ACADEMIC REGULATIONS-R20
COURSE STRUCTURE AND DETAILED SYLLABI

B. TECH REGULAR (FULL-TIME) FOUR YEAR DEGREE PROGRAMME
(FOR THE BATCHES ADMITTED FROM THE ACADEMIC YEAR 2022-23)

BACHELOR OF TECHNOLOGY
FOR

B. Tech Regular (Full-Time) Four Year Degree Courses

(For the Batches Admitted From 2022-2023)

&

B. Tech (Lateral Entry Scheme)

(For the Batches Admitted From 2023-2024)

COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING(AI)
SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
Accredited by NBA, New Delhi & NAAC, Bengaluru │Affiliated to JNTUA, Ananthapuramu, Recognized by the UGC under Section 12 (B) and 12 (F)│ Approved by AICTE, New Delhi.
R.V.S. NAGAR, TIRUPATI ROAD, CHITTOOR – 517 127 (A.P) – INDIA

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FOREWORD

The autonomy conferred Sri Venkateswara College Engineering and technology by JNT University, Ananthapuramu based on performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms the monitoring bodies UGC and AICTE. It reflects the confidence of the affiliating University in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Sri Venkateswara College of Engineering and Technology is proud to win the confidence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, the standards and ethics it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education.

As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTUA, Ananthapuramu to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several expertise

solicited from academics, industry and research, to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications needed are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and brighter prospects of engineering graduates.

Principal

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
R.V.S. NAGAR, CHITTOOR-517 127, ANDHRA PRADESH
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE)

Vision, Mission, Quality Policy of the Institute

Vision

- To carve the youth as dynamic, competent, valued and knowledgeable professionals who shall lead the Nation to a better future and to mould the institution into a Academic Excellence and Advanced Research.

Mission

- To provide quality education, student-centered teaching- learning processes and state-of-art infrastructure for professional aspirants hailing from both rural and urban areas.
- To impart technical education that encourages independent thinking, develops strong domain of knowledge, own contemporary skills and positive attitudes towards holistic growth of young minds.

Quality policy

Sri Venkateswara College of Engineering and Technology strides towards excellence by adopting a system of quality policies and processes with continued improvements to enhance student's skills and talent for their exemplary contribution to the society, the nation and the world.

Vision and Mission of the Department under R20 Regulations

Vision:

- To develop as a Centre of Excellence in the diverse areas of Computer Sciences through teaching, innovation, research and collaboration there by addressing the challenges of emerging needs.

Mission:

- Produce globally competent professionals in through delivering knowledge in emerging technologies of computer science to solve realworld problems.
- Develop domain and research skills that enable them to undertake challenging careers and pursue Higher Education.
- Imbibe morals and values among students for developing a strong professional etiquette and with a zeal for continuous learning.
- Create an ecosystem for faculty to develop further in domain competence, research aptitude and pedagogical skills.
- Develop infrastructure and facilities for different academic and research activities.

Program Educational Objectives (PEOs) under R20 Regulations

Program Educational Objectives (PEOs):

PEO1: To be able to solve wide range of computing related problems to cater to the needs of industry and society.

PEO2: Enable students to build intelligent machines and applications with a cutting-edge combination of machine learning, analytics and visualization.

PEO3: Produce graduates having professional competence through life-long learning such as advanced degrees, professional skills and other professional activities related globally to engineering & society.

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Program Specific Outcomes (PSOs) under R20 Regulations

Program Specific Outcomes (PSOs):

After successful completion of the program the graduates will be able to

PSO1: Should have an ability to apply technical knowledge and usage of modern hardware and software tools related AI for solving real world problems.

PSO2: Should have the capability to develop many successful applications based on machine learning methods, AI methods in different fields, including neural networks, signal processing and data mining

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(**Affiliated to J.N.T. University Anantapur, Ananthapuramu).**

ACADEMIC REGULATIONS (R20) for

B.Tech Regular (Full - Time) Four Year Degree Program

(For the batches admitted from the academic year 2020-21)

and

B.Tech. (Lateral Entry Scheme)

(For the batches admitted from the academic year 2021-22)

1. Applicability : All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2020-2021 onwards. Any reference to "College" in these rules and regulations stands for Sri Venkateswara College of Engineering and Technology (Autonomous).

2. Extent : All the rules and regulations, specified herein after shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, Principal, Sri Venkateswara College of Engineering and Technology (A) shall be the Chairman of the Academic Council.

3. Admission :

3.1 Admission into first year of Four Year B.Tech., Degree Program of study in Engineering:

3.1.1 Eligibility: A candidate seeking admission into the first year of four year B.Tech., Degree Program should have Passed either Intermediate Public Examination conducted by the Board of Intermediate Education, Government of Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination recognized by the Board of Intermediate Education and JNTUA, Ananthapuramu) or Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or equivalent Diploma recognized by State Board of Technical Education, Government of Andhra Pradesh and JNTUA, Ananthapuramu) for admission.

3.1.2 Admission Procedure:

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year of four year B.Tech., Degree Program as follows:

Seats under various categories are filled as per the norms prescribed by the Government of Andhra Pradesh.

3.2 Admission into the second year of four Year B.Tech., Degree Program (Lateral Entry Scheme) in Engineering:

3.2.1 Eligibility: Candidates qualified in ECET (FDH) and / or admitted by the Convener, ECET (FDH). In all such cases for admission, when needed, Permissions from the statutory bodies are to be obtained.

3.2.2 Admission Procedure: Lateral Entry seats are filled as per the norms prescribed by the Government of Andhra Pradesh from time to time.

4. Programs of study offered leading to the award of B.Tech degree:

1. B.Tech (Civil Engineering)
2. B.Tech (Electrical and Electronics Engineering)
3. B.Tech (Mechanical Engineering)
4. B.Tech (Electronics and Communication Engineering)
5. B.Tech (Computer Science and Engineering)
6. B.Tech (Information Technology)
7. B.Tech (Computer Science and Engineering (Artificial Intelligence and Machine Learning))
8. B.Tech (Computer Science and Engineering (Data Science))

5. Choice Based Credit System:

The Indian Higher Education Institutions (HEI's) are changing from the conventional course structure to Choice Based Credit System (CBCS) along with introduction to semester system at first year itself. The semester system helps in accelerating the teaching-learning process and enables vertical and horizontal mobility in learning.

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and adopt an interdisciplinary approach to learning.

Choice Based Credit System (CBCS) is a flexible system of learning and provides choice for students to select from the prescribed elective courses. A course defines learning objectives and learning outcomes and comprises of Lectures / Tutorials / Laboratory Work / Field Work / Project Work / MOOCS / Internship / Comprehensive Examination / Seminars / Presentations / self-study etc. or a combination of some of these.

Under the CBCS, the requirement for awarding a degree is prescribed in terms of number of credits to be completed by the students.

The CBCS permits students to:

1. Choose electives from a wide range of elective courses offered by the departments.
2. Undergo additional courses of interest.
3. Adopt an interdisciplinary approach in learning.
4. Make the best use of expertise of the available faculty.

6. Medium of instruction:

The medium of instruction shall be English for all courses, examinations, seminar presentations and project work. The curriculum will comprise courses of study as given in course structure, in accordance with the prescribed syllabi.

7. Types of Courses:

Courses in a programme may be of five kinds: **Foundation, Skill, Core, Elective and Mandatory.**

7.1 Foundation / Skill Course:

Foundation courses are the courses based upon the content leads to enhancement of skill and knowledge. Skill subjects are those areas in which one needs to develop a set of skills to learn anything at all. They are fundamental to learn any subject.

7.2 Core Course:

There may be a core course in every semester. This is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

7.3 Elective Course:

Electives provide breadth of experience in respective branch and applications areas. Elective course is a course which can be chosen from a pool of courses. It may be:

- Supportive to the discipline of study
- Providing an expanded scope
- Enabling an exposure to some other discipline / domain
- Nurturing student's proficiency / skill.

An elective may be discipline centric (Professional Elective) focusing on those courses which add generic proficiency to the students or may be chosen from an interdisciplinary area called as "Open Elective".

There are five professional elective groups. Students can choose not more than one elective from each of the five groups. Also there are four open elective groups, students can choose not more than one elective from each of the four groups.

8. Academic Year:

8.1 Course Duration:

8.1.1 Course duration for B. Tech program of study is 4 years and the maximum duration to complete the program is 8 years excluding the gap year.

8.1.2 For lateral entry students the course duration is 3 years and the maximum duration to complete the program is 6 years excluding the gap year.

8.2 Each academic year is divided into two semesters and each semester shall have a minimum of 16 Instructional Weeks.

9. Unique course identification code:

Every course of the B. Tech program will be placed in one of the eleven groups of courses as listed in the table 1. The various courses and their two-letter codes are given below.

Table 1: Group of Courses

S.No.	Branch	Code
1	Civil Engineering	CE
2	Electrical and Electronics Engineering	EE
3	Mechanical Engineering	ME
4	Electronics and Communication Engineering	EC
5	Computer Science and Engineering	CS
6	Information Technology	IT
7	Computer Science and Engineering (Artificial Intelligence and Machine Learning)	CM

8	Computer Science and Engineering (Data Science)	CD
9	Humanities and Basic Sciences	HS
10	MBA	MB
11	MCA	MC

10. Curriculum and Course Structure:

The curriculum shall comprise Foundation / Skill Courses, Core Courses, Elective Courses, Laboratory Courses, Audit Courses, Mandatory Courses, Comprehensive Examination / Mini Project, Internship and Project work. The list of elective courses may include subjects from allied disciplines also.

Assigning of Credits: Depending on the complexity and volume of the course, the number of contact hours per week will be assigned. Each Theory and Laboratory course carries credits based on the number of hours/weeks as follows.

- **Contact classes (Theory):** 1 credit per lecture hour per week.
- **Laboratory Hours (Practical):** 1 credit for 2 Practical hours, per week.

10.1 Course Structure:

Every program of study shall be designed to have 38-42 theory courses and 17-22 laboratory courses. Every course of the B.Tech program will be placed in one of the eight categories with average credits as listed in the Table 2. In this, a student has to carry out a mini project, project work and comprehensive Examination also.

Table 2: Category-wise Distribution of Credits

S.No.	Category	Subject Area and % of Credits	Average No. of Credits
1	Humanities and Social Sciences (HS), including Management courses	HS (05% to 10%)	10.5
2	Basic Sciences (BS) including Mathematics, Physics and Chemistry.	BS (15% to 20%)	21
3	Engineering Sciences (ES), including Workshop, Drawing, Basics of Electrical / Electronics / Mechanical / Computer Engineering.	ES (15% to 20%)	24
4	Professional Subjects-Core (PC), relevant to the chosen specialization / branch.	PC (30% to 40%)	51

5	Professional Elective Courses (PE), relevant to the chosen Specialization / branch.	PE (10% to 15%)	15
6	Open Elective Courses (OE), from other technical and / or emerging Subject area.	OE (05% to 10%)	12
7	Project Work, Internship Mini Project / Comprehensive Examination.	10% to 15%	16.5
8	Mandatory Courses	MC	Non-credit
9	Skill Oriented Courses	SC	10
TOTAL			**160**

10.2 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., as per the guidelines issued by AICTE.

10.3 All undergraduate students shall register for NCC / NSS activities. A student will be required to participate in an activity for two hours in a week during second and third semesters. Grade shall be awarded as Satisfactory or Unsatisfactory in the grade sheet on the basis of participation, attendance, performance and behavior. If a student gets an unsatisfactory Grade, he shall repeat the above activity in the subsequent semesters, in order to complete the degree requirements.

10.4 Courses like Environmental Science, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc., are included in the curriculum as non-credit mandatory courses. Environmental Science is offered as mandatory course for all branches. A student has to secure 40% of the marks allotted in the internal evaluation for passing the course. No marks or letter grade shall be allotted for all mandatory non-credit courses.

10.5 There shall be 05 Professional Elective courses and 04 Open Elective courses. All the Professional & Open Elective courses shall be offered for 03 credits. All Open Electives are offered to students of all branches in general. However, a student shall choose an open Elective from the list in such a manner that he has not studied the same course in any form during the Programme.

10.6 A student shall be permitted to pursue up to a maximum of two open elective courses under MOOCs during the Programme as mentioned in course structure. Each of the courses must be of minimum 8 - 12 weeks in duration. Attendance will not be monitored for MOOC courses. Student has to pursue and acquire a certificate for a MOOC course only from the

Organizations/agencies approved by the BoS in order to earn the 3 credits. The Head of the department shall notify the list of such courses at the beginning of the semester.

10.6.1 In case a student fails to complete the MOOC / MOOCs in the stipulated semester he has to re-register and complete the same. In case any provider discontinues the course, Institution shall allow the student to opt for any other course from the list provided by the department from time to time.

10.6.2 Students have to acquire a certificate from the agencies approved by the BOS with grading or percentage of marks in order to earn 3 credits.

10.6.3 The certificate submitted by the student will be duly verified and attested by the concerned BOS chairman, and the same will be forwarded to examination branch before the end of the stipulated semester.

10.7 The department shall invite registration forms from the students at the beginning of the semester for offering professional and open elective courses. Elective course shall be offered by the Department only if a minimum of 20 percent of students in the class / section strength register for that course.

10.8 Students shall undergo mandatory summer internships for a minimum of six weeks duration at the end of second and third year of the Programme. There shall also be mandatory full internship in the final semester of the Programme along with the project work.

10.9 There shall be 05 skill-oriented courses offered during II B.Tech I Semester to IV B.Tech I Semester. Among the five skill courses, four courses shall focus on the basic and advanced skills related to the domain courses and the remaining one shall be a soft skills course.

10.10 Under graduate Degree with Honors/Minor shall be issued by the University, upon the recommendation of the college, to the students who fulfill all the academic eligibility requirements for the B.Tech program and Honors/Minor program. The objective is to provide additional learning opportunities to academically motivated students.

11. Evaluation Methodology:

11.1 Theory Course:

Each theory course will be evaluated for a total of 100 Marks, with 40 Marks for Continuous Internal Assessment (CIA) and 60 Marks for Semester End Examination (SEE).

11.2 Continuous Internal Assessment (CIA):

The distribution of marks for Continuous Internal Assessment is as follows:

Two Sessional Examinations: 30 Marks

Five Assignments	: 10 Marks
	40 Marks

11.3 Question Paper Pattern for Sessional Examinations:

11.3.1 Each sessional exam question paper consists of two parts, namely Part A and Part B. Part A is compulsory which carries 10 marks and consists of five short answer type questions with each carrying 2 marks. In Part B, 4 essay type questions with internal choice (either or type) each carrying 5 marks may be given. The questions may be set as per Bloom'sTaxonomy. Time duration for each sessional exam is 2 hours. Internal marks for sessional examinations shall be arrived at by considering the marks secured by the student in both the sessional examinations with 80% weightage to the better sessional exam and 20% to the other.

11.3.2 Five assignments, each one for 10 marks shall be given to the students at the end of each unit. Internal marks for the assignments shall be awarded by considering the average of the five assignments.

11.4 Semester End Examination (SEE):

The SEE is conducted for 60 marks of 3 hours duration. The syllabus for the theory course is divided into FIVE units. SEE Question Paper consists of two parts, Part A and Part B.

Part A consists of 05 short answer type questions, each carries 2 marks for a total of 10 marks with no choice.

Part B Consists of 5 questions with one question from each of the 5 units with internal choice with 10 marks for each question.

The emphasis on the questions is broadly based on objective skill, analytical skill and application skill following the outcome based education.

11.5 Laboratory Course:

Each Laboratory Course will be evaluated for a total of 100 marks, consisting of 40 marks for internal assessment (CIA) and 60 marks for semester end lab examination. Out of 40marks of CIA, continuous lab assessment (SEE) for day to day performance will be done for 20 marks, final internal lab examination carries 15 marks and Viva-Voce carries 5 marks. The semester end lab examination for 60 marks shall be conducted by two examiners, one of them being internal examiner (subject teacher) and the other being external examiner (other than the teacher handled) to be nominated by the Principal from the panel of experts as recommended by the Chairman, BOS. The scheme of valuation for the 60 Marks will be informed to the students in advance by the concerned Chairman, BOS and displayed in the laboratory during the beginning of the semester.

11.6. Drawing Courses:

All the **drawing** related courses are evaluated in line with laboratory courses. The distribution shall be 40 marks for internal evaluation (20 marks for day to day work and 20 marks for final internal test) and 60 marks for semester end examinations.

