO3, PO4**
CO4	Analyze variation and uncertainty using statistical tools such as mean, median, and control charts.	**PO1, PO3, PO4**
CO5	Explore changes over time and geographic patterns using time-based charts and map-based visualizations in Tableau.	**PO2, PO3, PO4, PO5**

TEXT BOOKS:

1. Cole Nussbaumer Knaflic, Storytelling with data, Wiley 13 oct 2015
2. Ben Jones, Communicating Data with Tableau, O 'Reilly June 2014

REFERENCE BOOKS:

1. A Julie Steele and Noah Iliinsky, Designing Data Visualizations: Representing
2. Informational Relationships, O 'Reilly.
3. Andy Kirk, Data Visualization: A Successful Design Process, PAKT.
4. Scott Murray, Interactive Data Visualization for Web, O 'Reilly.

REFERENCE WEBSITE:

1. Data Analysis and Visualization Foundations | Coursera
2. Data Visualization | Coursera

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES (Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. TECH.-VI SEMESTER

23CSD361T	PREDICTIVE ANALYTICS	L T P C
		3 - - 3

PRE-REQUISITES:NIL

COURSE EDUCATIONAL OBJECTIVES:
1. Discuss the concept Predictive Analytics
2. Illustrate the uses and applications of Predictive Analytics
3. Demonstrate building of Predictive Analytics models

UNIT –I: (9)

Overview of Predictive Analytics: What Is Analytics? What Is Predictive Analytics? Business Intelligence Predictive Analytics vs. Business Intelligence, Predictive Analytics vs. Statistics, Predictive Analytics vs. Data Mining, Who Uses Predictive Analytics? Challenges in Using Predictive Analytics, What Educational Background Is Needed to Become a Predictive Modeler?

Setting Up the Problem: Predictive Analytics Processing Steps: CRISP-DM, Business Understanding, Defining Data for Predictive Modelling, Defining the Target Variable, Defining Measures of Success for Predictive Models, Doing Predictive Modelling Out of Order, Case study- Recovering Lapsed Donors, Fraud Detection

UNIT-II: (9)

Data Understanding: What the Data Looks Like, Single Variable Summaries, Data Visualization in One Dimension, Histograms, Multiple Variable Summaries, Data Visualization, Two or Higher Dimensions, The Value of Statistical Significance, Pulling It All Together into a Data Audit.

Data Preparation: Variable Cleaning, Feature Creation.

UNIT-III: (9)

Item sets and Association Rules: Terminology, Parameter Settings, How the Data Is Organized, Measures of Interesting Rules, Deploying Association Rules, Problems with Association Rules, Building Classification Rules from Association Rules. Descriptive **Modelling:** Data Preparation Issues with Descriptive Modelling, Principal Component Analysis, Clustering Algorithms. Interpreting Descriptive Models: Standard Cluster Model Interpretation.

UNIT-IV: (9)

Predictive Modelling: Decision Trees, Logistic Regression, Neural Networks, K-Nearest Neighbour, Naïve Bayes, Regression Models, Linear Regression, Other Regression Algorithms. Assessing Predictive Models: Batch Approach to Model Assessment, Assessing Regression Models.

UNIT-V: (9)

Model Ensembles: Motivation for Ensembles, Bagging, Boosting, Improvements to Bagging and Boosting, Model Ensembles and Occam�much's Razor, Interpreting Model Ensembles.

Text Mining: Motivation for Text Mining, A Predictive Modelling Approach to Text Mining, structured vs. Unstructured Data, Why Text Mining Is Hard, Data Preparation Steps, Text Mining Features, Modelling with Text Mining Features, Regular Expressions.
Model Deployment: General Deployment Considerations.
Case Studies: Survey Analysis Case Study, Help Desk Case Study.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Visualize and explore data to better understand relationships among variables	**PO1, PO2**
CO2	Understand how ensemble models improve predictions	**PO2, PO3**
CO3	Organize the predictive modelling task and data flow	**PO2, PO4**
CO4	Apply predictive models to generate predictions for new data	**PO2, PO3, PO4**
CO5	Choose and implement appropriate performance measures for predictive models	**PO3, PO5**

TEXT BOOKS:

1. Dean Abbott, Applied Predictive Analytics, Published by Jhon Wiley &Sons, Inc,2014.

REFERENCE BOOKS:

1. Eric Siegel, Predictive Analytics, Published by Jhon Wiley & Sons, inc,2013.
2. Data Analytics using Python Kindle Edition by Bharti Motwani, 2020.

REFERENCE WEBSITE:

1. Predictive Analytics: Introduction to Business Forecasting | Udemy

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING-DATA SCIENCE
III B.Tech. - VI Semester

23CSE352T	COMPUTER NETWORKS & INTERNET PROTOCOLS	L T P C 3 - - 3

PRE-REQUISITES

COURSE EDUCATIONAL OBJECTIVES:

1. To understand the different types of networks
2. To discuss the software and hardware components of a network
3. To develop an understanding the principles of computer networks.
4. To familiarize with OSI model and the functions of layered structure.
5. To explain networking protocols, algorithms and design perspectives

UNIT–1: INTRODUCTION (9)

Types of Computer Networks, Broadband Access Networks, Mobile and Wireless Access Networks, Content Provider Networks, Transit networks, Enterprise Networks, Network technology from local to global, Personal Area Networks, Local Area Networks, Home Networks, Metropolitan Area Networks, Wide Area Networks, Internetworks, Network Protocols, Design Goals, Protocol Layering, Connections and Reliability, Service Primitives, The Relationship of Services to Protocols ,Reference Models, The OSI Reference Model, The TCP/IP Reference Model, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP Reference Model and Protocols..

UNIT–2:THEDATALINKLAYER (9)

Guided Transmission Media, Persistent Storage, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Data Link Layer Design Issues, Services Provided To The Network Layer, Framing Error Control, Flow Control, Error Detection And Correction, Error- Correcting Codes, Error-Detecting Codes, Elementary Data Link Protocols, Initial Simplifying Assumptions Basic Transmission And Receipt, Simplex Link-Layer Protocols, Improving Efficiency, Bidirectional Transmission, Multiple Frames In Flight, Examples Of Full-Duplex, Sliding Window Protocols, The Channel Allocation Problem, Static Channel Allocation, Assumptions For Dynamic Channel Allocation, Multiple Access Protocols, Aloha, Carrier Sense Multiple Access Protocols, Collision-Free Protocols, Limited- Contention Protocols, Wireless LAN Protocols, Ethernet, Classic Ethernet Physical Layer, Classic Ethernet Mac Sublayer Protocol, Ethernet Performance, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet,40- And 100-Gigabit Ethernet, Retrospective On Ethernet.

UNIT–3: THENETWORKLAYER (9)

Network Layer Design Issues, Store-And-Forward Packet Switching, Services ProvidedTo The Transport Layer, Implementation Of Connectionless Service, Implementation Of Connection-Oriented Service, Comparison Of Virtual-Circuit And Datagram Networks, Routing Algorithms In A Single Network, The Optimality Principle, Shortest Path Algorithm, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing Within a Network, Broadcast Routing, Multicast Routing, Anycast Routing, Traffic Management at The Network Layer, The Need for Traffic Management: Congestion, Approaches To Traffic Management, Internetworking, Internetworks: An Overview, How

Networks differ, Connecting Heterogeneous Networks, Connecting Endpoints Across Heterogeneous Networks, Internetwork Routing: Routing Across Multiple Networks Supporting Different Packet Sizes: Packet Fragmentation, The Network Layer In The Internet, The IP Version 4 Protocol, IP Addresses, IP Version 6, Internet Control Protocols, Label Switching and MPLS, OSPF—An Interior Gateway Routing Protocol, BGP—The Exterior Gateway Routing Protocol, Internet Multicasting..

UNIT–4: THE TRANSPORT LAYER (9)

The Transport Service, Services Provided To The Upper Layers, Transport Service Primitives, Berkeley Sockets, An Example Of Socket Programming: An Internet File Server, Elements Of Transport Protocols, Addressing, Connection Establishment, Connection Release, Error Control And Flow Control, Multiplexing, Crash Recovery, Congestion Control, Desirable Bandwidth Allocation, Regulating The Sending Rate, Wireless Issues, The Internet Transport Protocols: UDP, Introduction To UDP, Remote Procedure Call, Real-Time Transport Protocols, The Internet Transport Protocols: TCP, Introduction To TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release.

UNIT–5:THE APPLICATION LAYER (9)

Electronic Mail, Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery, The World Wide Web, Architectural Overview, Static Web Objects, Dynamic Web Pages and Web Applications, HTTP and HTTPS, Web Privacy, Content Delivery, Content and Internet Traffic, ServerFarms and Web Proxies, Content Delivery Networks, Peer-To-Peer Networks, Evolution of The Internet

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Evaluate various fundamental concepts and hardware of virtual reality medium.	PO1 ,PO2
CO2	Obtain Virtual reality modules using Oculus and Web VR	PO1, PO2
CO3	Analyze the augmented reality display environment, applications and tracking methods for spatial measurement and alignment of objects	PO1, PO2, P03
CO4	Analyze optical tracking and scene reconstruction algorithms for electronically perceiving imagery from camera sensors.	PO1, PO2, P03
CO5	Investigate interaction, authoring, navigation and collaboration methods for providing human computer interaction in augmented reality systems.	PO1, PO2

TEXT BOOKS:

1. AndrewTanenbaum,FeamsterWetherall,ComputerNetworks,6th Edition,GlobalEdition

REFERENCE BOOKS:

1. 1BehrouzA.Forouzan,DataCommunicationsandNetworking,5th Edition,McGrawHill Publication, 2017.
2. JamesF.Kurose,KeithW.Ross,"ComputerNetworking:ATop-DownApproach",6th edition, Pearson, 2019.

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING-DATA SCIENCE

III B.Tech. - VI Semester

23CSE362T	**CRYPTOGRAPHY & NETWORK SECURITY**	**L T P C** **3 - - 3**

PRE-REQUISITES: A course on Computer Networks

COURSE EDUCATIONAL OBJECTIVES:

1. To understand basics of Cryptography and Network Security. Identify computer and network security threats, classify the threats and develop a security model to prevent,detect and recover from the attacks.
2. Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
3. Analyze existing authentication and key agreement protocols; identify the weaknesses ofthese protocols.
4. Download and install an e-mail and file security software, PGP and efficiently use the codeto encrypt and sign messages.
5. Develop SSL or Firewall based solutions against security threats, employ access controltechniques.

UNIT–1: (9)

COMPUTER AND NETWORK SECURITY CONCEPTS: Computer Security Concepts, The OSI Security Architecture,SecurityAttacks,SecurityServices,SecurityMechanisms,A Model for Network Security, Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography, Block Ciphers: Traditional Block Cipher Structure, The Data Encryption Standard, Advanced Encryption Standard: AES Structure, AES Transformation Functions

UNIT–2: (9)

NUMBER THEORY: The Euclidean Algorithm, Modular Arithmetic, Fermat‵s and Euler‵s Theorems, The Chinese Remainder Theorem, Discrete Logarithms, Finite Fields: Finite Fields of the Form GF(p), Finite Fields of the Form GF(2^n) . **Public Key Cryptography**: Principles, Public Key Cryptography Algorithms, RSA Algorithm, Diffie Hellman Key Exchange, EllipticCurve Cryptography.

UNIT–3: (9)

CRYPTOGRAPHIC HASH FUNCTIONS: Application of Cryptographic Hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC & CMAC. **Digital Signatures**: NIST Digital Signature Algorithm, Distribution of Public Keys, X.509Certificates, Public-Key Infrastructure

UNIT–4: (9)

USER AUTHENTICATION: Remote User Authentication Principles, Kerberos. Electronic Mail Security: Pretty Good Privacy (PGP) And S/MIME. **IP Security:** IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange.

UNIT–5: (8)

TRANSPORT LEVEL SECURITY: Web Security Requirements, Transport Layer Security(TLS), HTTPS, Secure Shell (SSH) **Firewalls:**Fire wall Characteristics and Access Policy, Types of Fire walls, Firewall Location and Configurations.

Total Hours: 44

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand basics of Cryptography and Network Security.	PO1, PO2
CO2	Encrypt and decrypt messages ,sign and verify messages using well known signature generation and verification algorithms.	PO1, PO2
CO3	Analyze existing authentication and key agreement protocols.	PO1, PO2, P03, PO4
CO4	Use e-mail and file security software's	PO1, PO2, P03, PO5
CO5	Develop SSL/Firewall.	PO1, PO2, P03, PO4

TEXT BOOKS:

1. Cryptography and Network Security–William Stallings ,Pearson Education,8thEdition.
2. Cryptography, Network Security and CyberLaws–Bernard Menezes, Cengage Learning , 2010 edition.

REFERENCE BOOKS:

1. Cryptography and Network Security-BehrouzA Forouzan,Debdeep Mukhopadhyaya, Mc- Graw Hill, 3rdEdition, 2015.
2. Network Security Illustrated,Jason Albanese and Wes Sonnenreich, MGH Publishers, 2003.

REFERENCE WEBSITE:

1.https://nptel.ac.in/courses/106/105/106105031/lecture
2.https://nptel.ac.in/courses/106/105/106105162/lecturebyDr.SouravMukhopadhyayIIT Kharagpur [VideoLecture]
3.https://www.mitel.com/articles/web-communication-cryptography-andnetwork-security web articles by Mitel Power Connections

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	2	3	3	2	-	-	-	-	-	-	-	-
CO.2	3	3	3	3	-	-	-	-	-	-	-	-
CO.3	3	3	2	3	-	-	-	-	-	-	-	-
CO.4	2	3	2	-	1	-	-	-	-	-	-	-
CO.5	2	3	3	2	2	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**2.6**	**2.5**	**1.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING-DATA SCIENCE

III B.Tech. - VI Semester

23CSD362A	**SOCIAL NETWORK ANALYSIS (COMMON TO CSD, CSM)**	**L T P C** **3 - - 3**

PRE-REQUISITES:

COURSEEDUCATIONALOBJECTIVES:

1. Discuss the characteristics of different social networks
2. Demonstrate the functioning of different social networks

UNIT -1 : (9)

Hacking on Twitter data , Micro formats : Semantic Mark up and common sense collide

UNIT – 2 : (9)

Mailboxes : Oldies but Goodies , Titter : Friends , Followers and Setwise operations

UNIT – 3 : (9)

Twitter : The Tweet , the Whole Tweet , and Nothing but the Tweet

UNIT - 4: (9)

LinkedIn : Clustering your professional network for Fun (andprofit)

UNIT – 5: *(9)*

Facebook : The All-in-one Wonder

TotalHours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		**Pos**
CO1	Understand the structure and semantics of microformats and how semantic markup enhances data interpretation in social media.	**PO1, PO2**
CO2	Analyze and manipulate mail box data and apply set-wise operations on social media networks such as Twitter.	**PO1, PO3**
CO3	Evaluate and extract insights from tweet-level data, understanding content structure and meta data for sentiment Ortrend analysis.	**PO1, PO3,PO5**
CO4	Apply clustering techniques to LinkedIn data to discover community structures and professional network patterns.	**PO1, PO2, P03, PO5**
CO5	Explore and integrate multiple data types from Facebook to derive unified user profiles and social behavior analytics.	**PO1, PO3, P04, PO5**

TEXT BOOKS:

1.MatthewA.Russel,MiningtheSocialWeb,O'Reilly,2013

REFERENCE BOOKS:

1. SocialNetworkAnalysis:AIntroductionwithanExtensiveImplementationtoaLargeScale Online Network using Pajek, SeifedineKadry, Mohammed Taie, 2014.
2. AnIntroductiontoSocialNetworkDataAnalytics,CharuC.Aggarwal,IBMT.J.Watson Research Center.

REFERENCE WEBSITE:

1.SocialNetworkAnalysis|Coursera

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	2	-	-	-	-	-	-	-	-	-
CO.3	3	2	-	-	3	-	-	-	-	-	-	-
CO.4	3	3	3	-	3	-	-	-	-	-	-	-
CO.5	3	-	3	2	3	-	-	-	-	-	-	-
CO*	**3**	**2**	**2.8**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING-DATA SCIENCE

III B.Tech. - VI Semester

23CSM363A	RECOMMENDER SYSTEMS	L T P C
		3 - - 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. To provide students with basic concepts and its application in various domain
2. To make the students understand different techniques that a data scientist needs to know for analysing big data
3. To design and build a complete machine learning solution in many application domains

UNIT-I AN INTRODUCTION TO RECOMMENDER SYSTEMS, NEIGHBORHOOD-BASED COLLABORATIVE FILTERING (9)

Introduction, Goals of Recommender Systems, Basic Models of Recommender Systems, Domain Specific Challenges in Recommender Systems. Advanced Topics and Applications. Introduction, Key Properties of Ratings Matrices, Predicting Ratings with Neighborhood- Neighborhood-Based Collaborative Filtering: Based Methods, Clustering and Neighborhood- Based Methods, Dimensionality Reduction and Neighborhood Methods, Graph Models for Neighborhood-Based Methods, A Regression Modelling View of Neighborhood Methods.

UNIT-II MODEL-BASED COLLABORATIVE FILTERING, CONTENT-BASED RECOMMENDER SYSTEMS (9)

Introduction, Decision and Regression Trees, Rule-Based Collaborative Filtering, Naïve Bayes Collaborative Filtering, Using an Arbitrary Classification Model as a Black-Box, Latent Factor Models, Integrating Factorization and Neighborhood Models. Content-Based Recommender Systems: Introduction, Basic Components of Content-Based Systems, Preprocessing and Feature Extraction, Learning User Profiles and Filtering, Content-Based Versus Collaborative Recommendations, Using Content-Based Models for Collaborative Filtering, Summary.

UNIT-III KNOWLEDGE-BASED RECOMMENDERSYSTEMS, ENSEMBLEBASED AND HYBRID RECOMMENDER SYSTEMS (9)

Introduction, Constraint-Based Recommender Systems, Case-Based Recommenders, Persistent Personalization in Knowledge-Based Systems, Summary. Introduction, Ensemble Methods from the Classification Perspective, Weighted Hybrids, Switching Hybrids, Cascade Hybrids, Feature Augmentation Hybrids, Meta-Level Hybrids, Feature Combination Hybrids, Summary.

UNIT-IV EVALUATING RECOMMENDER SYSTEMS, CONTEXT-SENSITIVE RECOMMENDER SYSTEMS (9)

Introduction, Evaluation Paradigms, General Goals of Evaluation Design, Design Issues in Offline Recommender Evaluation, Accuracy Metrics in Offline Evaluation, Limitations of Evaluation Measures, Limitations of Evaluation Measures. Introduction, TheMultidimensional Approach, Contextual Pre- filtering: A Reduction-Based Approach, ContextualPre-filtering:AReduction-Based Approach, Contextual Modelling.

UNIT-V :TIME-ANDLOCATION-SENSITIVERECOMMENDERSYSTEMS (9)

Introduction, temporal collaborative filtering, discrete temporal models, location-aware recommendersystems,location-awarerecommendersystemslocation-aware recommender systems, summary.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand and key issues and challenges in personalization and recommendation systems.	**PO1, PO2**
CO2	Analyze user behavior and preferences to identify appropriate recommendation strategies.	**PO2, PO3**
CO3	Design and implement standard recommender algorithms like collaborative filtering and content-based filtering.	**PO2, PO3, P04**
CO4	Apply and evaluate recommender system models in real-world domains such as e-commerce and tourism.	**PO1, P03, PO4**
CO5	Develop and customize recommender systems for specialized domains like education and healthcare.	**PO1, PO3, P04, PO5**

TEXT BOOKS:

1.CharuC.Aggarwal,—RecommenderSystems‖,Springer,2016.

REFERENCE BOOKS:

1.FrancescoRicci,LiorRokach,—RecommenderSystemsHandbook‖,2nded.,Springer, 2015 Edition

REFERENCE WEBSITE:

1. RecommendationSystem-UnderstandingTheBasicConcepts(analyticsvidhya.com)
2. RecommenderSystems|Coursera

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	-	2	3	-	-	-	-	-	-	-	-	-
CO.3	-	3	2	2	-	-	-	-	-	-	-	-
CO.4	3	-	2	3	-	-	-	-	-	-	-	-
CO.5	-	3	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**2.5**	**2.6**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING-DATA SCIENCE

III B.Tech. - VI Semester

23CSE361T	**CLOUD COMPUTING**	**L T P C**
	(Common to CSE, CSE(AI), CSE(AI&ML), CSE(DS))	**3 - - 3**

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:
1.To explain the evolving computer model called cloud computing.
2.To introduce the various levels of services that can beachieved by cloud.
3.To describe the security aspects in cloud.

UNIT-1:BASICS OF CLOUDCOMPUTING (9)

Introduction to cloud computing: Introduction, Character is tics of cloudcomputing, Cloud Models, Cloud Services Examples, Cloud Based services and applications Cloud concepts and Technologies: Virtualization, Load balancing, Scalability and Elasticity, Deployment, Replication, Monitoring, Software defined, Network function virtualization, Map Reduce, Identity and Access Management, services level Agreements, Billing.

Cloud Services and Plat forms: Compute Services, Storage Services, Data, base Services, Application services, Content delivery services Analytics Services, Deployment and Management Services, Identity and Access Management services, Open SourcePrivate Cloud software.

UNIT – 2 : HADOOP AND PYTHON (9)

Hadoop Map Reduce: Apache Hadoop, Hadoop Map Reduce Job Execution, Hadoop Schedulers, Hadoop Clusterset up.

Cloud Application Design: Reference Architecture for Cloud Applications, Cloud Application Design Methodologies, Data Storage Approaches.

Python Basics: Introduction, Installing Python, Python data Types & Data Structures,Controlflow,Function,Modules,Packages,Filehandling,Date/Time Operations, Classes.

UNIT -3 : PYTHONFORCLOUDCOMPUTING (9)

Python for Cloud: Python for Amazon web services, Python for Google Cloud Platform, Python for windows Azure, Python for Map Reduce, Python packages of Interest, Python web Application Frame work, Designing a REST ful web API.

Cloud Application Developmentin Python: Design Approaches, Image Processing APP, Document Storage App, Map Reduce App, Social Media Analytics App.

UNIT – 4: BIGDATA,MULTIMEDIAANDTUNING (9)

BigDataAnalytics:Introduction,ClusteringBigData,ClassificationofBigdata Recommendation of Systems.

MultimediaCloud:Introduction,CaseStudy:LivevideoStreamingApp,Streaming Protocols, case Study: Video Trans coding App.

Cloud Application Bench marking and Tuning: Introduction,WorkloadCharacter is tics, Application Performance Metrics, Design Considerations for a Bench marking Methodology, Bench marking Tools, Deployment Prototyping, Load Testing & Bottleneck Detection case Study, Hadoop bench marking case Study.

UNIT-V: APPLICATIONS AND ISSUES IN CLOUD (9)

Cloud Security: Introduction, CSA Cloud Security Architecture, Authentication, Authorization, Identity Access Management, Data Security, Key Management, Auditing.

Cloud for Industry, Health care & Education: Cloud Computing for Health care, Cloud computing for Energy Systems, Cloud Computing for Transportation Systems, Cloud Computing for Manufacturing Industry, Cloud computing for Education.

Migrating in to a Cloud: Introduction, Broad Approaches to migrating into the cloud, the seven– step model of migration in to a cloud.

Organizational readiness and Change Management in The Cloud Age: Introduction, Basic concepts of Organizational Readiness, Drivers for changes: A frame work to comprehend the competitive environment, common change management models, change management maturity models, Organizational readiness self– assessment

Legal Issues in Cloud Computing: Introduction, Data Privacy and security Issues, cloud contracting models, Jurisdictional issues raised by virtualization and at a location, commercial and business considerations, Special Topics.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate Different type of Computing Systems, Cloud Computing Basics, Types of Cloud Computing	**PO1, PO2**
CO2	Understand the different services of cloud.	**PO1, PO2**
CO3	Understand the Privacy and security aspects of cloud.	**PO1, PO8**
CO4	Demonstrate knowledge on common standards for Cloud.	**PO1, PO6**
CO5	Develop skill to setup our own private cloud a nd to know applications of cloud.	**PO1, PO2, P03, PO5, PO9, PO12**

TEXT BOOKS:

1.Cloud computing Ahands-on Approach By Arshdeep Bahga, Vijay Madisetti, Universities Press, 2016

2.Cloud Computing principlesan dParadigms: By RajKumar Buyya,James Broberg,Andrzej Goscinski, Wiley, 2016.

REFERENCE BOOKS:

1.Mastering Cloud Computing by Raj kumar Buyya,ChristianVecchiola,S Thamarai Selvi, TMH

2.Cloud computing A Hands-On Approach by Arshdeep Bahgaand VijayMadisetti.

3.Cloud Computing : A Practical Approach ,AnthonyT. Velte, TobyJ.Velte ,Robert Elsenpeter, Tata Mc Graw Hill, rp 2011.

4.Enterprise Cloud Computing ,GautamShroff ,Cambridge University Press,2010.

5.Cloud Application Architectures : Building Applications and Infrastructure in the Cloud,GeorgeReese,O_Reilly,SPD,rp2011.

6.Essentials of Cloud Computing by K.Chandrasekaran.CRC Press.

REFERENCE WEBSITE:

1.Cloudcomputing–Course(nptel.ac.in)

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING-DATA SCIENCE

III B.Tech. -VI Semester

23CSE364A	**COMPUTER VISION**	**L T P C**
		3 - - 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. Identify basic concepts, terminology, theories,models and methods in the field of computer vision,
2. Describe known principles of human visual system,
3. Describe basic methods of computer vision related to multi-scale representation, edge detection and detection of other primitives, stereo, motion and object recognition,
4. Suggest a design of a computer vision system for a specific problem.

UNIT-1 : LINEARFILTERS (9)

Introduction to Computer Vision, Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing Filters as Templates, Technique: Normalized Correlation and Finding Patterns, Technique: Scale and Image Pyramids.

UNIT-2 : EDGEDETECTION (9)

Noise- Additive Stationary Gaussian Noise, Why Finite Differences Respond to Noise, Estimating Derivatives -DerivativeofGaussian Filters, WhySmoothingHelps, Choosinga SmoothingFilter, Why Smooth with a Gaussian? Detecting Edges-Using the Laplacian to Detect Edges, Gradient-Based Edge Detectors, Technique: Orientation Representations and Corners.

UNIT-3 :TEXTURE (9)

Representing Texture –Extracting Image Structure with Filter Banks, Representing Texture using the Statistics of Filter Outputs, Analysis (and Synthesis) Using Oriented Pyramids –The LaplacianPyramid, Filters in the Spatial Frequency Domain, Oriented Pyramids, Application: Synthesizing Textures for Rendering, Homogeneity, Synthesis by Sampling Local Models, Shape from Texture, Shape from Texture for Planes.

