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 & III Year Course Structure & Scheme of Examination

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
(AUTONOMOUS)
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		CIA	SEE	Total
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	PC LAB	20ACS14	Design and Analysis of Algorithms lab	0	0	3	1.5	40	60	100
7	PC LAB	20ACS15	Operating Systems Lab	0	0	3	1.5	40	60	100
8	PC LAB	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										

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
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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

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
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence)

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							
		20ACA14	MATLAB programming for Engineers							
		20ACS28	Internet of Things							
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
(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 higherorder 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 (Cartesianand 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 ofIntegration (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) Weak acid VsStrong base.
4. Estimation of Copper using EDTA by complexometric method.
5. Determination of effect of temperature on absolute and kinematic viscosity of oils through Red woodviscometer 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
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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 Wins Freedom – 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)

L	T	P	C
2	0	0	0

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**

SRI VENKATESWARA COLLEGE OFENGINEERING & TECHNOLOGY

(Autonomous)

II B. Tech – II Semester (Common to CE, ME, CSE, CSE(AI), CSE (CS), CSE (IoT), CSE(AI&ML) & IT)

L	T	P	C
3	-	-	3

20AHS13: PROBABILITY AND STATISTICS

Course Outcomes:

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

1. Apply probability distributions to real life problems.
2. Analyze inference theory to make wise decisions about a population parameter.
3. Apply sampling methods in the day-to-day practical life to assess the quality of commodities.
4. Apply the testing of hypothesis for large and small samples.

UNIT-I **11 Hrs**

RANDOM VARIABLES & THEORITICAL DISTRIBUTIONS: Introduction on Probability – Discrete and Continuous random variables – Distribution functions – Moment generating functions. Binomial distribution – Poisson distribution – Normal distribution – related properties.

UNIT-II **9 Hrs**

SAMPLING DISTRIBUTIONS & ESTIMATION: Population – Sample – Parameter and Statistic – Characteristics of a good estimator – Consistency – Invariance property of Consistent estimator – Sufficient condition for consistency – Unbiasedness – Sampling distributions of means (known and unknown)- sums and difference. Estimation- Estimator, Estimate, Point estimation – Interval estimation – Bayesian estimation.

UNIT-III **8 Hrs**

TEST OF HYPOTHESIS: Null Hypothesis-Alternative Hypothesis-Critical region – Level of Significance-TypeI error and Type II errors-One tail test -Two tail tests – Hypothesis concerning one and two means – Hypothesis concerning one and two proportions.

UNIT-IV **9 Hrs**

TEST OF SIGNIFICANCE: Student's t-test, test for a population mean, equality of two Population means, paired t-test, F-test for equality of two population variances, $\chi 2$ -Chi-squaretest for goodness of fit and test for attributes.

ANALYSIS OF VARIANCE – One way and Two way Classifications

UNIT-V **8 Hrs**

QUEUING THEORY: Introduction – Queues with impatient customers: Balking and reneging-Classification, stationary process, Binomial process, Poisson process, Birth and death process, - M/M/1 Model –Problems on M/M/1 Model.

Total Hours: 45

TEXT BOOKS:

1. Miller and John Freund. E, Probability & Statistics for Engineers, New Delhi, Pearson Education, 2014.
2. S. P. Gupta, Statistical Methods,33rd Edition, publications Sultan Chand& Sons.2021.
3. Iyengar, T.K.V., Krishna Gandhi B., Probability & Statistics, New Delhi, S. Chand &Company, 2014.

REFERENCES BOOKS:

1. Arnold O Allen, Probability & Statistics, Academic Press. 2014.
2. Manoj Kumar Srivastava and Namita Srivastava, Statistical Inference Testing of Hypotheses,Prentice Hall of India, 2014.

CO-PO-PSO Mapping Table:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

L	T	P	C
3		-	3

20AHS14: DISCRETE STRUCTURES AND GRAPH THEORY

Course Outcomes:

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

1. Apply the rules of inference to determine the validity of argument.
2. Apply lattice theory and Boolean algebra in theory and design of computers.
3. Apply generating functions to solve the combinatorial problems which makes easier to solve broad spectrum of problems.
4. Apply the graph theory and trees in describing structures involving hierarchy. Also used inswitching and logical design.

UNIT-I **9 Hrs**

MATHEMATICAL LOGIC AND PREDICATES: Statements and notations, Connectives, Well -formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.

Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof by contradiction.