- **Question paper pattern for drawing courses will be followed as mentioned in the syllabus.**

  The following course is considered as theory subject, but for all practical purposes examination will be conducted like practical.

  i. Computer Aided Engineering Drawing

11.7 Mandatory Courses:

Mandatory courses will not carry any credits; but, a pass in the examination during the programme shall be necessary requirement for student to qualify for the award of Degree. The student is declared pass in each such course after securing 40% of the marks in internal examination. Evaluation will be done by conducting descriptive examination at the end of the semester for 100 marks, internally. Its result shall be declared with "satisfactory" (Pass) or Not Satisfactory (Fail) performance. Attendance is mandatory for these courses**.**

The examination will be conducted for 100 marks of 3 hours duration. The syllabus for the course is divided into FIVE units. The Question Paper consists of two parts, Part A and Part B. Part A consists of 5 short answer type questions, each carries 5 marks for a total of 25 marks with no choice. Part B Consists of 5 questions with one question from each of the 5 units with internal choice with 15 marks for each question.

The emphasis on the questions is broadly based on objective skill, analytical skill and application skill following the outcome based education.

11.8 Community Service Project: Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships.

11.9 Project Work:

There shall be a Project Work in the IV year second semester which carries 12 credits. Out of 100 marks allotted for the project work, 40 marks shall be for Internal Evaluation and 60 marks for the End Semester Examination (Viva – Voce). The Viva – Voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner nominated by the

Principal from the panel of examiners recommended by Chairman, BOS. The Evaluation of project work shall be conducted at the end of the IV year – II semester. The Internal Evaluation shall be made by the departmental committee, on the basis of two seminars given by each student on the topic of his project.

11.10 Framework for Mandatory Internships:

11.10.1 Two summer internships each with a minimum of six weeks duration, done at the end of second and third years, respectively are mandatory. The internship can be done by the students at local industries, Govt. Organizations, construction agencies, Industries, Hydel and thermal power projects and also in software MNCs.

11.10.2 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. The report and the oral presentation shall carry 40% and 60% weightages respectively.

11.10.3 In the final semester, the student should mandatorily undergo internship and parallelly he 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. Theproject report shall be evaluated with an external examiner.

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

11.11 Framework for Skill Oriented Courses:

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

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

11.11.3 A pool of interdisciplinary job-oriented skill courses shall be designed by a Common Board of studies by the participating departments / disciplines and the syllabus along with the prerequisites shall be prepared for each of the laboratory infrastructure

Requirements. The list of such courses shall be included in the curriculum structure of each branch of Engineering, so as to enable the student to choose from the list.

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

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

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

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

11.11.8 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. There commended conversions and appropriate grades/marks are to be approved by the Academic Council.

11.12 Gap Year:

Gap Year – concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after II year to pursue entrepreneurship full time. 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 HOD of the respective department shall forward such proposals submitted by the students to the Principal. An evaluation committee shall be constituted by the Principal to evaluate the proposal submitted by the student and the committee shall decide whether or not to permit student (s) to avail the Gap Year.

11.13 Frame work for Minor Degree in a Discipline (Minor Degree / Programme):

The concept of Minor degree is introduced in the curriculum of all B. Tech. programs offering a Major degree. The main objective of Minor degree in a discipline is to provide additional learning opportunities for academically motivated students and it is an optional feature of the B.Tech Program. In order to earn a Minor degree in a discipline, a student has to

earn 20 extra credits, by studying FIVE courses each carrying four credits (in each course, three credits for theory and one credit for lab).

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

b) Student can also opt for industry relevant tracks of any branch to obtain the minor degree. For example, a B.Tech Mechanical Engineering student can opt for the industry relevant tracks like Data Mining track, IOT track, Machine learning track, etc.

11.13.1 Students having a CGPA of 8.0 or above up to II B.Tech I-Semester without any backlogs shall be permitted to register for Minor degree.

11.13.2 An SGPA and CGPA of 8.0 has to be maintained in the subsequent semesters without any backlog subjects in order to keep the Minor discipline registration live or else it shall be cancelled.

11.13.3 Students aspiring for a Minor degree must register from II B.Tech II-Semester onwards and must opt for a Minor in a discipline other than the discipline he is registered in or any industry relevant track of any branch.

11.13.4 The Evaluation pattern of the courses shall be similar to the regular program courses evaluation.

11.13.5 Minimum strength required for offering a Minor in a discipline is considered as 20% of the class size and Maximum should be 80% of the class size.

11.13.6 Minor degree program should be completed by the end of IV B. Tech I-Semester.

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

11.13.8 The Minor degree shall be mentioned in the degree certificate as Bachelor of Technology in XXX with Minor in YYY. For example, Bachelor of Technology in Computer Science & Engineering with Minor in Electronics & Communication Engineering or the chosen industry relevant track. This shall also be reflected in the transcripts, along with the list of courses taken for Minor degree program with CGPA mentioned separately.

11.13.9 Separate course/class work and time table shall be arranged for the various Minor degree programs. Attendance regulations for these Minor discipline programs shall be as per regular courses.

NOTE: Interested meritorious students shall be permitted to register either for Minor degree in a discipline or industry relevant track of any branch (or) Honors Degree in a discipline only, but not both.

11.14 Framework for Honors Degree in a Discipline:

11.14.1 This concept is introduced in the curriculum for all conventional B. Tech. programmes.

The main objective of Honors degree in a discipline is to provide additional learning opportunities for academically motivated students and it is an optional feature of the B. Tech. programme. In order to earn a Honors degree in his/her discipline, a student has to earn 20 extra credits by studying five advanced courses each carrying four credits for 20 credits in the concerned branch of Engineering. In place of advanced courses, he can study equivalent MOOC courses available under SWAYAM / Other platform, as decided by the institution from time to time. The Evaluation pattern of theory subjects will be similar to the regular programme evaluation. Students aspiring for Honors degree must register from II B.Tech, II Semester onwards. However, Honors degree registrations are not allowed before II B.Tech, II Semester and after III B.Tech, I Semester.

11.14.2 Students having a CGPA of 8.0 or above up to II year-I semester and without any backlog subjects will be permitted to register for degree with Honors. The SGPA and CGPA of 8.0 has to be maintained in the subsequent semesters without any backlog subjects in order to keep the degree with Honors registration live or else it will be cancelled.

NOTE: Interested meritorious students shall be permitted to register either for Honors degree or Minor degree in a discipline or industry relevant track of any branch but not both.

12. Attendance Requirements and Detention Policy:

12.1 A student shall be eligible to appear for Semester – End examinations if he acquires a minimum of 40% in each subject and 75% of attendance in aggregate of all the subjects in a semester.

12.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted on medical grounds by the College Academic Committee. A stipulated fee shall be payable towards condonation of shortage of attendance to the College.

12.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned and the candidate will be detained.

12.4 Detained students are not eligible to take their end examination of that class and their registration shall stand cancelled.

12.5 A student detained due to shortage of attendance, will have to repeat that semester when offered next.

13. Conduct of Semester End Examination and Evaluation:

13.1 Semester end examination shall be conducted by the Controller of Examination (COE) by inviting 50% Question Papers from the External and 50% Question papers from the Internal Subject Experts. Principal will decide the External and Internal subject experts.

13.2 The answer papers of semester end examination should be evaluated externally / internally.

13.3 The marks for the internal evaluation components will be added to the external evaluation marks secured in the Semester – End examinations, to arrive at total marks for any subject in that semester.

13.4 Performance in all the subjects is tabulated program-wise and will be scrutinized by the office of the Controller of Examinations. Total marks obtained in each subject areconverted into letter grades. Finally subject-wise marks and grades details, subject-wise and branch-wise pass percentages are calculated through software.

13.5 Results Committee:

Results Committee comprising of Principal, Controller of Examinations, Additional Controller of Examinations (Confidential), One Senior Professor nominated by the Principal and the University Nominee will oversee the details of marks, grades and pass percentages of all the subjects and branch-wise pass percentages.

13.6 Office of the Controller of Examinations will generate student-wise result sheets and the same will be published through college website.

13.7 Student-wise Grade Sheets are generated and issued to the students.

14. Academic Requirements for Promotion / Completion of Regular B.Tech Programme of Study:

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion / completion of regular B.Tech Program of study.

14.1 For Students Admitted in B.Tech (Regular) Program:

i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design drawing subject or project, if he secures not less than 35%of marks in the Semester End examination and a minimum of 40% of marks in the sum total of the internal evaluation and Semester-End examination taken together.

ii. A student shall be promoted from second year to third year only if he fulfills the academic requirement of securing **33** credits from:

a) Two Regular and two Supplementary Examinations of I-Year I Semester.
b) Two Regular and one Supplementary Examinations of I-Year II Semester.
c) One Regular and one Supplementary Examination of II-Year I semester.
d) One Regular Examination of II-Year II Semester.

Irrespective of whether the candidate appear for Semester-End Examination or not as per the normal course of study.

iii. A student shall be promoted from third year to fourth year Program of study only if he fulfills the academic requirements of securing **50** credits from:

a) Three Regular and Three Supplementary Examinations of I-Year I Semester.
b) Three Regular and Two Supplementary Examinations of I-Year II Semester
c) Two Regular and Two Supplementary Examination of II-Year I Semester.
d) Two Regular and One Supplementary Examinations II-Year II Semester.
e) One Regular and One Supplementary examination of III-Year I Semester.
f) One Regular Examination of III-Year II semester.

Irrespective of whether the candidate appears for the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits by sections 14.1 (ii) and 14.1 (iii) above, the student may make up the credits through supplementary examinations before the date of commencement of class work for III Year I Semester or IV Year I Semester as the case may be.

iv. A student shall register for all the **160** credits and earn all the **160** credits. Marks obtained in all the **160** credits shall be considered for the award of the class based on CGPA.

v. A student who fails to earn **160** credits as indicated in the course structure within eight academic years from the year of his admission shall forfeit his seat in B. Tech., Program and his admission stands cancelled.

vi. A student will be eligible to get under graduate degree with Honours or additional Minor Engineering, if he completes an additional **20** credits.

vii. A student will be permitted to register either for Honours degree or additional Minor Engineering but not both.

14.2 For Lateral Entry Students:

i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the Semester-End examination and a minimum of 40% of marks in thesum total of the internal evaluation and Semester-End examination taken together.

ii. A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing **34** credits from the following examinations.

a) Two Regular and Two Supplementary Examinations of II Year I Semester.
b) Two Regular and One Supplementary Examination of II Year II Semester.
c) One Regular and One Supplementary Examination of III Year I Semester.
d) One Regular Examination of III-Year II Semester.

Irrespective of whether the candidate appear the Semester-End examination or not as per the normal Course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV Year I Semester.

iii. A student shall register for all **121** credits and earn all the **121** credits. Marks obtained in all **121** credits shall be considered for the award of the class based on CGPA.

iv. A student who fails to earn **121** credits as indicated in the course structure within six academic years from the year of his admission shall forfeit his seat in B.Tech. Program and his admission stands cancelled.

v. A student will be eligible to get under graduate degree with Honours or additional Minor Engineering, if he completes an additional **20** credits.

vi. A student will be permitted to register either for Honours degree or additional Minor Engineering but not both.

15. Letter Grades and Grade Points:

15.1 Performances of students in each course are expressed in Letter Grades based on absolute grading system. The UGC recommends a 10-point grading system with the following letter grades as given in the Table 3.

Table 3: Grade Points Scale (Absolute Grading)

Percentage of Marks	Grade Point	Letter Grade
90-100	10	S (Outstanding)
80-89	9	A+ (Excellent)
70-79	8	A (Very Good)
60-69	7	B+ (Good)
50-59	6	B (Above Average)
45-49	5	C (Average)
40-44	4	D (Pass)
Below 40	0	F (Fail)
Absent	0	N (Absent)

15.2 A student obtaining Grade F shall be considered Failed and will be required to re-appear in the examination.

15.3 For non credit courses, 'P' for 'Satisfactory' or 'F' for 'Not Satisfactory' is indicated and this will not be counted for the computation of SGPA / CGPA.

15.4 At the end of each semester, the institute issues grade sheet indicating the SGPA and CGPA of the student. However, grade sheet will not be issued to the student if he has any outstanding dues.

16.0 Computation of SGPA and CGPA:

16.1 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.

$$SGPA = \Sigma (C_i \times G_i) / \Sigma C_i$$

where, Ci is the number of credits of the ith subject and Gi is the grade point scored by the student in the ith course

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

$$CGPA = \Sigma (Ci \times Si)/ \Sigma Ci$$

where 'Si' is the SGPA of the i^{th} semester and Ci is the total number of credits in that semester

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

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

16.5 Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

16.6 Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters S, A+, A, B+, B, C, D, F and N.

16.7 As per AICTE regulations, conversion of CGPA into equivalent percentage is as follows:

Equivalent Percentage to SGPA = (SGPA – 0.50) x 10

Equivalent Percentage to CGPA = (CGPA – 0.50) x 10

17. Grade Sheet:

A grade sheet will be issued to each student indicating his performance in all subjects registered in that semester indicating the SGPA and CGPA. SGPA and CGPA will be rounded off to the second place of decimal.

18. Consolidated Grade Sheet:

After successful completion of the entire Program of study, a Consolidated Grade Sheet containing performance of all academic years will be issued as a final record. Transcripts will also be issued, if required, after payment of requisite fee.

19. Award of Degree:

The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendation of the Principal of SVCET (Autonomous), Chittoor

19.1 Eligibility:

A student shall be eligible for the award of B.Tech Degree if he fulfills all the following conditions:

- Registered and successfully completed all the components prescribed in the program of study for which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 4.0 (Minimum requirement for declaring as passed.)

19.2. Award of Class:

Declaration of Class is based on CGPA

Cumulative Grade Point Average	Class
≥7.5	First Class with Distinction
≥6.5 and<7.5	First Class
≥5.5 and <6.5	Second Class
≥4.0 and<5.5	Pass Class

20. Personal Verification /Recounting / Revaluation / Final Valuation

20.1 Personal Verification of Answer Scripts:

Candidates appear in a particular semester end examination may appeal for verification of their answer script(s) for arithmetic correction in totaling of marks and any omission / deletion in evaluation as per the notifications issued from time to time in the prescribed proforma and by paying the prescribed fee per answer script.

It is clarified that personal verification of answer script shall not tantamount to revaluation of answer script. This is only a process of reverification by the candidate. Any mistake / deficiency with regard to arithmetic correction in totaling of marks and any omission / deletion in evaluation if found, the institution will correct the same.

20.2 Recounting / Revaluation:

Students shall be permitted for request for recounting/revaluation of the Semester-End examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the same will be intimated to the students.

20.3 Final Valuation:

Students shall be permitted for request for final valuation of the Semester–End Examination answer scripts within a stipulated period after the publication of the revaluation results by paying the necessary fee. The final valuation shall be carried out by an expert not less than Associate Professor as per the scheme of valuation supplied by the examination branch in the presence of the student, Controller of Examinations and Principal. However, students are not permitted to discuss / argue with the examiner. If the increase in marks after final valuation is equal to or more than 15% of the previous valuation marks, the marks obtained after final valuation shall be treated as final. If the variation of marks after final valuation is less than 15% of the previous valuation marks, then the earlier valuation marks shall be treated as the final marks.

21. Supplementary Examinations:

In addition to the regular semester-end examinations conducted, the college may also schedule and conduct supplementary examinations for all the courses of other semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

22. Termination from the Program:

The admission of a student to the program may be terminated and the student is askedto leave the institute in the following circumstances:

a. The student fails to satisfy the requirements of the program within the maximum period stipulated for the program.
b. The student fails to satisfy the norms of discipline specified by the institute from time to time.

23. With-Holding of Results:

If the candidate has not paid any dues to the institute / if any case of indiscipline / malpractice is pending against him, the results of the candidate will be withheld. The issue of the degree is liable to be withheld in such cases.

24. Graduation Day:

The institute shall have its own annual Graduation Day for the award of Provisional Certificates to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute. The college shall institute prizes and medals to meritorious students and award them annually at the Graduation Day. This will greatly encourage the students to strive for excellence in their academic work.

25. Discipline:

Every student is required to observe discipline and decorum both inside and outside the institute and not to indulge in any activity which will tend to bring down the honor of the institute. If a student indulges in malpractice in any of the theory / practical examination, continuous assessment examinations he shall be liable for punitive action as prescribed by the Institute from time to time.