UNIT-4 : SEGMENTATIONBYCLUSTERING (9)

What is Segmentation, Human Vision: Grouping and Gestalt, Applications: Shot Boundary Detection and Background Subtraction. Image Segmentation by Clustering Pixels, Segmentation by Graph- Theoretic Clustering. The Hough Transform, Fitting Lines, Fitting Curves

UNIT-VRECOGNIZATIONBYRELATIONSBETWEENTEMPLATES (9)

Finding Objects by Voting on Relations between Templates, Relational Reasoning Using Probabilistic Modelsand Search, UsingClassifiersto PruneSearch,HiddenMarkovModels, Application: HMM and Sign Language Understanding, Finding People with HMM.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand linear filtering, convolution, Fourier analysis, sampling, and pattern matching.	**PO1, PO2, PO3, PO4, PO5**
CO2	Apply smoothing, derivative filters, and edge-detection techniques.	**PO1, PO2, PO3, PO4, PO5**
CO3	Model and synthesize textures using filter banks and pyramids.	**PO1, PO2, PO3, PO4, PO5**
CO4	Perform image segmentation using clustering and graph-based methods; detect shapes using Hough transform.	**PO1, PO2, PO3, PO4, PO5**
CO5	Implement template-based recognition and probabilistic models like HMMs.	**PO1, PO2, PO3, PO4, PO5**

TEXT BOOKS:

1.DavidA.Forsyth,JeanPonce,ComputerVision–AmodernApproach,PHI,2003.

REFERENCEBOOKS:

1. Geometric Computing with Clifford Algebras:Theoretical Foundations and Applications in Computer Vision and Robotics, Springer;1 edition,2001by Sommer.

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	2	2	1	–	-	-	-	-	-	-
CO.2	3	3	2	3	1	–	-	-	-	-	-	-
CO.3	3	2	2	3	2	–	-	-	-	-	-	-
CO.4	3	3	3	3	2	–	-	-	-	-	-	-
CO.5	3	3	3	3	2	-	-	-	-	-	-	-
CO*	**3**	**3**	**2.4**	**2.8**	**1.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING-DATA SCIENCE
III B.TECH. - VI SEMESTER

23CSE364D	SOFTWARE PROJECT MANAGEMENT	L T P C 3 - - 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

This course is designed to enable the students to understand the fundamental principles of Software Project management & will also have a good knowledge of the responsibilities of a project manager and how to handle them.

UNIT–1: CONVENTIONAL SOFTWARE MANAGEMENT (9)

The waterfall model, conventional software Management performance Evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT–2:THEOLDWAYANDTHENEW (9)

The principles of conventional software Engineering, principles of modern software management, transitioning to aniterative process. Lifecycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts

UNIT –3: WORK FLOWS OF PROCESS (9)

Software process work flows, Inter Transwork flows.Check points of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments.Iterative Process Planning: work break down structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning

UNIT–4:PROCESSAUTOMATION (9)

Automation Building Blocks, The Project Environment. Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators Tailoring the Process: Process discriminants. Managing people and organizing teams.

UNIT–5:PROJECTORGANIZATIONSANDRESPONSIBILITIES (9)

Line-of-Business Organizations, Project Organizations , evolution of Organizations.
Future Software Project Management : modern ProjectProfiles,Next generation Software economics, modern process transitions. Case Study: The Command Center Processing and Display System- Replacement (CCPDS-R)

TotalHours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrated and applied the knowledge of the various methods to determine the resultant forces.	**PO1, PO2, P03, PO4**
CO2	Analyze the equilibrium acting on a particle, bodies subjected to friction, simple frames and apply principle of virtual work to find reactions.	**PO1, PO2, P03, PO4**
CO3	Find the location of centroid, center of gravity and moment of inertia for the given appropriate sections.	**PO1, PO2, P03, PO4**
CO4	Analyze the kinematics of a body undergoing rectilinear, curvilinear motion.	**PO1, PO2, P03, PO4**
CO5	Apply the dynamic equilibrium principles and work energy equations to solve appropriate problems.	**PO1, PO2, P03, PO4**

TEXT BOOKS:

1.SoftwareProjectManagement,WalkerRoyce,PearsonEducation,2012

2.BobHughes,MikeCotterellandRajibMall—SoftwareProjectManagement‖,6thEdition,Mc Graw Hill Edition, 2017

REFERENCE BOOKS:

1.PankajJalote,—SoftwareProjectManagementinpractice‖,5thEdition,PearsonEducation, 2017.

2.MuraliK.Chemuturi,ThomasM.CagleyJr.‖MasteringSoftwareProjectManagement:Best Practices, Tools and Techniques‖, J.RossPublishing, 2010

3.SanjayMohapatra,—SoftwareProjectManagement‖,CengageLearning,2011

REFERENCE WEBSITE:

1.http://nptel.ac.in/courses/106101061/29

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING-DATA SCIENCE
III B.TECH. - VI SEMESTER

23CSM363C	QUANTUM COMPUTING	L T P C
		3 - - 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1.Introduce fundamental quantum concepts like super position and entanglement.
2.Understand the oretical structure of qubits and quantumin formation.
3.Explore conceptual challenges in building quantum computers.
4.Explain principles of quantum communication and computing.
5.Examine real-world applications and the future of quantum technologies.

UNIT-1:INTRODUCTION TO QUANTUM THEORY AND TECHNOLOGIES (9)

The transition from classical to quantum physics, Fundamental principles explained conceptually: Superposition, Entanglement, Uncertainty Principle, Wave-particle duality, Classical vs Quantum mechanics – theoretical comparison,Quantum states and measurement: nature of observation,Overview of quantum systems: electrons, photons, atoms,The concept of quantization: discrete energy levels,Why quantum? Strategic, scientific, and technological significance,Asnapshot of quantum technologies: Computing, Communication, and Sensing,National and global quantum missions: India's Quantum Mission, EU, USA, China

UNIT-2:THEORETICAL STRUCTURE OF QUANTUM INFORMATION SYSTEMS (9)

What is a qubit? Conceptual understanding using spin and polarization, Comparison: classical bitsvs quantum bits, Quantum systems: trapped ions, superconducting circuits, photons (non- engineering view),Quantum coherence and decoherence – intuitive explanation, Theoretical concepts: Hilbert spaces, quantum states, operators – only interpreted in abstract,The role of entanglement and non-locality in systems, Quantum information vs classical information: principles and differences, Philosophical implications: randomness, determinism, and observer role

UNI3:BUILDING A QUANTUM COMPUTER THE ORETICAL CHALLENGES AND REQUIREMENTS (9)

What is required to build a quantum computer (conceptual overview)?,Fragility of quantumsystems: decoherence, noise, and control, Conditions for a functional quantum system: Isolation, Error management, Scalability, Stability, Theoretical barriers:
Why maintaining entanglement is difficult,Error correction as a theoretical necessity, Quantum hardware platforms (brief conceptual comparison),Superconducting circuits, Trapped ions, Photonics,Visionvs reality:what's workingand whatremainselusive,The role ofquantumsoftware in managing theoretical complexities

UNIT4:QUANTUM COMMUNICATION AND COMPUTING–THEORETICAL PERSPECTIVE (9)

Quantum vs Classical Information, Basics of Quantum Communication, Quantum Key Distribution (QKD),Role of Entanglement in Communication, The Idea of the Quantum Internet– SecureGlobal Networking, Introduction to Quantum Computing, Quantum Parallelism (Many States at Once),Classical vs Quantum Gates, Challenges: Decoherence and Error Correction, Real-World Importance and Future Potential

UNIT5:APPLICATIONS, USECASES ,AND THE QUANTUM FUTURE (9)

Real-world application domains: Healthcare (drug discovery),Material science, Logistics and optimization, Quantum sensing and precision timing, Industrial case studies: IBM, Google, Microsoft, PsiQuantum, Ethical, societal, and policy considerations, Challenges to adoption: cost, skills, standardization, Emerging careers in quantum: roles, skillsets, and preparation pathways, Educational and research landscape – India's opportunity in the global quantum race

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrated and applied the knowledge of the various methods to determine the resultant forces.	PO1, PO2, P03, PO4
CO2	Analyze the equilibrium acting on a particle, bodies subjected to friction, simple frames and apply principle of virtual work to find reactions.	PO1, PO2, P03, PO4
CO3	Find the location of centroid, center of gravity and moment of inertia for the given appropriate sections.	PO1, PO2, P03, PO4
CO4	Analyze the kinematics of a body undergoing rectilinear, curvilinear motion.	PO1, PO2, P03, PO4
CO5	Apply the dynamic equilibrium principles and work energy equations to solve appropriate problems.	PO1, PO2, P03, PO4

TEXTBOOKS:

1.Michael A.Nielsen, IsaacL.Chuang, *Quantum Computation and Quantum Information*, Cambridge University Press, 10th Anniversary Edition, 2010.
2.Eleanor Rieffeland Wolfgang Polak,*QuantumComputing: A Gentle Introduction* ,MITPress, 2011.
3.Chris Bernhardt, *Quantum C omputing for Everyone*,MITPress,2019.

REFERENCEBOOKS:

1.David McMahon, *Quantum Computing Explained*,Wiley,2008.
2.PhillipKaye, Raymond Laflamme, MicheleMosca ,*An Introduction to Quantum Computing*, Oxford University Press, 2007.
3.Scott Aaronson, *Quantum Computing Since Democritus*, CambridgeUniversityPress,2013.
4.Alastair I.M. Rae, *Quantum Physics: A Beginner's Guide*, One world Publications, Revised Edition, 2005.
5.Eleanor G. Rieffel, Wolfgang H. Polak, *Quantum Computing: A Gentle Introduction*, MIT Press, 2011.
6.Leonard Susskind, Art Friedman, *Quantum Mechanics: The Theoretical Minimum*, Basic Books, 2014.
7.Bruce Rosenblum, Fred Kuttner, *Quantum Enigma: Physics Encounters Consciousness*, Oxford University Press, 2nd Edition, 2011.
8.GiulianoBenenti, GiulioCasati, GiulianoStrini, *Principles of Quantum Computation and Information, Volume I: Basic Concepts*, World Scientific Publishing, 2004.
9.K.B. Whaley et al., *Quantum Technologies and Industrial Applications: European Roadmap and Strategy Document*, Quantum Flagship, European Commission, 2020.
10.Department of Science & Technology (DST), Government of India, *National Mission on Quantum Technologies & Applications – Official Reports and Whitepapers*, MeitY/DST Publications, 2020 onward.

CO-PO MAPPING

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

23OCE361A	**DISASTER MANAGEMENT (OE – II)**	**L T P C**
		3 0 0 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. **To understand** the fundamental concepts of natural disasters, their occurrence, and disaster risk reduction strategies.
2. **To analyze** the impact of cyclones on structures and explore retrofitting techniques for adaptive reconstruction.
3. **To apply** wind engineering principles and computational techniques in designing wind-resistant structures.
4. **To evaluate** earthquake effects on buildings and develop strategies for seismic retrofitting.
5. **To assess** seismic safety planning, design considerations, and innovative construction materials for disaster-resistant structures.

UNIT– I **(9)**

Introduction to Natural Disasters– Brief Introduction to Different Types of Natural Disasters, Occurrence of Disasters in different Climatic and Geographical Regions, Hazard Maps (Earthquake and Cyclone) of The World and India, Regulations for Disaster Risk Reduction, Post-Disaster Recovery and Rehabilitation (Socioeconomic Consequences).

UNIT– II **(9)**

Cyclones and Their Impact– Climate Change and Its Impact On Tropical Cyclones, Nature of Cyclonic Wind, Velocities and Pressure, Cyclone Effects, Storm Surges, Floods, and Landslides. Behavior of Structures in Past Cyclones and Windstorms, Case Studies. Cyclonic Retrofitting, Strengthening of Structures, and Adaptive Sustainable Reconstruction. Life-Line Structures Such as Temporary Cyclone Shelters.

UNIT– III **(9)**

Wind Engineering and Structural Response– Basic Wind Engineering, Aerodynamics of Bluff Bodies, Vortex Shedding, and Associated Unsteadiness Along and Across Wind forces. Lab: Wind Tunnel Testing and Its Salient Features. Introduction to Computational Fluid Dynamics (CFD). General Planning and Design Considerations Under Windstorms and Cyclones. Wind Effects On Buildings, towers, Glass Panels, Etc., and Wind-Resistant Features in Design. Coda Provisions, Design Wind Speed, Pressure Coefficients. Coastal Zoning Regulations for Construction and Reconstruction in Coastal Areas. Innovative Construction Materials and Techniques, Traditional Construction Techniques in Coastal Areas.

UNIT–IV **(9)**

Seismology and Earthquake Effects– Causes of Earthquakes, Plate Tectonics, Faults, Seismic Waves; Magnitude, Intensity, Epicenter, Energy Release, and Ground Motions. Earthquake Effects– On Ground, Soil Rupture, Liquefaction, Landslides. Performance of Ground and Buildings in Past Earthquakes– Behavior of Various Types of Buildings and Structures, Collapse Patterns; Behavior of Non-Structural Elements Such as Services, Fixtures, and Mountings – Case Studies. Seismic Retrofitting– Weaknesses Existing Buildings, Aging, Concepts in Repair, Restoration, and Seismic Strengthening.

UNIT– V **(9)**

Planning and Design Considerations for Seismic Safety– General Planning and Design Considerations; Building forms, Horizontal and Vertical Eccentricities, Mass and Stiffness Distribution, Soft Story Effects, Etc.; Seismic Effects Related to Building Configuration. Plan and Vertical Irregularities, Redundancy, and Setbacks. Construction Details– Various Types of Foundations, Soil Stabilization, Retaining Walls, Plinth Fill, Flooring, Walls, Openings, Roofs, Terraces, Parapets, Boundary Walls, Underground and Overhead Tanks, Staircases, and Isolation of Structures. Innovative Construction Materials and Techniques. Local Practices– Traditional Regional Responses. Computational Investigation Techniques.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	**Understand** the fundamental concepts of natural disasters, their occurrence, and disaster risk reduction strategies.	PO1,PO6,PO8,PO9
CO2	**Analyze** the impact of cyclones on structures and explore retrofitting techniques for adaptive reconstruction.	PO2,PO5
CO3	**Apply** wind engineering principles and computational techniques in designing wind resistant structures.	PO1,PO7,PO4
CO4	**Evaluate** earthquake effects on buildings and develop strategies for seismic retrofitting.	PO3,PO5,PO8
CO5	**Assess** seismic safety planning, design considerations, and innovative construction materials for disaster-resistant structures	PO4,PO6,PO7,PO8, PO9

TEXT BOOKS:

1. David Alexander, Natural Disasters, 1st Edition, CRC Press, 2017.
2. Edward A. Keller and Duane E. DeVecchio, Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes, 5th Edition, Routledge, 2019.

REFRENCE BOOKS:

1. Ben Wisner, J.C. Gaillard, and Ilan Kelman (Editors), Handbook of Hazards and Disaster Risk Reduction and Management, 2nd Edition, Routledge, 2012.
2. Damon P. Coppola, Introduction to International Disaster Management, 4th Edition, Butterworth-Heinemann, 2020.
3. Bimal Kanti Paul, Environmental Hazards and Disasters: Contexts, Perspectives and Management, 2nd Edition, Wiley-Blackwell, 2020.

Online Learning Resources:

1. **https://nptel.ac.in/courses/124107010**
2. **https://onlinecourses.swayam2.ac.in/cec19_hs20/preview**

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. Tech –VI Semester

23OCE361B	SUSTAINABILITY IN ENGINEERING PRACTICES (OE – II)	L	T	P	C
		3	0	0	3

PRE-REQUISITES:
COURSE EDUCATIONAL OBJECTIVES:

1. To understand the fundamentals of sustainability, the carbon cycle, and the environmental impact of construction materials.
2. To analyze sustainable construction materials, their durability, and life cycle assessment.
3. To apply energy calculations in construction materials and assess their embodied energy.
4. To evaluate green building standards, energy codes, and performance ratings.
5. To assess the environmental effects of energy use, climate change, and global warming.

UNIT I: INTRODUCTION (9)

Introduction and Definition of Sustainability - Carbon Cycle - Role of Construction Material: Concrete and Steel, Etc. - CO2Contribution from Cement and Other Construction Materials.

UNIT 2: MATERIALS USED in SUSTAINABLE CONSTRUCTION (9)

Cyclones and Their Impact– Climate Change and Its Impact On Tropical Cyclones, Nature of Cyclonic Wind, Velocities and Pressure, Cyclone Effects, Storm Surges, Floods, and Landslides. Behavior of Structures in Past Cyclones and Windstorms, Case Studies. Cyclonic Retrofitting, Strengthening of Structures, and Adaptive Sustainable Reconstruction. Life-Line Structures Such as Temporary Cyclone Shelters.

UNIT 3: ENERGY CALCULATIONS (9)

Components of Embodied Energy - Calculation of Embodied Energy for Construction Materials - Energy Concept and Primary Energy - Embodied Energy Via-A-Vis Operational Energy in Conditioned Building - Life Cycle Energy Use.

UNIT 4: GREEN BUILDINGS (9)

Control of Energy Use in Building - ECBC Code, Codes in Neighboring Tropical Countries - OTTV Concepts and Calculations – Features of LEED and TERI – GRIHA Ratings – Role of Insulation and Thermal Properties of Construction Materials - Influence of Moisture Content and Modeling - Performance Ratings of Green Buildings - Zero Energy Building.

UNIT 5: ENVIRONMENTAL EFFECTS (9)

Non-Renewable Sources of Energy and Environmental Impact– Energy Norm, Coal, Oil, Natural Gas - Nuclear Energy - Global Temperature, Green House Effects, Global Warming - Acid Rain: Causes, Effects and Control Methods - Regional Impacts of Temperature Change.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	**Understand** the fundamentals of sustainability, the carbon cycle, and the environmental impact of construction materials.	PO1,PO2,PO3,PO4,PO5,PO12
CO2	**Analyze** sustainable construction materials, their durability, and life cycle assessment.	PO1,PO2,PO3,PO4,PO5,PO12
CO3	**Apply** energy calculations in construction materials and assess their embodied energy.	PO1,PO2,PO3,PO4,PO5,PO6,PO12
CO4	**Evaluate** green building standards, energy codes, and performance ratings.	PO1,PO2,PO3,PO4,PO5,PO12
CO5	**Assess** the environmental effects of energy use, climate change, and global warming	PO1,PO2,PO3,PO4,PO5,PO12

TEXT BOOKS:

1.Charles J Kibert, Sustainable Construction: Green Building Design & Delivery, 4th Edition, Wiley Publishers 2016.
2.Steve Goodhew, Sustainable Construction Process, Wiley Blackwell, UK, 2016.

REFRENCE BOOKS:

1.Craig A. Langston & Grace K.C. Ding, Sustainable Practices in the Built Environment, Butterworth Heinemann Publishers, 2011.
2.William P Spence, Construction Materials, Methods & Techniques (3e), Yes Dee Publication Pvt. Ltd, 2012

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES. (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. Tech –VI Semester

23OEE361A	RENEWABLE ENERGY SOURCES	L T P C
		3 0 0 3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the fundamentals of solar radiation, solar geometry, and solar energy collection and storage systems.
2. To provide an understanding of photovoltaic (PV) effect, PV technologies, module characteristics, and PV system configurations.
3. To explain the principles, components, design considerations, and performance estimation of wind energy conversion systems.
4. To familiarize students with geothermal energy resources, technologies, applications, and their prospects in India.
5. To expose students to emerging and miscellaneous renewable energy technologies such as ocean energy, biomass energy, and fuel cells along with their advantages, limitations, and applications.
6.

UNIT I: SOLAR ENERGY (9)

Solar radiation - beam and diffuse radiation, solar constant, Sun at Zenith, attenuation and measurement of solar radiation, local solar time, derived solar angles, sunrise, sunset and day length. flat plate collectors, concentrating collectors, storage of solar energy-thermal storage.

UNIT 2: PV ENERGY SYSTEMS (9)

Introduction, The PV effect in crystalline silicon basic principles, the film PV, Other PV technologies, Solar PV modules from solar cells, mismatch in series and parallel connections design and structure of PV modules, Electrical characteristics of silicon PV cells and modules, Stand-alone PV system configuration, Grid connected PV systems.

UNIT 3: WIND ENERGY (9)

Principle of wind energy conversion; Basic components of wind energy conversion systems; windmill components, various types and their constructional features; design considerations of horizontal and vertical axis wind machines: analysis of aerodynamic forces acting on wind mill blades; wind data and energy estimation and site selection considerations

UNIT 4: GEOTHERMAL ENERGY (9)

Estimation and nature of geothermal energy, geothermal sources and resources like hydrothermal, geo pressured hot dry rock, magma. Advantages, disadvantages and application of geothermal energy, prospects of geothermal energy in India..

UNIT 5: MISCELLANEOUS ENERGY TECHNOLOGIES (9)

Ocean Energy: Tidal Energy-Principle of working, Operation methods, advantages and limitations.

Wave Energy-Principle of working, energy and power from waves, wave energy conversion devices, advantages and limitations.

Bio mass Energy: Biomass conversion technologies, Biogas generation plants, Classification, advantages and disadvantages, constructional details, site selection, digester design consideration

Fuel cell: Principle of working of various types of fuel cells and their working, performance and limitations

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand principle operation of various renewable energy sources	**PO1, PO2**
CO2	Identify site selection of various renewable energy sources	**PO1, PO2, P03, PO4**
CO3	Analyze various factors affecting on solar energy measurements, wind energy conversion techniques, Geothermal, Biomasss, Tidal Wave and Fuel cell energies	**PO1, PO2**
CO4	Design of Solar PV modules and considerations of horizontal and vertical axis Wind energy Systems	**PO1, PO2**
CO5	Apply the concepts of Geo Thermal Energy, Ocean Energy, Bio mass and Fuel Cells for generation of power	**PO1, PO2**

TEXT BOOKS:

1. G.D.Rai,"Non-ConventionalEnergySources",4thEdition, Khanna Publishers,2000.
2. Chetan Singh Solanki" Solar Photovoltaics fundamentals, technologies and applications" 2nd Edition PHI Learning Private Limited. 2012.

REFERENCE BOOKS:

1. Stephen Peake, "Renewable Energy Power for a Sustainable Future", Oxford International Edition, 2018.
2. S.P.Sukhatme,"SolarEnergy",3rd Edition, Tata McGraw Hill EducationPvt.Ltd,2008.
3. BHKhan,"Non-Conventional EnergyResources",2nd Edition, Tata Mc GrawHill Education Pvt Ltd, 2011.
4. S. Hasan Saeed and D.K.Sharma, "Non-Conventional Energy Resources",3rd Edition, S.K.Kataria& Sons, 2012.
5. G. N. Tiwari and M.K.Ghosal, "Renewable Energy Resource: Basic Principles and Applications", Narosa Publishing House, 2004.

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. Tech –VI Semester

23OEC361A	DIGITAL ELECTRONICS	L T P C
		3 0 0 3

PRE-REQUISITES: Basic Mathematics
COURSE EDUCATIONAL OBJECTIVES:

1. To Learn Boolean algebra, logic simplification techniques, and combinational circuit design.
2. To analyze combinational circuits like adders, subtractors, and code converters.
3. To explore combinational logic circuits and their applications in digital design.
4. To understand sequential logic circuits, including latches, flip-flops, counters, and shift registers.
5. To gain knowledge about programmable logic devices and digital IC's.

UNIT–:1 INTRODUCTION (9)
Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Introduction to Logic Gates, Ex-OR, Ex-NOR operations, Minimization of Switching Functions: Karnaugh map method, Logic function realization: AND-OR, OR-AND and NAND/NOR realizations.

UNIT-2: INTRODUCTION TO COMBINATIONAL DESIGN 1 (9)
Introduction to Combinational Design 1: Binary Adders, Subtractors and BCD adder, Code converters - Binary to Gray, Gray to Binary, BCD to excess3, BCD to Seven Segment display.

UNIT-3: COMBINATIONAL LOGIC DESIGN 2 (9)
Combinational Logic Design 2: Decoders, Encoders, Priority Encoder, Multiplexers, Demultiplexers, Comparators, Implementations of Logic Functions using Decoders and Multiplexers.

UNIT-4: SEQUENTIAL LOGIC DESIGN (9)
Sequential Logic Design: Latches, Flip-flops, S-R, D, T, JK and Master-Slave JK FF, Edge triggered FF, set up and hold times, Ripple counters, Shift registers.

UNIT-5: PROGRAMMABLE LOGIC DEVICES AND DIGITAL ICs (9)
Programmable Logic Devices:ROM, Programmable Logic Devices (PLA and PAL).
Digital IC's: Decoder (74x138), Priority Encoder (74x148), multiplexer (74x151) and de-multiplexer (74x155), comparator (74x85).

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Learn Boolean algebra, logic simplification techniques, and combinational circuit design.	**PO1, PO2**
CO2	Analyze combinational circuits like adders, subtractors, and code converters.	**PO1, PO2, PO3**
CO3	Explore combinational logic circuits and their applications in digital design.	**PO1, PO2, PO3**
CO4	Understand sequential logic circuits, including latches, flip-flops, counters, and shift registers.	**PO1, PO2, PO3**
CO5	Gain knowledge about programmable logic devices and digital IC's.	**PO1, PO2**

TEXT BOOKS:

1. Digital Design, M.Morris Mano & Michel D. Ciletti, 5th Edition, Pearson Education, 1999.
2. Switching theory and Finite Automata Theory, ZviKohavi and NirahK.Jha, 2nd Edition, Tata McGraw Hill, 2005.

REFERENCE BOOKS:

1. Fundamentals of Logic Design, Charles H Roth,Jr., 5th Edition, Brooks/cole Cengage Learning, 2004.

REFERENCEWEBSITE:

2. https://archive.nptel.ac.in/courses/108/105/108105132/
3. https://archive.nptel.ac.in/courses/108/105/108105113/
4. https://archive.nptel.ac.in/content/storage2/courses/106108099/Digital%20Systems.pdf

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. Tech –VI Semester

23OME361A	PRINCIPLES OF AUTOMATION AND ROBOTICS	L	T	P	C
	(MECHANICAL BRANCH)	3	0	0	3

PRE-REQUISITES:
COURSE EDUCATIONAL OBJECTIVES:

1. Fundamentals of industrial automation, production types, automation strategies, and hardware elements used in modern manufacturing processes.
2. Understanding of automated manufacturing systems, and strategies for improving productivity and flexibility in industrial automation.
3. Knowledge of industrial automation and robotics, sensors, and end-effector design for modern manufacturing environments.
4. Explain industrial automation and robotics, and trajectory planning for intelligent and efficient manufacturing applications.
5. Familiarity of industrial automation and robotics, and practical applications in manufacturing processes.

UNIT-1: INTRODUCTION TO AUTOMATION (9)
Introduction to Automation, Need, Types, Basic elements of an automated system, Manufacturing Industries, Types of production, Functions in manufacturing, Organization and information processing in manufacturing, Automation strategies and levels of automation, Hardware components for automation and process control, mechanical feeders, hoppers, orienters, high speed automatic insertion devices.

UNIT-2: AUTOMATED FLOW LINES (9)
Automated flow lines, Part transfer methods and mechanisms, types of Flow lines, flow line with/without buffer storage, Quantitative analysis of flow lines. Assembly line balancing: Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

UNIT-3: INTRODUCTION TO INDUSTRIAL ROBOTICS (9)
Introduction to Industrial Robotics, Classification of Robot Configurations, functional line diagram, degrees of freedom. Components common types of arms, joints grippers, factors to be considered in the design of grippers. Robot actuators and Feedback components: Actuators, Pneumatic, Hydraulic actuators, Electric & Stepper motors, comparison. Position sensors - potentiometers, resolvers, encoders - velocity sensors, Tactile sensors, Proximity sensors.