UNIT-II **9 Hrs**

SET THEORY AND BOOLEAN ALGEBRA: Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram. Functions: Inverse Function Compositions of functions, Lattice and its Properties. Introduction to Boolean Algebra- Sub Algebra, Direct product and homomorphism.

UNIT-III **9 Hrs**

ELEMENTARY COMBINATORICS: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.

UNIT- IV **9 Hrs**

RECURRENCE RELATION: Generating Functions, Sequences, Calculating Coefficient of generating functions, Recurrence relations. Solving recurrence relation by substitution. Generating

functions and Characteristic equations (both homogeneous and non-homogeneous Recurrence Relation).

UNIT-V **9 Hrs**

GRAPH THEORY: Representation of Graph, Directed Graph, Sub graphs, Isomorphism of Graphs, Planar Graphs, Connected Graphs, Euler and Hamiltonian circuits and their necessary and sufficient conditions for existence of Euler Circuits and Hamiltonian Circuits. (without Proof). Trees, Spanning and minimal spanning Trees, Prim's and Kruskal algorithm. Searching Algorithmsof Trees – DFS, BFS.

Total Hours: 45

TEXT BOOKS:

1. Trembly J.P. and Manoha. P, Discrete Mathematical Structures with applications to computerscience TMH. 2017.
2. Dr D.S. Chandrasekhara, Mathematical Foundations of computer science Prism books PvtLtd.2012.

REFERENCE BOOKS:

1. Bernand Kolman, Roberty C. Busby, Sharn Cutter, Discrete Mathematical Structures,Ross, Pearson Education/PHI. 2013
2. Mallik and Sen, Discrete Mathematical Structures, Thomson. 2004.
3. J.L. Mott, A. Kandel, T.P. Baker, Discrete Mathematics for Computer Scientists &Mathematicians Prentice Hall, 1986.

CO-PO-PSO Mapping Table:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B.Tech II Semester (Common to CSE,CSE(AI), CSE(IoT), IT, CSE (DS))

III B.Tech I Semester CSE (AI & ML)-PE-I

L	T	P	C
3	-	-	3

20ACS12: DESIGN AND ANALYSIS OF ALGORITHMS

Course Outcomes

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

1. Analyze the complexity of algorithms
2. by applying the knowledge of asymptotic notations andrecurrence methods.
3. Analyze the given problem and identify appropriate algorithm design technique for problemsolving.
4. Perceive and apply different algorithm design paradigms to find solutions for computingproblems.
5. Apply the knowledge of NP-hard and NP-Complete complexity classes to classify decisionproblems.

UNIT-I

Basics of Algorithms and Mathematics: **8 Hrs**

What is an algorithm? Algorithm Specification, Analysis Framework, Performance Analysis: Space complexity, Time complexity.

Analysis of Algorithm: Asymptotic Notations: Big-Oh notation (O), Omega notation (Ω), Theta notation (θ), and Little-oh notation (o), Mathematical analysis of non-Recursive and recursive Algorithms with Examples. Important Problem Types: Sorting, Searching, String processing.

UNIT-II ` **9 Hrs**

Divide and Conquer Algorithm:

Introduction, multiplying large Integers Problem, Binary Search, Sorting (Merge Sort, Quick Sort), Matrix Multiplication. Greedy Algorithm General Characteristics, Problem solving, Activity selection problem, Elements of Greedy Strategy, Minimum Cost Spanning trees, Prim's Algorithm, Kruskal's Algorithm. Single source shortest paths: Dijkstra's Algorithm, The Knapsack Problem, Job Scheduling Problem.

UNIT-III **8 Hrs**

Dynamic Programming: Introduction, General method with Examples, Multistage Graphs Transitive Closure: Warshall"s Algorithm All Pairs ;Shortest Paths: Floyd's Algorithm, Optimal Binary Search Trees, Knapsack problem, Bellman-Ford Algorithm, Travelling Sales Person problem.

UNIT-IV **7 Hrs**

Exploring Graph Introduction, Traversing Trees – Preconditioning, Undirected Graph, Directed Graph, Depth First Search, Breath First Search, Sum of subsets problem, 0/1 The Knapsack Problem, Graph coloring, Hamiltonian cycles.

UNIT-V

Backtracking **8 Hrs**

Introduction, General Template The I string-matching algorithm, The Rabin, Karp algorithm, String Matching with finite automata, The four queens' problem, The Eight queens' problem.

Introduction to NP, Completeness:

The class P and NP, Polynomial reduction, NP Completeness Problem, NP Hard Problems.