26. Grievance Redressal Committee:

The institute shall form a Grievance Redressal Committee for each course in each department with the Course Teacher and the HOD as the members. This Committee shall solve all grievances related to the course under consideration.

27. Transitory Regulations:

Students who got detained for want of attendance (or) who have 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 and they continue to be in the academic regulations of the batch they join later. A regular student has to satisfy all the eligibility requirements within the maximum stipulated period of eight years, and a lateral entry student within six years, for the award of B.Tech Degree.

28. Mode of Learning:

Preferably 50% course work for the Theory courses in every semester shall be conducted in the blended mode of learning. If the blended learning is carried out in online mode, then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

29. Student Transfers:

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

Students admitted on transfer from JNTU affiliated institutes, Universities and other institutes are required to pass all the subjects studied in the previous institution. Further, the students who have passed some of the subjects at the earlier institution, if the same subjects are prescribed in different semesters in the transferred institutions, the student has to study the substitute subjects as prescribed by concerned 'Board of Studies'.

30. General Instructions:

i. The academic regulations should be read as a whole for purpose of any interpretation.
ii. Disciplinary action for Malpractice/improper conduct in examinations is appended.
iii. Where the words " he" , " him" , " his" , occur in the regulations, they include" she" , " her"," hers" .
iv. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
v. The Principal may change or amend the academic regulations of common BOS 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 Principal.
vi. The above rules and regulations are to be approved/ratified by the College Academic Council as and when any modification is to be done.

FAILURE TO READ AND UNDERSTAND THE REGULATIONS IS NOT AN EXCUSE

ANNEXURE – I

COMMUNITY SERVICE PROJECT

Allocation of Community Service Project for the students will be done as per the decision of the concerned BOS Chairman

Introduction:

Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.

Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.

Community Service Project is meant to link the community with the college for mutual benefit. The community will be benefited with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and also emerge as a socially responsible institution.

Objective:

Community Service Project should be an integral part of the curriculum, as an alternative to the 2months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;

- To sensitize the students to the living conditions of the people who are around them,
- To help students to realize the stark realities of the society.
- To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability.
- To make students aware of their inner strength and help them to find new /out of box solutions to the social problems.
- To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.

- To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project:

- Every student should put in a minimum of 180 hours for the Community Service Project during the summer vacation.

- Each class/section should be assigned with a mentor.

- Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, house-wives, etc

- A log book has to be maintained by each of the student, where the activities undertaken/involved to be recorded.
- The log book has to be countersigned by the concerned mentor/faculty in-charge.

- Evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.

- The final evaluation to be reflected in the grade memo of the student.

- The Community Service Project should be different from the regular programmes of NSS / NCC / Green Corps / Red Ribbon Club etc.,

- Minor project report should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.

- Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training

Procedure:

- A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, so as to enable them to commute from their residence and return back by evening or so.

• The Community Service Project is a twofold one –

- First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the village or ward volunteers, rather, it could be another primary source of data.

- *Secondly, the student/s could take up a social activity, concerning their domain or* subject area. The different areas, could be like –

  - *Agriculture*
  - *Health*
  - *Marketing and Cooperation*
  - *Animal Husbandry*
  - *Horticulture*
  - *Fisheries*
  - *Sericulture*
  - *Revenue and Survey*
  - *Natural Disaster Management*
  - *Irrigation*
  - *Law & Order*
  - *Excise and Prohibition*
  - *Mines and Geology*
  - *Energy*
  - *Internet*
  - *Free Electricity*
  - *Drinking Water*

EXPECTED OUTCOMES:

BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS:

Learning Outcomes:

- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development
- Improved ability to understand complexity and ambiguity Personal Outcomes
- Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
- Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills Social Outcomes
- Reduced stereotypes and greater inter-cultural understanding
- Improved social responsibility and citizenship skills
- Greater involvement in community service after graduation Career Development
- Connections with professionals and community members for learning and career opportunities
- Greater academic learning, leadership skills, and personal efficacy can lead to greater Opportunity Relationship with the Institution
- Stronger relationships with faculty
- Greater satisfaction with college
- Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS:

- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providing networking opportunities with engaged faculty in other disciplines or institutions
- A stronger commitment to one's research

BENEFITS OF COMMUNITY SERVICE PROJECT TO THE INSTITUTION:

- Improved institutional commitment
- Improved student retention
- Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY:

- Satisfaction with student participation
- Valuable human resources needed to achieve community goals
- New energy, enthusiasm and perspectives applied to community work
- Enhanced community-university relations.

RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices / Improper Conduct	Punishment
	If the candidate	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

5.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
6.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred and forfeits of seat.
7.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is anoutsider, he will be handed over to the police and a case is registered against him.
8.	Refuses to obey the orders of the Chief Superintendent / Assistant –Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against

	in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction or property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	them.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Examination committee for further action to award suitable punishment.	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING(AI)

Induction Program: 3 weeks

(Common for All Branches of Engineering)

Semester-0 **Regulations: R20**

S.No	Category	Course code	Course title	Hours per week			Credits
				L	T	P	
1	MC		Physical Activities -- Sports, Yoga and Meditation, Plantation	0	0	6	0
2	MC		Career Counselling	2	0	2	0
3	MC		Orientation to all branches - career options, tools, etc.	3	0	0	0
4	EC		Orientation on admitted Branch --corresponding labs, tools and platforms	2	0	3	0
5	ES		Proficiency Modules & Productivity Tools	2	1	2	0
6	MC		Assessment on basic aptitude and mathematical skills	2	0	3	0
7	MC		Remedial Training in Foundation Courses	2	1	2	0
8	MC		Human Values & Professional Ethics	3	0	0	0
9	BS		Communication Skills focus on Listening, Speaking, Reading, Writing skills	2	1	2	0
10	ES		Concepts of Programming	2	0	2	0
Total				**20**	**3**	**22**	**0**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE)

Course Structure & Scheme of Examination

I B.Tech I Semester-CSE (AI) **Regulations: R20**

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
1	BS	20AHS02	Differential Equations and Multivariable calculus	3	1	0	3	40	60	100
2	BS	20AHS03	Engineering Chemistry	3	0	0	3	40	60	100
3	ES	20ACS01	C Programming and Data Structures	3	1	0	3	40	60	100
4	HS	20AHS01	Communicative English	3	0	0	3	40	60	100
5	ES	20ACS02	Computational Thinking	3	1	0	3	40	60	100
6	BS	20AHS06	Engineering Chemistry Lab	0	0	3	1.5	40	60	100
7	ES	20ACS03	C Programming and Data Structures Lab	0	0	3	1.5	40	60	100
8	HS	20AHS05	Communicative English Lab	0	0	3	1.5	40	60	100
9	MC	20AMB01	Design Thinking	2	0	0	-	100	00	100
			TOTAL	**17**	**3**	**9**	**19.5**	**420**	**480**	**900**

I B.Tech II Semester-CSE (AI) **Regulations: R20**

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
1	ES	20AME01	Computer Aided Engineering Drawing	1	0	4	3	40	60	100
2	BS	20AHS04	Engineering Physics	3	0	0	3	40	60	100
3	BS	20AHS08	Algebra and Transformation Techniques	3	1	0	3	40	60	100
4	ES	20AEE05	Basic Electrical Engineering	3	1	0	3	40	60	100
5	ES	20ACS04	Problem Solving and Programming using Python	3	1	0	3	40	60	100
6	ES	20AME02	Engineering Practice Lab	0	0	3	1.5	40	60	100
7	ES	20ACS05	Problem Solving and Programming using Python Lab	0	0	3	1.5	40	60	100
8	BS	20AHS07	Engineering Physics Lab	0	0	3	1.5	40	60	100
9	MC	20AHS09	Environmental Sciences	2	0	0	-	100	00	100
10		20ANSS1/ 20ANCC1	NSS/NCC	0	0	2	-			
			TOTAL	**15**	**3**	**15**	**19.5**	**420**	**480**	**900**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence)

II B.Tech., I Semester -CSE(AI) **Regulations: R20**

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
1	BS	20AHS10	Numerical Methods	3	0	0	3	40	60	100
2	PC	20ACS06	Computer Organization and Architecture	3	0	0	3	40	60	100
3	PC	20ACS07	Object Oriented programming through JAVA	3	0	0	3	40	60	100
4	PC	20AIT01	Automata & Compiler Design	3	0	0	3	40	60	100
5	PC	20ACS08	Relational Database Management Systems	3	0	0	3	40	60	100
6	PC LAB	20ACS09	Object Oriented Programming through JAVA Lab	0	0	3	1.5	40	60	100
7	PC LAB	20AIT02	Automata& Compiler Design Lab	0	0	3	1.5	40	60	100
8	PC LAB	20ACS10	Relational Database Management Systems Lab	0	0	3	1.5	40	60	100
9	SC	20ACS11	Android Application Development	1	0	2	2	40	60	100
10	MC	20AMB02	Universal Human Values-I	2	0	0	Non-credit	100	00	100
11	AC	20AHS11	Quantitative Aptitude and Reasoning-I	2	0	0	Non-credit	-	-	-
12		20ANSS1/ 20ANCC1	NSS/NCC	0	0	2	Non-credit	-	-	-
			TOTAL	**20**	**00**	**13**	**21.5**	**460**	**540**	**1000**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence)

II B.Tech., II Semester -CSE(AI) **Regulations: R20**

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination Max. Marks		
				L	T	P				
1	BS	20AHS13	Probability and Statistics	3	0	0	3	40	60	100
2	ES	20AHS14	Discrete Structures and Graph Theory	3	0	0	3	40	60	100
3	PC	20ACS12	Design and Analysis of Algorithms	3	0	0	3	40	60	100
4	PC	20ACS13	Operating Systems	3	0	0	3	40	60	100
5	PC	20AIT04	Software Engineering	3	0	0	3	40	60	100
6	ES/PCLAB	20ACS14	Design and Analysis of Algorithms lab	0	0	3	1.5	40	60	100
7	PCLAB	20ACS15	Operating Systems Lab	0	0	3	1.5	40	60	100
8	PCLAB	20AIT05	Software Engineering Lab	0	0	3	1.5	40	60	100
9	SC	20ACA01	**Computational Intelligence Practice**	1	0	2	2	40	60	100
10	AC	20AHS15	Quantitative Aptitude and Reasoning-II	2	0	0	Non-credit	-	-	-
			TOTAL	**18**	**00**	**11**	**21.5**	**360**	**540**	**900**
Honor Degree hours distribution **4-0-0-4**										
Minor General Degree hours distribution **3-0-2-4** and Minor Industrial Relevant Track Degree hours distribution										
Internship2 Months (Mandatory) during summer vacation/Community Service project										

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence)

III B.Tech., I Semester -CSE(AI) **Regulations: R20**

S.NO	Category	Course code	CourseTitle	Hours perweek			Credits	Scheme of Examination Max.Marks		
				L	T	P		CIA	SEE	Total
1	HS	20AMB03	Managerial Economics and Financial Analysis	3	0	0	3	40	60	100
2	PC	20ACS33	Artificial Intelligence	3	0	0	3	40	60	100
3	PC	20ACS17	Computer Networks	3	0	0	3	40	60	100
4	PE	**Professional Elective Courses-I**		3	0	0	3	40	60	100
		20ACA02	**Knowledge Representation and Reasoning**							
		20ACA03	**LINUX Programming**							
		20ACA04	**Essentials of Natural Language Processing**							
		20ACS43	Big Data Analytics							
		20ACA05	**AI in Visual Recognition**							
5	OE/JOE	**Open Elective/Job Oriented Elective -I**		3	0	0	3	40	60	100
		20AEC45	Microprocessors and Interfacing							
		20ACE35	Integrated Waste Management for Smart City							
		20AME31	Operation Research							
		20ACO32	**Arduino Programming for IoT Boards**							
		20ACM10	Virtual and Augmented reality							
6	PCLAB	20ACA06	**Artificial Intelligence Practice Lab**	0	0	3	1.5	40	60	100
7	PCLAB	20ACS26	Computer Networks Lab	0	0	3	1.5	40	60	100
8	SC	20ACA07	**Pattern Recognition Tools**	1	0	2	2	40	60	100
9	MC	20AHS21	Indian Constitution	2	0	0	-	100	-	100
10	AC	20AHS17	Quantitative Aptitude and Reasoning-III	2	0	0	-	100	-	100
11	AC	20AHS18	French Language	2	0	0	-	-	-	-
		20AHS19	German Language							
		20AHS20	Japanese Language							
12	20ACA08/20ACA09		Summer Internship / Community Service Project	0	0	0	1.5	40	60	100
			TOTAL	22	00	8	**21.5**	**460**	**540**	**1000**

HonorDegreehoursdistribution**3-1-0-4**

Minor General Degree hours distribution **3-0-2-4** and Minor Industrial Relevant Track Degree hours distribution **3-1-0-4**

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III B.Tech., II Semester -CSE(AI) **Regulations: R20**

S.NO	Category	Course code	Course Title	Hours perweek			Credits	Scheme of Examination Max.Marks		
				L	T	P		CIA	SEE	Total
1	PC	20ACS29	Data Warehousing and Data Mining	3	0	0	3	40	60	100
2	PC	20ACS34	Machine Learning	3	0	0	3	40	60	100
3	PC	20ACA10	**Essentials of Artificial Neural Networks**	3	0	0	3	40	60	100
4	PE	**Professional Elective Courses-II**		3	0	0	3	40	60	100
		20ACA11	**Game Theory**							
		20ACA12	**Programming Using R**							
		20ACA13	**Natural Language Processing Models**							
		20ACS47	NoSQL Databases							
		20ACM22	AI in Speech Processing							
5	OE/JOE	**Open Elective/Job Oriented Elective -II**		3	0	0	3	40	60	100
		20AEC37	Wireless Communication Systems							
		20AMB09	Intellectual Property Rights							
		20ACE36	Disaster Management							
		20ACS28	Internet of Things							
		20ACA14	**IoT Domain Analysis**							
6	PCLAB	20ACS35	Data Warehousing and Data Mining Lab	0	0	3	1.5	40	60	100
7	PCLAB	20ACA15	**Machine Learning Lab**	0	0	3	1.5	40	60	100
8	PCLAB	20ACA16	**Artificial Neural Networks Lab**	0	0	3	1.5	40	60	100
9	SC	20AHS16	Advanced English Communication Skills	1	0	2	2	40	60	100
10	MC	20AHS23	Essence of Indian Traditional Knowledge	2	0	0	-	100	-	100
TOTAL				18	0	11	**21.5**	**460**	**540**	**1000**

Honor Degree hours distribution 3-1-0-4

Minor General Degree hours distribution3-0-2-4 and Minor Industrial Relevant Track Degree hours distribution 3-1-0-4

Industrial/Research Internship (Mandatory)2 Months during summer vacation (to be evaluated during IV year I Sem)

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence)

IV B.Tech., I Semester -CSE(AI) **Regulations: R20**

S.No	Category	Course code	Course Title	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
1	H & SSE	**Humanities and social science Elective**		3	0	0	3	40	60	100
		20AMB04	Creativity and Innovation							
		20AMB05	Leadership Essentials							
		20AMB06	Law for Engineers							
		20AMB07	Entrepreneurship Essentials							
		20AMB08	Essential of Management Science							
2	PE	**Professional Elective Courses-III**		3	0	0	3	40	60	100
		20ACA17	**Cognitive Systems**							
		20ACA18	**Prolog Programming**							
		20ACA19	**Nature Inspired Algorithms**							
		20ACA20	**Automation of Model Building**							
		20ACA21	**Text Processing using AI**							
3	PE	**Professional Elective Courses-IV**		3	0	0	3	40	60	100
		20ACS46	Computer Vision							
		20ACA22	**LISP Programming**							
		20ACA23	**Bio Inspired Algorithms**							
		20ACA24	**Predictive Analytics**							
		20ACA25	**AI in Cyber Security**							
4	PE	**Professional Elective Courses-V**		3	0	0	3	40	60	100
		20ACM08	Deep Learning							
		20ACA26	**Programming for Data Science**							
		20ACA27	**NLP for Robotics**							
		20ACA28	**Recommender Systems Using ML and AI**							
		20ACA29	**AI for Robotics**							
5	OE/JOE	**Open Elective/ Job Oriented Elective -III**		3	0	0	3	40	60	100
		20AEC56	Embedded Systems							
		20AME54	Optimization Techniques							
		20AMB10	Industrial Marketing							
		20ACS49	DevOps							
		20ACA30	**MATLAB programming for Engineers**							
6	OE/JOE	**Open Elective/ Job Oriented Elective -IV**		3	0	0	3	40	60	100
		20AEC51	Digital Image Processing							
		20AMB11	Social Media Marketing							
		20AME20	Total Quality Management and Reliability Engineering							
		20ACA31	**Game Programming**							

		20ACO25	**Industrial IoT**							
7	SC	20ACA32	**Generative AI Modeling Using Python**	1	0	2	2	40	60	100
8	MC	20AMB12	Professional Ethics	2	0	0	-	100	0	100
9	20ACA33		Industrial/Research Internship	0	0	0	3	40	60	100
TOTAL				21	00	4	**23**	**420**	**480**	**900**

Honor Degree hours distribution 3**-1-0-4**

Minor General Degree hours distribution **3-0-2-4** and Minor Industrial Relevant Track Degree hours distribution 3**-1-0-4**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence)

IV B.Tech., II Semester -CSE(AI) **Regulations: R20**

S.NO	Category	Course code	Course Title	Hours per week			Credits	Scheme of Examination Max.Marks		
				L	T	P		CIA	SEE	Total
1	Major Project	20ACA34	Project work, Seminar and Internship in Industry	0	0	24	12	40	60	100
	INTERNSHIP(6MONTHS)									
TOTAL										**12**

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(Autonomous)

I B.Tech I Semester (Common to all Branches)

L	T	P	C
3	1	0	3

20AHS02: DIFFERENTIAL EQUATIONS AND MULTIVARIABLE CALCULUS

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Classify and interpret the solution of ordinary differential equations.
2. Apply the principles of differential equations to the engineering and scientific problems.
3. Analyze the maxima and minima of functions of two or more variables.
4. Evaluate the double and triple integral to find surface area and volumes.
5. Compute the derivatives and line integrals of vector functions and learn their applications.