UNIT-4: MANIPULATOR KINEMATICS: (9)
Manipulator Kinematics: Manipulator Kinematics, Homogenous transformations as applicable to rotation and transition - D-H notation, Forward inverse kinematics. Manipulator Dynamics: Differential transformations, Jacobians, Lagrange - Euler and Newton – Euler formations. Trajectory Planning: Trajectory Planning and avoidance of obstacles path planning, skew motion, joint integrated motion - straight line motion.

UNIT-5: ROBOT PROGRAMMING AND APPLICATIONS (9)
Robot Programming: Lead through programming – Robot language structure – Motion commands of move, speed control, workplace, path, frames, end effecter operation, sensor operation and react statement – Program sequence and subroutine – Teach pendant

programming – VAL II programming. Robot Applications: Material transfer and machine loading / unloading – Processing applications in spray coating, spot and arc welding – Assembly and inspection automation – Selection of robots in industry applications

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand and analyze the structure and functions of automated manufacturing systems, and evaluate hardware components for efficient production.	L2,L4,L5
CO2	Analyze and design automated flow lines with or without buffer storage, perform quantitative evaluations, apply assembly line balancing techniques.	L4,L5,L6
CO3	Classify robot configurations, select suitable actuators and sensors, analyze and apply automation and robotics principles to optimize production efficiency and flexibility	L2,L3,L4
CO4	Apply kinematic and dynamic modeling using D-H notation and select appropriate hardware and control strategies for real-world industrial scenario to analyze and design automated and robotic systems.	L3,L4,L5
CO5	Design, program, and implement robotic systems, understand and apply robotics technology to manufacturing tasks.	L1,L3,L6

TEXT BOOKS:
1. Automation , Production systems and CIM,M.P. Groover /Pearson Edu.
2. Industrial Robotics - M.P. Groover, TMH.

REFERENCE BOOKS:
1. Robotics , Fu K S, McGraw Hill, 4th edition, 2010.
2. An Introduction to Robot Technology, P. Coiffet and M. Chaironze, Kogam Page Ltd. 1983 London.
3. Robotic Engineering , Richard D. Klafter, Prentice Hall
4. Robotics, Fundamental Concepts and analysis – Ashitave Ghosal ,Oxford Press, 1/e, 2006 Robotics and Control , Mittal R K &Nagrath IJ , TMH

REFERENCE WEBSITE:
1. https://www.youtube.com/watch?v=yxZm9WQJUA0&list=PLRLB5WCqU54UJG45UnazSYmnmhl-gt76o
2. https://www.youtube.com/watch?v=6f3bvIhSWyM&list=PLRLB5WCqU54X5Vy4DwjfSODT3ZJgwEjyE

CO-PO MAPPING:

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

CO*	3	2	2	2	-	-	-	-	-	-	-	-

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

III B. Tech –VI Semester

23OSH361A OPTIMIZATION TECHNIQUES FOR ENGINEERS (OE – II)

L	T	P	C
3	-	-	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1.Impart knowledge on theory of optimization and conditions for optimality for unconstraint and constraint optimization problems
2.Inculcate modeling skills necessary to describe and formulate optimization problems in design and manufacturing
3.Familiarize with the working principle of optimization algorithms used to solve linear and non-linear problems
4.Train the students to solve optimization problems using software tools

UNIT I: LINEAR PROGRAMMING I (9)

Introduction, Applications of Linear Programming, Standard form of a Linear Programming Problem, Geometry of Linear Programming Problems, Basic Definitions in Linear Programming. Simplex Method, Simplex Algorithm and Two phase Simplex Method, Big-M method.

UNIT2: LINEAR PROGRAMMING II: DUALITY IN LINEAR PROGRAMMING (9)

Symmetric Primal-Dual Relations, General Primal-Dual Relations, Duality Theorem, Dual Simplex Method, Transportation Problem and assignment problem, Complementary slackness Theorem

UNIT3: NON - LINEARPROGRAMMING: UNCONSTRAINED OPTIMIZATION TECHNIQUES (9)

Introduction: Classification of Unconstrained minimization methods,
Direct Search Methods: Random Search Methods: Descent Method and Fletcher Powell Method, Grid Search Method

UNIT 4: NON-LINEAR PROGRAMMING: CONSTRAINED OPTIMIZATION TECHNIQUES (9)

Introduction, Characteristics of a constrained problem, Random Search Methods, complex method, Sequential linear programming, Basic approach in methods of Feasible directions, Zoutendijk's method of feasible directions: direction finding problem, determination of step length, Termination criteria.

UNIT 5: GEOMETRIC PROGRAMMING (9)

Unconstrained Minimization Problems: solution of unconstrained geometric programming using differential calculus and arithmetic-geometric inequality.
Constrained minimization Problems: Solution of a constrained geometric programming problem, primal-dual programming in case of less-than inequalities, geometric programming

with mixed inequality constraints.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the meaning, purpose, tools of Operations Research and linear programming in Solving practical problems in industry.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO2	Interpret the transportation models' solutions and infer solutions to the real-world problems.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO3	Develop mathematical skills to analyze and solve non linear programming models arising from a wide range of applications.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO4	Apply the concept to non-linear programming for solving the problems involving non-linear constraints and objectives	**PO1,PO2,PO3,PO4,PO5,PO12**
CO5	Apply the concept of unconstrained geometric programming for solving the problems involving non-linear constraints and objectives.	**PO1,PO2,PO3,PO4,PO5,PO12**

TEXT BOOKS:

1.SingiresuSRao.,EngineeringOptimization:TheoryandPractices,NewAgeInt.(P)Ltd. Publishers, New Delhi.

2.J.C.Panth,IntroductiontoOptimizationTechniques,(7-e)JainBrothers,NewDelhi.

REFERENC BOOKS:

1.HarveyM.Wagner,PrinciplesofOperationResearch,Printice-HallofIndiaPvt.Ltd.New Delhi.

2.Peressimi A.L., Sullivan F.E., Vhl, J. J. Mathematics of Non-linear Programming, Springer –Verlag.

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc24_ee122/preview
2. https://archive.nptel.ac.in/courses/111/105/111105039/
3. https://onlinecourses.nptel.ac.in/noc21_ce60/preview

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES. (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE

III B. Tech –VI Semester

23OSH361B	MATHEMATICAL FOUNDATION OF QUANTUM TECHNOLOGIES(OE – II)	L	T	P	C
		3	-	-	3

PRE-REQUISITES:

COURSE EDUCATIONAL OBJECTIVES:

1. To provide students with essential linear algebra foundations including vector spaces, inner products, and operators for quantum mechanical applications.
2. To develop understanding of the transition from finite-dimensional systems to infinite-dimensional function spaces and Hilbert space concepts.
3. To establish quantum mechanical formalism including measurement theory, uncertainty relations, and time evolution principles.
4. To enable students to apply quantum mechanical principles to solve problems in simple quantum systems and understand statistical interpretation.
5. To introduce advanced concepts in composite systems, measurement processes, and modern perspectives in quantum mechanics.

UNIT I: LINEAR ALGEBRA FOUNDATION FOR QUANTUM MECHANICS (9)

Vector spaces definition and examples (R^2, R^3, function spaces), Inner products (dot product, orthogonality, normalization), Linear operators (matrices, eigenvalues, eigenvectors), Finite-dimensional examples (2×2 matrices, spin-1/2 systems), Dirac notation introduction ($|\psi\rangle$, $\langle\varphi|$, $\langle\varphi|\psi\rangle$), Change of basis (transformations, unitary matrices).

UNIT2: FROM FINITE TO INFINITE DIMENSIONS (9)

Function spaces (L^2 space, square-integrable functions), Inner products for functions ($\int \psi^* \varphi \, dx$), Orthogonal function sets (Fourier series, basis functions), Introduction to Hilbert space concept (complete inner product spaces), Position and momentum representations (wave functions), Operators on functions (d/dx, multiplication by x).

UNIT3: QUANTUM MECHANICAL FORMALISM (9)

Mathematical formulation (states as vectors, observables as operators), Measurement theory (Born rule, expectation values, probabilities), Uncertainty relations (mathematical derivation from commutators), Time evolution (Schrödinger equation, unitary evolution).

UNIT 4: APPLICATIONS AND STATISTICAL INTERPRETATION (9)

Simple applications (infinite square well, harmonic oscillator), Statistical interpretation (ensembles, pure vs mixed states), Measurement process (von Neumann measurement scheme).

UNIT 5: ADVANCED TOPICS (9)

Composite systems (tensor products basic introduction), Reversibility and irreversibility (unitary evolution vs measurement), Thermodynamic connections (equilibrium states, entropy), Modern perspectives (decoherence, measurement problem conceptual).

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand vector spaces, inner products, and linear operators with applications to quantum systems.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO2	Apply linear algebra concepts to function spaces and analyze the transition from finite to infinite dimensional systems.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO3	Analyze quantum mechanical formalism including measurement theory, uncertainty relations, and time evolution.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO4	Apply quantum mechanical principles to solve problems in simple quantum systems and evaluate statistical interpretations.	**PO1,PO2,PO3,PO4,PO5,PO12**
CO5	Evaluate advanced concepts in composite systems and synthesize understanding of measurement processes and modern quantum theory.	**PO1,PO2,PO3,PO4,PO5,PO6,PO12**

TEXT BOOKS:

1. David J. Griffiths, Darrell F. Schroeter, "Introduction to Quantum Mechanics", 3rd Edition, Cambridge University Press (2018).
2. R. Shankar, Principles of Quantum Mechanics, 2nd Edition, Kluwer Academy/Plenum Publishers (1994).

REFERENCE BOOKS:

1. George. F. Simmons, "Introduction to Topology and Modern Analysis",MedTech Science Press.
2. Gilbert Strang, Linear Algebra and Its Applications, 4th Edition, Cengage Learning (2006).
3. John von Neumann and Robert T Beyer, Mathematical Foundations of Quantum Mechanics,Princeton Univ. Press (1996).

REFERENCE WEBSITE:

1. https://eclass.uoa.gr/modules/document/file.php/CHEM248/Griffiths%20-%20Introduction%20to%20Quantum%20Mechanics%203rd%20ed%202018.pdf
2. https://fisica.net/mecanicaquantica/Shankar%20%20Principles%20of%20quantum%20mechanics.pdf

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES. (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. Tech –VI Semester

23OSH361C	**PHYSICS OF ELECTRONIC MATERIALS AND DEVICES**	**L T P C**
	(Common to all branches)	**3 0 0 3**

PRE-REQUISITES:
COURSE EDUCATIONAL OBJECTIVES:

1. To facilitate a deeper understanding of crystal growth, defects in crystals, and thin-films.
2. To examine and understand the properties, characteristics, and applications of varioussemiconducting materials, and their role in advancing technology.
3. To establish a solid foundation in the principles and practices of semiconductor physics and devices engineering.
4. To examine the fundamental principles governing excitonic and luminescent processes in solid-state materials, and their significance in optoelectronic applications.
5. To gain insight into the principles, innovations, and applications of modern display systems.

UNIT–1: FUNDAMENTALS OF MATERIALS SCIENCE (9)
Introduction, Phase rule, Phase Diagram, Elementary idea of Nucleation and Growth, Methods of crystal growth. The basic idea of point, line, and planar defects. Concept of thin films, preparation of thin films, Deposition of thin film using sputtering methods (RF and glow discharge).

UNIT –2: SEMICONDUCTORS (9)
Introduction, charge carriers in semiconductors, effective mass, Diffusion and drift, Diffusion and recombination, Diffusion length. The Fermi level & Fermi-Dirac distribution, Electron and Hole in quantum-well, Change of electron-hole concentration- Qualitative analysis, Temperature dependency of carrier concentration, Conductivity and mobility, Effects of temperature and doping on mobility, High field effects.

UNIT-3: PHYSICS OF SEMICONDUCTOR DEVICES (9)
Introduction, Band structure, PN junctions and their typical characteristics under equilibrium and under bias, Hetero junctions, Transistors, MOSFETs.

UNIT –4: EXCITONS AND LUMINESCENCE (9)
Luminescence: Different types of luminescence, basic definitions, Light emission in solids, Inter-band luminescence, Direct and indirect gap materials. Photoluminescence: General Principles of photoluminescence, Excitation and relaxation, OLED, Quantum-dot. Electro-luminescence: General Principles of electroluminescence, light emitting diode, diode laser.

UNIT –5: DISPLAY DEVICES (9)
LCD, three-dimensional display: Holographic display, light-field displays: Head-mounted display, MOEMS (Micro-Opto-Electro-Mechanical Systems) and MEMS displays.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the principles of crystal growth and techniques for thin film fabrication	PO1, PO2,PO3,PO4,PO5
CO2	Summarize fundamental concepts of semiconductors and their classification	PO1, PO2,PO3,PO4,PO5
CO3	Illustrate the operating principles of various semiconductor devices	PO1, PO2,PO3,PO4,PO5
CO4	Analyze different luminescent phenomena and the functioning of devices based on these mechanisms	PO1, PO2,PO3,PO4
CO5	Explain the construction and working principles of various types of display devices	PO1, PO2,PO3,PO4

TEXT BOOKS:

1. Principles of Electronic Materials and Devices-S.O. Kasap, McGraw-Hill
2. Education (India) Pvt. Ltd., 4th edition, 2021.
3. Semiconductor physics & devices: basic principles, 4th Edition, McGraw-Hill,
    a. 2012.

REFERENCE BOOKS:

1. Solid State Electronic Devices-B.G.Streetman and S.Banerjee, PHILearning, 6th
2. edition.
3. An Introduction to Electronic Materials for Engineers-WeiGao,
4. ZhengweiLi, NigelSammes, World Scientific Publishing Co. Pvt. Ltd.
5. 2nd Edition, 2011.

NPTELcourse links:

1. **https://nptel.ac.in/courses/113/106/113106062/**
2. **https://onlinecourses.nptel.ac.in/noc20_ph24/preview**

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. Tech –VI Semester

23OSH361D	CHEMISTRY OF POLYMERS AND APPLICATIONS	L T P C
	OPEN ELECTIVE-II(COMMON TO ALL)	3 - - 3

PRE-REQUISITES:
COURSE EDUCATIONAL OBJECTIVES:
1. To understand the basic principles of polymers
2. To understand natural polymers and their applications.
3. To impart knowledge to the students about synthetic polymers, their preparation and importance.
4. To enumerate the applications of hydrogel polymers
5. To enumerate applications of conducting and degradable polymers in engineering

UNIT – 1: POLYMERS-BASICS AND CHARACTERIZATION: (09)
Basic concepts: monomers, repeating units, degree of polymerization, linear, branched and network polymers, classification of polymers, Polymerization: addition, condensation, copolymerization and coordination polymerization. Average molecular weight concepts: number, weight and viscosity average molecular weights, polydispersity and molecular weight distribution. Measurement of molecular weight: End group, viscosity, light scattering, osmotic and ultracentrifugation methods, analysis and testing of polymers.

UNIT – II: NATURAL POLYMERS & MODIFIED CELLULOSIC (09)
Natural Polymers: Chemical & Physical structure, properties, source, important chemical modifications, applications of polymers such as cellulose, lignin, starch, rosin, shellac, latexes, vegetable oils and gums, proteins.
Modified cellulosic: Cellulose esters and ethers such as Ethyl cellulose, CMC, HPMC, cellulose acetals, Liquid crystalline polymers; speciality plastics- PES, PAES, PEEK, PEA.

UNIT – III: SYNTHETIC POLYMERS (09)

Addition and condensation polymerization processes– Bulk, Solution, Suspension and Emulsion polymerization. Preparation and significance, classification of polymers based on physical properties. Thermoplastics, Thermosetting plastics, Fibers and elastomers, General Applications. Preparation of Polymers based on different types of monomers, Olefin polymers (PE, PVC), Butadiene polymers (BUNA-S, BUNA-N), nylons, Urea-formaldehyde, phenol – formaldehyde, Melamine Epoxy and Ion exchange resins.

UNIT-IV: HYDROGELS OF POLYMER NETWORKS (09)
Definitions of Hydrogel, polymer networks, Types of polymer networks, Methods involved in hydrogel preparation, Classification, Properties of hydrogels, Applications of hydrogels in drug delivery.

UNIT – V: CONDUCTING AND DEGRADABLE POLYMERS: (09)
Conducting polymers: Introduction, Classification, Mechanism of conduction in Poly Acetylene, Poly Aniline, Poly Thiophene, Doping, Applications.
Degradable polymers: Introduction, Classifications, Examples, Mechanism of degradation, poly lactic acid, Nylon-6, Polyesters, applications.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Classify the polymers, explain polymerization mechanism, differentiate addition, condensation polymerizations, Describe measurement of molecular weight of polymer	PO1, PO2, PO2, PO4, PO5
CO2	Describe the physical and chemical properties of natural polymers and modified cellulosic.	PO1, PO2, PO2, PO4, PO6
CO3	Differentiate Bulk, solution, Suspension and emulsion polymerization, describe fibers and elastomers, Identify the thermosetting and thermos polymers.	PO1, PO2, PO2, PO4, PO5,PO12
CO4	Identify types of polymer networks, describe methods involve in hydrogel preparation, Explain applications of hydrogels in drug delivery.	PO1, PO2, PO2, PO4, PO5
CO5	Explain classification and mechanism of conducting and degradable polymers.	PO1, PO2, PO2, PO4, PO5

TEXT BOOKS:

1. A Text book of Polymer science, Billmayer
2. Polymer Chemistry – G.S. Mishra
3. Polymer Chemistry – Gowarikar

REFERENCE BOOKS:

1. Organic polymer Chemistry, K.J. Saunders, Chapman and Hall
2. Advanced Organic Chemistry, B. Miller, Prentice Hall
3. Polymer Science and Technology by Premamoy Ghosh, 3rd edition, McGraw-Hill, 2010.

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. Tech –VI Semester

23OSH361E	**ACADEMIC WRITINGAND PUBLIC SPEAKING**	**L T P C**
	OPEN ELECTIVE-II(COMMON TO ALL)	**3 0 0 3**

PRE-REQUISITES:
COURSE EDUCATIONAL OBJECTIVES:
1. To encourage all round development of the students by focusing on writing skills
2. To make the students aware of non-verbal skills
3. To develop analytical skills
4. To deliver effective public speeches

UNIT-1: Introduction to Academic Writing Lecture (9)
Introduction to Academic Writing –Essential Features of Academic Writing – Courtesy–Clarity– Conciseness–Correctness–Coherence–Completeness–Types–Descriptive, Analytical, Persuasive, Critical writing

UNIT-2: Academic Journal Article Lecture (9)
Artofcondensation-summarizingandparaphrasing-AbstractWriting,writingProject Proposal, writing application for internship, Technical/Research/Journal Paper Writing – Conference Paper writing - Editing, Proof Reading – Plagiarism

UNIT-3: ESSAY &WRITING REVIEWS LECTURE (9)
Compare and Contrast –Argumentative Essay– Exploratory Essay–Features and Analysis of Sample Essays – Writing Book Report, Summarizing, Book/film Review- So P.

UNIT-4: PUBLIC SPEAKING LECTURE (9)
Introduction, Nature, characteristics, significance of Public Speaking – Presentation –4Ps of Presentation–StageDynamics–AnsweringStrategies–AnalysisofImpactfulSpeeches-Speechesfor Academic events

UNIT-5: Public Speaking and Non-Verbal Delivery Lecture (9)
BodyLanguage–FacialExpressions–Kinesics–Oculesics–Proxemics–Haptics–Chronomics-Paralanguage-Signs

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		**Pos**
	Understand various elements of Academic Writing	L1,L2
	Identify sources and avoid plagiarism	L1,L2
	Demonstrate the knowledge in writing a Research chapter	L3
	Analyse different types of essays	L4
	Assess the speeches of other sand know the positive strengths of speakers	L5

	Build confidence in giving an impactful presentation to the audience	L3

TEXT BOOKS:

1. Critical Thinking ,Academic Writing and Presentation Skills :MG University Edition Paperback– 1 January 2010Pearson Education; First edition (1 January 2010)
2. Pease,Allan&Barbara.TheDefinitiveBookofBodyLanguageRHUSPublishers,2016

REFERENCE BOOKS:

1. AliceSavage,MasoudShafieiEffectiveAcademicWriting,2Ed.,2014.
2. ShaliniVerma,BodyLanguage,SChandPublications 2011.
3. SanjayKumarandPushpalata, CommunicationSkills2E 2015, Oxford.
4. SharonGerson,StevenGerson, TechnicalCommunicationProcessandProduct,Pearson,New Delhi, 2014
5. Elbow,Peter.WritingwithPower.OUPUSA,1998

Online Services:

1. https://youtu.be/NNhTIT81nH8
2. phttps://www.youtube.com/watch?v=478ccrWKY-A
3. https://www.youtube.com/watch?v=nzGo5ZC1gMw
4. https://www.youtube.com/watch?v=Qve0ZBmJMh4
5. https://courses.lumenlearning.com/publicspeakingprinciples/chapter/chapter-12-nonverbal-aspects-of-delivery/
6. https://onlinecourses.nptel.ac.in/noc21_hs76/preview
7. https://archive.nptel.ac.in/courses/109/107/109107172/#
8. https://archive.nptel.ac.in/courses/109/104/109104107/

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. TECH.-VI SEMESTER

23CSD363L DEEP LEARNING AND DATA VISUALIZATION LAB (USING POWER BI/TABLEAU)	**L**	**T**	**P**	**C**
	0	**-**	**3**	**1.5**

PRE-REQUISITES:NIL

COURSE EDUCATIONAL OBJECTIVES:
1. Discuss concepts and principles of data visualization particularly related to decision making.
2. Investigate technologies and practices for visualizing data as part of a data management and analytics system.
3. Apply user interface design principles and practices to develop interactive data visualizations.
4. Design effective dashboard for decision making at various levels.

PART-1

LIST OF EXPERIMENTS:
1. Implementing Matrix Operations Using Numpy
   a. Basic Operations (Add, Sub, Mul, Dot, Transpose, Inverse,)
   b. Eigen Values And Eigen Vectors
   c. Single Value Decomposition
2. Illustrate Bionomial, Piosson Using Scipy.Stats Library
3. Implement A Simple Feedforward Neural Network Using A Library Like Tensorflow Or Keras
4. Implement Various Optimizers
   a. Implementing Batch Gradient Descent Algorithm
   b. Implementing Stochastic Batch Gradient Descent Algorithm(Calculate Gradient And New Weight For Each Sample)
5. CNN Implementation On MNIST Dataset
6. Apply RNN For Autocompletion
7. Apply RNN For Language Translation
8. Apply LSTM For Autocompletion

PART 2

LIST OF EXPERIMENTS:
1. Connecting to the data
2. Formatting and insertion of data
3. Creating worksheets, navigating the sheets, applying filters, aggregating the data
4. Organize the data into dashboards
5. Create story
6. Develop interactive plots in Python
7. Create Time series Data Visualization in Python
8. Visualization of Semi-Structured data
9. Create Sales Growth Dashboard – for the tracking of sales teams progress
10. Design Social media Dashboard – find how well your sponsored social

11. activating are performing, monitor your PPC campaigns.
12. Develop Healthcare Data Dashboard – Allows hospital administrators to manage and identify patient hazards from a single screen.

TEXT BOOKS:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Natural Language Processing, A paninian perspective, AksharBharathi, Vineet Chaitanya, Prentice – Hall of India.
3. Andy Kirk, Data Visualization A Handbook for Data Driven Design, Sage Publications, 2016
4. Philipp K. Janert, Gnuplot in Action, Understanding Data with Graphs, Manning Publications, 2010

REFERENCE BOOKS:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Natural Language Processing, A paninian perspective, Akshar Bharathi, Vineet Chaitanya, Prentice – Hall of India.
3. Andy Kirk, Data Visualization A Handbook for Data Driven Design, Sage Publications, 2016
4. Philipp K. Janert, Gnuplot in Action, Understanding Data with Graphs, Manning Publications, 2010
5. Ian Goodfellow, Yoshua Bengio, Aaron Courville Deep Learning (Adaptive Computation and Machine Learning series)MIT Press, 2016.
6. Amit Kumar Das, Saptarsi Goswami, Pabitra Mitra, Amlan Chakrabarti Deep Learning Pearson Paperback, First Edition, 2021.
7. Josh Patterson, Adam Gibson Deep Learning: A Practitioner's Approach O'Reilly Media, First Edition, 2017.
8. Nikhil Buduma Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms O'Reilly, Shroff Publishers, 2019.

REFERENCE WEBSITE:

1. Data Visualization with Tableau | Coursera
2. Natural Language Processing in TensorFlow | Coursera

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Install and configure Keras along with required Python packages for deep learning.	**PO1**
CO2	Develop and train simple models using Keras to perform arithmetic operations and basic tasks.	**PO2**
CO3	Implement advanced deep learning models including LSTM, GRU, and bidirectional networks for real-world datasets.	**PO3**
CO4	Apply Convolutional Neural Networks (CNNs) using 1D convolutions on text and time-series data.	**PO5**
CO5	Connect to structured and semi-structured data sources and perform preprocessing and formatting.	**PO8**
CO6	Apply filtering, aggregation, and worksheet manipulation for data exploration and cleaning.	**PO9**
CO7	Create time-series and interactive data visualizations using Python and dashboarding tools.	**PO10**
CO8	Design and develop domain-specific dashboards (e.g., sales, healthcare, social media) to support data-driven decision-making.And Life Long Learning	**PO12**

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. TECH.-VI SEMESTER

23CSD364L	PREDICTIVE ANALYTICS LAB	L T P C
		0 - 3 1.5

PRE-REQUISITES:NIL

COURSE EDUCATIONAL OBJECTIVES:
To develop the fundamental understanding and application of Mathematics and Statistics in business organizations

LIST OF EXPERIMENTS:
1. Introduction to SPSS, Sorting File, Split File, Compute File, Recode File and Select Cases
2. Chi-Square Test (Parametric and Non- Parametric)
3. Exploratory Factor Analysis
4. Cluster Analysis
5. Logistic Regression
6. Discriminant Analysis
7. Confirmatory Factor Analysis
8. Conjoint Analysis
9. Time Series
10. MANOVA
11. Decision Tree Analysis

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate proficiency in using SPSS for basic data preparation tasks such as sorting, splitting, computing, recoding, and selecting cases.	PO1
CO2	Apply Chi-Square tests (both parametric and non-parametric) to analyze categorical data and test hypotheses.	PO2
CO3	Perform Exploratory Factor Analysis to identify underlying structures in datasets.	PO3
CO4	Implement Cluster Analysis techniques to segment data and uncover patterns.	PO4
CO5	Apply Logistic Regression for predictive modeling and classification tasks.	PO5
CO6	Use Discriminant Analysis to distinguish between groups and predict group membership.	PO6
CO7	Conduct Confirmatory Factor Analysis to validate factor structures and test measurement models.	PO7
CO8	Apply Conjoint Analysis to understand consumer preferences and support decision-making.	PO8
CO9	Continue updating their skill related to object oriented concepts and implementing programs in future.	PO12

TEXT BOOKS:

1. Andy Field, Discovering Statistics Using IBM SPSS Statistics, SAGE Publications.
2. George A. Morgan et al., IBM SPSS for Introductory Statistics: Use and Interpretation, Routledge.
3. Joseph F. Hair et al., Multivariate Data Analysis, Pearson.
4. Richard A. Johnson, Dean W. Wichern, Applied Multivariate Statistical Analysis, Pearson.