Total Hours: 45

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, 2nd Edition, Universities Press, 2008.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms,3rd Edition, MIT Press, 2009.
3. Introduction to the Design and Analysis of Algorithms, Anany Levitin:, 2rd Edition, 2009. Pearson.

REFERENCE BOOKS:

1. Design and Analysis of Algorithms, Parag Himanshu Dave and Himanshu Bhalachandra Dave, Pearson,2009.
2. Fundamental of Algorithms by Gills Brassard, Paul Bratley, PHI,1996.
3. Introduction to Design and Analysis of Algorithms, Anany Levitin, Pearson,2011.
4. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd Edition, PHI.

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	2
CO2	3	3	3	2									3	2
CO3	3	3	3	1									3	1
CO4	3	3	1	2									3	2
Average	3	3	2.25	1.75									3	1.75
Level of Correlation	3	3	2	2									3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

L	T	P	C
3	-	-	3

20ACS13: OPERATING SYSTEMS

Course Outcomes:

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

1. Apply the knowledge of operating system fundamental concepts to manage the computer resources.
2. Evaluate the performance of scheduling algorithms which is best suited in a multiprogramming environment.
3. Develop an algorithm to check the resources are effectively used in an operating system's component in a shared environment
4. Analyze an operating system's components to manage the user data.

UNIT I

INTRODUCTION TO OS **9 Hrs**

Functionality of OS – OS Design issues – Structuring methods (monolithic, layered, modular, micro-kernel models) Overview of computer operating systems, protection and security, distributed systems, special purpose systems, operating systems structures: operating system services and systems calls, system programs, operating system structure, operating systems generation.

UNIT II

SCHEDULING **9 Hrs**

Process concepts, Cooperating processes, Inter process communication. Threads: Overview, Multithreading models, Pthreads. CPU Scheduling: Basic concepts, Scheduling criteria, Algorithms, and their evaluation.

UNIT III

PROCESS SYNCHRONIZATION & DEADLOCK **9 Hrs**

Process synchronization, The critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Deadlocks: System model, deadlock characterization, Methods for handling deadlock, deadlock prevention, detection and avoidance, recovery form deadlock.

UNIT IV **9 Hrs**

MEMORY MANAGEMENT STRATEGIES

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory: demand paging, page replacement, algorithms, allocation of frames, Thrashing case studies UNIX, Linux, Windows 100

UNIT V **9 Hrs**

FILE SYSTEM INTERFACE

File concepts, Access Methods, Directory structure, File system mounting, File sharing, protection. File System implementation: File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, Mass-storage structure: Disk structure, disk scheduling, disk management, swap-space management and disk attachment.

Total Hours: 45

TEXT BOOKS:

2. Abraham Silberschatz, Peter B. Galvin, Greg Gagne-Operating System Concepts, Wiley (2012).

REFERENCE BOOKS:

3. RamezElmasri, A Carrick, David Levine, Operating Systems, A Spiral Approach – McGrawHillScience Engineering Math (2009).

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1										3	3
CO2	3	3	2	3	1								3	1
CO3	3	2	1										3	2
CO4	3	2											3	2
Average	3	2.25	1.33	3	1								3	2
Level of Correlation	3	2	1	3	1								3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

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

L	T	P	C
3	-	-	3

20AIT04: SOFTWARE ENGINEERING

Course Outcomes:

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

1. Design software requirements specifications for given problems.
2. Implement structure, object-oriented analysis and design for given problems.
3. Design test cases for given problems.
4. Apply quality management concepts at the application level.

UNIT – I **10 Hrs**

BASIC CONCEPTS IN SOFTWARE ENGINEERING AND SOFTWARE PROJECT MANAGEMENT: Basic concepts: abstraction versus decomposition, evolution of software engineering techniques, Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, Halstead's Software Science, project scheduling, staffing, Organization and team structure, risk management, configuration management.

UNIT – II **9 Hrs**

REQUIREMENTS ANALYSIS AND SPECIFICATION: The nature of software, The Unique nature of Webapps, Software Myths, Requirements gathering and analysis, software requirements specification, Traceability, Characteristics of a Good SRS Document, IEEE 830 guidelines, representing complex requirements using decision tables and decision trees, overview of formal system development techniques, axiomatic specification, algebraic specification.