UNIT-I **9 Hrs**

DIFFERENTIAL EQUATIONS: Exact differential Equations - Linear Differential Equations – Bernoulli's Equations – Non – homogenous Linear Differential equation of second and higher order with constant coefficients with R.H.S terms of the form e^{ax}, $Sinax$, $Cosax$, x^m, $e^{ax}V(x)$, $x^mV(x)$ and $xV(x)$.

UNIT-II **9 Hrs**

APPLICATIONS OF DIFFERENTIAL EQUATIONS: Orthogonal Trajectories (Cartesian and polar forms) - Newton's law of cooling- Law of natural Growth and Decay- L- R-C circuits,Bending of beams-Mass spring System

UNIT-III **9 Hrs**

FUNCTIONS OF SEVERAL VARIABLES: Partial derivatives- chain rule- Total derivative, Jocobian-Maxima and Minima for functions of two variables – Lagrange's method of multipliers of three variables only.

UNIT-IV **9 Hrs**

APPLICATIONS OF INTEGRATION: Length of an arc and area using integral.

Multiple Integrals: Double and Triple Integrals-Change of variables-Change of order of Integration (Cartesian and polar forms). Surface area and Volume of solid of revolution.

UNIT-V **9 Hrs**

VECTOR CALCULUS: Gradient, Divergence, Curl and their properties (without identities).

Vector Integration: Line Integrals – Potential functions – Area, Surface and Volume integrals – Green's theorem- Stoke's theorem& Gauss Divergence theorems (without proof) – problems on Green's, Stoke's and Gauss's Theorem.

Total Hours: 45

TEXT BOOKS:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Kanna Publications, 40th edition.
2. A Text book of Engineering Mathematics –I, T.K.V. Iyengar, B. Krishna Gandhi, S. Chand andcompany.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics. John Wiley & Sons.2016
2. Thomson, A Text book of Engineering Mathematics, Book Collection
3. B.V. Ramana, A Text book of Engineering Mathematics-I, Tata Mc Grawhill.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2		2										
CO3	2	2		1										
CO4	3	2												
CO5	3	2		2										
Average	2.8	2		1.6										
Level of correlation	3	2		2										

3- High Mapping **2- Medium Mapping** **1-Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to CE, ME, ECE, CSE(AI), CSE(CS) & CSE(IOT)
I B.Tech II Semester (Common to EEE, CSE, IT, CSE (DS) & CSE (AI &ML))

L	T	P	C
3	0	0	3

20AHS03: ENGINEERING CHEMISTRY

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Understand the impact of hard water and its removal, apply the concept of estimation of hardness.
2. Analyze the selection of suitable engineering materials for specific applications.
3. Understand the Effect of corrosion and to know the designing of corrosion resistant articles.
4. Apply suitable fuels based on analysis of coal, calorific value for a particular application, calculation of air requirements for combustion of fuel, types of various batteries.

UNIT - I **9 Hrs**

WATER TECHNOLOGY: Sources of water - impurities in water - Hardness of Water and its unit of expression - Estimation of hardness in water by EDTA titration method - Numerical problems - Boiler troubles and prevention methods - Estimation of Dissolved Oxygen in water by Winkler's method - specifications for drinking water Bureau of Indian Standards(BIS) and World health organization(WHO) standards - Water softening methods by Internal conditioning and External conditioning methods - Chlorination Of Domestic Water Treatment - Desalination of Brackish Water by Reverse Osmosis and electro dialysis methods.

UNIT - II **12 Hrs**

MATERIALS CHEMISTRY: High Polymers: Polymers – Definition - Nomenclature of polymers Types of polymerization reactions addition, condensation and copolymerization with examples. Plastics: Thermoplastics and thermosetting plastics and differences between them - Preparation, Properties and Engineering applications of PE, PTFE, PVC, Nylon and Bakelite. Conducting polymers polyacetylene, polyaniline, polypyr roles - mechanism of conduction and applications. **Rubbers:** Natural Rubbers – Vulcanization - Synthetic Rubbers (Buna-S, Silicone Rubber, Neoprene) preparation, properties and applications. **Lubricants:** Functions of Lubricants - Classification of Lubricants - various properties of Lubricants (Viscosity, Viscosity Index, Flash and fire point, Cloud and pour point, Aniline point, Acid value or Neutralization number. **Refractories**: Important properties of refractories (Refractoriness, Refractoriness under Load, Porosity, Thermal spalling) and their applications.

UNIT - III **9 Hrs**

CHEMISTRY OF CORROSION: Introduction on corrosion - causes and consequences of corrosion - Types of corrosion - Dry, Wet, Galvanic, Differential Corrosion - Mechanism of Dry and Wet corrosion - Factors influencing the corrosion - Control of corrosion - Cathodic protection by Sacrificial anodic and Impressed current cathodic protection - Electro Plating and Electroless plating (Copper and Nickel).

UNIT - IV **11 Hrs**

FUELS AND COMBUSTION: Fuels, Classification of Solid, Liquid and Gaseous fuels - Analysis of coal - Proximate and Ultimate analysis - Refining of Petroleum - Preparation of synthetic petrol - Bergius process - knocking and anti-knock agents - Octane and Cetane values - Calorific value - HCV, LCV - Numerical problems using Dulong-Petit's formula - Measurement of calorific value using Bomb calorimeter and Junkers gas calorimeter - Numerical problems.

Combustion: Calculation of air quantity requirement for Combustion - Numerical problems.

UNIT-V **9 Hrs**

ELECTROCHEMICAL ENERGY SYSTEMS: Electrochemical Cells - Electrode potential - Standard electrode potential - Nernst equation - cell potential calculations - Basic concepts of pHmetry, Potentiometry and Conductometric Titrations - Working principles and applications of different batteries - Dry cell, Lithium-ion cell, Lead-acid cell and Nickel-cadmium cell with discharging and recharging reactions - Working principles and applications of hydrogen-oxygen fuel cell, methanol-oxygen fuel cell.

Total Hours: 50

TEXT BOOKS:

1.A text book of Engineering Chemistry, Jain & Jain, Dhanpat Rai Publishing Company, 15th edition, New Delhi, 2008.
2.Chemistry for Engineers, Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr. C. Ramachandraiah, McGraw Hill Higher Education Hyd., 3rd edition, 2009.

REFERENCE BOOKS:

1. Engineering Chemistry, Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, Scitech Publications (India) Pvt. Limited, Hyderabad, 2009.
2. A text book of Engineering Chemistry, Dr. K. RaviKrishnan, Sri Krishna Publications, Secunderabad, Telangana, New edition. July, 2015.
3. Chemistry of Engineering Materials, C.V. Agarwal, C. Parameswara Murthy and AndraNaidu, BS Publications, Hyderabad, 9th edition, 2006.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1												
CO2	3	3												
CO3	3	2												
CO4	3	3												
Average	3	2.25												
Level of correlation	3	2												

3-High Mapping **2- Medium Mapping** **1-Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to all branches)

L	T	P	C
3	1	0	3

20ACS01: C PROGRAMMING & DATA STRUCTURES

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Analyze the basic concepts of C Programming language.
2. Design applications in C, using functions, arrays, pointers and structures.
3. Apply the concepts of Stacks and Queues in solving the problems.
4. Explore various operations on Linked lists.
5. Demonstrate various tree traversals and graph traversal techniques.
6. Design searching and sorting methods

UNIT-1 **7 Hrs**

Introduction to C Language - C language elements, structure of C program, A simple C program, variable declarations and data types, operators and expressions, decision statements - If and switch statements, loop control statements - while, for, do-while statements, arrays, control statements- break and continue, programming examples.

UNIT-I **7 Hrs**

Introduction to C Language - C language elements, structure of C program, A simple C program, variable declarations and data types, operators and expressions, decision statements - If and switch statements, loop control statements - while, for, do-while statements, arrays, control statements- break and continue, programming examples.

UNIT – II **10 Hrs**

Functions: Defining a function, Accessing a function, Function prototypes, Passing arguments to a function, Parameter passing mechanisms - Call-by-value, Call-by-reference, Recursion, Storage classes (auto, static, register, extern),**Arrays**: Declaration and Definition of an array, Processing an Array, Passing arrays to functions, Two dimensional and Multi- dimensional arrays**, Strings:** Defining and Initialization of Strings, NULL character, Reading and Writing a string , Processing the string , String handling functions.

UNIT-III **8 Hrs**

Pointers: Fundamentals, Pointer declarations, Pointers and One-dimensional array, Dynamic memory allocation, Operations on pointers**, Structures and Unions**: Declaration, Definition and Initialization of structures, Accessingstructures, User defined data type (typedef), Enumerated Data types, Nested structures, Array of structures, Structures andpointers, Passing structures to functions, Unions.

UNIT – III **10 Hrs**

Data Structures

Overview of data structures, stacks and queues, representation of a stack, operations on a stack, implementation of a stack,evaluation of arithmetic expressions, infix, prefix, and postfix notations, evaluation of postfix expression, conversion of expression from infix to postfix, recursion, queues - various positions of queue, representation of queue, insertion, deletion,searching operations.

Linked Lists – Singly linked list, dynamically linked stacks and queues, polynomials using singly linked lists, using circularly linked lists, insertion, deletion and searching operations, doubly linked lists and its operations, circular linked lists and its operations.

UNIT-5 **9 Hrs**

Trees - Tree terminology, Binary trees, representation, binary tree traversals. Binary tree operations, Graphs - graph terminology, graph representation, elementary graph operations, Breadth First Search (BFS) and Depth First Search (DFS),connected components, spanning trees.

Searching and Sorting – sequential search, binary search, exchange (bubble) sort, selection sort, Insertion sort.

Total Hours: 45

TEXT BOOKS:

1. Behrouz A. Forouzan, Richard F. Gilberg, ―C Programming & Data Structures‖, India Edition, Course Technology,2010.
2. The C Programming Language, Brian W Kernighan and Dennis M Ritchie, Second Edition, Prentice HallPublication.
3. Fundamentals of Data Structures in C, Ellis Horowitz, SartajSahni, Susan Anderson-Freed,Computer Science Press.
4. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao,Pearson Education.
5. B.A. Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming Approach Using C", Thirdedition, CENGAGE Learning, 2016.
6. Richard F. Gilberg & Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach withC", Second Edition,CENGAGE Learning, 2011.

REFERENCE BOOKS:

1. Pradip Dey and Manas Ghosh, Programming in C, Oxford University Press, 2nd Edition2011.
2. E. Balaguruswamy, "C and Data Structures", 4th Edition, Tata Mc Graw Hill.
3. A.K. Sharma, Computer Fundamentals and Programming in C, 2nd Edition, UniversityPress.
4. M.T. Somashekara, "Problem Solving Using C", PHI, 2nd Edition 2009.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3				7	8						3	2
CO2	3	3	3	1									3	2
CO3	3	3											3	3
CO4	3	3	1	2									3	2
CO5	3	3	2	3									3	3
CO6	3	3	3	2									3	2
Average	3	3	2.25	2									3	2.33
Level of Correlation	3	3	3	2									2	3

3-High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to CSE, IT, CSE (DS) ,CSE (AI &ML), CSE(AI), CSE(CS) & CSE(IOT))

L	T	P	C
3	0	0	3

20ACS02: COMPUTATIONAL THINKING

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Understand the computational thinking and Moore's law.
2. Understand the Boolean logic and applications of propositional logic.
3. Apply actions and data organizations in real time applications.
4. Analyze software correction, testing and performance measure using computer.

UNIT –I **8 Hrs**

Computer, computer science and computational thinking, From Abacus to machine, the first software, what make it a modern computer, the first computer, moores law, **How Real world data becomes computable Data:** Information and data, converting information to data, Data capacity, Data types and Data Encoding, Data Compression, **Logic:** what is logic, Boolean logic-writing well-formed propositions, Evaluating propositions, Applications of propositional Logic

UNIT- II **8 Hrs**

Solving Problems: problem definition, Logic Reasoning, software design, other issues, Abstraction-Class diagram, use case diagram, **Algorithm thinking:** algorithm, software and programming language, Actions- Selection, Repetition, modularization.

UNIT- III **9 Hrs**

Modeling Solutions- Activity Diagrams, Selection in Activity Diagram, Repetition in Activity Diagram, States and state diagrams, Including Behavior in state diagram, Data organization: Names, List-Arrays, linking, Graphs, And Hierarchies-organization charts, family tree, Biology, Linguistics, Trees.

UNIT- IV **7 Hrs**

von Neumann Architecture, Spread sheets-Spread sheet structure, Formulas/Expressions, Text Processing-string basics, string operation, Patterns-how to write a pattern, Repetitions rules, character class rules

UNIT –V **8 Hrs**

Computer errors, software corrections, verification, software testing, white box testing, black box testing, boundary value analysis**,** How is capacity measured in computer, an estimate of physical limitation, benchmarks,counting the performance, impractical algorithm, impossible algorithms.

Total Hours: 45

TEXT BOOK:

1. Computational thinking for modern solver, David Riley and Kenny Hunt Chapman&Hall/CRC, 2014

REFERENCE BOOK:

1. How to solve it by Computer, R.G. Dromey, PHI, 2008

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	
CO2	3												2	
CO3	3	2	1	3									3	2
CO4	3	3											3	2
Average	3	2.5	1	3									2.5	2
Level of Correlation	3	3	1	3									3	2

3-High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to CE, ME, ECE, CSE(AI), CSE(CS) & CSE(IOT))
I B.Tech II Semester (Common to EEE, CSE, IT, CSE (DS) & CSE (AI &ML))

L	T	P	C
0	0	3	1.5

20AHS06: ENGINEERING CHEMISTRY LAB

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Estimate the amount of metal ions, hardness of water, chlorides in water, acidity, alkalinity,dissolved oxygen in water by using volumetric analysis.
2. Demonstrate the importance of viscosity index, flash point and fire point of lubricants and to prepare a polymer.
3. Apply pH meter, conductivity meter and potentiometer to find the normality and amounts of substances in solution

Any **TEN** of the following experiments

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Chlorides in Water sample.
3. Determination of acid strength by using a pH meter (I) Strong acid VS Strong base (II) Weakacid Vs Strong base.
4. Estimation of Copper using EDTA by complexometric method.
5. Determination of effect of temperature on absolute and kinematic viscosity of oils throughRedwood viscometer No.1.
6. Estimation of Ferrous Ion by Potentiometry using standard Potassium Dichromate in a Redoxreaction.
7. Determination of rate of corrosion by weight loss method.
8. Determination of acid strength by Conductometric method – Strong acid VS Strong base.
9. Determination of Alkalinity of water sample.
10. Determination of Acidity of water sample.
11. Estimation of Dissolved Oxygen in water by Winkler’s method.
12. Estimation of Ferrous Ion by Potassium Dichromate method.
13. Determination of Flash and Fire point by using Pensky Marten’s apparatus.
14. Preparation of Phenol-Formaldehyde resin.
15. Determination of moisture content in a coal sample

TEXT BOOKS:

1. Chemistry pre-lab manual by Dr K. N. Jayaveera and K.B. Chandra Sekhar, S.M. Enterprises Ltd., 2007.
2. Vogel'S text book of Quantitative Inorganic Analysis, ELBS Edition, 1994.