REFERENCE BOOKS:

1. Efraim Turban et al., Business Intelligence: A Managerial Approach, Pearson.
2. James R. Evans, Business Analytics: Methods, Models, and Decisions, Pearson.
3. Nitin R. Patel, D. P. Prajapati, SPSS for Data Analysis, McGraw-Hill.
4. R. A. Johnson, D. W. Wichern, Applied Multivariate Statistical Analysis, Pearson.
5. Joseph F. Hair et al., Multivariate Data Analysis, Pearson.

REFERENCE WEBSITE:

1. https://www.ibm.com/products/spss-statistics
2. https://statistics.laerd.com/
3. https://www.khanacademy.org/math/statistics-probability
4. https://www.coursera.org

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	-	-	-	-	-	-	-	-	-	-
CO8	-	-	-	-	-	-	-	-	3	-	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B.Tech. - VI Semester

SOFT SKILLS (SEC)
DATA SCIENCE

L	T	P	C
-	-	3	1.5

PRE-REQUISITES: Nil.

COURSE EDUCATIONAL OBJECTIVES:

1. To encourage all round development of the students by focusing on soft skills
2. To make the students aware of critical thinking and problem-solving skills
3. To develop leadership skills and organizational skills through group activities
4. To function effectively with heterogeneous teams

UNIT – I SOFT SKILLS & COMMUNICATION SKILLS

Introduction, meaning, significance of soft skills – definition, significance, types of communication skills- Intrapersonal & Inter-personal skills - Verbal and Non-verbal Communication Activities:

Intrapersonal Skills- Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity (The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources)

Interpersonal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- convincing- negotiating- agreeing and disagreeing with professional grace. Non-verbal communication – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation

UNIT – II CRITICAL THINKING

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking

Activities:

Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis

UNIT – III PROBLEM SOLVING & DECISION MAKING

Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Methods of decision making – Effective decision making in teams – Methods & Styles

Activities:

Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion

UNIT – IV EMOTIONAL INTELLIGENCE & STRESS MANAGEMENT

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips

Activities:Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations. Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

UNIT – V LEADERSHIP SKILLS

Team-Building – Decision-Making – Accountability – Planning – Public Speaking – Motivation – Risk Taking - Team Building - Time Management

Activities:

Forming group with a consensus among the participants- choosing a leader- encouraging the group members to express views on leadership- democratic attitude- sense of sacrifice – sense of adjustment – vision – accommodating nature- eliciting views on successes and failures of leadership using the past knowledge and experience of the participants, Public Speaking, Activities on Time Management, Motivation, Decision Making, Group discussion etc. **NOTE-:** The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill.

Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear or for good Leadership – Mahendar Singh Dhoni etc.

TEXT BOOKS:

1. Personality Development and Soft Skills (English, Paperback, MitraBarunK.)Publisher: Oxford University Press; Pap/Cdr edition (July 22, 2012)
2. Personality Development and Soft Skills: Preparing for Tomorrow, Dr ShikhaKapoorPublisher : I K International Publishing House; 0 edition (February 28, 2018)

REFERENCE BOOKS:

1. Soft skills: personality development for life success by Prashant Sharma, BPB publications 2018.
2. Soft Skills By Alex K. Published by S.Chand
3. Soft Skills: An Integrated Approach to Maximise Personality Gajendra Singh Chauhan, Sangeetha Sharma Published by Wiley.
4. Communication Skills and Soft Skills (Hardcover, A. Sharma) Publisher: Yking books
5. SOFT SKILLS for a BIG IMPACT (English, Paperback, RenuShorey) Publisher: Notion Press
6. Life Skills Paperback English Dr. Rajiv Kumar Jain, Dr.Usha Jain Publisher: Vayu Education of India

REFERENCE WEBSITE:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc

OURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Understand the importance of soft skills and demonstrate effective intrapersonal communication, including self-expression, clarity of thought, and personal articulation.	**PO1**
CO2	Demonstrate interpersonal communication skills through group discussions, debates, and collaborative tasks in a professional setting.	**PO2**
CO3	Exhibit verbal communication skills such as public speaking, oral presentations, extempore, and persuasive speaking with professional etiquette.	**PO3**
CO4	Identify and interpret non-verbal communication cues through mock interviews, presentations, and observational activities.	**PO5**
CO5	Apply critical thinking skills such as observation, analysis, curiosity, and creativity to evaluate and respond to real-world scenarios.	**PO8**
CO6	Solve problems and make decisions effectively by managing conflicts, exploring alternatives, and selecting appropriate solutions through group discussions and case studies.	**PO9**
CO7	Develop emotional intelligence by practicing self-awareness, empathy, emotional regulation, and stress management techniques.	**PO10**
CO8	Demonstrate leadership abilities such as team-building, time management, accountability, and motivational speaking in individual and group activities.	**PO12**

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
III B. TECH.-VI SEMESTER

23ESC352L	TINKERING LAB	L T P C
		0 - 3 1.5

PRE-REQUISITES:NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Encourage Innovation and Creativity
2. Provide Hands-on Learning and Impart Skill Development
3. Foster Collaboration and Teamwork
4. Enable Interdisciplinary Learning, Prepare for Industry and Entrepreneurship
5. Import Problem-Solving mind-set

LIST OF EXPERIMENTS: (Any nine experiments shall be done)

1. Make your own parallel and series circuits using breadboard for any application of your choice.
2. Design and 3D print a Walking Robot
3. Design and 3D Print a Rocket.
4. Temperature & Humidity Monitoring System (DHT11 + LCD)
5. Water Level Detection and Alert System
6. Automatic Plant Watering System
7. Bluetooth-Based Door Lock System
8. Smart Dustbin Using Ultrasonic Sensor
9. Fire Detection and Alarm System
10. RFID-Based Attendance System
11. Voice-Controlled Devices via Google Assistant
12. Heart Rate Monitoring Using Pulse Sensor
13. Soil Moisture-Based Irrigation
14. Smart Helmet for Accident Detection
15. Milk Adulteration Detection System
16. Water Purification via Activated Carbon
17. Solar Dehydrator for Food Drying
18. Temperature-Controlled Chemical Reactor
19. Ethanol Mini-Plant Using Biomass
20. Smart Fluid Flow Control (Solenoid + pH Sensor)
21. Portable Water Quality Tester
22. AI Crop Disease Detection
23. AI-based Smart Irrigation
24. ECG Signal Acquisition and Plotting
25. AI-Powered Traffic Flow Prediction
26. Smart Grid Simulation with Load Monitoring
27. Smart Campus Indoor Navigator
28. Weather Station Prototype
29. Firefighting Robot with Sensor Guidance
30. Facial Recognition Dustbin
31. Barcode-Based Lab Inventory System
32. Growth Chamber for Plants
33. Biomedical Waste Alert System
34. Soil Classification with AI

35. Smart Railway Gate
36. Smart Bin Locator via GPS and Load Sensors
37. Algae-Based Water Purifier
38. Contactless Attendance via Face Recognition

Note: The students can also design and implement their own ideas, apart from the list of experiments mentioned above.

Note: A minimum of 8 to 10 experiments must be completed by the students.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Design electronic circuits for variety of applications using series and parallel connections	**PO1**
CO2	Analyze and solve real time problems using Arduino boards	**PO2**
CO3	Design and analyze a real time circuit using Tinkercad	**P03**
CO4	Simulate and interface actuators using Arduino boards	**PO4**
CO5	Able to use modern simulation tools for interfacing the hardware components.	**PO5**
CO6	Follow ethical principles in designing, simulating and implementing various circuits.	**PO8**
CO7	Do experiments effectively as an individual and as a member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understandings about the experiments.	**PO10**
CO9	Continue updating their skill related to semiconductors implementation for various application during their life time	**PO12**

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	-	-
CO.2	-	3	-	-	-	-	-	-	-	-	-	-
CO.3	-	-	3	-	-	-	-	-	-	-	-	-
CO.4	-	-	-	3	-	-	-	-	-	-	-	-
CO.5	-	-	-	-	3	-	-	-	-	-	-	-
CO.6	-	-	-	-	-	-	-	3	-	-	-	-
CO.7	-	-	-	-	-	-	-	-	3	-	-	-
CO.8	-	-	-	-	-	-	-	-	-	3	-	-
CO.9	-	-	-	-	-	-	-	-	-	-	-	3

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSD471T	BIG DATA ANALYTICS	L T P C
		3 - - 3

PRE-REQUISITES: DATA ENGINEERING

COURSE EDUCATIONAL OBJECTIVES:

1. Provide an overview of an exciting growing field of big data analytics.
2. Introduce the tools required to manage and analyze big data like Hadoop, NoSQL, MapReduce, HIVE, Cassandra, Spark.
3. Teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
4. Optimize business decisions and create competitive advantage with Big Data analytics

UNIT–1: INTRRODUCTION TO BIG DATA (9)

Introduction to Big Data platform- What is Big Data? Big Data Sources-Acquisition-Nuts and Bolts of Big data-Features of Big Data-Security - Compliance - auditing and protection- Evolution of Big Data- Best practices for Big Data Analytics-Big Data characteristics- Volume
- Veracity - Velocity - Variety- Structure of Big Data- Exploring the opportunities with Big Data.

UNIT–2: APACHE HADOOP (9)

Introduction to Hadoop- A brief history of Hadoop - Apache Hadoop and The Hadoop Ecosystem AND Hadoop Features - fault tolerance , with data replication, Distributed, parallel processing , High availability, Data locality - The Design of HDFS-HDFS concepts.

UNIT–3: INTRODUCTION TO HIVE AND PIG (9)

Introduction to Hive, data types and file formats, HiveQL data definition- Table creation- Internal table -External table, HiveQL data manipulation, Logical joins, Window functions- rank-dense-rank- row number- Table partitioning-static partitioning -dynamic partitioning - Bucketing.

Pig- Pig Latin-Statements-Expressions-Types- Pig Architecture-Data processing Operators- Loading and storing Data-Filtering Data-Grouping and Joining Data-Sorting Data-Combining and Splitting Data

UNIT–4: HBASE- ZOOKEEPER – SQOOP (9)

HBasics – Concepts – Example-HBase Versus RDBMS HBase, Hbase architecture, data model, operations—Introduction to Zookeeper-Zookeeper Services-Building applications with Zookeeper - Introduction to Sqoop-Database Imports-Working with Imported data-Importing large objects-performing exports.

UNIT–5: APACHE SPARK (9)

Apache spark- Advantages over Hadoop, lazy evaluation, In memory processing, DAG, Spark context, Spark Session, RDD, Transformations- Narrow and Wide, Actions, Data frames
,RDD to Data frames, Catalyst optimizer, Data Frame Transformations, Working with Dates and Timestamps, Working with Nulls in Data, Working with Complex Types, Working with JSON, Grouping, Window Functions, Joins, Data Sources, Broadcast Variables, Accumulators.

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the fundamentals of Big Data, its sources, characteristics, security aspects, and explore opportunities with Big Data analytics.	**PO1, PO2**
CO2	Explain the architecture, features, and functioning of the Hadoop Ecosystem and the concepts of HDFS.	**PO1, PO2,PO3, PO5**
CO3	Develop the ability to create, manipulate, and query large datasets using Hive and Pig for data processing and analysis.	**PO1,PO2,PO3 ,PO4,PO5**
CO4	Compare HBase with traditional databases, understand HBase architecture, operations, and integrate data using Zookeeper and Sqoop.	**PO1,PO2,PO3 ,PO4, PO5**
CO5	Apply Apache Spark features such as RDDs, DataFrames, transformations, and actions to efficiently process large-scale datasets.	**PO1,PO2,PO3, PO4, PO5**

TEXT BOOKS:

1. Big Data, Big Analytics: Emerging, Michael Minnelli, Michelle Chambers, and AmbigaDhiraj
2. SPARK: The Definitive Guide, Bill Chambers &MateiZaharia, O'Reilley, 2018Edition 3. Business Intelligence and Analytic Trends for Today's Businesses", Wiley,2013
3. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World Polyglot Persistence", Addison-Wesley Professional,2012
4. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley,2012

REFERENCE BOOKS:

1. "Hadoop Operations", O'Reilley, Eric Sammer,2012
2. "Programming Hive", O'Reilley, E. Capriolo, D. Wampler, and J. Rutherglen,2012
3. "HBase: The Definitive Guide", O'Reilley, Lars George,2011
4. "Cassandra: The Definitive Guide", O'Reilley, Eben Hewitt,2010
5. "Programming Pig", O'Reilley, Alan Gates,2011

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23HSM471A BUSINESS ETHICS AND CORPORATE GOVERNANCE

L	T	P	C
3	-	-	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To make the student understand the principles of business ethics
2. To enable them in knowing about the ethics in management
3. To facilitate the student' role in corporate culture
4. To impart knowledge about the legal Frame-work
5. To provide awareness about the corporate governance

UNIT-I: INTRODUCTION TO ETHICS (9)

Ethics Introduction – Meaning – Nature, Scope, significance, Loyalty, and ethical behavior. Value systems - Business Ethics - Types, Characteristics, Factors, Contradictions and Ethical Practices in Management Corporate Social Responsibility – Issues of Management – Crisis Management.

UNIT-II: ETHICS IN MANAGEMENT (9)

Ethics in production, finance, Human resource management and Marketing Management - The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures - Culture and Individual Ethics – professional ethics and technical ethics.

UNIT-III: CORPORATE CULTURE (9)

Introduction - Meaning, definition, Nature, and significance – Key elements of corporate culture, shared values, beliefs and norms, rituals, symbols and language - Types of corporate culture, hierarchical culture, market driven culture – Organization leadership and corporate culture, leadership styles and their impact on culture, transformational leadership and culture change.

UNIT- IV: LEGAL FRAME WORK (9)

Law and Ethics -Agencies enforcing Ethical Business Behavior - Legal Impact – Environmental Protection, Fair Trade Practices, legal Compliances, Safeguarding Health and wellbeing of Customers – Corporate law, Securities and financial regulations, corporate governance codes and principles.

UNIT -V: CORPORATE GOVERNANCE (9)

Introduction - Meaning – Corporate governance code, transparency & disclosure -Role of auditors, board of directors and shareholders. Global issues, accounting and regulatory frame work - Corporate scams - Committees in India and abroad, corporate social responsibility. BoDs composition, Cadbury Committee Various committees - Reports - Benefits and Limitations.

Total Hours:45

COURSE OUTCOMES

At the end of the course, students will be able to		POS
CO1	Understand the Ethics and different types of ethics.	PO6,PO8,PO9,PO10, PO12
CO2	Understand business ethics and ethical practices in management	PO6,PO8,PO9,PO10,PO12
CO3	Understand the role of ethics in management	PO6,PO8,PO9,PO10,PO12
CO4	Apply the knowledge of professional ethics & technical ethics	PO6,PO8,PO9,PO10,PO12
CO5	Analyze corporate law, ethics, codes & principles, Evaluate corporate governance & corporate scams	PO6, PO8,P10,PO12

TEXT BOOKS:

1. Murthy CSV: Business Ethics and Corporate Governance, HPH July 2017
2. Bholananth Dutta, S.K. Podder – Corporation Governance, VBH. June 2010

REFERENCE BOOKS:

1. Dr. K. Nirmala, KarunakaraReaddy. Business Ethics and Corporate Governance, HPH
2. H.R.Machiraju: Corporate Governance, HPH, 2013
3. K. Venkataramana, Corporate Governance, SHBP.
4. N.M.Khandelwal. Indian Ethos and Values for Manager

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc21_mg46/
2. https://archive.nptel.ac.in/courses/110/105/110105138/
3. https://onlinecourses.nptel.ac.in/noc21_mg54/
4. https://onlinecourses.nptel.ac.in/noc22_mg54/
5. https://archive.nptel.ac.in/courses/109/106/109106117/

CO-PO MAPPING

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23HSM471B **E-BUSINESS** **L T P C**
3 - - 3

PRE - REQUSITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge on emerging concept on E-Business related aspects
2. To understand various electronic markets & business models.
3. To impart the information about electronic payment systems & banking.
4. To create awareness on security risks and challenges in E-commerce.
5. To make the students aware on different e-marketing channels & strategies

UNIT – I: ELECTRONIC BUSINESS (8)

Introduction – Nature, meaning, significance, functions and advantages - Definition of Electronic Business - Functions of **Electronic Commerce** (EC)-Advantages & Disadvantages of E-Commerce –E-Commerce and E-Business, Internet Services, Online Shopping- E-Commerce Opportunities for Industries.

UNIT – II: ELECTRONIC MARKETS AND BUSINESS MODELS: (9)

Introduction –E-Shops-E-Malls E-Groceries - Portals - Vertical Portals-Horizontal Portals - Advantages of Portals -Business Models**- Business to Business (B2B)-**Business to Customers (B2C) - Business to Government(B2G)-Auctions-B2B Portals in India

UNIT – III: ELECTRONIC PAYMENT SYSTEMS: (9)

Introduction to electronic payment systems (EPS) -Types of electronic payments - Credit/debit cards, e- wallets, UPI, and crypto currencies -Smart cards and digital wallets: Features and usage -**Electronic Fund Transfer (EFT):** Role in business transactions - Infrastructure requirements and regulatory aspects of e-payments

UNIT – IV: E-SECURITY: (10)

Security risks and challenges in electronic commerce - Cyber threats - Phishing, hacking, identity theft, and malware - Digital Signatures & Certificates - Security protocols over public networks (HTTP, SSL, TLS) - Firewalls in securing e-business platforms.

UNIT – V: E-MARKETING: (9)

Introduction – Online Marketing – Advantages of Online Marketing – Internet Advertisement – Advertisement Methods – Conducting Online Market Research– – E-marketing planning: Online branding, social media marketing, and email marketing - E-business strategies: Digital advertising, content marketing, and analytics
E-Customer Relationship Management (e CRM) E-supply chain management (e-SCM)

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, student will be able to		POs
CO1	Outline the concept of E-Business & its scope and functions.	PO9,PO11,PO12
CO2	Apply the E-market-Models in various business situations and organizations	PO9,PO11,PO12
CO3	Analyze the various E-payment systems & importance of net banking	PO8,PO9, PO11,PO12
CO4	Demonstrate the knowledge gained in E -security and its challenges	PO1,PO6,PO8, PO9, PO11,PO12
CO5	Evaluate market research strategies& E-advertisements.	PO8,PO9,PO10, PO11,PO12

TEXT BOOKS:

1. Arati Oturkar & Sunil Khilari. E-Business. Everest Publishing House, 2022
2. P.T.S Joseph. E-Commerce, Fourth Edition, Prentice Hall of India, 2011

REFERENCE BOOKS:

1. Debjani, Kamalesh K Bajaj. E-Commerce, Second Edition Tata McGraw-Hill�代s, 2005
2. Dave Chaffey.E-Commerce E-Management, Second Edition, Pearson, 2012.
3. Henry Chan. E-Commerce Fundamentals and Application, Raymond Leatham Wiley India 2007
4. S. Jaiswal. E-Commerce Galgotia Publication Pvt Ltd., 2003.

REFERENCE WEBSITE:

1. https://www.slideshare.net/fatimahAlkreem/e-businessppt-67935771
2. https://www.slideshare.net/VikramNani/e-commerce-business-models
3. https://www.slideshare.net/RiteshGoyal/electronic-payment-system
4. https://www.slideshare.net/WelingkarDLP/electronic-security

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	-	-	2	-	3	3
CO.2	-	-	-	-	-	-	-	-	2	-	3	3
CO.3	-	-	-	-	-	-	-	2	3	-	3	3
CO.4	2	-	-	-	-	2	-	2	3	-	3	3
CO.5	-	-	-	-	-	-	-	2	2	3	3	3
CO*	2	-	-	-	-	2	-	2	2.6	3	3	3

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES (Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23HSM471C	MANAGEMENT SCIENCE	L T P C
		3 - - 3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide fundamental knowledge on Management, Administration, Organization & its concepts;
2. To make the students understand the role of management in Production;
3. To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training & Development, Job Evaluation and Merit Rating concepts;
4. To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management;
5. To make the students aware of the contemporary issues in modern management.

UNIT- I INTRODUCTION TO MANAGEMENT (9)

Management - Concept and meaning - Nature-Functions - Management as a Science and Art and both - Schools of Management Thought - Taylor's Scientific Theory - Henry Fayol's principles - Elton Mayo's Human relations - Organizational Designs - Line organization - Line & Staff Organization - Functional Organization - Matrix Organization - Project Organization - Committee form of Organization - Social Responsibilities of Management.

UNIT - II OPERATIONS MANAGEMENT (9)

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study - Statistical Quality Control- Material Management - Objectives Inventory-Functions - Types, Inventory Techniques – EOQ - ABC Analysis - Marketing Management - Concept - Meaning – Nature - Functions of Marketing - Marketing Mix - Channels of Distribution - Advertisement and Sales Promotion - Marketing Strategies based on Product Life Cycle.

UNIT - III HUMAN RESOURCES MANAGEMENT (HRM) (9)

HRM - Definition and Meaning – Nature - Managerial and Operative Functions - Job Analysis - Human Resource Planning (HRP) - Employee Recruitment - Sources of Recruitment - Employee Selection - Process - Employee Training and Development - Methods - Performance Appraisal Concept - Methods of Performance Appraisal – Placement - Employee Induction - Wage and Salary Administration.

UNIT - IV STRATEGIC & PROJECT MANAGEMENT (9)

Definition & Meaning - Setting of Vision - Mission - Goals - Corporate Planning Process - Environmental Scanning - Steps in Strategy Formulation and Implementation - SWOT Analysis - Project Management - 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 - V CONTEMPORARY ISSUES IN MANAGEMENT (9)

Customer Relations Management (CRM) - Total Quality Management (TQM) - Six Sigma Concept - Supply Chain Management (SCM) - Enterprise Resource Planning (ERP) - Performance Management – Employee Engagement and Retention - Business Process Re-engineering and Bench Marking - Knowledge Management – Change Management – Sustainability and Corporate Social Responsibility.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Remember the concepts & principles of management and designs of organization in a practical world	PO6, PO9, PO10,PO11,PO12
CO2	Understand the knowledge of Work-study principles & Quality Control techniques in industry	PO2,PO9,PO10, PO11,PO12
CO3	Apply the process of Recruitment & Selection in organization.	PO9,PO10, PO11,PO12
CO4	Analyze the concepts of HRM & different training methods.	PO2,PO3,PO4,PO5, PO9, PO10, PO11,PO12
CO5	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT	PO2,PO3,PO4,PO5, PO6,PO7,PO8,PO9, PO10, PO11,PO12

TEXT BOOKS:

1. Frederick S. Hillier, Mark S. Hillier. Introduction to Management Science, October 26, 2023.
2. A.R Aryasri, Management Science, TMH, 2019

REFERENCE BOOKS:

1. Stoner, Freeman, Gilbert.Management, Pearson Education, New Delhi, 2019.
2. Introduction to Management Science, 12e, Bernard W. Taylor, Pearson Education, New Delhi, 2016
3. Koontz & Weihrich, Essentials of Management, 6/e, TMH, 2005.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Samuel C.Certo, Modern Management, 9/e, PHI, 2005
6. R.K. Rajput, "A Textbook of Manufacturing Technology: Manufacturing Processes", 2/e, Laxmi Publications (P) Ltd., New Delhi, 2017.

REFERENCE WEBSITE:

1. https://www.slideshare.net/slideshow/introduction-to-management-and-organization231308043/23130804
2. https://nptel.ac.in/courses/112107238
3. https://archive.nptel.ac.in/courses/110/104/110104068/
4. https://archive.nptel.ac.in/courses/110/105/110105069/
5. https://onlinecourses.nptel.ac.in/noc24_mg112

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	-	-	3	2	2	3
CO2	-	2	-	-	-	-	-	-	2	2	2	3
CO3	-	-	-	-	-	-	-	-	3	2	2	3
CO4	-	2	2	2	2	-	-	-	2	2	2	3
CO5	-	2	2	2	2	2	2	3	2	2	2	3
CO*	**-**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**2.6**	**2**	**2**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSD472A	**NOSQL DATABASES (PROFESSIONAL ELECTIVE IV)**	**L T P C** **3 - - 3**

PRE-REQUISITES: DATABASE MAANGEMENT SYSTEM

COURSE EDUCATIONAL OBJECTIVES:
1. To learn the distinction between optimal reasoning Vs. human like reasoning.
2. To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
3. To learn different knowledge representation techniques.
4. To understand the applications of AI, namely game playing, theorem proving, and machine learning.

UNIT–1:INTRODUCTION TO NOSQL (9)
Introduction to NoSQL: Definition And Introduction, Sorted Ordered Column-Oriented Stores, Key/Value Stores, Document Databases, Graph Databases, Examining Two Simple Examples, Location Preferences Store, Car Make And Model Database, Working With Language Bindings.

UNIT–2: INTERACTING WITH NOSQL (9)
If NoSql Then What, Language Bindings For NoSQL Data Stores, Performing Crud Operations, Creating Records, Accessing Data, Updating And Deleting Data

UNIT–3: NOSQL STORAGE ARCHITECTURE (9)
Working With Column-Oriented Databases, Hbase Distributed Storage Architecture, Document Store Internals, Understanding Key/Value Stores In Memcached And Redis, Eventually Consistent Non- Relational Databases.

UNIT–4: NOSQL STORES (9)
Similarities Between SqlAndMongodb Query Features, Accessing Data From Column-Oriented Databases Like Hbase, Querying Redis Data Stores, Changing Document Databases, Schema Evolution In Column-Oriented Databases, Hbase Data Import And Export, Data Evolution In Key/Value Stores.

UNIT–5: INDEXING AND ORDERING DATA SETS (9)
Indexing and Ordering Data Sets: Essential Concepts Behind A Database Index, Indexing And Ordering In Mongodb, Creating and Using Indexes In Mongodb, Indexing And Ordering In Couchdb, Indexing In Apache Cassandra.

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the fundamentals, types, and use cases of various NoSQL databases including key/value stores, document databases, column-oriented, and graph databases.	PO1, PO2
CO2	Demonstrate the ability to interact with NoSQL databases using language bindings and perform CRUD operations.	PO1, PO2, PO3, PO5
CO3	Explain the internal storage architecture of popular NoSQL databases like HBase, Redis, and Document stores.	PO1, PO2, PO4, PO5
CO4	Analyze querying techniques, schema evolution, and data management strategies across different NoSQL databases like HBase, MongoDB, and Redis.	PO1, PO2, PO3, PO4, PO5
CO5	Apply indexing and ordering techniques in NoSQL databases like MongoDB, CouchDB, and Apache Cassandra to optimize data retrieval.	PO1, PO3, PO4, PO5

TEXT BOOKS:

1. Shashank Tiwari, Professional NoSQL, Wrox Press, Wiley, 2011, ISBN: 978-0- 470-94224-6
2. PramodSadalage and Martin Fowler, NoSQL Distilled, Addison-Wesley Professional, 2012.