UNIT -III **9 Hrs**

SOFTWARE DESIGN: Good Software Design, Cohesion and coupling, Control Hierarchy: Layering, Control Abstraction, Depth and width, Fan-out, Fan-in, Software design approaches, object oriented vs. function oriented design. Overview of SA/SD methodology, structured analysis,

Data flow diagram, Extending DFD technique to real life systems, Basic Object oriented concepts, UML Diagrams, Structured design, Detailed design, Design review, Characteristics of a good user interface, User Guidance and Online Help, Mode-based vs Mode-less Interface, Types of user interfaces, Component-based GUI development, User interface design methodology: GUI design methodology

UNIT – IV **8 Hrs**

CODING AND TESTING: Coding standards and guidelines, code review, software documentation, Testing, Black Box Testing, White Box Testing, debugging, integration testing, Program Analysis Tools, system testing, performance testing, regression testing, Testing Object Oriented Programs.

UNIT-V **9 Hrs**

SOFTWARE QUALITY, RELIABILITY, AND OTHER ISSUES: Software reliability, Statistical testing, Software quality and management, ISO 9000, SEI capability maturity model (CMM), Personal software process (PSP), Six sigma, Software quality metrics, CASE and its scope, CASE environment, CASE support in software life cycle, Characteristics of software maintenance, Software reverse engineering, Software maintenance processes model, Estimation maintenance cost. Basic issues in any reuse program, Reuse approach, Reuse at organization level.

Total Hours: 45

TEXT BOOKS:

1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018.
2. Pressman R, "Software Engineering- Practioner Approach", McGraw Hill.

REFERENCE BOOKS:

1. Somerville, "Software Engineering", Pearson 2.
2. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill.
3. JalotePankaj, "An integrated approach to Software Engineering", Narosa

ADDITIONAL LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106/105/106105182/
2. http://peterindia.net/SoftwareDevelopment.html

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3										3	1
CO2	3	3	2	3	1								3	1
CO3	3	2	1										3	2
CO4	3	2											3	3
Average	3	2.25	1.33	3	1								3	1.75
Level of correlation	3	3	2	3	1								3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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

L	T	P	C
-	-	3	1.5

20ACS14: DESIGN AND ANALYSIS OF ALGORITHMS LAB

Course Outcomes:

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

1. Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
2. Apply a variety of algorithms such as sorting, graph related, combinatorial using high level language tools.
3. Analyze and compare the performance of algorithms using language features.
4. Apply and implement learned algorithm design techniques and data structures to solve real-world problems.

LIST OF EXPERIMENTS

1. Sort a given set of elements using the Quicksort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
2. Obtain the Topological ordering of vertices in a given digraph
3. Implement 0/1 Knapsack problem using Dynamic Programming
4. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm
5. Find Minimum Cost Spanning Tree of a given undirected graph using Krushkal'salgorithm.
6. Check whether a given graph is connected or not using DFS method.
7. Find Minimum Cost Spanning Tree of a given undirected graph using Prim"s algorithm.
8. Implement N Queen's problem using Backtracking.
9. Implement All-Pairs Shortest Paths problem using **Floyd's algorithm.**
10. Implement **Travelling Sales Person problem** using Dynamic programming

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	2
CO2	3	3	2	1	3								3	1
CO3	3	3	1	3									3	1
CO4	3	3	3	3									3	3
Average	3	3	2.25	2.25	3								3	1.75
Level of Correlation	3	3	2	2	3								3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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

L	T	P	C
-	-	3	1.5

20ACS15: OPERATING SYSTEMS LAB

Course Outcome:

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

4. Execute the basic command in UNIX operating system and shell program.
5. Design the principles of CPU scheduling concepts.
6. Design and symbolize the principles of synchronization and contiguous memory allocation technique.
7. Simulate the principle of page replacement algorithm
8. Simulate the concepts of disk scheduling algorithm

LIST OF EXPERIMENTS:

1. Explain the following system calls in UNIX operating system (fork, exec, mkdir, cat, open, date, history, clear, pwd, ls, cd)
2. Write a shell script program
   (a) To perform arithmetic operations.
   (b) To find the given number is odd or even
3. Implement the various process scheduling mechanisms such as FCFS, SJF, Priority, round – robin.
4. Implement the solution for reader – writer's problem.
5. Implement the solution for dining philosopher's problem.
6. Implement banker's algorithm.
7. Implement the first fit; best fit and worst fit file allocation strategy.
8. Write a C program to simulate page replacement algorithms a) FIFO b) LRU c) LFU
9. Write a C program to simulate disk scheduling algorithm a)FIFO b)SCAN c)CSCAN

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	3								3	3
CO2	3	3	3	2									3	2
CO3	3	2	3	2									3	2
CO4	3	2	3	2									3	1
CO5	3	2	3	2									3	2
Average	3	2.2	2.6	2.25	3								3	2
Level of Correlation	3	2	3	2	3								3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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

L	T	P	C
-	-	3	1.5

20AIT05: SOFTWARE ENGINEERING LAB

Course Outcomes:

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

1. Acquaint with historical and modern software methodologies.
2. Understand the phases of software projects and practice the activities of each phase
3. Practice clean coding
4. Take part in project management
5. Adopt tools for distributed computation.