EQUIPMENT REQUIRED:

1. Glassware: Burettes, Pipettes, Standard Flasks, Beakers, Measuring jars, BOD bottlesand Reagent bottles.
2. Analytical balance,
3. Pensky Marten's apparatus
4. Redwood viscometer,
5. Conductometer,
6. Potentiometer.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3												
CO2	3	2												
CO3	3	3												
Average	3	2.67												
Level of correlation	3	3												

3-High Mapping **2- Medium Mapping** **1-Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to All Branches)

L	T	P	C
0	0	3	1.5

20ACS03: C PROGRAMMING & DATA STRUCTURES LAB

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Demonstrate basic concepts of C programming language.
2. Develop C programs using functions, arrays, structures and pointers.
3. Apply the concepts Stacks and Queues using C Programming.
4. Ilustrate operations on Linked lists.
5. Develop searching and sorting methods.

Week l

a) Programs using I/O statements and expressions.

b) Programs using decision-making constructs.

Week 2

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

i) To find the factorial of a given integer.
ii) To solve Towers of Hanoi problem.

Week 3

a) Write a C program to find both the largest and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
i) Addition of Two Matrices ii) Multiplication of Two Matrices

Week 4

Write a C program that uses functions to perform the following operations:
i) To insert a sub-string in to a given main string from a given position.
ii) Given a string -a$bcd./fg find its reverse without changing the position of special characters. (Example input:a@gh%;j and output:j@hg%;a)

Week 5

From a given paragraph perform the following using built-in functions:

a. Find the total number of words.
b. Capitalize the first word of each sentence.
c. Replace a given word with another word.

Week 6

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

Week 7

Write C programs that implement stack (its operations) using

i) Arrays
ii) Pointers

Week 8

Write C programs that implement Queue (its operations) using

i) Arrays
ii) Pointers

Week 9

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

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

Week 10

Write a C program that uses functions to perform the following operations on singly linked list.

i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 11

Write a C program that uses functions to perform the following operations on Doubly linkedlist.

i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 12

Write a C program that uses functions to perform the following operations on circular linked list.

i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 13

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

i) Creating a Binary Tree of integers
ii) Traversing the above binary tree in preorder, inorder and postorder.

Week 14

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

i) Linear search
ii) Binary search

Week 15

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

i) Bubble sort
ii) Selection sort

iii) Insertion sort

Week 16 (Case Study)

Create a -Railway reservation system| with the following modules

i) Booking
ii) Availability checking
iii) Cancellation
iv) Prepare chart

TEXT BOOKS:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao,Pearson Education.
2. B.A. Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming ApproachUsing C", Third edition, CENGAGE Learning, 2016.
3. Richard F. Gilberg & Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach withC", Second Edition, CENGAGE Learning, 2011.

REFERENCE BOOKS:

1. PradipDey and ManasGhosh, Programming in C, Oxford University Press, 2nd Edition 2011.
2. E.Balaguruswamy, "C and Data Structures", 4th Edition, Tata Mc Graw Hill.
3. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.
4. M.T.Somashekara, "Problem Solving Using C", PHI, 2nd Edition 2009.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2		3								3	2
CO2	3	3	3	3	3				2				3	3
CO3	3	3	1	2	3								3	3
CO4	3	2	2		2								3	2
CO5	3	3	3	2	3						2		3	2
Average	3	2.8	2.2	2.33	2.8				2		2		3	2.4
Level of Correlation	3	3	2	3	3				2		2		3	3

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to CE, ME, ECE, CSE(AI), CSE(CS) & CSE(IOT))
I B.Tech II Semester (Common to EEE, CSE, IT, CSE(DS) & CSE(AI &ML))

L	T	P	C
0	**0**	**3**	**1.5**

20AHS05: COMMUNICATIVE ENGLISH LAB

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
2. Develop communication skills through debates, oral presentations, group discussions and various language learning activities
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and reading comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional settings.

UNIT-I

1. Phonetics for listening comprehension of various accents.
2. Reading comprehension
3. Describing objects/places/persons

UNIT-II

1. JAM
2. Small talks on general topics
3. Debates

UNIT-III

1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Group Discussion

UNIT-IV

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

UNIT-V

2. Oral Presentations
3. Précis Writing and Paraphrasing
4. Reading Comprehension and spotting errors

PRESCRIBED SOFTWARE FOR PRACTICE:

Sky Pronunciation, Pro-power 2 & Globarena

Reference Books

1. Academic writing: A handbook for international students, Bailey, Stephen, Routledge,2014.
2. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
3. Cambridge Academic English (B2), Hewings, Martin. 2012.
4. Effective Technical Communication, Ashrif Rizvi, TataMcGra hill, 2011
5. Technical Communication by Meenakshi Raman & Sangeeta Sharma, 3rd Edition, O U Press2015.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2								3				
CO2	3	3							3	3				
CO3	2	2								3		2		
CO4	3									3		2		
Average	2.75	2.33							3	3		2		
Level of correlation	3	2							3	3		2		

3-High Mapping 2- Medium Mapping 1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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20AMB01: DESIGN THINKING
(Mandatory course)

L	T	P	C
2	0	0	0

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Explain design thinking concepts and models to be used to perform human centered design
2. Apply design thinking tools techniques to produce good design.
3. Develop innovative products or services for a customer.
4. Build prototypes for complex problems using gathered user requirements.

UNIT I: INTRODUCTION TO DESIGN THINKING **9 Hrs**

Design Thinking Process: Types of the thinking process, Common methods to change the human thinking process, Design thinking: Definition, Origin of design thinking, Importance of design thinking, Design vs Design thinking, Problem solving, understanding design thinking and its process model, Design thinking tools.

UNIT II: EMPATHIZE **9 Hrs**

Design thinking phases, How to empathize, Role of empathy in design thinking, purpose of empathy maps, Things to be done prior to empathy mapping, Activities during and after the session, Understanding empathy tools : Customer Journey Map, Personas.

UNIT III: IDEATION **9 Hrs**

Challenges in idea generation, need for systematic method to connect to user, Visualize, Empathize, and Ideate method, Importance of visualizing and empathizing before ideating, Applying the method, Ideation Tools: How Might We? (HMW), Story board, Brainstorming.

UNIT IV: PROTOTYPING **9 Hrs**

What is a prototype? - Prototyping as a mindset, prototype examples, prototyping for products; Why we prototype? Fidelity for prototypes, Process of prototyping- Minimum Viable prototype.

UNIT V: TESTING PROTOTYPES **9 Hrs**

Prototyping for digital products: What's unique for digital products, Preparation; Prototyping for physical products: What's unique for physical products, Preparation; Testing prototypes with users. **Total Hours:45**

TEXT BOOKS:

1. S.Salivahanan, S.Suresh Kumar, D.Praveen Sam, "Introduction to Design Thinking",TataMc Graw Hill, First Edition,2019.
2. Kathryn McElroy, "Prototyping for Designers: Developing the best Digital and PhysicalProducts", O'Reilly,2017.

REFERENCE BOOKS:

1. Michael G. Luchs, Scott Swan , Abbie Griffin,"Design Thinking – New Product Essentialsfrom PDMA", Wiley, 2015.
2. Vijay Kumar, "101 Design Methods: A Structured Approach for Driving Innovation in YourOrganization", 2012.

ADDITIONAL LEARNING RESOURCES:

1. https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking- process
2. https://www.ibm.com/design/thinking/page/toolkit
3. https://www.interaction-design.org/literature/article/define-and-frame-your-design- challenge-by-creating-your-point-of-view-and-ask-how-might-we
4. https://hbr.org/2018/09/design-thinking-is-fundamentally-conservative-and-preserves- the-status-quo
5. https://hbr.org/2018/09/why-design-thinking-works
6. https://hbr.org/2015/09/design-thinking-comes-of-age
7. https://www.culturepartnership.eu/en/article/ten-tools-for-design-thinking
8. https://nptel.ac.in/courses/109/104/109104109/
9. https://nptel.ac.in/courses/110106124/

CO-PO-PSO Mapping Table:

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		2	3											
CO2		2	3								3			
CO3			3											
CO4			3	2										
Average		2	3	2										
Level of correlation of the course		2	3	2							3			

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to EEE, CSE, IT, CSE(DS) & CSE(AI & ML))
I B.Tech II Semester (Common to CE, ME & ECE, CSE(AI), CSE(CS) & CSE(IOT)))

L	T	P	C
1	0	4	3

20AME01: COMPUTER AIDED ENGINEERING DRAWING

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Communicate ideas effectively by using Auto CAD software.
2. Project the points, lines, planes, solids with digital environment
3. Represent sectional views of solids and develop the sectioned object surfaces.
4. Communicate ideas effectively by using Orthographic Projections and Isometric Views usingcomputer software.

UNIT-I **10 Hrs**

Geometrical constructions of polygons (in scribing, circum scribing), special methods circle-tangents, Conics-ellipse, parabola, hyperbola -properties of conics, special methods of construction.

UNIT-II **10 Hrs**

Projections of points, straight lines-lines inclined to both the principal planes, determination of true length, traces and true inclinations.

UNIT-III **10 Hrs**

Projections of planes inclined to both the principal planes.

Projection of regular solids prisms, Pyramids, cylinders, tetrahedron and cones axis inclined to one plane.

UNIT-IV **10 Hrs**

Sections of solids such as prisms, pyramids, cylinders, tetrahedron and cones (solids in simple position) True shape of the section.
Development of surfaces of simple solids, as above and part solids.

UNIT-V **10 Hrs**

Principles of isometric projection is o metric scale isometric projection of planes and solids conversionof orthographic views into isometric views and vice-versa.

Practice:

1.Geometrical constructions:

a) Sketching of polygons - Triangles, Square, Rectangle, Pentagon, Hexagon, Circle at different positions.

Sketching of Tangents to the circles

2.Conics:

Constructions of Ellipse, Parabola ,Hyperbola

3.Points:

Drawing the quadrant sand positioning of the points with reference to H.P and V.P with dimensions.

4.Lines:

Sketching of lines when they are

1.Parallel to both H.P & V.P

2.Parallel to V.P/H.P and perpendicular to H.P/V.P

3.Parallel toV.P/H.P and inclined to H.P/V.P

4.Inclined to both the planes

a) Sketching of the line to measure true length & true inclinations

b) Sketching of the line to determine the traces

5 Planes:

Sketching of the planes when they are

a) Perpendicular to V.P/H.Pandparallel to H.P /V.P

b) Inclined to V.P/H.P and perpendicular to H.P/V.P

c) Perpendicular to both V.P and H.P.

d) Inclined to bothV.P and H.P.

6 Solids:

a) Sketching of 2D shapes and convert it to 3D solids (Prisms, Pyramids, cube , cylinder, one, tetrahedron)

b) Sketching of projections of solids when the position of axisis

i. Perpendicular to V.P/H.P and parallel toH.P/V.P.

ii. Inclined to V.P/H.P and parallel toH.P/V.P.

iii. Parallel to both V.P and H.P.

7. Sections of solids:

a) Different types of hatching on the polygons.

b) Sketching of sections of solids when the section/cutting planeis

i. Parallel to V.P/H.P and perpendicular to H.P/V.P.

ii. Inclined to V.P/H.P and perpendicular to H.P/V.P.

iii. Perpendicular to both principal planes.

c) Sketching of sections when the cutting plane passing through different positions-base, axis, corner, apex /vertex, generator, lateraledge.

Sketching of true shapes

8 Development of surfaces:

Sketching of developed surfaces of

a) cylinder, prisms using parallel line method

b) cone, pyramids using radial line method

c) truncated solids and frustum

9. Orthographic Projections:

Sketching of 2D views of front, top and side views of 3D objects.

10. Isometric projections:

a) Setting of isometric grid

b) Sketching of isometric views of 3D models / shapes.

TEXT BOOKS

1. K. L. Narayana and S. Bheemanjaneyulu, Engineering Drawing with Auto CAD 2016 ,New Age Publishers, NewDelhi,2017
2 Basant Agrawal and C.M.Agrawal, Engineering Drawing, McGraw Hill Education 2nd edition.

REFERENCE BOOKS

1 K.Venugopal, Engineering Drawing and Graphics+Auto Cad, New Age International (P)Ltd, Publishers , New Delhi, Fourth Edition

2 Siddiquee Arshad. N., Zahid A. Khan, Mukhtar Ahmad, Engineering Drawing: Withprimeron AUTO CAD, PHI Learning Pvt. Ltd.,

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		3				3	3				
CO2	3	3	3		3				3					
CO3	3	3			3				3					
CO4	3	3			3				3	3				
Average	3	3	3		3				3	3				
Level of correlation	3	3	3		3				3	3				

3-High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

I B.Tech I Semester (Common to EEE, CSE, IT, CSE (DS) & CSE (AI &ML))

I B.Tech II Semester (Common to CE, ME, ECE, CSE(AI), CSE(CS) & CSE(IOT))

L	T	P	C
3	0	0	3

20AHS04: ENGINEERING PHYSICS

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Demonstrate strong fundamental knowledge in optic, lasers and optical fibers.
2. Comprehend and apply quantum mechanical principles towards the free electron theory.
3. Learn about the crystal structure, magnetic materials, semiconductors, superconductors
4. and their applications.
5. Propose preparation methods for different nanomaterials and relate structure of Nanomaterials with their property.

UNIT-I **9 Hrs**

OPTICS INTERFERENCE: Introduction - Principle of superposition - Conditions for sustained interference – interference in thin films by reflection – Newton's Rings - Determination of wavelength of light and refractive index of liquid.

DIFFRACTION: Introduction–Definition of Fresnel and Fraunhofer diffraction - Fraunhofer diffraction due to single slit and double slit.

UNIT-II **9 Hrs**

LASERS & FIBER OPTICS

Lasers: Introduction - Laser Characteristics - spontaneous and stimulated emission of radiation - Einstein's coefficients - population inversion - Ruby laser - He-Ne laser- Applications of laser. **Fiber Optics:** Introduction - Principle of optical fiber - Acceptance angle and acceptance cone - Numerical aperture - Classification of Optical Fibers-Optical fiber communication system-Applications of optical fibers.

UNIT-III **9 Hrs**

PRINCIPLE OF QUANTUM MECHANICS: Wave and particles - de Broglie hypotheses - de Broglie's wavelength for electron - Properties of Matter waves -Schrödinger time independent wave equation - Physical significance of wave function -Particle in one dimensional infinite potential box (qualitative only).

CRYSTAL PHYSICS: Single crystalline, Polycrystalline and amorphous materials -Fundamental of crystallography- Space lattice - Basis - unit cell - Lattice parameters - Crystal systems –Bravais Lattice - Structure and packing fraction of Simple cubic and body centered cubic - Miller Indices- Bragg's

law- X-ray diffraction by powder method.

FREE ELECTRON THEORY: Electrical conductivity of Classical free electron theory and Quantum free electron theory - merits and demerits - Kronig penny model (qualitative only).

UNIT-IV **9 Hrs**

SEMICONDUCTORS & SUPERCONDUCTORS

SEMI CONDUCTORS: Introduction - Intrinsic and extrinsic Semiconductors - Fermi level- Drift and diffusion - Einstein's equation - Hall Effect – LED.

SUPERCONDUCTORS: General properties of superconductors - Meissner effect - Penetration depth – Type I and Type II superconductors - Josephson effect - Application of superconductors.

UNIT-V **9 Hrs**

MAGNETISM & NANOMATERIALS

MAGNETISM: Introduction and basic definitions - Origin of magnetic moment -Classification of magnetic materials - Hysteresis curve - Hard and Soft Magnetic Materials - Applications.

NANOMATERIALS: Introduction - Significance of Nano scale - Types of nanomaterials -Ball Milling- Chemical vapor deposition - Properties of nanomaterials, Optical and magnetic – application of Nano materials.

Total Hours: 45

TEXT BOOKS:

1. Engineering Physics, Thyagarajan K, Tata Mcgraw Hill Publishers, New Delhi, 2013.
2. A Text book of Engineering Physics, Avadhanulu and Kshirasagar, Revised Edition, S. Chand, NewDelhi, 2014.
3. Gaur R K and Gupta S L, Engineering Physics, Dhanpat Rai Publications, New Delhi, 2010.