REFERENCE BOOKS:

1. Dan McCreary and Ann Kelly, Making Sense of NoSQL, Manning Publications, 2013.
2. Gaurav Vaish, Getting Started with NoSQL, Packt Publishin

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	2	3	-	3	-	-	-	-	-	-	-
CO.3	3	3	-	2	2	-	-	-	-	-	-	-
CO.4	3	3	3	3	3	-	-	-	-	-	-	-
CO.5	3	-	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.6**	**2.8**	-	-	-	-	-	-	-

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSE363B	**DEVOPS**	**L T P C**
	(PROFESSIONAL ELECTIVE IV)	**3 - - 3**

PRE-REQUISITES: Fundamentals of software development and maintenance

COURSE EDUCATIONAL OBJECTIVES:
1. Understand collaboration and productivity by automating infrastructure and workflows
2. Familiarize with continuous measuring applications performance To apply the concepts of centroids/center of gravity of various sections.

UNIT –1 **(8)**
Dev Ops: An Overview, Dev Ops: Origins, Dev Ops: Roots, Dev Ops: Practices Dev Ops: Culture. Adopting Dev Ops: Developing the Playbook. Developing a Business Case for a Dev Ops: Developing the Business Case.

UNIT –2 **(9)**
Completing the Business Model Canvas, Customer Segments, Value Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, Cost Structures. Dev Ops Plays for Optimizing the delivery Pipeline: Dev Ops as an optimization Exercise, Core Themes, The Dev Ops Plays, Specializing Core Plays.

UNIT –3 **(8)**
Dev Ops Plays for Driving Innovation: Optimize to Innovate, The Uber Syndrome, Innovation and the Role of Technology, Core Themes, play: Build a Dev Ops Platform, play: Deliver Micro services Architectures, play: DevOps an API Economy, play: Organizing for Innovation.

UNIT –4 **(10)**
Scaling Dev Ops for the Enterprise: Core Themes, play: Dev Ops Center of Competency, play: Developing Culture of Innovation at Scale, play: Developing a Culture of continuous Improvement, play: Team Models for Dev Ops, play: Standardization of Tools and Process, play: Security Considerations for Dev Ops, Play: Dev Ops and Outsourcing..

UNIT –5 **(10)**
Leading Dev Ops Adoption in the Enterprise: Play: Dev Ops as a transformation Exercise, play: Developing a Culture of Collaboration and Trust, play: Dev Ops Thinking for the Line of Business, play: starting with Pilot Projects, Play: Rearing Unicorns on an Aircrafts Carrier. Appendix Case Study: Example Dev Ops Adoption Roadmap Organization Background, Roadmap Structure, Adoption Roadmap

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrated and applied the knowledge of the various methods to determine the resultant forces.	**PO1, PO2, P03, PO4**
CO2	Analyze the equilibrium acting on a particle, bodies subjected to friction, simple frames and apply principle of virtual work to find reactions.	**PO1, PO2, P03, PO4**
CO3	Find the location of centroid, center of gravity and moment of inertia for the given appropriate sections.	**PO1, PO2, P03, PO4**
CO4	Analyze the kinematics of a body undergoing rectilinear, curvilinear motion.	**PO1, PO2, P03, PO4**
CO5	Apply the dynamic equilibrium principles and work energy equations to solve appropriate problems.	**PO1, PO2, P03, PO4**

TEXT BOOKS:

1. Sanjeev Sharma, The Dev Ops Adoption Playbook, Published by John Wiley & Sons, Inc.2017

REFERENCE BOOKS:

1. Sanjeev Sharma & Bernie Coyne, Dev Ops for Dummies, Published by John Wiley & Sons, Inc.
2. Michael Huttermann, Dev Ops for Developers, Apress publishers,2012.

REFERENCE WEBSITE:

1. Learning Dev Ops with Terra form Infrastructure Automation Course | Udemy

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSE471B	**BLOCK CHAIN TECHNOLOGY (PROFESSIONAL ELECTIVE IV)**	**L T P C** **3 - - 3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Understand how block chain systems (mainly Bit coin and Ethereum) work and to securely interact with them.
2. Design, build, and deploy smart contracts and distributed applications.
3. Integrate ideas from block chain technology into their own projects

UNIT - I INTRODUCTION (8)

Introduction, Scenarios, Challenges Articulated, Block chain, Block chain Characteristics, Opportunities Using Block chain, History of Block chain. Evolution of Block chain: Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Block chain Evolution, Consortia, Forks, Public Block chain Environments, Type of Players in Block chain Ecosystem, Players in Market.

UNIT - II BLOCK CHAIN CONCEPTS (9)

Block chain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on block chain, data storage on block chain, wallets, coding on block chain: smart contracts, peer-to-peer network, types of block chain nodes, risk associated with bloc chain solutions, life cycle of block chain transaction.

UNIT - III ARCHITECTING BLOCK CHAIN SOLUTIONS (9)

Architecting Block chain solutions: Introduction, Obstacles for Use of Block chain, Block chain Relevance Evaluation Framework, Block chain Solutions Reference Architecture, Types of Block chain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Block chain Solutions, Architecture Considerations, Architecture with Block chain Platforms, Approach for Designing Block chain Applications.

UNIT - IV ETHEREUM BLOCK CHAIN IMPLEMENTATION (8)

Ethereum Block chain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, My Ether Wallet, Ethereum Networks/Environments, Infura, Ether scan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, Open Zeppel in Contracts .

UNIT - V HYPER LEDGER BLOCK CHAIN IMPLEMENTATION (8)

Hyper ledger Implementation: Introduction, Use Case – Car Ownership Tracking, Hyper ledger Fabric, Hyper ledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chain code Functions Using Client Application.

Advanced Concepts in Block chain: Introduction, Inter Planetary File System (IPFS), Zero Knowledge Proofs, Oracles, Self-Sovereign Identity, Block chain with IoT and AI/ML Quantum Computing and Block chain, Initial Coin Offering, Block chain Cloud Offerings, Block chain and its Future Potential.

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding.	**PO1, PO2**
CO2	Identify the risks involved in building Block chain applications.	**PO1, PO2,PO3, PO5**
CO3	Review of legal implications using smart contracts.	**PO1,PO2,PO3,PO4,PO5**
CO4	Choose the present landscape of Blockchain implementations and Understand Crypto currency markets	**PO1,PO2,PO3,PO4, PO5**
CO5	Examine how to profit from trading crypto currencies.	**PO1,PO2,PO3,PO4, PO5**

TEXT BOOKS:

1. Ambadas, Arshad Sarfarz Ariff, Sham "Block chain for Enterprise Application Developers", Wiley, 2020
2. Andreas M. Antonopoulos, "Mastering Bitcoin: Programming the Open Blockchain", O'Reilly, 2017

REFERENCE BOOKS:

1. Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill.
2. Blockchain: Blueprint for a New Economy, Melanie Swan, O'Reilly

ONLINE LEARNING RESOURCES:

https://github.com/blockchainedindia/resources

CO-PO MAPPING

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSE471C SOFTWARE ARCHITETCURE AND DESIGN PATTERNS (PROFESSIONAL ELECTIVE IV)

L	T	P	C
3	-	-	3

PRE-REQUISITES: SOFTWARE ENGINEERING

COURSE EDUCATIONAL OBJECTIVES:

1. To under stand the concept of patterns and the Catalog.
2. To discuss the Presentation tier design patterns and their affect on: sessions, client access, validation and consistency.
3. To understand the variety of implemented bad practices related to the Business and Integration tiers.

UNIT-I **(9)**

Envisioning Architecture: The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views. Creating an Architecture: Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT- II **(9)**

Analyzing Architectures: Architecture Evaluation, Architecture design decision making, ATAM, CBAM. Moving from one system to many: Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT- III **(9)**

Patterns: Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage.Creational and Structural patterns: Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight.

UNIT- IV **(9)**

Behavioural patterns: Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy. template method, visitor.

UNIT- V **(9)**

Case Studies: A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development.

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	To highlight the evolution of patterns.	**PO1, PO2**
CO2	To learn how to add functionality to designs while minimizing complexity	**PO1, PO2,PO3, PO5**
CO3	To learn what design patterns really are, and are not	**PO1,PO2,PO3,PO4 ,PO5**
CO4	To know about specific design patterns.	**PO1,PO2,PO3,PO4, PO5**
CO5	To learn how to use design patterns to keep code quality high without over design	**PO1,PO2,PO3,PO4 , PO5**

TEXT BOOKS:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education.

REFERENCES:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001
3. Software Design, David Budgen, second edition, Pearson education, 2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.
8. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons.

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	2	3	-	3	-	-	-	-	-	-	-
CO.3	3	3	-	2	2	-	-	-	-	-	-	-
CO.4	3	3	3	3	3	-	-	-	-	-	-	-
CO.5	3	-	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.6**	**2.8**	-	-	-	-	-	-	-

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSE472A	**AGILE METHODOLOGIES (PROFESSIONAL ELECTIVE V)**	**L T P C** **3 - - 3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide students with a theoretical as well as practical under standing of agile software development practices and how small teams can apply them to create high-quality software.
2. To provide good under standing of software design and a set of software technologies and APIs.
3. To carry out detailed examination and demonstration of Agile development and testing techniques.
4. To discuss Agile software development

UNIT I AGILE METHODOLOGY (9)

Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile
Documentations – Agile Drivers, Capabilities and Values

UNIT II AGILE PROCESSES (9)

Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.

UNIT III AGILITY AND KNOWLEDGE MANAGEMENT (9)

Agile Information Systems – Agile Decision Making - Earl‗S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment, Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).

UNIT IV AGILITY AND REQUIREMENTS ENGINEERING (9)

Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.

UNIT V AGILITY AND QUALITY ASSURANCE (9)

Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven

Development – Agile Approach in Global Software Development.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Realize the importance of interacting with business stakeholders in determining the requirements for a software system	**PO1, PO2**
CO2	Perform iterative software development processes: how to plan them, how to execute them.	**PO1, PO2,PO3, PO5**
CO3	Point out the impact of social aspects on software development success.	**PO1,PO2,PO3,PO4 ,PO5**
CO4	Develop techniques and tools for improving team collaboration and software quality.	**PO1,PO2,PO3,PO4, PO5**
CO5	Perform Software process improvement as an ongoing task for development teams.	**PO1,PO2,PO3,PO4 , PO5**

TEXT BOOKS:

1. David J. Anderson and Eli Schragenheim, ―Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results‖, Prentice Hall, 2003.
2. Hazza and Dubinsky, ―Agile Software Engineering, Series: Undergraduate Topics in Computer Science‖, Springer, 2009.

REFERENCE BOOKS:

1. Craig Larman, ―Agile and Iterative Development: A Manager‗s Guide‖, Addison-Wesley, 2004.
2. Kevin C. Desouza, ―Agile Information Systems: Conceptualization, Construction, and Management‖, Butterworth-Heinemann, 2007.

ONLINE LEARNING RESOURCES:

https://www.nptelvideos.com/video.php?id=904

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	-	-	-	-	-	-	-	-	-	-
CO.2	3	2	3	-	3	-	-	-	-	-	-	-
CO.3	3	3	-	2	2	-	-	-	-	-	-	-
CO.4	3	3	3	3	3	-	-	-	-	-	-	-
CO.5	3	-	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2.6**	**2.8**	-	-	-	-	-	-	-

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSE472C	**HIGH PERFORMANCE COMPUTING (PROFESSIONAL ELECTIVE V)**	**L T P C** **3 - - 3**

PRE-REQUISITES: DIGITAL LOGIC DESIGN AND COMPUTER ORGANIZATION

COURSE EDUCATIONAL OBJECTIVES:
1. To improve the system performance
2. To learn various distributed and parallel computing architecture
3. To learn different computing technologies

UNIT - I **(9)**

Grid Computing: Data & Computational Grids, Grid Architectures And Its Relations To Various Distributed Technologies. Autonomic Computing, Examples Of The Grid Computing Efforts (Ibm).

UNIT - II **(9)**

Cluster Setup & Its Advantages, Performance Models & Simulations; Networking Protocols & I/O, Messaging Systems. Process Scheduling, Load Sharing And Balancing; Distributed Shared Memory, Parallel I/O.

UNIT - III **(9)**

Example Cluster System – Beowulf; Cluster Operating System: Compass And Nanos Pervasive Computing Concepts & Scenarios; Hardware & Software; Human – Machine Interface.

UNIT- IV **(9)**

Device Connectivity; Java for Pervasive Devices; Application Examples.

UNIT - V **(9)**

Classical Vs Quantum Logic Gates; One, Two & Three Qubit Quantum Gates; Fredkin &Toffoli Gates; Quantum Circuits; Quantum Algorithms.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		**POs**
CO1	Understanding the concepts in grid computing	**PO1, PO2, P03, PO4**
CO2	Ability to set up cluster and run parallel applications	**PO1, PO2, P03, PO4**
CO3	Ability to understand the cluster projects and cluster OS	**PO1, PO2, P03, PO4**

CO4	Understanding the concepts of pervasive computing & quantum computing	**PO1, PO2, P03, PO4**
CO5	Understanding the concepts in Classical and Quantum Logic gates	**PO1, PO2, P04, PO4**

TEXT BOOK:

1. "Selected Topics In Advanced Computing" Edited By Dr. P. Padmanabham And Dr. M.B. Srinivas, 2005 Pearson Education.

REFERENCE BOOKS:

1. J. Joseph & C. Fellenstien: 'Grid Computing ', Pearson Education
2. J. Burkhardt et.al: 'pervasive computing' Pearson Education
3. Marivesar:' Approaching quantum computing', Pearson Education.
4. Raj kumarBuyya:'High performance cluster computing', Pearson Education.
5. Neilsen& Chung L:' Quantum computing and Quantum Information', Cambridge University Press.
6. A networking approach to Grid Computing, Minoli, Wiley

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CAI353T	**NATURAL LANGUAGE PROCESSING (PROFESSIONAL ELECTIVE V)**	**L T P C**
		3 - - 3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Basics of NLP, Morphology, Tokenization, N-gram Models
2. POS Tagging, Parsing, Treebank's, Ambiguity Handling
3. Word Sense Disambiguation, Semantic Parsing, Sentiment Analysis
4. Machine Translation, Transformers, BERT/GPT, Ethical NLP
5. Speech Recognition, Feature Extraction, Discourse Analysis

UNIT I: INTRODUCTION TO NLP (9)

Introduction to NLP: Origins and Challenges, Language and Grammar in NLP, Regular Expressions and Finite- State Automata, Tokenization: Text Segmentation and Sentence Splitting, Morphological Parsing: Stemming and Lemmatization, Spelling Error Detection and Correction, Minimum Edit Distance and Applications, Statistical Language Models: Unigram, Bigram, and Trigram Models, Processing Indian Languages in NLP.

UNIT II: WORD-LEVEL AND SYNTACTIC ANALYSIS (9)

Introduction, Part-of-Speech (POS) Tagging: Rule-Based, Stochastic and Transformation-Based Approaches, Hidden Markov Models (HMM) and Maximum Entropy Models for POS Tagging, Context-Free Grammar (CFG) and Constituency Parsing, Treebanks and Normal Forms for Grammar, Top-Down and Bottom-Up Parsing Strategies, CYK Parsing Algorithm, Probabilistic Context-Free Grammars (PCFGs), Feature Structures and Unification.

UNIT III: TEXT CLASSIFICATION AND INFORMATION RETRIEVAL (9)

Naïve Bayes Classifier for Text Classification, Training and Optimization for Sentiment Analysis, Information Retrieval: Basic Concepts and Design Features, Information Retrieval Models: Classical, Non-Classical, and Alternative Models, Cluster Model, Fuzzy Model, and LSTM-Based Information, Retrieval, Word Sense Disambiguation (WSD) Methods: Supervised and Dictionary-Based Approaches.

UNIT IV: MACHINE TRANSLATION AND SEMANTIC PROCESSING (9)

Introduction to Machine Translation (MT), Language Divergence and Typology in MT Encoder-Decoder Model for Machine Translation, Translating in Low-Resource Scenarios, MT Evaluation Metrics and Techniques, Bias and Ethical Issues in NLP and Machine Translation, Semantic Analysis and First-Order Logic in NLP, Thematic Roles and Selectional Restrictions in Semantics, Word Senses and Relations Between Senses

UNIT V: SPEECH PROCESSING AND ADVANCED NLP MODELS (9)

Speech Fundamentals: Phonetics and Acoustic Phonetics, Digital Signal Processing in Speech Analysis, Feature Extraction in Speech: Short-Time Fourier Transform (STFT), Mel-Frequency Cepstral Coefficients (MFCC) and Perceptual Linear Prediction (PLP), Hidden Markov Models (HMMs) in Speech Recognition.

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to Cos
CO1	Understand morphological processing and the structure of words and documents.	PO1,PO2
CO2	Analyze syntactic structures using various parsing algorithms.	PO1, PO3
CO3	Apply semantic parsing techniques to interpret natural language text.	PO1, PO2, PO4
CO4	Understand predicate-argument structures and meaning representation systems.	PO1, PO2, PO3, PO4
CO5	Apply cross-lingual language models and speech recognition techniques in NLP applications	PO1, PO2, PO4, PO5

TEXT BOOKS:

1. Daniel Jurafsky & James H. Martin – Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition, Pearson Education, 2023.
2. Tanveer Siddiqui & U.S. Tiwary – Natural Language Processing and Information Retrieval, Oxford University Press.

REFERENCES BOOKS:

1. T.V. Geetha – Understanding Natural Language Processing – Machine Learning and Deep Learning Perspectives, Pearson, 2024.
2. Akshay Kulkarni & Adarsha Shivananda – Natural Language Processing Recipes - Unlocking Text Data with Machine Learning and Deep Learning using Python, Apress, 2019.

REFERENCE WEBSITES:

1. https://www.youtube.com/watch?v=M7SWr5xObkA
2. https://onlinecourses.nptel.ac.in/noc23_cs45/preview
3. https://archive.nptel.ac.in/courses/106/106/106106211/

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	2	-	2	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-
CO5	3	3	-	3	2	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**1.2**	**1.4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSM364B	**REINFORCEMENT LEARNING (PROFESSIONAL ELECTIVE V)**	**L T P C** **3 - - 3**

PRE-REQUISITES: MACHINE LEARNING

COURSE EDUCATIONAL OBJECTIVES:
1. To learn RL task formulation (action space, state space, environment definition)
2. To learn Tabular based solutions (dynamic programming, Monte Carlo, temporal-difference)
3. To learn Function approximation solutions (Deep Q-networks)
4. To learn Policy gradient from basic (REINFORCE) towards advanced topics (proximal policy optimization, deep deterministic policy gradient, etc.)
5. To learn Model-based reinforcement learning

UNIT-I: INTRODUCTION TO ML AND PROBABILITY (9)
Introduction: Course logistics and overview. Origin and history of Reinforcement Learning research. Its connections with other related fields and with different branches of machine learning.
Probability Primer: Brush up of Probability concepts - Axioms of probability, concepts of random variables, PMF, PDFs, CDFs, Expectation. Concepts of joint and multiple random variables, joint, conditional and marginal distributions. Correlation and independence.

UNIT-II: PREDICTION AND DYNAMIC PROGRAMMING (9)
Markov Decision Process: Introduction to RL terminology, Markov property, Markov chains, Markov reward process (MRP). Introduction to and proof of Bellman equations for MRPs along with proof of existence of solution to Bellman equations in MRP. Introduction to Markov decision process (MDP), state and action value functions, Bellman expectation equations, optimality of value functions and policies, Bellman optimality equations.
Prediction and Control by Dynamic Programming: Overview of dynamic programming for MDP, definition and formulation of planning in MDPs, principle of optimality, iterative policy evaluation, policy iteration, value iteration, Banach fixed point theorem, proof of contraction mapping property of Bellman expectation and optimality operators, proof of convergence of policy evaluation and value iteration algorithms, DP extensions.

UNIT-III: PREDICTION AND CONTROL (9)
Monte Carlo Methods for Model Free Prediction and Control: Overview of Monte Carlo methods for model free RL, First visit and every visit Monte Carlo, Monte Carlo control, On policy and off policy learning, Importance sampling.
TD Methods: Incremental Monte Carlo Methods for Model Free Prediction, Overview TD(0), TD(1) and TD(λ), k step estimators, unified view of DP, MC and TD evaluation methods, TD Control methods - SARSA, Q-Learning and their variants.

UNIT: IV: ALGORITHMS FOR FUNCTION CONTROL (9)
Function Approximation Methods: Getting started with the function approximation methods, Revisiting risk minimization, gradient descent from Machine Learning, Gradient MC and Semi-gradient TD(0) algorithms, Eligibility trace for function approximation, After states, Control with function approximation, Least squares, Experience replay in deep Q-Networks.

UNIT – V: (9)
Policy Gradients: Getting started with policy gradient methods, Log-derivative trick, Naive REINFORCE algorithm, bias and variance in Reinforcement Learning, Reducing variance in policy gradient estimates, baselines, advantage function, actor-critic methods.

Total Hours:45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Formulate Reinforcement Learning problems	**PO1, PO2, P03, PO4**
CO2	Apply various Tabular Solution Methods to Markov Reward Process Problems	**PO1, PO2, P03, PO4**
CO3	Apply various Iterative Solution methods to Markov Decision Process Problems	**PO1, PO2, P03, PO4**
CO4	Comprehend Function approximation methods	**PO1, PO2, P03, PO4**
CO5	Analyze applications and challenges of quantum computing in real-world domains	**PO1, PO2, P04, PO4**

TEXT BOOKS:
1. Sutton, Richard S., and Andrew G. Barto. Reinforcement learning: An introduction. MIT press, 2018.
2. Leon-Garcia, Alberto, Probability and random processes for electrical engineering, 4^{th} Ed., Pearson Educational Publisher, 2022.

REFERENCE BOOKS:
1. Murphy, Kevin P. Machine learning: a probabilistic perspective. MIT press, 2012.

ONLINE LEARNING RESOURCES:
2. A brief introduction to reinforcement learning (freecodecamp.org)
3. Reinforcement learning – Geeks for Geeks

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OCE471A	BUILDING MATERIALS AND SERVICES (OPEN ELECTIVE III)	L T P C
		3 - - 3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:
1. To understand the properties, classifications, and applications of building materials like stones, bricks, tiles, wood, aluminum, glass, paints, and plastics.
2. To analyze the composition, manufacturing process, and properties of cement and admixtures.
3. To apply knowledge of building components such as lintels, arches, walls, stairs, floors, roofs, foundations, and joinery.
4. To evaluate masonry, mortars, finishing techniques, and formwork systems.
5. To assess various building services including plumbing, ventilation, air conditioning, acoustics, and fire protection.

UNIT– I **(9)**

Stones and Bricks, Tiles: Building Stones – Classifications and Quarrying – Properties – Structural Requirements – Dressing. Bricks – Composition of Brick Earth – Manufacture and Structural Requirements, Fly Ash, Ceramics. Timber, Aluminum, Glass, Paints and Plastics: Wood - Structure – Types and Properties – Seasoning – Defects; Alternate Materials for Timber – GI / Fiber – Reinforced Glass Bricks, Steel & Aluminum, Plastics.

UNIT– II **(9)**

Cement &Admixtures: Types of Cement - Ingredients of Cement – Manufacture – Chemical Composition – Hydration - Field & Lab Tests – Fineness – Consistency– Initial &Final Setting – Soundness. Admixtures – Mineral & Chemical Admixtures – Uses

UNIT– III **(9)**

Building Components: Lintels, Arches, Walls, Vaults – Stair Cases – Types of Floors, Types of Roofs – Flat, Curved, Trussed; Foundations – Types; Damp Proof Course; Joinery – Doors – Windows – Materials – Types.

UNIT– IV **(9)**

Mortars, Masonry and Finishing 's Mortars: Lime and Cement Mortars Brick Masonry – Types – Bonds; Stone Masonry – Types; Composite Masonry – Brick-Stone Composite; Concrete, Reinforced Brick. Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.form Work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT– V **(9)**

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines &Fittings; Ventilations: Functional Requirements Systems of Ventilations. Air-Conditioning - Essentials and Types; Acoustics – Characteristic – Absorption – Acoustic Design; Fire Protection – Fire Hazards – Classification of Fire-Resistant Materials and Constructions.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	**Understand** the properties, classifications, and applications of building materials like stones, bricks, tiles, wood, aluminum, glass, paints, and plastics.	PO1, PO5
CO2	**Analyze** the composition, manufacturing process, and properties of cement and admixtures.	PO1,PO2,PO5
CO3	**Apply** knowledge of building components such as lintels, arches, walls, stairs, floors, roofs, foundations, and joinery.	PO3,PO1,PO4, PO5
CO4	**Evaluate** masonry, mortars, finishing techniques, and formwork systems.	PO3,PO5,PO7,PO4
CO5	**Assess** various building services including plumbing, ventilation, air conditioning, acoustics, and fire protection	PO6,PO7,PO8

TEXT BOOKS:

1. Building Materials and Construction – Arora& Bindra, Dhan pat Roy Publications.
2. Building Materials and Construction by G C Sahu, Joy Gopal Jena McGraw hill Pvt Ltd 2015.

REFRENCE BOOKS:

1. Building Construction by B. C. Punima, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
2. P. C. Varghese, Building Materials, Prentice Hall of India, 2015.
3. N. Subramanian, Building Materials Testing and Sustainability‖, Oxford Higher Education, 2019.
4. R. Chudleigh, Construction Technology, Longman Publishing Group, 1973.
5. S. K. Duggal, Building Materials, Oxford & IBH Publishing Co. Ltd., New Delhi, 2019

ONLINE LEARNING RESOURCES:

https://archive.nptel.ac.in/courses/105/102/105102088/

CO-PO MAPPING:

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO-1	3	-	-	-	2	-	-	-	-	-	-	-
CO-2	3	3	-	-	2	-	-	-	-	-	-	2
CO-3	3	-	3	2	3	-	-	-	-	-	-	-
CO-4	-	-	3	3	3	-	2	-	-	-	-	-
CO-5	-	-	-	-	-	3	3	2	-	-	-	-

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OCE471B	**ENVIRONMENTAL IMPACT ASSESSMENT (OPEN ELECTIVE III)**	**L T P C** **3 - - 3**

PRE-REQUISITES: NIL
COURSE EDUCATIONAL OBJECTIVES:

1. **Understand** the principles, methodologies, and significance of Environmental Impact Assessment (EIA).
2. **Analyze** the impact of developmental activities on land use, soil, and water resources.
3. **Evaluate** the impact of development on vegetation, wildlife, and assess environmental risks.
4. **Develop** environmental audit procedures and assess compliance with environmental regulations.
5. **Understand** and apply environmental acts, notifications, and legal frame works in EIA studies.

UNIT– I CONCEPTS AND METHODOLOGIES OF EIA: (9)

Initial Environmental Examination, Elements of EIA, - Factors Affecting E-I-A Impact Evaluation and Analysis, Preparation of Environmental Base Map, Classification of Environmental Parameters-Criteria for The Selection of EIA Methodology, E I A Methods, Ad-Hoc Methods, Matrix Methods, Network Method Environmental Media Quality Index Method, Overlay Methods and Cost/Benefit Analysis.