LIST OF EXPERIMENTS:

1. Draw the Work Breakdown Structure for the system to be automated
2. Schedule all the activities and sub-activities Using the PERT/CPM charts
3. Define use cases and represent them in use-case document for all the stakeholders of the system to be automated
4. Identify and analyze all the possible risks and its risk mitigation plan for the system to be automated
5. Diagnose any risk using Ishikawa Diagram (Can be called as Fish Bone Diagram or Cause& Effect Diagram)
6. Define Complete Project plan for the system to be automated using Microsoft Project Tool
7. Define the Features, Vision, Business objectives, Business rules and stakeholders in the vision document
8. Define the functional and non-functional requirements of the system to be automated by using Use cases and document in SRS document
9. Develop a tool which can be used for quantification of all the non-functional requirements
10. Write C/Java/Python program for classifying the various types of coupling.
11. Write a C/Java/Python program for classifying the various types of cohesion.
12. Write a C/Java/Python program for object oriented metrics for design proposed by Chidamber and Kremer. (Popularly called CK metrics)
13. Draw a complete class diagram and object diagrams using Rational tools

REFERENCE BOOKS:

1. Software Engineering? A Practitioner‟ s Approach, Roger S. Pressman, 1996, MGH.
2. Software Engineering by Ian Sommerville, Pearson Edu, 5th edition, 1999
3. An Integrated Approach to software engineering by Pankaj Jalote , 1991 Narosa

ADDITIONAL LEARNING RESOURCES:

http://vlabs.iitkgp.ac.in/se/

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												3	1
CO2	2	3		3				3					2	1
CO3	2	3											2	2
CO4	3												2	1
CO5	3												2	
Average	2.6	1		3				3					2.2	1.25
Level of Correlation	3	1		3				3					2	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

II B. Tech II Semester CSE (AI)

L	T	P	C
1	0	2	2

20ACA01: COMPUTATIONAL INTELLIGENCE PRACTICE

(Skill Course)

Course outcomes:

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

1. Apply the knowledge of basic programming and execute R program using supported functionalities to solve real time applications.
2. Apply the knowledge of pre-processing techniques, to transform variables to facilitate analysis.
3. Design an effective model which enhance the prediction accuracy
4. Implement visualization technique to interpret the analyzed data.
5. Work independently or in teams to solve problems with effective communication.

LIST OF EXPERIMENTS:

1. Implement **Feature Selections** for dimension reduction using Python Programming.
2. Implement **Wrappers Methods** for dimension reduction using Python Programming.
3. Implement **Feature Extraction** using Python Programming.
4. Generate a Function for SVD low-rank approximation of a matrix, using numpy.linalg.svd. Can be used as a form of compression, or to reduce the condition number of a matrix.
5. How to create a vector in Python using NumPy?
6. Perform basic Arithmetic operation on Vectors Using Python
7. Perform Vector-Scalar Multiplication Using Python.
8. Implement Projection of a Vector onto a Plane using Python.
9. Implement Projection of a Vector on another vector Using Python
10. Implement Orthogonal Projections with testing numerical algorithms on test on small dataset to find invariants Using Python.

REFERENCE BOOKS:

1. Thomas Mailund Beginning Data Science in R: Data Analysis, Visualization, and Modelling for the Data Scientist.
2. Norman Matloff, The Art of R Programming: A Tour of Statistical Software Design, No Starch Press Edition: 2011
3. Garrett Grolemund, Hadley Wickham, R for Data Science, O'Relly,2016

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
CO2	2	3	3	3	3	-	-	3	-	-	-	-	3	3
CO3	2	3	3	2	3	-	-	-	-	-	-	-	3	3
CO4	3		3	2	3	-	-	-	-	-	-	-	3	3
CO5	-	-	-	-	-	-	-	-	3	3	-	-	-	-
Average	2.6	1	3	1.4	3	-	-	3	0.6	0.6	-	-	2.4	2.4
Level of Correlation	3	1	3	1	3	-	-	3	1	1	-	-	2	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