REFERENCE BOOKS:

2. Solid State Physics, Pillai. S.O, New Age International, New Delhi, 2005.
3. Introduction to Nanoscience and Technology, Chattapadhyay K.K, Banerjee A.N, New Delhi.
4. Engineering Physics, Vijaya kumara K, S. Chand & Company Ltd., New Delhi .

CO-PO-PSO Mapping Table:

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		3	2		1		7	8							
CO2		3	2												
CO3		3	2		1										
CO4		2			2	1									
Average		2.75	2		1.33	1									
Level of correlation		3	2		1	1									

3-High Mapping **2- Medium Mapping** **1-Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

I B.Tech II Semester (Common to All Branches)

L	T	P	C
3	1	0	3

20AHS08: ALGEBRA AND TRANSFORMATION TECHNIQUES

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Solve the system of linear equations and determine the eigen values and eigen vectors.
2. Apply the Laplace transform techniques to solve ordinary differential equations.
3. Apply Fourier series to expand periodic and elementary functions.
4. Evaluate Fourier sin and cosine transforms for given functions.
5. Analyze the principles of Z-transforms for solving the difference equation.

UNIT-I **10 Hrs**

MATRICES: Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous linear equations. Eigen values and Eigen vectors. Cayley- Hamilton theorem (without proof) – Finding inverse and power of a matrix by Cayley-Hamilton theorem. Diagonalization of a matrix.

UNIT-II **10 Hrs**

LAPLACE TRANSFORMS: Laplace transforms of standard functions - First Shifting Theorem -Transforms of derivatives and integrals- Unit step Function – Second Shifting Theorem –Laplace transforms of Periodic functions – Inverse Laplace transforms - Convolution theorem. Applications of Laplace Transforms to ODE

UNIT-III **10 Hrs**

FOURIER SERIES: Determination of Fourier coefficients- Fourier series- Even and odd functions -Fourier series in an arbitrary interval -Half-range Fourier sine and cosine expansions.

UNIT-IV **10 Hrs**

FOURIER TRANSFORMS: Fourier integral theorem (only statement) - Fourier sine and cosine integrals. Fourier Transforms - Fourier sine and cosine Transforms – properties –Inverse transforms – Infinite Fourier transforms.

UNIT-V **10 Hrs**

Z-TRANSFORMS: Standard functions - Properties - Damping rule- Shifting rule - Initial and final value theorems. Inverse Z- transforms - Convolution theorem - Solution of difference equations by Z-transforms.

Total Hours: 50

TEXT BOOKS:

1. Higher Engineering Mathematics, Dr. B. S. Grewal, 44/e Kanna Publications, 2017.
2. A Text book of Engineering Mathematics –II, T. K. V. Iyengar, B. Krishna Gandhi and others, S. Chand and company. 8th Revised edition, 2013.

REFERENCE BOOKS:

1. A Text Book of Engineering Mathematics-I, B.V. Ramana, , Tata Mc Grawhill
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons-2016.
3. Introductory Methods of Numerical Analysis S.S. Sastry, Printice Hall of India publications, 2012.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2		2										
CO3	3	2												
CO4	3	2												
CO5	3	2												
Average	3	2		2										
Level of correlation	3	2		2										

3-High Mapping **2- Medium Mapping** **1-Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

L	T	P	C
3	1	-	3

I B. Tech II Semester (Common to CSE, IT, CSE(AI) , CSE (DS) & CSE (AI &ML)

20AEE05: BASIC ELECTRICAL ENGINEERING

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Evaluate the electrical circuits and networks parameters
2. Emphasis the RLC Design models
3. Analyze the concept of all types of Electrical DC Machines
4. Analyze the concept of all types of Electrical AC Machines

UNIT I **9 Hrs**

D. C. Circuits: Ohm's Law and Kirchhoff's Laws - Analysis of series, parallel and series-parallel circuits excited by independent voltage sources - Power and energy.

Electromagnetism: Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically induced EMF - Concepts of self inductance, mutual inductance and coefficient of coupling - Energy stored in magnetic fields.

UNIT II: AC CIRCUITS **9 Hrs**

Generation of sinusoidal voltage - Definition of average value, root mean square value, form factor and peak factor of sinusoidal voltage and current and phasor representation of alternating quantities - Analysis with phasor diagrams of R, L, C, RL, RC and RLC circuits; Real power, reactive power, apparent power and power factor..

UNIT III: DC MACHINES **9 Hrs**

Working principle of DC machine as a generator and a motor - Types and constructional features- EMF equation of generator - Back EMF and its significance - torque equation - Types of D.C. motors - characteristics and applications - Necessity of a starter for DC motor

UNIT IV: AC MACHINES I **9 Hrs**

Transformers: Principle of operation and construction of single phase transformers - EMF equation – losses - efficiency and voltage regulation.

UNIT V: AC MACHINES II **9 Hrs**

Concept of rotating magnetic field - Principle of operation - types and constructional features - Slip and its significance - Applications of squirrel cage and slip ring motors – Stepper, Universal motor & Brushless DC Motor

Total Hours: 45

TEXT BOOKS:

1. V.K.Mehta & Rohit Mehta, Principles of Electrical Engineering, S.Chand publications
2. D.P.Kothari and I.J. Nagarath –"Basic Electrical & Electronics Engineering", Mc.Grawhill publications

REFERENCE BOOKS:

1. H.Cotton, Electrical Technology, CBS Publishers & Distributors, 2004.
2. T.K.Naga sarkar, M.S.Sukhija, Basic Electrical Engineering, Oxford University press,,2010

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS02
CO1	1	2			3			1			1			
CO2	1	2			3			1						
CO3	1				2			1						
CO4	1	1			1			2			1			
Average	1	2			3			2			1			
Level of Correlation of the Course	1	2			3			1			1			

3- High Mapping **2- Medium Mapping** **1-Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech II Semester (Common to all branches)

L	T	P	C
3	1	-	3

20ACS04: PROBLEM SOLVING AND PROGRAMMING USING PYTHON

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Demonstrate knowledge in Basics of python programming
2. Use the data structure lists, Dictionaries and Tuples.
3. Solve the problems by applying the modularity principle.
4. Demonstrate knowledge in OOP.
5. Demonstrate various mathematical operations using Numpy, Analyze Data using Pandasand visualizations using Matplotlib.

UNIT- I **9 Hrs**

INTRODUCTION TO PROBLEM SOLVING, EXPRESSION AND DATA TYPES

Fundamentals: what is computer science - Computer Algorithms - Computer Hardware - Computer software - Computational problem solving the Python programming language - Overview of Python, Environmental Setup, First program in Python, Python I/O Statement. **Expressions and Data Types:** Literals, Identifiers and Variables, Operators, Expressions. Data types, Numbers, Type Conversion, Random Number.

Problem solving: Restaurant Tab calculation and Age in seconds.

UNIT- II

CONTROL STRUCTURES& COLLECTIONS **10 Hrs**

Control Structures: Boolean expressions, Selection control and Iterative control. **Arrays -** Creation, Behaviorof Arrays, Operations on Arrays, Built-In Methods of Arrays. **List** –Creation, Behavior of Lists, Operations on Lists, Built-In Methods of Lists. **Tuple** -Creation, Behavior of Tuples, Operations on Tuples, Built-In Methods of Tuples. **Dictionary** – Creation, Behavior of Dictionary, Operations on Dictionary, Built-In Methods of Dictionary. **Sets** –Creation, Behavior of Sets, Operations on Sets, Built-In Methods of Sets, Frozen set.

Problem Solving: A Food Co-op's Worker Scheduling Simulation.

UNIT- III

STRINGS, FUNCTIONS AND FILES **10 Hrs**

Strings - String Literal, Assigning String to a variable, Multiline Strings, String Slicing, Built-in Functions and Methods. **Functions** – Creating functions, calling a function, passing arguments to

functions, function with return statement, Recursive function, Lambda Function**. Files** – File Handling, Create, Write, Read and Delete Files

UNIT-IV **9 Hrs**

OBJECT ORIENTED PROGRAMMING AND EXCEPTIONS

OOP - Classes and Objects, Encapsulation, Inheritance, Polymorphism, Constructor and Destructor, Self parameter, Local and Global Scope, Access Modifiers, Polymorphism, super() method. Modules in python. **Exceptions** – Handling Exceptions, Raising Exceptions, Exception Chaining, User Defined Exceptions.

Problem solving: Credit card calculation.

UNIT- V **8 Hrs**

INTRODUCTION TO NUMPY, PANDAS, MATPLOTLIB: Exploratory Data Analysis (EDA), Data Science life cycle, Descriptive Statistics, Basic tools (plots, graphs and summary statistics) of EDA,Philosophy of EDA. Data Visualization: Scatter plot, bar chart, histogram, boxplot, heat maps, etc.

Total Hours:45

TEXT BOOKS:

1. Introduction to Computer Science using Python: A Computational Problem-Solving Focus, First Edition, Charles Dierbach, Wiley India , 2012.

2. Programming Python, Mark Lutz, O'Reilly Publications, Fourth Edition, 2011.

REFERENCE BOOKS:

1. Core Python Programming, 2 nd edition,R. Nageswara Rao, Dreamtech Press, 2018.

2. Fundamentals of Python, Third Edition, Kenneth Lambert and B.L. Juneja, Cengage Learning,2012.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	
CO2	3	2												
CO3	3	3	3	3	2								3	2
CO4	3	3	1	1									3	2
CO5	3	3	3	3	3								3	3
Average	3	2.75	2.33	2.33	2.5								2.75	2.33
Level of Correlation	3	3	3	3	3								3	3

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to EEE, CSE, IT, CSE(DS) & CSE(AI & ML))
I B.Tech II Semester (Common to CE, ME & ECE, CE, ME , ECE, CSE(AI), CSE(CS) & CSE(IOT))

20AME02: ENGINEERING PRACTICE LAB

L	T	P	C
0	0	3	1.5

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Perform a different prototype models in the carpentry trade such as Mortise and Ten on joint, and Table stand using wood turning lathe.
2. Prepare models such as Dove tail joint and Half Round joint using Fitting tools and Rectangular tray, and funnel prototypes in the trade of Tin smithy.
3. Perform various basic House Wiring techniques such Staircase wiring (i.e. control ofone lamp by two switches fixed at two different places), and wiring for tube light (Fluorescent Lamp)/Focus light.
4. Fabricate different models in a foundry shop such as single and two pieces pattrens and prototypes in the trade of Welding such as T-Joint and H-Joint.

TRADES FOR EXERCISES:

a. Carpentry shop.

1. Prepare a Mortise and ten on joint from a given 300 x 40 x 25mm soft wood stock.
2. Prepare a Table stand (desired shape) by using wood turning Lathe from a given300x 40x25mm soft wood stock.

b. Fitting shop

1. Prepare a Dovetail joint from a given 100x50x5mm M.S.stock.
2. Prepare a Half Round joint from a given 100x50x5mm M.S.stock.

c. Sheet metal shop

1. Prepare a Funnel from given G.I. sheet.
2. Prepare a Rectangular Tray from given G.I. sheet.

d. House-wiring

1. Stair case wiring (i.e. control of one lamp by two switches fixed at two differentplaces).
2. Prepare a wiring for tube light (‘’Fluorescent Lamp ‘’)/ Focus light

3. Prepare a mould for a single piece pattern (Connecting rod)
4. Prepare a mould for a Double piece pattern(Stepped Pulley)

e. Welding

1. Prepare a T-Joint from given M.S Flat pates using Arc Welding.
2. Prepare a H-Joint from given M.S Flat pates using Arc Welding.

2. TRADES FOR DEMONSTRATION:

a) Plumbing
b) Machine Shop
c) Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

Reference Books

1 Work shop Manual/P.Kannaiah/K.L.Narayana/SciTech Publishers.
2 Engineering Practices Lab Manual, Jeyapoovan ,Saravana Pandian,4/eVika0073
3 Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.
4 Engineering Work shop by Vishnu UniversalLearning.
5 Engineering Work shop by GRIE institute.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2		3				3					
CO2	3	2	2		3		7	8	3					
CO3	3	2	2		3				3					
CO4	3	2	2		3				3					
Average	3	2	2		3				3					
Level of correlation	3	2	2		3				3					

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech – II Semester (Common to all Branches)	**L**	**T**	**P**	**C**
	-	**-**	**3**	**1.5**

20ACS05: PROBLEM SOLVING AND PROGRAMMING USING PYTHON

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Write, Test and Debug Python Programs
2. Implement Conditionals and Loops for Python Programs
3. Use functions and represent Compound data using Lists, Tuples and Dictionaries
4. Read and write data from & to files in Python

WEEK 1

a. Write a python script to display a simple message

b. Write a python script to perform basic arithmetic operations on two values which are accepted from the user.

WEEK 2

a. Write a python script to calculate the factorial of a given number.

b. Write a python script to calculate sum of individual digits of a given number.

c. Write a Python program that prompts the user for two floating-point values and displays the result of the first number divided by the second with exactly six decimal places displayed.

WEEK 3

a. Write a python script to find the largest number among three numbers and display them in ascending order using if-else construct.

b. Write a python script to display Fibonacci sequence of numbers using while loop, for loop and do-while loop constructs.

c. Write a python script to display the prime number series up to the given N Value.

WEEK 4

a. Write a Python program

i. To calculate sum all the items in a list.

ii . To remove duplicates from a list.

iii. To find the list of words that are longer than n from a given list of words.

iv. To get the difference between the two lists.

v. To append a list to the second list.

b.Write a Python program to print a specified list after removing the 0^{th}, 4^{th} and 5^{th} elements.

Sample List : ['Red', 'Green', 'White', 'Black', 'Pink', 'Yellow']

Expected Output : ['Green', 'White', 'Black']

c.Write a python script to arrange the given list of elements in ascending or descending order.

WEEK 5

a. To write a python program to create, slice, change, delete and index elements using Tuple.

b. Write a Python program to replace last value of tuples in a list.

Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)]

Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]

WEEK 6

a. Write a program to demonstrate working with dictionaries in Python

WEEK 7

a. Write a Python program

i. To create a set.

ii. To remove item(s) from a set.

iii. To remove an item from a set if it is present in the set.

iv. To create a union and intersection of sets.

v. To create set difference.

WEEK 8

a. Write a python script to demonstrate string methods.

b. Write a Python program to count the number of characters (character frequency) in a string.

Sample String: google.com'

Expected Result : {'g': 2, 'o': 3, 'l': 1, 'e': 1, '.': 1, 'c': 1, 'm': 1}

c. Write a Python program to reverse a string.

Sample String : "1234abcd"

Expected Output : "dcba4321"

d. Write a Python script that takes input from the user and displays that input back in upper and lower cases.

e. Write a Python script to get a string made of 4 copies of the last two characters of a specified string (length must be at least 2).

Sample Input /Output

Input: Python – Output: onononon

Input: Exercises – Output: eseseses

f. Write a Python function that checks whether a passed string is palindrome or not.

WEEK 9

a. Write a python script to find GCD of two numbers using recursive and non recursive functions.

b. Write a python script to convert the following using functions:

i. Fahrenheit to Celsius temperature.
ii. Celsius to Fahrenheit temperature.

WEEK 10

a. Write a python script to demonstrate the Exception Handling.

WEEK 11

a. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order

b. Write a script named copyfile.py. This script should prompt the user for the names oftwo text files. The contents of the first file should be the input that to be writtento the second file.

WEEK 12

a. Write a program to demonstrate a) arrays b) array indexing such as slicing, integer array indexing and Boolean array indexing along with their basic operations in NumPy.

b. Write a program to compute summary statistics such as mean, median, mode, standard deviation and variance of the given different types of data.

WEEK 13

a. Write a python script to implement inheritance.

b. Write a python script to implement constructor.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	3								3	3
CO2	3	3											3	1
CO3	3	3	3	3	3								3	3
CO4	3	3											3	2
Average	3	3	3	2.5	3								3	2.25
Level of Correlation	3	3	3	3	3								3	2

4- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to EEE, CSE, IT, CSE (DS) & CSE (AI&ML)
I B.Tech II Semester (Common to CSE (AI), CSE (CS), CSE (IOT), CE, ME & ECE)

20AHS07: ENGINEERING PHYSICS LAB

L	T	P	C
0	0	3	1.5

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Explore the knowledge of Spectrometer and other optical instruments.
2. Apply concepts of magnetic materials, lasers, semiconductor, and it's their relative parameters.
3. Access, process and analyse scientific information of optical communication.