UNIT– II IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE (9)

Introduction and Methodology for The Assessment of Soil and Ground Water, Delineation of Study Area, Identification of Actives. Procurement of Relevant Soil Quality, Impact Prediction, Assessment of Impact Significance, Identification and Incorporation of Mitigation Measures. E I Ain Surface Water, Air and Biological Environment: Methodology for The Assessment of Impacts on Surface Water Environment, Air Pollution Sources, Generalized Approach for Assessment of Air Pollution Impact.

UNIT– III ASSESSMENT OF IMPACT ON VEGETATION, WILD LIFE AND RISK ASSESSMENT (9)

Introduction - Assessment of Impact of Development Activities on Vegetation and Wildlife, Environmental Impact of Deforestation – Causes and Effects of Deforestation - Risk Assessment and Treatment of Uncertainty-Key Stages in Performing an Environmental Risk Assessment-Advantages of Environmental Risk Assessment.

UNIT– IV ENVIRONMENTAL AUDIT (9)

Introduction - Environmental Audit &Environmental Legislation Objectives of Environmental Audit, Types of Environmental Audit, Audit Protocol, Stages of Environmental Audit, Onsite Activities, Evaluation of Audit Data and Preparation of Audit Report Report

UNIT– V ENVIRONMENTAL ACTS AND NOTIFICATIONS (9)

The Environmental Protection Act, The Water Preservation Act, The Air (Prevention &Control of Pollution Act), Wild Life Act - Provisions in The EIA Notification, Procedure for Environmental Clearance, Procedure for Conducting Environmental Impact Assessment Report- Evaluation of EIA Report. Environmental Legislation Objectives, Evaluation of Audit Data and Preparation of Audit Report. Post Audit Activities, Concept of ISO and ISO 14000.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	**Apply** various methodologies for conducting Environmental Impact Assessments.	PO1,PO2,PO3,PO4,PO5,PO6
CO2	**Analyze** the impact of land-use changes on soil, water, and air quality.	PO1,PO2,PO3,PO4,PO5,PO6
CO3	**Evaluate** the environmental impact on vegetation, wildlife, and conduct risk assessments.	PO1,PO2,PO3,PO4,PO5,PO6, PO7
CO4	**Develop** environmental audit reports and assess compliance with environmental policies.	PO1,PO2,PO3,PO4,PO5,PO6, PO7
CO5	**Interpret** and apply environmental acts and regulations related to EIA.	PO1,PO2,PO3,PO4,PO5,PO6, PO7,PO8

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B. S. Publication, Hyderabad 2nd edition 2011
2. Environmental Impact Assessment, by Canter Larry W., McGraw-Hill education Edi (1996)

REFRENCE BOOKS:

1. Environmental Engineering, by Peavy, H. S, Rowe, D. R, Tchobanoglous, G.Mc-Graw Hill International Editions, New York 1985.
2. Environmental Science and Engineering, by Suresh K. Dhaneja, S.K., Katania& Sons Publication, New Delhi
3. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke, Prentice Hall Publishers.
4. Environmental Pollution and Control, by H. S. Bhatia, Galgotia Publication (P) Ltd, Delhi

ONLINE LEARNING RESOURCES:
https://archive.nptel.ac.in/courses/124/107/124107160/

CO-PO MAPPING:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P O 10	P O 11	P O 12
CO-1	3	2	2	2	2	3	-	-	-	-	-	1
CO-2	3	3	3	2	2	3	-	-	-	-	-	1
CO-3	3	3	3	2	2	3	3	-	-	-	-	1
CO-4	3	3	3	3	2	3	3	-	-	-	-	1
CO-5	2	2	2	2	2	3	3	3	-	-	-	1

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OEE471A	**SMARTGRID TECHNOLOGIES (OPEN ELECTIVE III)**	**L T P C** **3 - - 3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the evolution, need, architecture, and enabling technologies of Smart Grids with a focus on Indian and international perspectives.
2. To provide fundamental knowledge of synchro-phasor technology and Wide Area Monitoring Systems using PMUs and PDCs.
3. To familiarize students with smart meters, AMR/AMI systems, and their role in demand-side integration and power quality management.
4. To impart understanding of communication technologies and protocols used in Smart Grid information and communication infrastructure.
5. To expose students to Smart Grid applications, renewable and distributed generation integration, advanced energy storage, and cyber security requirements

UNIT –1: INTRODUCTION TO SMART GRID: (9)

Evolution of Electric Grid – Need for Smart Grid – Difference between conventional & smart grid – Overview of enabling technologies – International experience in Smart Grid deployment efforts – Smart Grid road map for India – Smart Grid Architecture.

UNIT –2: WIDE AREA MONITORING SYSTEM: (9)

Fundamentals of Synchro phasor Technology – concept and benefits of Wide Area Monitoring System – Structure and functions of Phasor Measuring Unit (PMU) and Phasor Data Concentrator (PDC) – Road Map for Synchro phasor applications (NAPSI) – Operational experience and Blackout analysis using PMU - Case study on PMU.

UNIT –3: SMART METERS: (9)

Features and functions of Smart Meters – Functional specification – category of Smart Meters – Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) drivers and benefits – AMI protocol – Demand Side Integration: Peak load, Outage and Power Quality management.

UNIT –4: INFORMATION AND COMMUNICATION TECHNOLOGY: (9)

Overview of Smart Grid Communication system – Modulation and Demodulation Techniques: Radio Communication – Mobile Communication – Power Line Communication – Optical Fibre Communication – Communication Protocol for Smart Grid.

UNIT –5:SMART GRID APPLICATIONS AND CYBER SECURITY (9)

Applications: Overview and concept of Renewable Integration – Introduction to distributed generation - Role of Protective Relaying in Smart Grid – House Area Network – Advanced Energy Storage Technology: Flow battery – Fuel cell – SMES – Super capacitors – Plug – in Hybrid electric Vehicles - Cyber Security: Security issues in DG, Distribution Automation, AMI, Electric Vehicle Management Systems – Approach to assessment of smart grid cyber security risks – Methodologies. Cyber Security requirements – Smart Grid Information Model.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understanding the Concept and Evolution of Smart Grids	PO1, PO2
CO2	Analyzing Wide Area Monitoring System and Synchrophasor Technology	PO1, PO2, P03, PO4
CO3	Applying Smart Metering and Advanced Metering Infrastructure (AMI) Concepts	PO1, PO2, P03,
CO4	Evaluating Information and Communication Technology (ICT) Systems in Smart Grids	PO1, PO2, P03, PO4
CO5	Designing Smart Grid Applications and Cybersecurity Measures	PO1, PO2,

TEXT BOOKS:

1. James Momoh, "SMART GRID: Fundamentals of Design and Analysis", John Wiley and Sons, New York, 2012.
2. Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, "Smart Grid: Technology and Applications", John Wiley & Sons, New Jersey, 2012.

REFERENCE BOOKS:

1. Power Grid Corporation of India Limited, "Smart Grid Primer", 1st Edition, Power Grid Corporation of India Limited, Bangalore, India, 2013.
2. Fereidoon.P. Sioshansi, "Smart Grid – Integrating Renewable, Distributed and Efficient Energy", 1st Edition, Academic Press, USA, 2011.
3. Stuart Borlase, "Smart Grids: Infrastructure, Technology and Solutions", 1st Edition, CRC Press Publication, England, 2013.
4. Phadke A G, Thorp J S, "Synchronized Phasor Measurements and Their Applications", 1st Edition, Springer, Newyork, 2012.

ONLINE LINKS:

https://nptel.ac.in/courses/108/107/108107113/

CO-PO MAPPING

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OECE471A	**FUNDAMENTALS OF MICROPROCESSORS AND CONTROLLERS(OPEN ELECTIVE III)**	**L**	**T**	**P**	**C**
		3	**-**	**-**	**3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To comprehend the architecture, operation, and configurations of the 8086 microprocessors.
2. To get familiar with 8086 programming concepts, instruction set, and assembly language development tools.
3. To study the interfacing of 8086 with memory, peripherals, and controllers for various applications.
4. To learn the architecture, instruction set, and programming of the 8051 microcontrollers.
5. To understand microcontroller interfacing techniques, peripheral programming, and processor comparisons.

UNIT I – 8085 AND 8086 ARCHITECTURE (9)

8085 Architecture, Pind diagram, Addressing modes, Instruction set, 8086 Architecture: Introduction, Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response.

UNIT II - 8086 PROGRAMMING (9)

8086 Programming: 8086 system timing, minimum mode and maximum mode configuration, Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.

UNIT III - 8086 INTERFACING (9)

Introduction: Intel 8255 programmable peripheral interface, Interfacing with LEDS, Interfacing seven segment displays, software and hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controllers.

UNIT IV - MICROCONTROLLER (9)

Microcontroller: Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming, Comparison of Microprocessor, Microcontroller, PIC and ARM processors

UNIT V - INTERFACING MICROCONTROLLER (9)

Interfacing Microcontroller: Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Gain knowledge on the architecture, operation, and configurations of the 8085 and 8086 microprocessors.	PO1
CO2	Get familiar with 8086 programming concepts, instruction set, and assembly language development tools.	PO1, PO2
CO3	Know the interfacing of 8086 with peripherals, and controllers for various applications.	PO1, PO2
CO4	Learn the architecture, instruction set, programming of the 8051 microcontrollers and processor comparisons.	PO1, PO2
CO5	Understand microcontroller interfacing techniques, peripheral programming.	PO1

TEXT BOOKS:

1. Microprocessors and Interfacing – Programming and Hardware by Douglas V Hall, SSSP Rao, Tata McGraw Hill Education Private Limited, 3rdEdition,1994.
2. K M Bhurchandi, A K Ray, Advanced Microprocessors and Peripherals, 3rd edition, McGraw Hill Education, 2017.
3. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd edition, Pearson, 2012.

REFERENCE BOOKS:

1. Ramesh S Gaonkar, Microprocessor Architecture Programming and Applications with the 8085, 6th edition, Penram International Publishing, 2013.
2. Kenneth J. Ayala, The 8051 Microcontroller, 3rd edition, Cengage Learning, 2004.

REFERENCE WEBSITE:

1. https://archive.nptel.ac.in/courses/108/105/108105102/
2. https://archive.nptel.ac.in/courses/106/108/106108100/

CO-PO MAPPING

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OME471A	**3D PRINTING TECHNOLOGIES**	**L T P C**
	(OPEN ELECTIVE III)	**3 - - 3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the fundamental concepts of prototyping and distinguish between traditional and rapid prototyping methods.
2. Demonstrate the working principles, materials, and applications of solid-, liquid-, and powder-based RP systems.
3. Define the processes and classifications of rapid tooling and reverse engineering techniques.
4. Identify common errors in 3D printing and evaluate pre-processing, processing, and post-processing issues.
5. Familiarize RP-related software and its role in applications such as design, manufacturing, and medical fields.

UNIT –1: INTRODUCTION TO 3D PRINTING (9)

Introduction to 3D Printing Introduction to Prototyping, Traditional Prototyping Vs. Rapid Prototyping (RP), Need for time compression in product development, Usage of RP parts, Generic RP process, Distinction between RP and CNC, other related technologies, Classification of RP.

UNIT –2: SOLID AND LIQUID BASED RP SYSTEM: (9)

Working Principle, Materials, Advantages, Limitations and Applications of Fusion Deposition Modelling (FDM), Laminated Object Manufacturing (LOM), Stereo lithography (SLA), Direct Light Projection System (DLP) and Solid Ground Curing (SGC).

UNIT –3: POWDER BASED & OTHER RP SYSTEMS: (9)

Powder Based RP Systems: Working Principle, Materials, Advantages, Limitations and Applications of Selective Laser Sintering (SLS), Direct Metal Laser Sintering (DMLS), Laser Engineered Net Shaping(LENS) and Electron Beam Melting (EBM).
Other RP Systems: Working Principle, Materials, Advantages, Limitations and Applications of Three Dimensional Printing (3DP), Ballastic Particle Manufacturing (BPM) and Shape Deposition Manufacturing (SDM)

UNIT –4: RAPID TOOLING & REVERSE ENGINEERING RAPID TOOLING: (9)

Rapid Tooling & Reverse Engineering Rapid Tooling: Conventional Tooling Vs. Rapid Tooling, Classification of Rapid Tooling, Direct and Indirect Tooling Methods, Soft and Hard Tooling methods. Reverse Engineering (RE): Meaning, Use, RE – The Generic Process, Phases of RE Scanning, Contact Scanners and Noncontact Scanners, Point Processing, Application Geometric Model, Development.

UNIT –5: ERRORS IN 3D PRINTING AND APPLICATIONS: (9)

Pre-processing, processing and post-processing errors, Part building errors in SLA, SLS, etc. Software: Need for software, MIMICS, Magics, SurgiGuide, 3-matic, 3D-Doctor, Simplant, Velocity2, VoXim, Solid View,3DView, etc., software, Preparation of CAD models, Problems with STL files, STL file manipulation, RP data formats: SLC, CLI, RPI, LEAF, IGES, HP/GL, CT, STEP. Applications: Design, Engineering Analysis and planning applications, Rapid Tooling, Reverse Engineering, Medical Applications of RP.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define and explain the evolution and need for rapid prototyping in modern product development.	L1,L2,L6
CO2	Compare and contrast various 3D printing technologies based on working principles, materials, and limitations.	L2,L4,L5
CO3	Apply knowledge of rapid tooling and reverse engineering techniques for industrial and design applications.	L3,L5,L6
CO4	Diagnose and interpret different types of errors encountered in 3D printing processes and recommend solutions.	L2,L3,L5
CO5	Use RP-specific software tools to manipulate STL files and prepare models for printing in real-world scenarios	L1,L3,L6

TEXT BOOKS:

1. Chee Kai Chua and Kah Fai Leong, ―3D Printing and Additive Manufacturing Principles and Applications‖ 5/e, World Scientific Publications, 2017.
2. Ian Gibson, David W Rosen, Brent Stucker, ―Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing‖, Springer, 2/e, 2010. Reference Books:

REFERENCE BOOKS:

1. Frank W.Liou, ―Rapid Prototyping & Engineering Applications‖, CRC Press, Taylor & Francis Group, 2011.
2. Rafiq Noorani, ―Rapid Prototyping: Principles and Applicationsin Manufacturing‖,John Wiley&Sons, 2006.

CO PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OSH471A	**WAVELET TRANSFORMS AND ITS APPLICATIONS**	**L T P C**
	(OPEN ELECTIVE III)	**3 - - 3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

UNIT–I: WAVELETS (09)

Wavelets and Wavelet Expansion Systems - Wavelet Expansion-Wavelet Transform-Wavelet System – More Specific Characteristics of Wavelet Systems - Haar Scaling Functions and Wavelets - effectiveness of Wavelet Analysis -The Discrete Wavelet Transform - The Discrete-Time and Continuous Wavelet Transforms.

UNIT–II: A MULTI RESOLUTION FORMULATION OF WAVELET SYSTEMS (09)

Signal Spaces -The ScalingFunction -Multiresolution Analysis -The Wavelet Functions -The Discrete Wavelet Transform- A Parseval's Theorem - Display of the Discrete Wavelet Transform and the Wavelet Expansion.

UNIT–III: FILTER BANKS AND THE DISCRETE WAVELET TRANSFORM (09)

Analysis - From Fine Scale to Coarse Scale- Filtering and Down-Sampling or Decimating - Synthesis - From Coarse Scale to Fine Scale -Filtering and Up-Sampling or Stretching - Input Coefficients -Lattices and Lifting - -Different Points of View.

UNIT–IV: TIME – FREQUENCY AND COMPLEXITY (09)

Multi resolution versus Time - Frequency Analysis- Periodic versus Non periodic Discrete Wavelet Transforms -The Discrete Wavelet Transform versus the Discrete-Time Wavelet Transform- Numerical Complexity of the Discrete Wavelet Transform.

UNIT-V: BASES AND MATRIX EXAMPLES (09)

Bases, Orthogonal Bases, and Bi orthogonal Bases -Matrix Examples - Fourier Series Example - Sine Expansion Example - Frames and Tight Frames - Matrix Examples -Sine Expansion as a Tight Frame Example.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		**Pos**
CO1	Understand wavelets and wavelet basis and characterize continuous and discrete wavelet transforms	PO1,PO2,PO3,PO4, PO12
CO2	Illustrate the multi resolution analysis adscaling functions	PO1,PO2,PO3,PO4, PO12
CO3	Implement discrete wavelet transforms with multi rate digital filters	PO1,PO2,PO3,PO4, PO12
CO4	Understand multi resolution analysis and identify various wavelets and evaluate their time-frequency resolution properties.	PO1,PO2,PO3,PO4 ,PO12
CO5	Design certain classes of wavelets to specification and justify the basis of the application of Wavelet transforms to different fields	PO1,PO2,PO3,PO4, PO12

TEXT BOOKS:

1. C. Sidney Burrus, Ramesh A. Gopinath, ― Introduction to Wavelets and Wavelets Transforms ‖, Prentice Hall, (1997).
2. James S.Walker, ― A Primer on Wavelets and their Scientific Applications ‖,CRC Press, (1999).

REFERENCE BOOKS:

1. Raghuveer Rao,―Wavelet Transforms ‖,Pearson Education, Asia
2. C.S.Burrus,Ramose and A.Gopinath, Introduction to Wavelets and Wavelet Transform, Prentice Hall Inc.

REFERENCE WEBSITE:

1. http://users.rowan.edu/~polikar/WAVELETS/WTtutorial.html
2. http://www.wavelet.org/
3. http://www.math.hawaii.edu/~dave/Web/Amara's%20Wavelet%20Page.htm
4. https://jqichina.wordpress.com/wp-content/uploads/2012/02/ten-lectures-of-waveletsefbc88e5b08fe6b3a2e58d81e8aeb2efbc891.pdf

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OSH471B	SMART MATERIALS AND DEVICES	L T P C
	(OPEN ELECTIVE III)	3 - - 3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To understand the principles and applications of smart materials in engineering.
2. To understand the science behind smart materials and their behavior.
3. To elucidate the responsive characteristics of smart materials
4. To explore synthesis and characterization techniques for smart materials
5. To determine the appropriate smart material for a given application.

UNIT I INTRODUCTION TO SMART MATERIALS (9)

Historical account of the discovery and development of smart materials, Shape memory materials, chromoactive materials, magneto rheological materials, photoactive materials, Polymers and polymer composites (Basics).

UNIT II PROPERTIES OF SMART MATERIALS (9)

Optical, Electrical, Dielectric, Piezoelectric, Ferroelectric, Pyroelectric and Magnetic properties of smart materials.

UNIT III SYNTHESIS OF SMART MATERIALS (9)

Chemical route: Chemical vapour deposition, Sol-gel technique, hydrothermal method, Mechanical alloying and thin film deposition techniques: Chemical etching, Spray pyrolysis.

UNIT IV CHARACTERIZATION TECHNIQUES (9)

Powder X-ray diffraction, Raman spectroscopy (RS), UV-Visible spectroscopy, Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Atomic force microscopy (AFM).

UNIT V SMART MATERIALS BASED DEVICES (9)

Devices based on smart materials: Shape memory alloys in robotic hands, piezoelectric based devices, MEMS and intelligent devices.

Total Hours: 45

COURSE OUTCOME:

On successful completion of the course, students will be able to		Pos
CO1	Describe the breakthroughs that transformed shape memory materials into practical applications. Describe the two phases in shape memory alloys.	PO1, PO2,PO3,PO4,PO5
CO2	Investigate how smart materials react to external influences like light, electricity, and heat.	PO1, PO2,PO3,PO4,PO5
CO3	Describe synthesis approaches for smart materials.	PO1, PO2,PO3,PO4,PO5
CO4	Overview of characterization techniques for understanding smart material behavior.	PO1, PO2,PO3,PO4, PO5
CO5	Highlight the advantages of using smart materials in device applications.	PO1, PO2,PO3,PO4

TEXT BOOKS:

1. YaserDahman,NanotechnologyandFunctionalMaterialsforEngineers-,Elsevier, 2017
2. E. Zschech,C. Whelan, T. Mikolajick, Materials for Information Technology: Devices, Interconnects and Packaging Springer-Verlag London Limited 2005.

REFERENCE BOOKS:

1. Gauenzi,P.,SmartStructures,Wiley,2009.
2. MahmoodAliofkhazraei,Handbookoffunctionalnanomaterials,Vol(1&2),NovaPublishers, 2014
3. *Hand book of Smart Materials, Technologies, and Devices: Applications of Industry, 4.0, Chaudhery Mustansar Hussain, Paolo DiSia, Springer, 2022.*
4. Fundamentals of Smart Materials, Mohsen Shahinpoor, Royal Society of Chemistry, 2020.

NPTEL COURSE LINK:
https://onlinecourses.nptel.ac.in/noc22_me17/preview

CO PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1							
CO2	3	3	2	1	1							
CO3	3	3	1	1	1							
CO4	3	2	1	1	1							
CO5	3	3	1	1	-							
	3	2.8	1.4	1.2	1							

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OSH471C	INTRODUCTON TO QUANTUM MECHANICS (OPEN ELECTIVE III)	L	T	P	C
		3	-	-	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To comprehend the fundamental distinctions between classical and quantum mechanics.
2. To analyze the concepts of wave-particle duality and the uncertainty principle, along with their physical implications.
3. To acquire knowledge and solve the Schrödinger equation for simple quantum systems.
4. To apply operator formalism and relevant mathematical techniques in the study of quantum mechanics.
5. To investigate the quantum mechanical representations of angular momentum and spin.

UNIT- I: PRINCIPLES OF QUANTUM MECHANICS (9)

Introduction: Limitations of classical Mechanics, Difficulties with classical theories of black body radiation and origin of quantum theory of radiation. Wave-particle duality: de Broglie wavelength, Heisenberg uncertainty principle. Schrödinger time independent and time dependent wave equation, Solution of the time dependent Schrödinger equation, Concept of stationary states, Physical significance of wave function (ψ), Orthogonal, Normalized and Orthonormal functions

UNIT- II: ONE DIMENSIONAL PROBLEMS AND SOLUTIONS (9)

Potential step – Reflection and Transmission at the interface. Potential well: Square well potential with rigid walls, Square well potential with finite walls. Potential barrier: Penetration of a potential barrier (tunneling effect). Periodic potential and Harmonic oscillator, Energy eigen functions and eigen values.

UNIT-III: OPERATOR FORMALISM (9)

Operators, Operator Algebra, Eigen values and Eigen vectors, Postulates of quantum mechanics, Matrix representation of wave functions and linear operators.

UNIT- IV: MATHEMATICAL TOOLS FOR QUANTUM MECHANICS (9)

The concept of row and column matrices, Matrix algebra, Hermitian operators – definition. Dirac's bra and ket notation, Expectation values, Heisenberg (operator) representation of harmonic oscillator, Ladder operators and their significance.

UNIT- V : ANGULAR MOMENTUM AND SPIN (9)

Angular momentum operators: Definition. Eigen functions and Eigen values of AM operators. Matrix representation of angular momentum operators, System with spin half(1/2), Spin angular momentum, Pauli's spin matrices. Clebsch-Gordon coefficients. Rigid Rotator: Eigen functions and Eigen values.

Total Hours: 45

COURSE OUTCOME:

After completing this course, students will be able to:		Pos
CO1	Explain the foundational principles of quantum mechanics	PO1,PO2,PO3,PO4,PO5
CO2	Apply Schrödinger equations to solve one-dimensional quantum problems	PO1,PO2,PO3,PO4,PO5
CO3	Solve quantum mechanical problems using operator and matrix formulations,	PO1,PO2,PO3,PO4,PO5
CO4	Evaluate quantum states using Dirac notation and expectation values.	PO1,PO2,PO3,PO4,PO5
CO5	Analyze angular momentum and spin systems using Pauli matrices and operators.	PO1,PO2,PO3,PO4,PO5

BOOKS FOR STUDY:

1. Quantum Mechanics. Vol 1, A. MessaiaNoth-Holland Pub. Co., Amsterdam,(1961).
2. A Text Book of Quantum Mechanics. P.M.Mathews and K.Venkatesam, Tata McGraw Hill, New Delhi,(1976).
3. Introduction to Quantum Mechanics. R.H.Dicke and J.P.Witke, Addison-Wisley Pub.Co.Inc., London, (1960).
4. Quantum Mechanics. S.L.Gupta, V.Kumar, H.V.Sarama and R.C.Sharma, Jai PrakashNath& Co, Meerut, (1996).

REFERENCE BOOKS:

1. Quantum Mechanics. L.I. Schiff, McGraw Hill Book Co., Tokyo, (1968).
2. Introduction to Quantum Mechanics. Richard L. Liboff, Pearson Education Ltd (Fourth Edn.) 2003.

NPTEL courses link :

1. **https://archive.nptel.ac.in/courses/115/101/115101107/**
2. **https://archive.nptel.ac.in/courses/122/106/122106034/**
3. **https://nptel.ac.in/courses/115106066**

CO PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

		L	T	P	C
23OSH471D	**GREEN CHEMISTRY AND CATALYSIS FOR SUSTAINABLE ENVIRONMENT (OPEN ELECTIVE-III)**	3	-	-	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To Understand Principle and Concepts of Green Chemistry.
2. To Understand the Types of Catalysis and Industrial Applications.
3. To Apply Green Solvents in Chemical Synthesis.
4. To Enumerate Different Sourced of Green Energy.
5. To Apply Alternative Greener Methods Foe Chemical Reactions

UNIT I: PRINCIPLES AND CONCEPTS OF GREEN CHEMISTRY [09]

Introduction, Green chemistry Principles, sustainable development and green chemistry, E factor, atom economy, atom economic Reactions: Rearrangement and addition reactions and atom un-economic reactions: Substitution, elimination and Wittig reactions, Reducing Toxicity. Waste - problems and Prevention: Design for degradation, Polymer recycling

UNIT 2: CATALYSIS AND GREEN CHEMISTRY [09]

Introduction, Types of catalysis, Heterogeneous catalysis: Basics of Heterogeneous Catalysis, Zeolite and the Bulk Chemical Industry, Heterogeneous Catalysis in the Fine Chemical and Pharmaceutical Industries, Catalytic Converters, Homogeneous catalysis: Transition Metal Catalysts with Phosphine Ligands, Greener Lewis Acids, and Phase transfer catalysis, Bio-catalysis and Photo- catalysis with examples.

UNIT 3: GREEN SOLVENTS IN CHEMICAL SYNTHESIS [09]

Green Solvents: Concept, Tools and techniques for solvent selection, supercritical fluids: Super critical carbon dioxide, super critical water, Polyethylene glycol (PEG), Ionic liquids, Recycling of green solvents.

UNIT 4: EMERGING GREENER TECHNOLOGIES [09]

Biomass as renewable resource, Energy: Energy from Biomass, Solar Power, Chemicals from Renewable Feedstock's, Chemicals from Fatty Acids, Polymers from Renewable Resources, Alternative Economies: The Syngas Economy, The Biorefinery, Design for energy efficiency, Mechanochemical synthesis.