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

L	T	P	C
2	0	0	0

20AHS15: QUANTITATIVE APTITUDE AND REASONING-II

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 III: Profit, Loss and Discount – Cost Price – Selling Price – Retail Price – Markup Price – Ratio and Proportion Antecedent – Consequent – Mean Proportion –Direct variation – Indirect Variation – Joint Variation Partnership – Mixture and Allegation – Problems on Ages – Surds and Indices

UNIT-II **9 Hrs**

QUANTITATIVE ABILITY IV: Time Speed and Distance – Uniform and Variable speed – Conversion – Average Speed –Relative Speed – Effective speed – Problems on Trains – Stationary point and object – Moving Point and Object – Boats and Streams – Downstream and Upstream – Races and Games – Head start – Dead Heat – Escalator – Number of steps

UNIT-III **9 Hrs**

REASONING ABILITY II: Syllogism – Statement and Conclusion – Data Sufficiency – Data Arrangement –Linear and Circular arrangement – Data Interpretation – Line Graph – Bar graph – Pie Chart

UNIT-IV **9 Hrs**

VERBAL II: Tense – Present Tense, Past Tense, Future Tense – Voice – Active voice, Passive voice and Active toPassive Voice Conversion Rules – Speech – Direct Speech, Indirect Speech and Direct to Indirect Speech ConversionRules –Essay Writing – Types, Steps, Format.

UNIT V **9 Hrs**

SOFT SKILL II: Time Management – Stress Management – Team Work – Accent and Voice Communication –Interview Skills.

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	1	2	-	-	-	-	-	-	-	2	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	2	-	-	-	-
Average	2	2	-	-	-	-	-	-	-	2	-	-	-	-
Level of correlation	2	2	-	-	-	-	-	-	-	2	-	-	-	-

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
II B.Tech II Semester CE,ME & ECE
III B.Tech I Semester EEE, CSE, IT, CSE (AI), CSE (AI&ML), & CSE (DS)

L	T	P	C
3	-	-	3

20AMB03: MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Outcomes:

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

1. Explain the fundamental concepts and theoretical principles of the Economics
2. Apply economic principles for problem solving.
3. Identify market structures and types of business organizations.
4. List features, steps, merits, uses & limitations of Pay Back, ARR, NPV, PI & IRR methods of Capital Budgeting
5. Explain the basic concepts of book keeping and accounting, and analyze financialstatements.

UNIT –I INTRODUCTION TO MANAGERIAL ECONOMICS 9 Hrs

Managerial Economics: Definition, Nature and Scope –Demand analysis: Law of demand, Demand determinants, Elasticity of Demand: Definition, Types, Measurementand Significance –Demand forecasting methods (Survey methods, Statistical methods, Expert opinion method, Test marketing, Controlled experiments, Judgmental approach)

UNIT –II THEORY OF PRODUCTION AND COST ANALYSIS 9 Hrs

Production function –Cobb Douglas Production function –Laws of Returns–Internal and External economies of scale COST ANALYSIS: Cost concepts, Fixed vs. Variable costs, Explicit vs. Implicit Costs, Out of Pocket costs Vs Imputed costs, Opportunity Cost and Sunk costs BREAK EVEN ANALYSIS: Concept of Break Even Point (BEP)–Break Even Chart – Assumptions underlying and Practical significance of BEP (Simple Problems).

UNIT –III INTRODUCTION TO MARKETS ANDBUSINESSORGANIZATIONS 9 Hrs

Market structures –Types of Competition –Features of perfect competition, Monopoly, Monopolistic competition –Price-Output Determination under perfect competition and Monopoly –Types of Business organization –Features, Merits and demerits of Sole proprietorship, Partnership and Joint stock companies –Types of companies –Public enterprises –Types and Features –Changing business environment in post –Liberalization scenario

UNIT –IV CAPITAL AND CAPITAL BUDGETING 9 Hrs

Capital and its Significance –Types of capital –Estimation of fixed and working capital requirements –Methods and sources of raising capital –Capital Budgeting Methods: Payback Method, Accounting Rate of Return (ARR), and Net Present Value (NPV) Method (Simple Problems).

UNIT –V FINANCIAL ACCOUNTING AND FINANCIAL ANALYSIS THROUGH RATIOS **9 Hrs**

Double entry book keeping –Journal –Ledger –Trial Balance –Trading Account and balance sheet with simple adjustments Ratio analysis: Computation of Liquidity Ratios (Current and Quick Ratio), Activity Ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt-Equity Ratio and Interest Coverage Ratio) and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratio and EPS).