Minimum of 10 experiments to be conducted during the academic year

1. Determine the wavelengths of given light source - Spectrometer.
2. Dispersive power of prism.
3. Determine the thickness of thin wire by Interference.
4. Determine the wavelength of given laser source - Diffraction grating.
5. Determine the radius of curvature of given piano convex lens by forming Newton Rings.
6. Magnetic field along the axis of a current carrying coll - Stewart and Gee's method.
7. Numerical Aperture of an optical fiber.
8. Bending losses In Optical Fiber.
9. Determine the wavelength of Laser source using optical fiber.
10. Determine Hall Coefficient and Carrier concentration of the given Semiconductor.
11. Determine the energy loss of ferromagnetic sample by plotting B-H curve.
12. Energy gap of a given semiconductor.
13. Solar Cell: To study the V-I Characteristics of solar cell.
14. Determine the particle size using laser source.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1												
CO2	3	1			2									
CO3	2													
Average	2.67	1			2									
Level of correlation	3	1			2									

3-High Mapping 2- Medium Mapping 1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

I B.Tech I Semester (Common to EEE, CSE, CSE (DS), CSE (AI & ML) & IT)
I B.Tech II Semester (Common to CE, ME, ECE, CSE(AI), CSE(CS) & CSE(IOT))

L	T	P	C
2	0	0	0

20AHS09: ENVIRONMENTAL SCIENCES

(Mandatory Course)

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Aware of the complex relationships between environment and human system.
2. Develop critical thinking (or) observation skills and apply them in the analysis of a problem(or) question related to the environment.
3. Identify the major pollutants and abatement devices in order to protect the environment frompollution for effective environmental management.
4. Analyze and interpret the fundamental physical, chemical, biological principles and socialfactors that govern natural process.

UNIT-I **5 Hrs**

ECO SYSTEMS AND BIODIVERSITY AND ITS CONSERVATION: Definition, scope and importance, Need for public awareness. Concept of an ecosystem - Structure and function of an ecosystem.- Producers, consumers, decomposers - Energy flow in the eco systems - Ecological succession - Food chains, food webs and ecological pyramids -Introduction, types, characteristic features, structure and function of the following eco systems: - Forest ecosystem - Grass land ecosystem - Desert ecosystem - Aquatic eco systems (lakes, rivers, oceans) – Introduction - Definition: genetics, species and ecosystem diversity - Biogeographical classification of India. - Valueof biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - India asa mega diversity nation - Hot-spots of biodiversity. - Threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts- Endangered and endemic species of India- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-II **5 Hrs**

NATURAL RESOURCES:

Forest resources - Use and over-exploitation – deforestation - case studies - Timber extraction – mining- dams and their effects on forests and tribal people. **Water resources** - Use and over-utilization of surface and ground water - floods, drought - conflicts over water - dam’s benefits and

problems.

Mineral resources - Use and exploitation - environmental effects of extracting and using mineral resources - case studies. **Food resources** - World food problems - effects of modern agriculture - fertilizers- pesticides problems. **Energy Resources** - Growing energy needs- renewable and non-renewable energy sources, use of alternate energy sources - case studies - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable life styles.

UNIT-III **5 Hrs**

ENVIRONMENTAL POLLUTION: Definition Causes, 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, earth quake, cyclone and landslides.

UNIT-IV **5 Hrs**

SOCIAL ISSUES AND THE ENVIRONMENT: Form unsustainable to sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, water shed management - Resettlement and rehabilitation of people; its problems andconcerns, 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 legislations - Public awareness. Visit to a local area to document environment assets river / forest / grassland / hill / mountain.

UNIT-V **3 Hrs**

HUMAN POPULATION AND THE ENVIRONMENT: Population growth and variation among nations - Population explosion- family welfare program - 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. Visit to a local polluted site-urban/rural/industrial/agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hills lopes, etc.

Total Hours:23

TEXT BOOKS:

1. Textbook of Environmental studies, Erach Bharucha, UGC.
2. Fundamental concepts in Environmental Studies, D D Mishra, , S Chand & Co Ltd

REFERENCES BOOKS:

1. Environmental Science G. Tyler Miller and Scottt Spoolman, Cengage Learning Publishers,15th Edition, 2015.
2. Environmental Encyclopedia Cunningham, W. P, Cooper T.H, Gorhani, Jaico publications, Mumbai, 2001.
3. Environmental Chemistry, B.K.Sharma, Krishna Prakashan Media (p) Ltd, 2011.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS02
CO1	2						3							
CO2	2						3							
CO3	2						3							
CO4	2						3							
Average	2						3							
Level of correlation	2						3							

3-High Mapping 2- Medium Mapping 1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech - I Semester (Common to All Branches)

20AHS10: NUMERICAL METHODS

L	T	P	C
3	-	-	3

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Classify the algebraic and non-algebraic equations and solve them using different iterative methods.
2. Apply numerical techniques to solve engineering problems.
3. Interpret the data and drawing the valid conclusion.
4. Evaluate the numerical solutions of ordinary differential equations using single step and multistepmethods.
5. Solve real world problems using solutions of partial differential equations.

UNIT-I **10 Hrs**

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction–Inter mediate value theorem-The Bisection method-The method of false position Newton - Raphson method-Problems on Iterative methods. Interpolation: Forward Differences - backward differences-Newton's forward and backward differences formulae for interpolation –Problems on Interpolation - Lagrange's interpolation formula-Inverse interpolation- Problems.

UNIT-II **8 Hrs**

NUMERICAL DIFFERENTIATION AND INTEGRATION: Approximation of derivatives using interpolation polynomials-First and second order derivatives-Problems on numerical differentiation. Newton Cotes formulae – Numerical integration using Trapezoidal rule, Simpson's 1/3 rule and Simpson's 3/8 Rule.

UNIT-III **10 Hrs**

CURVE FITTING: Fitting of Curves by method of Least - squares – Fitting of Straight lines – Fitting of second degree Parabola-Fitting of the exponential curve- Fitting of the power curve – Problems – Regression- Correlation–Problems on interpretation of data–Drawing conclusions.

UNIT-IV **8 Hrs**

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS: Taylor's series-Picard's method of successive Approximations -Euler's and Modified Euler's Method- Problems on single step methods– Runge – Kutta Methods – Predictor – corrector method-Milne's method.

UNIT-V **9 Hrs**

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions -Method of separation of variables - Solution of one-dimensional wave equation, heat equation and two–dimensional Laplace's equation.

Total Hours:45

TEXT BOOKS:

1. Dr. B. S. GREWAL, Higher Engineering Mathematics. Kanna Publications, 42th edition.
2. B.V. Ramana, A Text Book of Engineering Mathematics-I, TATA MCGRAWHILL
3. E. Rukmangadachari and Keshava Reddy, A Text Book of Engineering Mathematics-I, Pearson Education.
4. T.K.V. Iyengar, B. Krishna Gandhi and Others, A Text Book of Engineering Mathematics–I, S.Chand and Company.

REFERENCE BOOKS

1. Erwin Kreyszig, Advanced EngineeringMathematics.JOHNWILEY&SONS-2016.
2. Jain.M. K, Iyengar T.K. V, Jain.R.K. Numerical Methods for Scientific and Engineering Computation.New age International Publishers.
3. N. Bail, M.Goyal & C.Walking, A Text Book of Advanced Engineering Mathematics-A Computer Approach.
4. Pal, Mathematical Methods, Oxford University Press, 2009.
5. S.S. Sastry, Introductory Methods of Numerical Analysis, Printice Hall of India publications, 2011.

CO-PO-PSO Mapping Table:

CO/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	PO1 2	PSO1	PSO2
CO1	3	3												
CO2	3	3												
CO3	3	2												
CO4	3	2												
CO5	3	2												
Average	3	2.4												
Level of correlation	3	2												

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech I Semester (Common to CSE, CSE (AI), CSE (CS), CSE (IoT), IT, CSE (DS) & CSE (AI &ML))

L	T	P	C
3	-	-	3

20ACS06 : COMPUTER ORGANIZATION AND ARCHITECTURE

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Recognize the functionalities of computer architecture and its components.
2. Apply various basic algorithms and operations to solve complex arithmetic problemscomplying with IEEE standards.
3. Apply the concepts of memory management for analysis of system performance.
4. Identify the I/O components of computer architecture and their performance.
5. Describe pipelining mechanisms and recognize different parallel machine models.

UNIT I **9 Hrs**

INTRODUCTION TO COMPUTER SYSTEMS – Overview of Organization and Architecture – Functional components of a computer -Registers and register files-Interconnection of components-Organization of the von Neumann machine and Harvard architecture-Performance of processor. Data representation, fixed and floating point and error detecting codes.

UNIT II **9 Hrs**

FUNDAMENTALS OF COMPUTER ARCHITECTURE: Introduction to ISA (Instruction Set Architecture)- Instruction formats- Instruction types and addressing modes- Instruction execution (Phases of instruction cycle)- Assembly language programming-Subroutine call and return mechanisms-Single cycle Data path design-Introduction to multi cycle data path-Multi cycle Instruction execution. Arithmetic micro operations, logic micro operations, shift micro operations, arithmetic logic shift unit.

UNIT III **9 Hrs**

MICRO PROGRAMMED CONTROL: Control memory, address sequencing, micro program example, and design of control unit. Computer Arithmetic: Fixed point representation of numbers-algorithms for arithmetic operations: multiplication (Booths, Modified Booths) – division (restoring and non-restoring) – Floating point representation with IEEE standards and algorithms for common arithmetic operations- Representation of non-numeric data (character codes).

UNIT IV **9 Hrs**

THE MEMORY SYSTEM: Memory systems hierarchy-Main memory organization-Types of Main memory-memory inter- leaving and its characteristics and performance- Cache memories: address mapping-line size- replacement and policies- coherence- Virtual memory systems- TLB- Reliability of memory systems- error detecting and error correcting systems.

INPUT/OUTPUT ORGANIZATION: I/O fundamentals: handshaking, buffering-I/O techniques: programmed I/O, interrupt-driven I/O, DMA- Interrupt structures: vectored and prioritized-interrupt overhead- Buses: Synchronous and asynchronous- Arbitration.

UNIT V **9 Hrs**

Device Subsystems: Externa lst- RAID Levels- I/O Performance. Performance Enhancements: Classification of models – Flynn's taxonomy of parallel machine models (SISD, SIMD, MISD, MIMD)- Introduction to Pipelining- Pipelined data path-Introduction to hazards. Contemporary issues: Recent Trends: Multiprocessor architecture: Overview of Shared Memory architecture, Distributed architecture.

Total Hours:45

TEXT BOOKS:

1. M. Morris Mano, Computer System Architecture, 3rdedition,PHI,India, 2006.
2. Carl Hamacher, ZvonksVranesic, SafeaZaky, Computer Organization, 5th edition, McGrawHill, New Delhi, India,2010.

REFERENCE BOOKS:

1. William Stallings, Computer Organization and Architecture, designing for performance, 8 thedition, Prentice Hall, NewJersy, 2010.
2. Andrew S. Tanenbaum, Structured Computer Organization, 5th edition, Pearson Education Inc,NewJersy, 2006.
3. Sivarama P. Dandamudi, Fundamentals of Computer Organization and Design, Springer Int.Edition, USA, 2003.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												3	
CO2	3	3	1	3									3	2
CO3	3	3		1									3	2
CO4	3	2	1										3	2
CO5	3	2											2	
Average	3	2.5	1	2									2.8	2
Level of Correlation	3	3	1	2									3	2

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech I Semester (Common to CSE, IT, CSE (AI), CSE (CS), CSE (IoT), CSE (DS) & CSE (AI &ML))
III B.Tech I Semester EEE, ECE (Open Elective-I)

L	T	P	C
3	-	-	3

20ACS07 : OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Demonstrate basic principles of OOP in java programming.
2. Apply the concepts of inheritance packages and interfaces in code reusability.
3. Apply the principles of exception handling in designing the customized exception to handle errors in application software.
4. Apply concepts of multithreading to solve problems in parallelism.
5. Apply concepts of Enumeration and Collections Framework in solving real time problems

UNIT-I **9 Hrs**

Java History, Java Features, Object Oriented Features, Tokens-Constants, Identifiers, Keywords, Operators. Data types, type conversions, Statements-Expression, selection, Loop, Jump, Label and block statements. Arrays-one dimensional, two dimensional, String class, String Buffer class, StringBuilder.

UNIT –II **8 Hrs**

Fundamentals, declaring objects, object references, Methods, Constructors-default, parameterized constructors, garbage collection, this keyword. Method Overloading, constructor overloading, static, nested and inner classes, command-line arguments.

Inheritance- Basics, Creating multilevel hierarchy, using super, method overriding, dynamic method dispatch, abstract classes, using final in inheritance.

UNIT-III **9 Hrs**

Packages-definition, class path, Access protection, importing packages.

Interfaces- definition, implementing interfaces, nested interfaces, variables and methods in interfaces, recent advances in interfaces, multiple inheritance using interfaces.

UNIT-IV **10 Hrs**

Exception Handling: Fundamentals, Exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, chained exceptions, custom exceptions.

Multithreading: Thread life cycle, Java Thread Model, Main thread, creation of child thread,

creation of multiple child threads, isAlive(),join(), wait(),notify(),notifyAll(), synchronization, inter thread communication.

UNIT- V **9 Hrs**

Enumerations, Wrapper classes, auto boxing, annotations.

Lambda expressions-introduction, Block lambda expressions, Generic functional interfaces, passing lambda expressions as arguments, lambda expressions and exceptions, lambda expressions and variable capture. Collections Framework: Collection interfaces and classes. Iterators, split Iterators, Map, comparators, Arrays, String tokenizer, Bitsets, Random, Scanner class.

Total Hours:45

TEXT BOOKS:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Java How to Program, 10th Edition, Paul Dietel, Harvey Dietel, Pearson Education.

REFERENCE BOOKS:

1. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.
2. Core Java Volume – 1 Fundamentals, Cay S. Horstmann, Pearson Education.
3. Java Programming for core and advanced learners, Sagayaraj, Dennis, Karthik and Gajalakshmi, University Press
4. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
5. Object Oriented Programming through Java, P. Radha Krishna, and University Press.
6. Programming in Java, S. Malhotra, S. Chaudhary, 2nd edition, Oxford Univ. Press.
7. Java Programming and Object-oriented Application Development, R.A. Johnson, Cengage Learning.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												3	
CO2	3	3	2	1	2								3	2
CO3	3	3	3	3	2								3	2
CO4	3	3	2	3	2								3	
CO5	2	3	1	3										1
Average	2.8	3	2	2.5	2								3	1.66
Level of Correlation	3	3	2	3	2								3	2

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech I Semester (Common to CSE, IT, CSE (AI), CSE (CS), CSE (IoT), & CSE (AI &ML))
III B.Tech I Semester CSE (DS)- Professional Elective-I

L	T	P	C
3	-	-	3

20AIT01 : AUTOMATA AND COMPILER DESIGN

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Demonstrate knowledge to represent the different programming language constructs (keywords, expressions, statement) in the machine understandable language by using the basic tools (Res, Automata) of automata theory.
2. Analyze various intermediate forms of source programs.
3. Apply the code optimization techniques in the generation of code for a given real time problem.

UNIT-I **7 Hrs**

COMPILER, FORMAL LANGUAGE, REGULAR EXPRESSIONS:

Introduction, Phases of Compiler, Specification of Token, Languages, Definition Languages regular expressions, Finite Automata – DFA, NFA, Conversion of regular expression to NFA,NFA to DFA.

UNIT-II **8 Hrs**

CONTEXT FREE GRAMMARS AND GRAMMAR PARSING:

Context free grammars, derivation, parse trees, ambiguity LL (K) grammars and LL (1) parsing. Bottom up parsing handle pruning LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

UNIT-III **10 Hrs**

SEMANTICS, RUN TIME STORAGE MANAGEMENT:

Syntax directed translation, S-attributed and L-attributed grammars, Chomsky hierarchy of languages and recognizers, Type checking, type conversions, equivalence of type expressions, overloading of functions and operations. Storage organization, storage allocation strategies, scope access to non-local names, parameter passing, and language facilities for dynamics storage allocation.

UNIT-IV **8 Hrs**

INTERMEDIATE CODE GENERATION

Intermediate code – abstract syntax tree, translation of simple statements and control flow statements, Back patching, procedure calls.