UNIT 5: ALTERNATIVE GREENER METHODS [09]

Photochemical Reactions - Examples, Advantages and Challenges, Photo redox catalysis, single electron transfer reactions (SET), Examples of Photochemical Reactions, Microwave-assisted Reactions and Sono chemical reactions, examples and applications.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Apply the Green chemistry Principles for day-to-day life as well as synthesis, describe the sustainable development and green chemistry, explain economic and un-economic reactions, Demonstrate Polymer recycling.	PO1, PO2, PO3, PO4, PO5, PO7
CO2	Explain Heterogeneous catalyst and its applications in Chemical and Pharmaceutical Industries, Differentiate Homogeneous and Heterogeneous catalysis, Identify the importance of Bio and Photo Catalysis, Discuss Transition metal and Phase transfer Catalysis	PO1, PO2, PO3, PO4, PO5, PO7
CO3	Demonstrate Green solvents and importance, Discuss Supercritical carbon dioxide, Explain Supercritical water, recycling of green solvents.	PO1, PO2, PO3, PO4, PO5, PO7
CO4	Describe importance of Biomass and Solar Power, Illustrate Sonochemistry, Apply Green Chemistry for Sustainable Development; discuss the importance of Renewable resources, mechanochemical synthesis.	PO1, PO2, PO3, PO4, PO5, PO7
CO5	Discuss Alternative green methods like Photo redox catalysis, single electron transfer reactions (SET), Photochemical Reactions, Microwave-assisted Reactions and Sono chemical reactions, examples and applications.	PO1, PO2, PO3, PO4, PO5, PO7

TEXT BOOKS:

1. M. Lancaster, Green Chemistry an Introductory Text, Royal Society of Chemistry, 2002.
2. Paul T. Anastas and John C. Warner, Green Chemistry Theory and Practice, 4^{th} Edition, Oxford University Press, Usa

REFERENCE BOOKS:

1. Green Chemistry for Environmental Sustainability, First Edition, Sanjay K. Sharma and AckmezMudhoo, CRC Press, 2010.
2. Edited by AlvisePerosa and Maurizio Selva, Hand Book of Green chemistry Volume 8: Green Nanoscience, wiley-VCH, 2013.

CO PO MAPPING:

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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OSH471E	EMPLOYABILITY SKILLS (OPEN ELECTIVE III)	L T P C
		3 - - 3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To encourage all round development of the students by focusing on productive skills
2. To make the students aware of Goal setting and writing skills
3. To enable them to know the importance of presentations skills in achieving desired goals.
4. To help them develop organizational skills group activities.
5. To function effectively with heterogeneous teams

UNIT-I : GOAL SETTING AND SELF-MANAGEMENT (9)

Definition, importance, types of Goal Setting–SMART Goal Setting–Advantages–Motivation Intrinsic and Extrinsic Motivation–Self-Management-Knowing about self–SWOC Analysis

UNIT-II: WRITING SKILLS (9)

Definition, significance ,types of writing skills –Resume writing Vs CV Writing -E-Mailwriting, Cover Letters- E-Mail Etiquette –So P (Statement of Purpose)

UNIT-III:TECHNICAL PRESENTATION SKILLS (9)

Nature, meaning& significance of Presentation Skills– Planning ,Preparation, Presentation, Stage Dynamics –Anxiety in Public speaking (Glossophobia)- PPT & Poster Presentation

UNIT-IV: GROUP PRESENTATION SKILLS (9)

Body Language – Group Behavior–Team Dynamics –Leadership Skills –Personality Manifestation -Group Discussion-Debate –Corporate Etiquette

UNIT-V: JOB CRACKING SKILLS (9)

Nature, characteristics, importance &types of Interviews –Job Interviews–Skills for success–Job Searching skills – STAR method - FAQs-Answering Strategies–Mock Interviews

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Understand the importance of goals and try to achieve them	PO2
CO2	Explain the significance of self-management	PO6,PO10
CO3	Apply the knowledge of writing skills in preparing eye-catchy resumes	PO10
CO4	Analyze various forms of Presentation skills	PO12
CO5	Judge the group behavior appropriately	PO4

TEXT BOOKS:

1. SabinaPillai,Agna Fernandez.SoftSkills&EmployabilitySkills, 2014.CambridgePublisher.
2. AlkaWadkar.LifeSkills forSuccess,SagePublications, 2016.

REFERENCE BOOKS:

1. GangadharJoshi.CampustoCorporatePaperback,SagePublications.2015
2. SherfieldMontogomeryMoody,CornerstoneDevelopingSoftSkills,PearsonPublications.4Ed. 2008
3. ShikhaKapoor.PersonalityDevelopment andSoftSkills-PreparingforTomorrow.1Edition,Wiley, 2017.
4. M.SenGupta,Skills forEmployability,Innovative Publication,2019.
5. SteveDuckandDavidTMcMahan, TheBasicofCommunicationSkills ARelationalPerspective, Sage press, 2012.

ONLINE SERVICES:

https://youtu.be/gkLsn4ddmTs
https://youtu.be/2bf9K2rRWwo
https://youtu.be/FchfE3c2jzc
https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel j2PUy0pwjVUgj7KIJ
https://www.youtube.com/c/skillopedia/videos
https://onlinecourses.nptel.ac.in/noc25 hs96/preview
https://onlinecourses.nptel.ac.in/noc21 hs76/preview
https://archive.nptel.ac.in/courses/109/107/109107172/#
https://archive.nptel.ac.in/courses/109/104/109104107/

CO PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OCE472A	**GEO-SPATIAL TECHNOLOGIES (OPEN ELECTIVE IV)**	**L T P C**
		3 - - 3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To understand raster-based spatial analysis techniques, including query, overlay, and cost-distance analysis.
2. To analyze vector-based spatial analysis techniques such as topology, overlay, and proximity analysis.
3. To apply network analysis techniques for geocoding, shortest path analysis, and location-allocation problems.
4. To evaluate surface and geostatistical analysis methods, including terrain modeling, watershed analysis, and spatial interpolation.
5. To assess GIS customization, Web GIS, and mobile mapping techniques for real world applications.

UNIT– I RASTER ANALYSIS (9)

Raster Data Exploration: Query Analysis - Local Operations: Map Algebra, Reclassification, Logical and Arithmetic Overlay Operations—Neighborhood - Operations: Aggregation, Filtering – Extended Neighborhood-Operations- Zonal Operations - Statistical Analysis – Cost-Distance Analysis-Least Cost Path.

UNIT– II VECTOR ANALYSIS (9)

Non-Topological Analysis: Attribute Database Query, Structured Query Language, Co Ordinate Transformation, Summary Statistics, Calculation of Area, Perimeter and Distance – topological Analysis: Reclassification, Aggregation, Overlay Analysis: Point-In-Polygon, Line-In-Polygon, Polygon-On-Polygon: Clip, Erase, Identity, Union, Intersection – Proximity Analysis: Buffering

UNIT– III NETWORK ANALYSIS (9)

Network – Introduction - Network Data Model – Elements of Network - Building A Network Database - Geocoding – Address Matching - Shortest Path in A Network – Time and Distance Based Shortest Path Analysis – Driving Directions – Closest Facility Analysis – Catchment / Service Area Analysis-Location-Allocation Analysis

UNIT– IV SURFACE and GEOSTATISTICAL ANALYSIS (9)

Surface Data – Sources of X, Y, Z Data – DEM, TIN – Terrain Analysis – Slope, Aspect, Viewshed, Watershed Analysis: Watershed Boundary, Flow Direction, Flow Accumulation, Drainage Network, Spatial Interpolation: IDW, Spline, Kriging, Variogram.

UNIT– V CUSTOMISATION, WEBGIS, MOBILEMAPPING (9)

Customization of GIS: Need, Uses, Scripting Languages –Embedded Scripts – Use of Python Script - Web GIS: Web GIS Architecture, Advantages of Web GIS, Web Applications- Location Based Services: Emergency and Business Solutions - Big Data Analytics.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand raster-based spatial analysis techniques, including query, overlay, and cost- distance analysis.	PO1,PO2,PO3,PO4,PO5,PO6
CO2	Analyze vector-based spatial analysis techniques such as topology, overlay, and proximity analysis.	PO1,PO2,PO3,PO4,PO5,PO6
CO3	Apply network analysis techniques for geocoding, shortest path analysis, and location- allocation problems.	PO1,PO2,PO3,PO4,PO5,PO6, PO7
CO4	Evaluate surface and geostatistical analysis methods, including terrain modeling, watershed analysis, and spatial interpolation.	PO1,PO2,PO3,PO4,PO5,PO6, PO7
CO5	Assess GIS customization, Web GIS, and mobile mapping techniques for real-world applications.	PO1,PO2,PO3,PO4,PO5,PO6, PO7,PO8

TEXT BOOKS:

1. Kang – Tsung Chang, Introduction to Geographical Information System, 4th Ed., Tata McGraw Hill Edition, 2008.
2. Lo, C.P. and Yeung, Albert K.W., Concepts and Techniques of Geographic Information Systems Prentice Hall, 2002.

REFRENCE BOOKS:

1. Michael N. Demers, Fundamentals of Geographic Information Systems, Wiley,2009
2. Ian Heywood, Sarah Cornelius, Steve Carver, Srinivasaraju, —An Introduction to Geographical Information Systems, Pearson Education, 2nd Edition, 2007.
3. John Peter Wilson, The Handbook of Geographic Information Science, Blackwell Pub.,2008

ONLINE LEARNING RESOURCES:

https://archive.nptel.ac.in/courses/105/105/105105202/
https://onlinecourses.nptel.ac.in/noc19_cs76/preview

CO-PO MAPPING:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO-1	3	2	2	2	2	3	-	-	-	-	-	1
CO-2	3	3	3	2	2	3	-	-	-	-	-	1
CO-3	3	3	3	2	2	3	3	-	-	-	-	1
CO-4	3	3	3	3	2	3	3	-	-	-	-	1
CO-5	2	2	2	2	2	3	3	3	-	-	-	1

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OCE472B	SOLID WASTE MANAGEMENT (OPEN ELECTIVE IV)	L T P C
		3 - - 3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To understand the types, sources, and characteristics of solid waste, along with regulatory frameworks.
2. To analyze engineering systems for solid waste collection, storage, and transportation.
3. To apply resource and energy recovery techniques for sustainable solid waste management.
4. To evaluate landfill design, construction, and environmental impact mitigation strategies.

UNIT– I (9)

Solid Waste: Definitions, Types of Solid Wastes, Sources of Solid Wastes, Characteristics, and Perspectives; Properties of Solid Wastes, Sampling of Solid Wastes, Elements of Solid Waste Management - Integrated Solid Waste Management, Solid Waste Management Rules 2016.

UNIT– II (9)

Engineering Systems for Solid Waste Management: Solid Waste Generation; On-Site Handling, Storage and Processing; Collection of Solid Wastes; Stationary Container System and Hauled Container Systems – Route Planning - Transfer and Transport; Processing Techniques;

UNIT– III (9)

Engineering Systems for Resource and Energy Recovery: Processing Techniques; Materials Recovery Systems; Recovery of Biological Conversion Products – Composting, Pre and Post Processing, Types of Composting, Critical Parameters, Problems with Composing -Recovery of Thermal Conversion Products; Pyrolisis, Gasification, RDF - Recovery of Energy from Conversion Products; Materials and Energy Recovery Systems.

UNIT– IV (9)

Landfills: Evolution of Landfills – Types and Construction of Landfills – Design Considerations – Life of Landfills- Landfill Problems – Lining of Landfills – Types of Liners – Leachate Pollution and Control – Monitoring Landfills – Landfills Reclamation.

UNIT– V (9)

Hazardous Waste Management: – Sources and Characteristics, Effects on Environment, Risk Assessment–Disposal of Hazardous Wastes–Secured Landfills, Incineration -Monitoring– Biomedical Waste Disposal, E-Waste Management, Nuclear Wastes, Industrial Waste Management

Total Hours: 45

COURSE OUTCOMES:

	On successful completion of the course, students will be able to	Pos
CO1	Understand the types, sources, and characteristics of solid waste, along with regulatory frameworks.	PO1, PO5,PO7
CO2	Analyze engineering systems for solid waste collection, storage, and transportation.	PO1,PO2,PO5,PO7
CO3	Apply resource and energy recovery techniques for sustainable solid waste management.	PO1,PO3,PO4,PO5, PO7
CO4	Evaluate landfill design, construction, and environmental impact mitigation strategies.	PO3,PO4,PO5,PO8, PO7
CO5	Assess hazardous waste management techniques, including biomedical and e-waste	PO5,PO6, PO7,PO8

TEXT BOOKS:

1. Tchobanoglous G, Theisen H and Vigil SA ‗Integrated Solid Waste Management, Engineering Principles and Management Issues ‛McGraw-Hill, 1993.
2. Vesilind PA, Worrell W and Reinhart D, ‗Solid Waste Engineering ‛Brooks/Cole Thomson Learning Inc., 2002.

REFRENCE BOOKS:

1. Peavy, H.S, Rowe, D.R., and G. Tchobanoglous, ‗Environmental Engineering ‛, McGraw Hill Inc., New York, 1985.
2. Qian X, Koerner RM and Gray DH, ‗Geotechnical Aspects of Landfill Design and Construction ‛Prentice Hall, 2002.

ONLINE LEARNING RESOURCES:

1. **https://archive.nptel.ac.in/courses/105/103/105103205/**
2. **https://archive.nptel.ac.in/courses/120/108/120108005/**

CO-PO MAPPING:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO-1	3	-	-	-	2	-	2	-	-	-	-	-
CO-2	3	3	-	-	2	-	3	-	-	-	-	2
CO-3	3	-	3	2	3	-	3	-	-	-	-	-
CO-4	-	-	3	3	3	-	3	2	-	-	-	-
CO-5	-	-	-	-	3	3	3	3	-	-	-	-

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OEE472A	**ELECTRIC VEHICLES (OPEN ELECTIVE IV)**	**L T P C** **3 - - 3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Remember and understand the differences between conventional Vehicle and Electric Vehicles, electro mobility and environmental issues of EVs.
2. Analyze various EV configurations, parameters of EV systems and Electric vehicle Dynamics.
3. Analyze the basic construction, operation and characteristics of fuel cells and battery charging techniques in HEV systems
4. Design and analyze the various control structures for Electric vehicle

UNIT –1: INTRODUCTION TO EV SYSTEMS AND ENERGY SOURCES: (9)

Past, Present and Future of EV - EV Concept- EV Technology- State-of-the Art of EVs- EV configuration- EV system- Fixed and Variable gearing- Single and multiple motor drive- In-wheel drives- EV parameters: Weight, size, force and energy, performance parameters. Electro mobility and the environment- History of Electric power trains- Carbon emissions from fuels- Green houses and pollutants- Comparison of conventional, battery, hybrid and fuel cell electric systems.

UNIT –2: EV PROPULSION AND DYNAMICS: (9)

Choice of electric propulsion system- Block diagram- Concept of EV Motors- Single and multi-motor configurations- Fixed and variable geared transmission- In-wheel motor configuration- Classification - Electric motors used in current vehicle applications - Recent EV Motors- Vehicle load factors- Vehicle acceleration.

UNIT –3: FUEL CELLS: (9)

Introduction of fuel cells- Basic operation- Model - Voltage, power and efficiency- Power plant system – Characteristics- Sizing - Example of fuel cell electric vehicle - Introduction to HEV- Brake specific fuel consumption - Comparison of Series-Parallel hybrid systems- Examples.

UNIT –4: BATTERY CHARGING AND CONTROL: (9)

Battery charging: Basic requirements- Charger architecture- Charger functions- Wireless charging- Power factor correction.

Control: Introduction- Modelling of electro mechanical system- Feedback controller design approach-

PI controller's designing- Torque-loop, Speed control loop compensation- Acceleration of battery electric vehicle

UNIT –5: ENERGY STORAGE TECHNOLOGIES: (9)

Role of Energy Storage Systems- Thermal- Mechanical-Chemical- Electrochemical- Electrical - Efficiency of energy storage systems- Super Capacitors-Superconducting Magnetic Energy Storage (SMES)- SOC- SoH -fuel cells - G2V- V2G- Energy storage in Micro-grid and Smart grid- Energy Management with storage systems- Battery SCADA

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	To understand and differentiate between Conventional Vehicle and Electric Vehicles, electro mobility and environmental issues of EVs	PO1, PO2, P03, PO4
CO2	Understand Various dynamics of Electric Vehicles	PO1, PO2, P03
CO3	To remember and understand various configurations in parameters of EV system and dynamic aspects of EV	PO1, PO2, P03, PO4
CO4	To analyze fuel cell technologies in EV and HEV systems	PO1, PO2, P03, PO4
CO5	To analyze the battery charging and controls required of EVs	PO1, PO2, P03,

TEXT BOOKS:

1. C.C Chan, K.T Chau: Modern Electric Vehicle Technology, Oxford University Press Inc., New York 2001,1st Edition
2. Ali Emadi, "Advanced Electric Drive Vehicles", CRC Press, 2017,1st Edition.

REFERENCE BOOKS:

1. Electric and Hybrid Vehicles Design Fundamentals, Iqbal Husain, CRC Press 2021, 3rd Edition.
2. Francisco Díaz-González, Andreas Sumper, Oriol Gomis-Bellmunt," Energy Storage in Power Systems" Wiley Publication, ISBN: 978-1-118-97130-7, Mar 2016,1st Edition
3. A.G.Ter-Gazarian, "Energy Storage for Power Systems", the Institution of Engineering and Technology (IET) Publication, UK, (ISBN – 978-1-84919-219-4), Second Edition, 2011.
4. Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, "Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 2004,1st Edition.
5. James Larminie, John Lowry, "Electric Vehicle Technology Explained", Wiley, 2003,2nd Edition.

ONLINE LEARNING RESOURCES:

1. https://nptel.ac.in/courses/108/102/108102121/
2. https://nptel.ac.in/syllabus/108103009

CO PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OEC472A	**TRANSDUCERS AND SENSORS (OPEN ELECTIVE IV)**	**L T P C** **3 - - 3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To understand characteristics of Instrumentation System and the operating principle of motion transducers.
2. To explore working principles, and applications of different temperature transducers and Piezo-electric sensors.
3. To provide knowledge on flow transducers and their applications.
4. To study the working principles of pressure transducers.
5. To introduce working principle and applications of force and sound transducers.

UNIT I -INTRODUCTION (9)

Introduction: General Configuration and Functional Description of measuring instruments, Static and Dynamic Characteristics of Instrumentation System, Errors in Instrumentation System, Active and Passive Transducers and their Classification.
Motion Transducers: Resistive strain gauge, LVDT, RVDT, Capacitive transducers, Piezo-electric transducers, seismic displacement pick-ups, vibrometers and accelerometers.

UNIT II - TEMPERATURE TRANSDUCERS (9)

Temperature Transducers: Standards and calibration, fluid expansion and metal expansion type transducers - bimetallic strip, Thermometer, Thermistor, RTD, Thermocouple and their characteristics.
Hall effect transducers, Digital transducers, Proximity devices, Bio-sensors, Smart sensors, Piezo-electric sensors.

UNIT III - FLOW TRANSDUCERS (9)

Flow Transducers: Bernoulli's principle and continuity, Orifice plate, Nozzle plate, Venture tube, Rotameter, Anemometers, Electromagnetic flow meter, Impeller meter and Turbid flow meter.

UNIT IV - PRESSURE TRANSDUCERS (9)

Pressure Transducers: Standards and calibration, different types of manometers, elastic transducers, diaphragm bellows, bourdon tube, capacitive and resistive pressure transducers, high and low pressure measurement.

UNIT V - FORCE AND SOUND TRANSDUCERS (9)

Force and Sound Transducers: Proving ring, hydraulic and pneumatic load cell, dynamometer and gyroscopes. Sound level meter, sound characteristics, Microphone**.**

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand characteristics of Instrumentation System and the operating principle of motion transducers.	**PO1, PO2**
CO2	Explore working principles, and applications of different temperature transducers and Piezo-electric sensors.	**PO1, PO2**
CO3	Gain knowledge on flow transducers and their applications.	**PO1, PO2**
CO4	Learn the working principles of pressure transducers.	**PO1, PO2**
CO5	Understand the working principle and applications of force and sound transducers.	**PO1, PO2**

TEXT BOOKS:

1. A.K. Sawhney, "A course in Electrical and Electronics Measurements and Instrumentation", Dhanpat Rai & Co. 3rd edition Delhi, 2010.
2. Rangan C.S, Sarma G.R and Mani V S V, "Instrumentation Devices and Systems", TATA McGraw Hill publications, 2007.

REFERENCE BOOKS:

1. Ramesh Doebelin. E.O, "Measurement Systems Application and Design", McGraw Hill International, New York, 2004.
2. Nakra B.C and Chaudhary K.K, "Instrumentation Measurement and Analysis", Second Edition, Tata McGraw-Hill Publication Ltd.2006.

REFERENCE WEBSITE:

1. https://onlinecourses.nptel.ac.in/noc23_ee105/preview
2. https://onlinecourses.nptel.ac.in/noc25_ee76/preview

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OME472A	FUNDAMENTALS OF QUALITY MANAGEMENT (OPEN ELECTIVE IV)	L	T	P	C
		3	-	-	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the fundamental concepts, definitions, and dimensions of quality and Total Quality Management (TQM).
2. To explore the evolution of quality management through historical perspectives and contributions of quality gurus.
3. To explain the core principles of TQM including customer satisfaction, employee involvement, and continuous improvement.
4. To analyze the various TQM tools such as Benchmarking, QFD, FMEA, Six Sigma, and their role in quality enhancement.
5. To provide an understanding of quality systems like ISO 9000, ISO 14000, QS 9000, and the processes for their implementation.

UNIT –1: INTRODUCTION TO QUALITY MANAGEMENT: (9)

Introduction: Definition of Quality, Dimensions of Quality, Definition of Total quality management, Quality Planning, Quality costs – Analysis, Techniques for Quality costs, Basic concepts of Total Quality Management.

UNIT –2: HISTORICAL REVIEW: (9)

Historical Review: Quality council, Quality statements, Strategic Planning, Deming Philosophy, Barriers of TQM Implementation, Benefits of TQM, Characteristics of successful quality leader, Contributions of Gurus of TQM, Case studies.

UNIT –3: PRINCIPLES OF QUALITY MANAGEMENT: (9)

TQM Principles: Customer Satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment teams, Continuous Process Improvement – Juran Trilogy, PDSA Cycle, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure Case studies.

UNIT –4: TQM TOOLS: (9)

TQM Tools: Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA, The seven tools of quality, Process capability, Concept of Six Sigma, New Seven management tools, Case studies.

UNIT –5: QUALITY SYSTEMS: (9)

Need for ISO 9000 – ISO 9001-2008 Quality System – Benefits of ISO registration – ISO 9000 series of standards – AS 9100, TS16949 and TL 9000 – ISO 9001 Requirements – Implementation – Documentation – Internal and external audits – Registration – TQM implementation in manufacturing and service sectors. Environmental Management System: Introduction – ISO 14000 Series Standards – Concepts of ISO 14001—Requirements of ISO 14001 – Benefits of EMS.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define and explain the basic concepts of quality, quality costs, and the scope of Total Quality Management.	L2,L4,L5
CO2	Summarize the philosophies and contributions of TQM pioneers and evaluate barriers and enablers for TQM implementation.	L4,L5,L6
CO3	Apply TQM principles such as employee empowerment, customer satisfaction, and supplier partnerships to real-world business scenarios.	L2,L3,L4
CO4	Analyze the application of tools like QFD, FMEA, Six Sigma, and Benchmarking in improving product and process quality	L3,L4,L5
CO5	Evaluate and formulate quality systems like ISO 9000 and ISO 14000, and design documentation and auditing processes.	L1,L3,L6

TEXT BOOKS:

1. Dale H Besterfield, Total Quality Management, Fourth Edition, Pearson Education, 2015.
2. Subburaj Ramaswamy, Total Quality Management, Tata Mcgraw Hill Publishing Company Ltd., 2005.
3. Joel E.Ross , Total Quality Management, Third Eition, CRC Press, 2017. Reference Books

REFERENCE BOOKS:

1. Narayana V and Sreenivasan N.S, Quality Management – Concepts and Tasks, New Age International, 1996.
2. Robert L.Flood, Beyond TQM, First Edition, John Wiley & Sons Ltd, 1993.
3. Richard S. Leavenworth & Eugene Lodewick Grant, Statistical Quality Control, Seventh Edition, Tata Mcgraw Hill, 2015
4. Samuel Ho , TQM – An Integrated Approach, Kogan Page Ltd, USA, 1995.

REFERENCE WEBSITE:

- **https://www.investopedia.com/terms/t/total-quality-management-tqm.asp**
- **https://blog.capterra.com/what-is-total-quality-management/**
- **https://nptel.ac.in/courses/110/104/110104080/**

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OSH472A	**FINANCIAL MATHEMATICS (OPEN ELECTIVE IV)**	**L T P C** **3 - - 3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide mathematical foundations for financial modelling, risk assessment and asset pricing.
2. To introduce stochastic models and their applications in pricing derivatives and interestrate modelling.
3. To develop analytical skills for fixed-income securities, credit risk, and investment strategies.
4. To equip students with computational techniques for pricing financial derivatives.

UNIT-I: ASSET PRICING AND RISK MANAGEMENT (09)

Fundamental financial concepts: Returns, arbitrage, valuation, and pricing. Asset/Liability management, investment income, capital budgeting, and contingent cash flows. One-period model: Securities, payoffs, and the no-arbitrage principle.Option contracts: Speculation and hedging strategies, CAP Model, Efficient market hypothesis.

UNIT-II: STOCHASTIC MODELS IN FINANCE (09)

Random Walks and Brownian Motion. Introduction to Stochastic Differential Equations (SDEs): Drift and diffusion. Ito calculus: Ito's Lemma, Ito Integral, and Ito Isometry.

UNIT-III: INTEREST RATE AND CREDIT MODELLING (09)

Interest rate models and bond markets. Short-rate models: Vasicek, Cox-Ingersoll-Ross (CIR), Hull & White models, Credit risk modelling: Hazard function and hazard rate.

UNIT-IV: FIXED-INCOME SECURITIES AND BOND PRICING (09)

Characteristics of fixed-income products: Yield, duration, and convexity. Yield curves, forward rates, and zero-coupon bonds. Stochastic interest rate models and bond pricing PDE. Yield curve fitting and calibration techniques, Mortgage Backed Securities.

UNIT-V:EXOTIC OPTIONS AND COMPUTATIONAL FINANCE (09)

Stochastic volatility models and the Feynman-Kac theorem.Exotic options: Barriers, Asians, and Look backs. Monte Carlo methods for derivative pricing, Black-Scholes-Merton model: Derivation and applications.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Explain fundamental financial concepts, including arbitrage, valuation, and risk.	PO1,PO2,PO5,PO11,PO12
CO2	Apply stochastic models, including Brownian motion and Stochastic Differential Equations (SDEs), in financial contexts.	PO1,PO2,PO3,PO4,PO5, PO11,PO12
CO3	Analyze mathematical techniques for pricing options and financial derivatives.	PO1,PO2,PO3,PO4,PO5,PO6, PO11,PO12
CO4	Evaluate interest rate models and bond pricing methodologies.	PO1,PO2,PO3,PO4,PO5, PO11,PO12
CO5	Utilize computational techniques such as Monte Carlo simulations for financial modeling.	PO1,PO2,PO3,PO4,PO5, PO11,PO12

TEXT BOOKS:

1. Ales Cerny,*Mathematical Techniques in Finance: Tools for Incomplete Markets*, Princeton University Press.
2. S.R.Pliska,*Introduction to Mathematical Finance: Discrete-TimeModels*, Cambridge University Press.