Total Hours: 45

TEXT BOOKS:

1. Aryasri A. R., Managerial Economics and Financial Analysis, 4/E, TMH, 2009.
2. Varshney R.L. and K.L. Maheswari, Managerial Economics, Sultan Chand &Sons, 19/E,2009.
3. Siddiqui S.A. and Siddiqui A.S., Managerial Economics and Financial Analysis,New Age international, 2009.

REFERENCE BOOKS:

1. Gupta R.L., Financial Accounting, Volume I, Sultan Chand & Sons, New Delhi, 2001
2. James C. Van Horne, Financial Management policy, 12/E, PHI, 2001.
3. Joel Dean, Managerial Economics, PHI, 2001.

CO-PO-PSO Mapping Table:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. Tech I Semester CSE (AI) Professional Core
III B.Tech II Semester CSE (Professional Elective -II)

L	T	P	C
3	-	-	3

20ACS33: ARTIFICIAL INTELLIGENCE

Course Outcomes:

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

1. Understand the fundamentals of Artificial Intelligence (AI).
2. Analyze the basic concepts of problem solving, searching, inference, perception using AI.
3. Apply basic principles of AI in solutions that require real world knowledge representation and learning.
4. Create the real life examples of Artificial Intelligence.

UNIT-I INTRODUCTION 9 Hrs

History of AI – the Present State of AI– Definition of AI – Examples Tasks, Phases of AI– Uniform Search: Notion of a State– Search Problem and Examples – Basic Search Strategies - -Iterative Deepening DFS – Bidirectional Search

UNIT-II PROBLEM SOLVING METHODS 9 Hrs

Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems – Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games.

UNIT-III KNOWLEDGE REPRESENTATION 9 Hrs

Logic in AI– Different Knowledge Representation systems – Syntax – Semantics– Forward Chaining– Resolution– Reduction to Satisfiability Problem– SAT Solvers: DPLL Algorithm – Walk SAT Algorithm – Uncertainty in AI: Motivation – Basics of Probability – Conditional Independence & Bayes Rule.

UNIT-IV SOFTWARE AGENTS 9 Hrs

Agents and Environments – Decision Theory – Probabilistic Uncertainty – Expected Utility vs Expected Value – Markov Decision Processes – Bayesian Networks: Syntax – Syntax – Conditional Independences and d-Separation – Inference using Variable Elimination – Reducing 3-SAT to Bayes Net – Rejection Sampling – Likelihood Weighting – MCMC with Gibbs Sampling – Maximum Likelihood Learning – Structure Learning and Expectation.

UNIT-V LEARNING METHODOLOGIES 9 Hrs

Reinforcement Learning: Background – Model-based Learning for policy – free Learning for policy evaluation – TD Learning and Computational – Q Learning – Exploration vs Exploitation Tradeoff – Generalization in RL – Deep Learning : Perceptions and Activation functions– Example of Handwritten digit recognition – Neural Layer as matrix operations – Differentiable loss function – Back propagation – Convolutional Neural Networks – Deep Reinforcement Learning – Ethics of AI.

Total Hours: 45

TEXT BOOK:

1. Mausam, An Introduction to Artificial Intelligence, IIT Delhi.

REFERENCE BOOKS:

1. S.Russel and P.Norvig,"Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition, 2009.
2. Bratko,"Prolog: Programming for Artificial Intelligence", Fourth Edition Addision – Wesley Educational Publishers Inc., 2011.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2
CO1	3												1	1
CO2	3	3	2										3	2
CO3	3	3	2										3	2
CO4	3	3	3	2									3	
Average	3	3	2.33	2									2.5	1.66
Level of Correlation	3	3	3	2									3	2

3 – High Mapping 2 – Medium Mapping 3 – Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

IV B. Tech I Semester ME (Open Elective-IV)

L	T	P	C
3	0	0	3

20ACS17: COMPUTER NETWORKS

Course Outcomes:

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

1. Describe various components and topologies of computer networks
2. Use the network reference model layered structure for real time applications.
3. Implement various routing protocols from different layers.
4. Design, implement and test an efficient algorithmic solution for the give problem.
5. Analyse network security mechanics and other issues in the application layer.