UNIT-V **9 Hrs**

CODE OPTIMIZATION AND CODE GENERATION:

Principal sources of optimization, optimization of basic blocks, peephole optimization, flow graphs, Data flow analysis of flow graphs. Machine dependent code generation, Issues in the design of code generation, object code forms, generic code generation algorithm, Register allocation and assignment. DAG representation of Basic Blocks.

Total Hours:41

TEXT BOOKS:

1. Compilers Principles, Techniques and Tools, Alfred V.Aho and Jeffrey D.Ullman, Ravisethi, Pearson Education.

REFERENCE BOOKS:

1. Modern Compiler Construction in C, Andrew W. Appel., Cambridge University Press.
2. Theory of Computation, S. Balakrishnan and V.D. Ambeth Kumar, ACME LearningPublisher, New Delhi.
3. Principles of Compiler Design 3rd Edition, Balakrishnan S, Sai Publishers.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1										3	2
CO2	3	2	3										1	
CO3	2		2										3	1
Average	2.33	1.5	1.5										1.67	1.5
Level of Correlation	3	2	2										2	2

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech I Semester (Common to CSE, IT, CSE (AI), CSE (CS), CSE (IoT), CSE (DS) & CSE (AI &ML))
III B.Tech II Semester EEE, ECE (Open Elective-II)

L	T	P	C
3	-	-	3

20ACS08 : RELATIONAL DATABASE MANAGEMENT SYSTEMS

Course Outcomes:
After successful completion of the course, the student will be able to :

1. Demonstrate the basic elements of a relational database management system.
2. Design entity relationship model and convert entity relationship diagrams into RDBMSand formulate SQL queries.
3. Apply the concepts of ER-modelling and normalization to design practical data models
4. Analyze transaction processing, concurrency control and storage methods for database management.

UNIT –I **8 Hrs**

Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications. Overview of Database Languages and Architectures: Data Models, Schemas, and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment. Conceptual Data Modelling using Entities and Relationships: Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.

UNIT-II **9 Hrs**

Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations. Relational Algebra: Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra. Mapping Conceptual Design into a Logical Design: Relational Database Design using ER-to-Relational mapping. SQL: SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Nested Queries, aggregation operators, NULL values,complex integrity constraints in SQL, triggers and active data bases.

UNIT-III **9 Hrs**

SQL: Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL. Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT-IV **9 Hrs**

Normalization Algorithms: Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational Designs, Further discussion of Multivalued dependencies and 4NF, Other dependencies and Normal Forms.

Transactions: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Concurrency: Concurrency control, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT-V **8 Hrs**

Indexing And Hashing: File Organization, Organization of Records in Files, Ordered Indices, B+ Tree Index Files, B,Tree Index Files, Multiple Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices.

Total Hours:45

TEXT BOOKS:

1. Ramez Elmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, 7th Edition, 2017, Pearson.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006.

REFERENCE BOOKS:

1. Ivan Bayross,”SQL, PL/SQL programming language of Oracle”, BPB Publications 4th edition, 2010.
2. Raghurama Krishnan, Johannes Gehrke, “Data base Management Systems”, TATA McGraw,Hill 3rd Edition,2007.
3. Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.

4. S.K.Singh, “Database Systems Concepts, Design and Applications”, First edition, Pearson Education, 2006.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3											3	
CO2	3	3	3	2	3								3	3
CO3	3	3	3	2	2								3	3
CO4	3	3											3	3
Average	3	3	3	2	2.5								3	3
Level of Correlation	3	3	3	2	3								3	3

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech I Semester (Common to CSE, IT, CSE (AI), CSE (CS), CSE (IoT), CSE (DS) & CSE (AI &ML))

L	T	P	C
-	-	3	1.5

20ACS09 : OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Outcomes:
After successful completion of the course, the student will be able to :

1. Apply syntactic constructs of JAVA to solve engineering problems.
2. Solve real time problems using interfaces, packages, Exception Handling, Collection Framework and Multithreading.
3. Work independently and in team to solve competitive problems.

Week-1:
Write a Java program that prints all real solutions to the quadratic equation ax2+ bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.

The Fibonacci sequence is defined by the following rule: The fir two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses recursive functions to print the nth value in the Fibonacci sequence

Write a Java program that uses non-recursive functions to print the nth value in the Fibonacci sequence

Week-2:
a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

b) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use String Tokenizer class of java. Util)

Week-3:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order. C) Write a Java programto make frequency count of words in a given text.

Week-4:

a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file.

Week-5:

a) Write a Java program that creates three threads. First thread displays ―Good Morning‖ every one second, the second thread displays ―Hello‖ every two seconds and the third thread displays ―Welcome‖ every three seconds.

b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

Week 6

1. Write a java program to create an abstract class named Shape that contains an empty method named number of Sides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such thateach one of the classes extends the class Shape. Each one of the classes contains.

Week 7

a) Write a java program to implement interface using lambda expressions.

b) Write a Java Program to implement comparator using lambda expressions.

c) Write a Java Program to illustrate the iteration of enumeration elements.

Week 8

Create an enumeration called Players that have some names and runs scored. Create a constructor and a method that will return the number of runs scored by each player or enumerator or enum constant. Using values () method to iterate the enumerator and display the number of runs scored by each player.

Week 9

In a given string, find the first non-repeating character .You are given a string, that can contain repeating characters. Your task is to return the first character in this string that does not repeat. i.e.,

occurs exactly once. The string will contain characters only from English alphabet set, i.e., (‘A’ –‘Z’) and (‘a’ – ‘z’). If there is no non-repeating character print the first character of string.

Week 10

Practice sessions on HackerRank and HackerEarth

Example: HackerEarth –jumble letter, missing alphabets

HackerRank -bear and steady gene, super reduced string, gemstones

CO-PO-PSO Mapping Table:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	2	3				1				3	3
CO2	3	3	3	3	2								3	2
CO3	3	3	3	3					3				1	1
Average	3	3	2.67	2.67	2.5				2				2.33	2
Level of Correlation	3	3	3	3	3				2				3	2

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech I Semester (Common to CSE, IT, CSE (AI), CSE (CS), CSE (IoT), CSE (DS) & CSE (AI &ML))

L	T	P	C
-	-	3	1.5

20AIT02 : AUTOMATA AND COMPILER DESIGN LAB

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Define the role of lexical analyzer, use of regular expressions and transition diagrams.
2. Analyze the working of lex and yacc compiler for debugging of programs.
3. Demonstrate the working of compiler at various stages
4. Demonstrate the working nature of compiler tools.

LIST OF EXPERIMENTS:

1. Write a C Program to implement NFAs that recognize identifiers, constants, and operators of the mini language.
2. Write a C Program to implement DFAs that recognize identifiers, constants, and operators of the mini language.
3. Design a Lexical analyzer for the given language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.
4. Implement the lexical analyzer using Jlex, flex or lex or other lexical analyzer generating tools.
5. Recognition of a valid variable which starts with a letter and followed by any number of letters or Digits.
6. Design Predictive parser for the given language.
7. Design LALR bottom up parser for the given language.
8. Implementation of the symbol table.
9. Implementation of type checking.
10. Implementation of Dynamic Memory Allocation (Stack, Heap, Static)
11. Construction of a DAG (Directed Acyclic Graph)
12. Implementation of the Backend of the Compiler.

TEXT BOOKS:

1. Introduction to Theory of computation, Sipser, 2nd Edition, Thomson.
2. Compilers Principles, Techniques and Tools Aho , Ullman, ravisethi, Pearson Education

REFERENCE BOOKS:

1. Modern Compiler construction in C, Andrew W.Appel Cambridge University Press.Compiler Construction, LOUDEN, Cengage Learning.

CO-PO-PSO Mapping Table:

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		3	2											3	1
CO2		3	3			2								2	
CO3		3												2	
CO4		3				2								2	
AVG		3	2.5			2								2.25	1
LOC		3	3			2								2	1

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech I Semester (Common to CSE, IT, CSE (AI), CSE (DS) & CSE (AI &ML))

L	T	P	C
-	-	3	1.5

20ACS10 : RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB

Course Outcomes:
After successful completion of the course, the student will be able to :

1. Design and implement a database schema for given problem.
2. Implement SQL queries using query language tools.
3. Apply the normalization techniques for development of application software to realistic problems.
4. Formulate queries using SQL tools for DML/DDL/DCL commands.

LIST OF EXPERIMENTS:

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.

2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSECT, EXCEPT operators.. Example:, Select the roll number and name of the student who secured fourth rank in the class.

3. Using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING, 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), datefunctions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round,to_char, to_date)

5. i) Creation of simple PL/SQL program which includes declaration section, executable section and exception –handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found) ii) Implement COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

6. Develop a program that includes the features NESTED IF, CASE and CASE expression.

7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions.

8. Program development using a creation of procedures, passing parameters IN and OUT of PROCEDURES.

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

10. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.

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

12. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2				1				3	1
CO2	3	3	3	2	3								3	1
CO3	3	3	3	2	2							1	3	3
CO4	3	3		1	3								3	1
Average	3	3	3	1.75	2.5				1			1	3	1.5
Level of Correlation	3	3	3	2	3				1			1	3	2

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech I Semester (Common to CSE)

IV B.Tech I Semester (Common to CSE (DS) &CSE (AI & ML)

L	T	P	C
1	-	2	2

20ACS11: ANDROID APPLICATION DEVELOPMENT

(Skill Course)

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Create, test and debug Android application by setting up Android development Environment
2. Implement adaptive, responsive user interfaces that work across a wide range of Devices.
3. Demonstrate methods in preferences and settings and storing data in Android applications.
4. Demonstrate methods in sharing and loading data in Android Applications.

LIST OF EXPERIMENTS

1. Create a basic app to display the student details as Name, Roll No, Section and Phone No
2. Develop a simple android application to print some alert message using Android Alert Dialog.
3. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.
4. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout).
5. Develop a simple android application to display food items with check box. Display selected food item using by pressing button “Order”.
6. Design an android application Send SMS using Intent.
7. Develop an Android application using controls like Button, Text View, Edit Text for designing a calculator having basic functionality like Addition, Subtraction, Multiplication and Division.
8. Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 secs.
9. Create a user registration application that stores the user details in a database table.

10. Develop a simple application with one EditText so that user can write some text in it. Create a button called "Convert Text to Speech" that converts the user input text to voice.

TEXT BOOKS:

1. Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Google Developer Training Team, 2017. https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-Course-concepts/details (Download pdf file from the above link).

REFERENCE BOOKS:

1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India. Pvt Ltd, 2014.
2. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPD Publishers, 2015.
3. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580
4. Anubhav Pradhan, Anil V Deshpande, " Composing Mobile Apps" using Android, Wiley 2014, ISBN: 978-81-265-4660-2

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1	3								3	3
CO2	3	1	3		3								3	
CO3	3		3		3									2
CO4	3	2			3								3	3
Average	3	1.66	3	1	3								3	2.66
Level of Correlation	3	2	3	1	3								3	3

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

II B.Tech – I Semester

(Common to CE, EEE, ME, ECE, CSE, IT, CSE(DS) ,CSE(AI &ML) , CSE(AI), CSE(CS) & CSE(IOT))

L	T	P	C
2	-	-	-

20AMB02 : UNIVERSAL HUMAN VALUES-I
(Mandatory course)

Course Outcomes:

After successful completion of the course, the student will be able to :

1. Apply the principles of natural acceptance to design a happy and prosperous living with responsibility.
2. Analyse the elements of sentient 'I' and material human body to design a living with responsibility for happiness and prosperity.
3. Apply the principles of 'trust' and 'respect' for designing a society with universal human order.
4. Analyse the situations causing imbalance in nature and further design an ecosystem for peaceful co-existence.
5. Apply the principles of science technology and management to solve contemporary problems professionally and ethically.

UNIT – I: **Introduction – Need, Basic Guidelines, Content and Process for ValueEducation**

Purpose and motivation for the course, recapitulation from Universal Human Values-I; Self-Exploration–what is it? – Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration; Continuous Happiness and Prosperity- A look at basic Human Aspirations; Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority; Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario; Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

UNIT – II: Understanding Harmony in the Human Being – Harmony in Myself

Understanding human being as a co-existence of the sentient 'I' and the material Body; Understanding the needs of Self ('I') and 'Body' – happiness and physical facility; Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer); Understanding the characteristics and activities of 'I' and harmony in 'I'; Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail;Programs to ensure Sanyam and Health.

UNIT – III: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship; Understanding the meaning of Trust; Difference between intention and competence; Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship; Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co- existence as comprehensive Human Goals; Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

UNIT – IV: Understanding Harmony in the Nature and Existence – Whole existence as Coexistence

Understanding the harmony in the Nature; Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature; Understanding Existence as Co-existence of mutually interacting units in all- pervasive space;Holistic perception of harmony atall levels of existence

UNIT – V: Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values; Definitiveness of Ethical Human Conduct; Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order; Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people friendly and eco- friendly production systems, c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Strategy for transition from the present state to Universal Human Order:

a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b. At the level of society: as mutually enriching institutions and organizations.

TEXT BOOKS:

1. R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1.
2. R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human

Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN978-93-87034-53-2.

REFERENCE BOOKS:

1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
2. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.The Story of Stuff (Book).
3. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth" E. Fschumacher. "Small is Beautiful"Slow is Beautiful –Cecile Andrews J C Kumarappa "Economy of Permanence" Pandit Sunderlal "Bharat Mein Angreji Raj" Dharampal.
4. Rediscovering India. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"India WinsFreedom – Maulana Abdul Kalam Azad Vivekananda – Romain Rolland (English)Gandhi –Romain Rolland (English).

CO-PO-PSO Mapping Table:

Cos/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	3	3	3	2	-	-	-		
CO2	-	-	-	-	-	3	3	3	2	-	-	-		
CO3	-	-	-	-	-	3	3	3	2	-	-	-		
CO4	-	-	-	-	-	3	3	3	2	-	-	-		
CO5	-	-	-	-	-	3	3	3	-	-	-	-		
Average	-	-	-	-	-	3	3	3	1.6	-	-	-		
Level of correlation of the course	-	-	-	-	-	3	3	3	2	-	-	-		

3- High mapping **2-Medium Mapping** **1- Low Mapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

II B.Tech – I Semester (Common to All Branches)

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20AHS11: QUANTITATIVE APTITUDE AND REASONING-I

Course Outcomes:
After successful completion of the course, the student will be able to :

1. Develop the thinking ability to meet the challenges in solving Logical Reasoning problems.
2. Solve campus placements aptitude papers covering Quantitative Ability and Verbal Ability.
3. Apply different placement practice techniques.

UNIT- I **9 Hrs**

QUANTITATIVE ABILITY – I: Vedic Maths – Square – Square root – Cube – Cube root –Fractions – Mathematical operations – Number System – Types of numbers – Divisibility Rule – Unit Digit – Factors and Factorials – Remainder Theorem – Factorization and Trailing Zeroes – LCM And HCF

UNIT-II **6 Hrs**

QUANTITATIVE ABILITY – II: Arithmetic Progression – Common Difference- n^{th} Term – Sum of terms – Geometric Progression – Common Ratio – n^{th} term – Sum of Terms – Averages – Weighted average – Percentages – Conversion – Increasing and decreasing in quantity – Change in Percentage – Successive discount
– Compound Growth

UNIT-III **6 Hrs**

REASONING ABILITY I: Coding and Decoding – Blood Relations – Directions – Number Series and Letter Series – Ranking and Ordering

UNIT-IV **6 Hrs**

VERBAL I: Verbal analogy – Types – Parts of Speech – Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction and Interjection – Prepositions –Preposition of Place, Preposition of Placement, Preposition of Timeand Preposition of Duration – Articles – Usage of a, an, the, Omission of articles – Sentences – Pattern and Types.**UNIT-V** **6 Hours**

SOFT SKILL I: Communication Skills – Self-Confidence – Introductions & Greetings – Presentation Skills – Self- Motivation

Total Hours:30

TEXT BOOKS:

1. Quantitative Aptitude, Logic Reasoning & Verbal Reasoning, R S Agarwal, S.Chand Publications.
2. Quantitative Aptitude for Competitive Examinations, R S Agarwal, S.Chand Publications

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	2	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	2	-	-	-	-
Average	2.33	2	-	-	-	-	-	-	-	1.3	-	-	-	-
Level of correlation	2	2	-	-	-	-	-	-	-	1	-	-	-	-

3-High Mapping **2- Medium Mapping** **1-Low Mapping**