REFERENCE BOOKS:

1. Ioann is Karatzas & Steven E.Shreve, *Methods of Mathematical Finance*, Springer, NewYork.
2. John C.Hull,*Options,Futures,and Other Derivatives*, Pearson.

REFERENCE WEBSITE:

- MIT–Mathematics for Machine Learning https://ocw.mit.edu
- Coursera – Financial Engineering and Risk Management (Columbia University) https://www.coursera.org/
- National Stock Exchange (NSE) India-Financial Derivatives https://www.nseindia.com/

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OSH472B	**SENSORS AND ACTUATORS FOR ENGINEERING APPLICATIONS (OPEN ELECTIVE IV)**	**L**	**T**	**P**	**C**
		3	**-**	**-**	**3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To provide comprehensive exposure to various types of sensors and actuators, along with their engineering applications.
2. To impart fundamental knowledge of the laws and phenomena governing the operation of sensors and actuators.
3. To explain the working principles and functionality of different sensors and actuators.
4. To educate students on the fabrication techniques and processes involved in sensor development.
5. To identify and explain the appropriate sensors and actuators required for interdisciplinary applications.

UNIT-I -INTRODUCTION TO SENSORS AND ACTUATORS (9)

Sensors: Types of sensors: temperature, pressure, strain, active and passive sensors, General characteristics of sensors (Principles only), Deposition: Chemical Vapor Deposition, Pattern: photolithography and Etching: Dry and Wet Etching.

Actuators: Functional diagram of actuators, Types of actuators and their basic principle of working: Pneumatic, Electromagnetic, Piezo-electric and Piezo-resistive actuators, Applications of Actuators.

UNIT-II- TEMPERATURE AND MECHANICAL SENSORS (9)

Temperature Sensors: Types of temperature sensors and their basic principle of working: Thermo-resistive sensors: Thermistors, Thermo-electric sensors: Thermocouples, PN junction temperature sensors

Mechanical Sensors: Types of Mechanical sensors and their basic principle of working: Force sensors: Strain gauges, Tactile sensors, Pressure sensors: Piezoresistive, Variable Reluctance Sensor (VRP).

UNIT-III OPTICAL AND ACOUSTIC SENSORS (9)

Optical Sensors: Basic principle and working of: Photodiodes, Phototransistors and Photoresistors based sensors, Photomultipliers, Infrared sensors: thermal, Passive Infra-Red, Fiber based sensors and Thermopiles Acoustic Sensors: Principle and working of Ultrasonic sensors, Piezo-electric resonators, Microphones

UNIT-IV- MAGNETIC AND ELECTROMAGNETIC SENSORS (9)

Motors as actuators (linear, rotational, stepping motors), magnetic valves, inductive sensors (LVDT, RVDT, and Proximity), Hall Effect sensors, Magneto-resistive sensors, Magneto strictive sensors and actuators.

UNIT-V-CHEMICAL AND RADIATION SENSORS (9)

Chemical Sensors: Principle and working of Electro-chemical, Thermo-chemical, Gas, pH, Humidity and moisture sensors.

Radiation Sensors: Principle and working of Ionization detectors, Scintillation detectors, Semiconductor radiation detectors and Microwave sensors (resonant, reflection, transmission)

Total Hours: 45

COURSE OUTCOMES:

	On successful completion of the course, students will be able to	POs
CO1	Classify various types of sensors and actuators along with their key characteristics.	PO1,PO2,PO3, PO4,PO5
CO2	Review the working principles and applications of temperature and mechanical sensors.	PO1,PO2,Po3, PO4,PO5
CO3	Explain the construction and functionality of different optical and mechanical sensors.	PO1,PO2,Po3, PO4,PO5
CO4	Analyze the operational principles and applications of optical and acoustic sensors.	PO1,PO2,PO3, PO4
CO5	Interpret the significance of smart materials in the design and development of advanced devices.	PO1,PO2,PO3, PO4

TEXT BOOKS:
1. Sensors and Actuators – Clarence W. de Silva, CRC Press, 2nd Edition, 2015
2. Sensors and Actuators, D.A.Hall and C.E.Millar, CRC Press, 1999

REFERENCE BOOKS:
1. Sensors and Transducers- D.Patranabhis, Prentice Hall of India (Pvt) Ltd. 2003
2. Measurement, Instrumentation, and Sensors Handbook-John G.Webster, CRC press 1999
3. Sensors – A Comprehensive Sensors- Henry Bolte, John Wiley.
4. Handbook of modern sensors, Springer, Stefan Johann Rupitsch.

NPTEL COURSE LINK:
https://onlinecourses.nptel.ac.in/noc21_ee32/preview

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OSH472C	**CHEMISTRY OF NANOMATERIALS AND APPLICATIONS (OPEN ELECTIVE IV)**	**L**	**T**	**P**	**C**
		3	**-**	**-**	**3**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To understand basics and characterization of nanomaterials.
2. To understand synthetic methods of nanomaterials.
3. To apply various techniques for charterization of nanomaterials.
4. To understand Studies of Nano-structured Materials
5. To enumerate the applications of advanced nanomaterials in engineering

UNIT – I BASICS AND CHARACTERIZATION OF NANOMATERIALS [09]

Introduction**,** Scope of nanoscience and nanotechnology, nanoscience in nature, classification of nanostructured materials, importance of nanomaterials.

UNIT – II SYNTHESIS OF NANOMATERIALS [09]

Top-Down approach**,** Inert gas condensation, arc discharge method, aerosol synthesis, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, and chemical vapour deposition method, electrodeposition method, high energy ball milling method.

Synthetic Methods**:** Bottom-Up approach**,** Sol-gel synthesis, microemulsions or reverse micelles, co-precipitation method, solvothermal synthesis, hydrothermal synthesis, microwave heating synthesis and son chemical synthesis.

UNIT-III TECHNIQUES FOR CHARACTERIZATION [09]

Diffraction technique, spectroscopy techniques, electron microscopy techniques for the characterization of nanomaterials, BET method for surface area analysis, dynamic light scattering for particle size determination.

UNIT-IV STUDIES OF NANO-STRUCTURED MATERIALS [09]

Synthesis, properties and applications of the following nanomaterials -fullerenes, carbon nanotubes, 2D-nanomaterial (Graphene), core-shell, magnetic nanoparticles, thermoelectric materials, non-linear optical materials.

UNIT-V ADVANCED ENGINEERING APPLICATIONS OF NANOMATERIALS [09]

Applications of Nano Particle, nanorods, nano wires, Water treatment, sensors, electronic devices, medical domain, civil engineering, chemical engineering, metallurgy and mechanical engineering, food science, agriculture, pollutants degradation.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Classify the nanostructure materials; describe scope of nanoscience and importance technology.	PO1, PO2, PO3, PO4, PO5, PO7
CO2	Describe the top-down approach, explain aerosol synthesis and plasma arc technique, differentiate chemical vapor deposition method and electrode position method, Discuss about high energy ball milling.	PO1, PO2, PO3, PO4, PO5, PO7
CO3	Discuss different technique for characterization of nanomaterial, explain electron microscopy techniques for characterization of nanomaterial, Describe BET method for surface area analysis.	PO1, PO2, PO3, PO4, PO5, PO7
C04	Explain synthesis and properties and applications of nanomaterials, discuss about fullerenes and carbon nanotubes, Differentiate nanomagnetic materials and thermoelectric materials, nonlinear optical materials.	PO1, PO2, PO3, PO4, PO5, PO7
CO5	Illustrate advance engineering applications of Water treatment, sensors, electronic devices, medical domain, civil engineering, chemical engineering, metallurgy and mechanical engineering, food science, agriculture, pollutants degradation.	PO1, PO2, PO3, PO4, PO5, PO7

TEXT BOOKS:

1. **NANO: The Essentials:** T Pradeep, MaGraw-Hill, 2007.
2. **Textbook of Nanoscience and nanotechnology:** B S Murty, P Shankar, Baldev Rai, BB Rath and James Murday, Univ. Press, 2012.

REFERENCES:

1. Concepts of Nano chemistry; LudovicoCademrtiri and Geoffrey A. Ozin& Geoffrey A. Ozin, Wiley-VCH, 2011.
2. **Nanostructures &Nanomaterials; Synthesis, Properties & Applications:** Guozhong Cao, Imperial College Press, 2007.

CO-PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OSH472D	LITERARY VIBES (OPEN ELECTIVE IV)	L	T	P	C
		3	-	-	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To inculcate passion for a esthetic sense and reading skills
2. To encourage respecting others' experiences and creative writing
3. To explore emotions ,communication skills and critical thinking
4. To educate how books serve as the reflection of history and society
5. To provide practical wisdom and duty of responding to events of the times

UNIT I:POETRY

1. Ulysses-Alfred Lord Tennyson
2. Night of the Scorpion – Nissim Ezekiel
3. The Second Coming-W.B.Yeats
4. Where the Mind is Without Fear-Rabindranath Tagore

UNIT II :DRAMA: TWELFTH NIGHT-WILLIAM SHAKESPEARE

1. Shakespeare-life and works
2. Plot &sub-plot and Historical background of the play
3. Themes and Criticism
4. Style and literary elements
5. Characters and characterization

UNIT III: SHORT STORY

1. The Luncheon-Somerset Maugham
2. The Happy Prince-Oscar Wild
3. Three Questions–Leo Tolstoy
4. Grief–Antony Chekov

UNIT IV: PROSE:ESSAY AND AUTOBIOGRAPHY

1. My Early Days – Dr. A.P.J. Abdul Kalam
2. The English Teacher – R.K, Narayan
3. The story of My Life-Helen Keller
4. Student Mobs-JB Priestly

UNIT V :NOVEL :A TALE OF TWO CITIES-CHARLES DICKENS

1. Charles Dickens-Life and works
2. Plot and Historical background of the novel
3. Themes and criticism
4. Style and literary elements
5. Characters and characterization

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POS
CO1	Identify genres, literary techniques and creative uses of language in literary texts.	PO1,
CO2	Explain the relevance of themes found in literary texts to contemporary, Personal and cultural values and to historical forces.	PO4
CO3	Apply knowledge and understanding of literary texts when Responding to others' problems and their own and make evidence–based arguments.	PO6,PO10
C04	Analyze the under lying meanings of the text by using the elements of literary texts	PO5
CO5	Evaluate their own work and that of others critically	PO12

TEXT BOOKS:

1. Charles Dickens**.** *Hard Times.*(Sangam A bridged Texts)VantagePress,1983
2. DENTJC.*WilliamShakespeare.TwelfthNight***.**OxfordUniversityPress,2016.

REFERENCES:

1. W Jong. *History of English Literature***,** Rupa Publications India; First Edition (4October 2015)
2. R K Kaushik And S C Bhatia. *Essays, Short Stories and One Act Plays*, Oxford University Press .2018.
3. Dhanvel,SP.*EnglishandSoftSkills*,OrientBlackswan,2017.
4. *NewHorizon*,Pearsonpublications,NewDelhi2014
5. VimalaRamarao,*ExplorationsVolume*-II,PrasarangaBangaloreUniversity,2014**.**
6. DevNeira,Anjana&Co.*CreativeWriting:ABeginner'sManual.*PearsonIndia, 2008.

ONLINE RESOURCES

https://www.litcharts.com/poetry/alfred-lord-tennyson/ulysseshttps://www.litcharts.com/lit/ain-t-i-a-woman/summary-and-analysishttps://englishliterature.education/articles/poetry-analysis/the-second-coming-by-w-b-yeats-critical-analysis-summary-and-line-by-line-explanation/#google_vignettehttps://sirjitutorials.com/where-the-mind-is-without-fear-poem-notes-explanation/https://www.litcharts.com/lit/twelfth-night/themes
https://smartenglishnotes.com/2021/11/28/the-luncheon-summary-characters-themes-and-irony/https://onlinecourses.nptel.ac.in/noc21_hs76/previewhttps://archive.nptel.ac.in/courses/109/107/109107172/#https://archive.nptel.ac.in/courses/109/104/109104107/

CO-PO MAPPING:

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23OPEN472	INTRODUCTION TO QUANTUM COMPUTING (OPEN ELECTIVE IV)	L	T	P	C
		3	-	-	3

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To introduce the principles and mathematical foundations of quantum computation.
2. To understand quantum gates, circuits, and computation models.
3. To explore quantum algorithms and their advantages over classical ones.
4. To develop the ability to simulate and write basic quantum programs.
5. To understand real-world applications and the future of quantum computing in AI, cryptography, and optimization.

UNIT I: FUNDAMENTALS OF QUANTUM MECHANICS AND LINEAR ALGEBRA (9)

Classical vs Quantum Computation, Complex Numbers, Vectors, and Matrices, Hilbert Spaces and Dirac Notation, Quantum States and Qubits, Superposition and Measurement, Tensor Products and Multi-Qubit Systems.

UNIT II: QUANTUM GATES AND CIRCUITS (9)

Quantum Logic Gates: Pauli, Hadamard, Phase, Controlled Gates and CNOT, Unitary Operations and Reversibility, Quantum Circuit Representation, Quantum Teleportation, Simulation of Quantum Circuits.

UNIT III: QUANTUM ALGORITHMS AND COMPLEXITY (9)

Quantum Parallelism and Interference, Deutsch and Deutsch-Jozsa Algorithms, Grover‵s Search Algorithm, Shor‵s Factoring Algorithm, Quantum Fourier Transform, Complexity Classes: BQP, P, NP, and QMA.

UNIT IV: QUANTUM PROGRAMMING AND SIMULATION PLATFORMS (9)

Introduction to Qiskit and IBM Quantum Experience, Writing Quantum Circuits in Qiskit, Measuring Qubits and Results, Classical-Quantum Hybrid Programs, Noisy Intermediate-Scale Quantum (NISQ) Systems, Limitations and Current State of Quantum Hardware.

UNIT V: APPLICATIONS AND FUTURE OF QUANTUM COMPUTING (9)

Quantum Machine Learning: Basics and Models, Quantum Cryptography and Quantum Key Distribution, Quantum Algorithms in AI and Optimization, Quantum Advantage and Supremacy, Ethical and Societal Impact of Quantum Technologies, Future Trends and Research Directions.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Explain the fundamental concepts of quantum mechanics used in computing.	**PO1, PO2**
CO2	Construct and analyze quantum circuits using standard gates.	**PO1, PO2, PO3, PO5**
CO3	Apply quantum algorithms like Deutsch-Jozsa, Grover‵s, and Shor‵s.	**PO1, PO2, PO3, PO4, PO5**
CO4	Develop simple quantum programs using Qiskit or similar platforms.	**PO2, PO3, PO4, PO5**
CO5	Analyze applications and challenges of quantum computing in real-world domains.	**PO2, PO4**

TEXT BOOKS:

1. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 10th Anniversary Edition, 2010.
2. Eleanor Rieffel and Wolfgang Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
3. Chris Bernhardt, Quantum Computing for Everyone, MIT Press, 2019.

REFERENCE BOOKS:

1. David McMahon, Quantum Computing Explained, Wiley, 2008.
2. Phillip Kaye, Raymond Laflamme, Michele Mosca, An Introduction to Quantum Computing, Oxford University Press, 2007.
3. Scott Aaronson, Quantum Computing Since Democritus, Cambridge University Press, 2013.

REFERENCE WEBSITE:

1. IBM Quantum Experience and Qiskit Tutorials
2. Coursera – Quantum Mechanics and Quantum Computation by UC Berkeley
3. edX – The Quantum Internet and Quantum Computers
4. YouTube – Quantum Computing for the Determined by Michael Nielsen
5. Qiskit Textbook – IBM Quantum
6.

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	–	–	–	–	–	–	–	–	–	–
CO.2	3	3	2	2	2	–	–	–	–	–	–	–
CO.3	3	3	2	2	2	–	–	–	–	–	–	–
CO.4	3	2	3	3	3	–	–	–	–	–	–	–
CO.5	2	3	2	2	2	–	–	–	–	–	–	–
CO*	2.8	2.6	2.25	2.25	2.25	–	–	–	–	–	–	–

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23CSE356L	**FULL STACK DEVELOPMENT- II**	**L T P C**
	SKILL ENHANCEMENT COURSE	**0 - 3 1.5**

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Make use of Modern- day JavaScript with ES6 standards for designing Dynamic web pages
2. Building robust & responsive User Interfaces using popular JavaScript library ‗**React.js**‘. Building robust backend APIs using ‗**Express. js**‘
3. Establishing the connection between frontend (React) Use interfaces and bac

LIST OF EXPERIMENTS:

1. **Introduction to Modern JavaScript and DOM**

a) Write a JavaScript program to link JavaScript file with the HTML page
b) Write a JavaScript program to select the elements in HTML page using selectors
c) Write a JavaScript program to implement the event listeners
d) Write a JavaScript program to handle the click events for the HTML button elements
e) Write a JavaScript program to With three types of functions
   i. Function declaration
   ii. Function definition
   iii. Arrow functions

2. **Basics of React. Js**

a) Write a React program to implement a counter button using react class components
b) Write a React program to implement a counter button using react functional components
c) Write a React program to handle the button click events in functional component
d) Write a React program to conditionally render a component in the browser
e) Write a React program to display text using String literals

3. **Important concepts of React. js**

a) Write a React program to implement a counter button using React use State hook
b) Write a React program to fetch the data from an API using React use Effect hook
c) Write a React program with two react components sharing data using Props.
d) Write a React program to implement the forms in react
e) Write a React program to implement the iterative rendering using map() function.

4. Introduction to Node. js and Express. js

a) Write a program to implement the ‗hello world‘ message in the route through the browser using Express
b) Write a program to develop a small website with multiple routes using Express. Js
c) Write a program to print the ‗hello world‘ in the browser console using Express. Js
d) Write a program to implement the CRUD operations using Express. Js
e)Write a program to establish the connection between API and Database using Express – My SQL driver

5. Introduction to My SQL

a) Write a program to create a Database and table inside that database using My SQL Command line client

b) Write a My SQL queries to create table, and insert the data, update the data in the table

c) Write a My SQL queries to implement the subqueries in the My SQL command line client

d) Write a My SQL program to create the script files in the My SQL workbench

e) Write a My SQL program to create a database directory in Project and initialize a database. sql file to integrate the database into API

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Demonstrate knowledge on web page design elements	PO1
CO2	Analyze user requirements to develop web applications.	PO2
CO3	Design client-server applications using web technologies.	PO3
CO4	Manually Test the functionality of the web application	PO4
CO5	select appropriate design tools and procedure to implement web applications	PO5
CO6	Follow ethical principles in designing, and implementing various Technologies.	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments	PO10
CO9	Continue updating their skill related to various web technologies for implementation of various web applications during their life time	PO12

TEXT BOOKS:

1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas

2. John Dean, Web Programming with HTML5, CSS and JavaScript, Jones & Bartlett Learning, 2019.

3. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node, Vasan Subramanian, 2nd edition, APress, O'Reilly.

4. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by- Step Guide to Creating Dynamic Websites by Robin Nixon

5. AZAT MARDAN, Full Stack Java Script: Learn Back bone. js, Node.jsand Mongo DB.2015

REFERENCE BOOKS:

1. Full-Stack JavaScript Development by Eric Bush.

2. Programming the World Wide Web, 7th Edition, Robet W Sebesta, Pearson, 2013.

3.Tomasz Dyl , Kamil Przeorski , Maciej Czarnecki, Mastering Full Stack React Web Development 2017

ONLINE LEARNING RESOURCES:

1. https://ict.iitk.ac.in/product/full-stack-developer-html5- css3- js-bootstrap-php-4/
2. https://www.w3schools.com/html
3. https://www.w3schools.com/css
4. https://www.w3schools.com/js/
5. https://www.w3schools.com/nodejs
6. https://www.w3schools.com/typescript

CO PO MAPPING:

CO\PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	O8	PO 9	PO1 0	PO1 1	PO1 2
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VII SEMESTER

23MAC471U	GENDER SENSITIZATION	L T P C
		2 0 0 0

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To enable students to understand the gender related issues, vulnerability of women and men
2. To familiarize them about constitutional safeguard for gender equality
3. To expose the students to debates on the politics and economics of work
4. To help students reflect critically on gender violence
5. To make them understand that gender identities and gender relations are part of culture as they shape the way daily life is lived in the family as well as wider community and the workplace.

UNIT-1UNDERSTANDING GENDER (9)

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male .First lessons in Caste.

UNIT-2 GENDER ROLES AND RELATIONS (9)

Two or Many?-Struggles with Discrimination-Gender Roles and Relations – Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and its Consequences-Declining Sex Ratio- Demographic Consequences - Gender Spectrum .

UNIT-3 GENDER AND LABOUR (9)

Division and Valuation of Labour - Housework: The Invisible Labor- ―My Mother doesn‗t Work.‖ ―Share the Load.‖ -Work: Its Politics and Economics-Fact and Fiction-Unrecognized.

UNIT-4 GENDER-BASED VIOLENCE (9)

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment - Domestic Violence - Different forms of violence against women - Causes of violence, impact of violence against women - Consequences of gender-based violence

UNIT-5 GENDER AND CULTURE (9)

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues - Gender Issues -Gender Sensitive Language- Just Relationships

Total Hours:45

COURSE OUTCOMES:

At the end of the course , students will be able to		POs
CO1	Understand the basic concepts of gender and its related terminology.	PO2
CO2	Identify the biological , sociological ,psychological and legal aspects of gender.	PO5
CO3	Use the knowledge in understanding how gender discrimination works in our society and how to counter it.	PO2
CO4	Analyze the gendered division of labour and its relation to politics and economics.	PO6,PO10
CO5	Appraise how gender-role beliefs and sharing behavior are associated with more well-being in all culture and gender groups.	PO4
CO6	Develop students ' sensibility with regard to issues of gender in Contemporary India.	PO4

TEXT BOOK:

1. A.Suneetha, Uma Bhrugubanda,etal. Towards a World of Equals: A Bilingual Text book on Gender, Telugu Akademi, Telangana, 2015.
2. Butler,Judith. Gender Trouble: Feminism and the Sub version of Identity. UK Paper back Edn. March 1990

REFERENCE BOOKS:

1. Wtatt,RobinandMassood,Nazia,BrokenMirrors:TheldowryProblemsinIndia,London : Sage Publications, 2011
2. Datt,R.and Kornberg,J.(eds),Women in Developing Countries, Assessing Strategies for Empowerment, London: Lynne Rienner Publishers, 2002
3. Brush,LisaD.,GenderandGovernance,NewDelhi,RawatPublication,2007
4. Singh,Direeti,WomenandPoliticsWorldWide,NewDelhi,AxisPublications,2010
5. Raj Pal Singh, Anupama Sihag , Gender Sensitization: Issues and Challenges(English, Hardcover), Raj Publications, 2019
6. A.Revathy & Murali, Nandini,ALifein Trans Activism(Lakshmi Narayan Tripathi). The University of Chicago Press, 2016

ONLINE RESOURCES:

Understanding Gender chrome-extension://kdpelmjpfafjppnhbloffcjpeomlnpah/https://www.arvindguptatoys.com/arvindgupta/kamla-gender1.pdf
https://onlinecourses.swayam2.ac.in/nou24_hs53/preview**Gende**

CO PO MAPPING:

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

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VIII SEMESTER

23CSD481P **INTERNSHIP** **L T P C**
0 0 24 4

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Objective is to give an opportunity to the student to get hands on training from industry / research and development center.
2. The course is designed so as to expose the students to industry environment / research environment and to take up on-site assignment as trainees or interns.

INTERNSHIP SCHEME:

1. At the end of the Industrial Internship, the candidate shall submit a certificate from the organization where he/she has undergone industrial training and also a brief report.
2. An industry internship report to be submitted by the individual and along with the internship certificate provided by the organization, which will be reviewed and evaluated by a Committee constituted by the Head of the Department.
3. The evaluation for 100 marks will be carried out internally based on this internship report and a Viva-Voce Examination will be conducted by a Departmental Committee constituted by the Head of the Department/Institution.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate in-depth knowledge on the project topic	PO1
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	PO2
CO3	Design solutions to the chosen project problem.	PO3
CO4	Undertake investigation of project problem to provide valid conclusions	PO4
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work	PO5
CO6	Apply project results for sustainable development of the society.	PO6
CO7	Understand the impact of project results in the context of environmental sustainability.	PO7
CO8	Understand professional and ethical responsibilities while executing the project work.	PO8
CO9	Function effectively as individual and a member in the project team	PO9
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	PO10
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	PO11
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.	PO12

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	3	-	-	-	-	-	-
CO7	-	-	-	-	-	-	3	-	-	-	-	-
CO8	-	-	-	-	-	-	-	3	-	-	-	-
CO9	-	-	-	-	-	-	-	-	3	-	-	-
CO10	-	-	-	-	-	-	-	-	-	3	-	-
CO11	-	-	-	-	-	-	-	-	-	-	3	-
CO12	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DATA SCIENCE
IV B. TECH.-VIII SEMESTER

23CSD482P	PROJECT WORK	L T P C
		0 0 0 8

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:

1. Discovering potential research areas in the field of Mechanical Engineering.
2. Comparing and contrast the several existing solutions for the problem identified.
3. Formulating and propose a plan for creating a solution for the research plan identified.
4. Conducting the experiments as a team and interpret the results.
5. Reporting and presenting the findings of the work conducted.

PROJECT WORK SCHEME:

1. The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design / fabrication / analysis for a specific application, a research project with a focus on an application needed by the industry / society, a computer project, a management project or a design and analysis project. A project topic must be selected by the students in consultation with their guides.
2. A candidate may, however, in certain cases, be permitted to work on projects in an Industrial/ Research Organization, on the recommendations of the Head of the Department Concerned. In such cases, the Project work shall be jointly supervised by a supervisor of the department and an expert, as a joint supervisor from the organization and the student shall be instructed to meet the supervisor periodically and to attend the review committee meetings for evaluating the progress.
3. To train the students in preparing project reports and to face reviews and viva voce examination. The progress of the project is evaluated based on a minimum of three reviews.
4. As per the guidelines given the project report must be prepared and submitted to the Head of the department before the Viva-Voce Examination.
5. The student shall make presentation on the progress made before the Committee.
6. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated jointly by external and internal examiners constituted by the Head of the Department based on oral presentation and the project report.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate in-depth knowledge on the project topic	PO1
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	PO2
CO3	Design solutions to the chosen project problem.	PO3
CO4	Undertake investigation of project problem to provide valid conclusions	PO4
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work	PO5
CO6	Apply project results for sustainable development of the society.	PO6
CO7	Understand the impact of project results in the context of environmental sustainability.	PO7
CO8	Understand professional and ethical responsibilities while executing the project work.	PO8
CO9	Function effectively as individual and a member in the project team	PO9
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	PO10
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	PO11
CO12	Engage in lifelong learning to improve knowledge and competence in the chosen area of the project.	PO12

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	3	-	-	-	-	-	-
CO7	-	-	-	-	-	-	3	-	-	-	-	-
CO8	-	-	-	-	-	-	-	3	-	-	-	-
CO9	-	-	-	-	-	-	-	-	3	-	-	-
CO10	-	-	-	-	-	-	-	-	-	3	-	-
CO11	-	-	-	-	-	-	-	-	-	-	3	-
CO12	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**