UNIT- I **9 Hrs**

INTRODUCTION:

Uses of Computer Networks, Network Hardware, Network Topologies, Network Software, References Models. The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, and Sliding Window Protocols

UNIT-II **9 Hrs**

THE MEDIUM ACCESS CONTROL SUBLAYER:

Channel allocation Problem, Multiple Access Protocols, Ethernet: Classic Ethernet physical layer, Ethernet MAC Sublayer Protocol, Ethernet Performance, Switched Ethernet, Fast Ethernet, Gigabit Ethernet,10-Gigabit Ethernet, Wireless LANs: The 802.11 Protocol Stack, 802.11 Physical Layer,802.11 MAC Sublayer Protocol, 802.11 Frame Structure

UNIT-III **9 Hrs**

THE NETWORK LAYER:

Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Internetworking, Network Layer in the Internet.

UNIT-IV **9 Hrs**

THE TRANSPORT LAYER:

Transport Service, Elements of Transport Protocols, Internet Transport Protocols: UDP, Internet Transport Protocols: TCP.

UNIT-V **9 Hrs**

THE APPLICATION LAYER:

Domain Name System, Electronic Mail. World Wide Web.

Total Hours: 45

TEXT BOOK:

1.Computer Networks, Fifth Edition, Andrew S. Tanenbaum, David J Wetherall Pearson Education, 2011.

REFERENCE BOOKS:

1.Data Communications and Networking, Fifth Edition, Behrouz A. Forouzan, Tata McGraw Hill, 2012.

2.Computer Networking: A Top, Down Approach Featuring the Internet, Six Edition, James F. Kurose, K.W. Ross, Pearson Education, 2013

3.Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning, 2001.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	-	-	-	-	-	-	-	-	-	-	-	2	-
C02	3	3	1	-	-	-	-	-	-	-	2	-	2	-
C03	3	2	3	-	1	-	-	-	-	-	2	3	2	-
C04	-	1	2	1	1	-	-	-	-	-	-	2	-	1
C05	-	-	-	1	1	-	-	-	-	-	-	1	-	1
Average	1.8	1.2	1.2	0.4	0.6						0.8	1.2	1.2	0.8
Level of Correlation	2	1	1	-	1						1	1	1	1

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech I Semester CSE (AI) - (Professional Elective - I)

L	T	P	C
3	0	0	3

20ACA02: KNOWLEDGE REPRESENTATION AND REASONING

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

1. Analyze and design knowledge-based systems intended for computer implementation.
2. Understand theoretical knowledge about principles for logic-based representation, knowledge-engineering process and reasoning.
3. Use production systems, frames, inheritance systems and approaches to handle uncertain or in complete knowledge.

UNIT- I **8 Hrs**

THE KEY CONCEPTS: Knowledge, Representation, Reasoning, purpose of knowledge representation and reasoning, Role of logic.

Logic: Historical background, Representing knowledge in logic, Varieties of logic, Name, Type, Measures, Unity and diversity

UNIT- II **9 Hrs**

Ontology: Ontological categories, Philosophical background, Top-level categories, physical entities, Defining abstractions, Sets, Collections, Types and Categories, Space and Time

UNIT- III **9 Hrs**

Knowledge Representations: Knowledge Engineering, Representing structure in frames, Rules and data, Object-oriented systems, Natural language Semantics, Levels of representation

UNIT- IV **9 Hrs**

Processes: Times, Events and Situations, Classification of processes, Procedures, Processes and Histories, Concurrent processes, Computation, Constraint satisfaction, Change Contexts: Syntax of contexts, Semantics of contexts, First-order reasoning in contexts, Modal reasoning in contexts, Encapsulating objects in contexts.

UNIT- V **10 Hrs**

Knowledge Soup: Vagueness, Uncertainty, Randomness and Ignorance, Limitations of logic, Fuzzy logic, Non-monotonic Logic, Theories, Models and the world, Semiotics.

Knowledge Acquisition and Sharing: Sharing Ontologies, Conceptual schema, accommodating multiple paradigms, Relating different knowledge representations, Language patterns, Tools for knowledge acquisition

Total Hours: 45

TEXT BOOKS:

1. John F. Sowa, Thomson Learning, Knowledge Representation logical, Philosophical, and Computational Foundations.

2. Ronald J. Brachman, Hector J. Levesque, Elsevier "Knowledge Representation and Reasoning"

REFERENCE BOOKS:

1. Gerhard Lakemeyer, "Foundations of Knowledge Representation and Reasoning: 810" (Lecture Notes in Computer Science),28 June 1994.

2. Arthur B. Markman, "Knowledge Representation" , Psychology Press Publications, ISBN: 9781134802975, 2013.

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1		-	-	-	-	-	-	-	-	-	-	3
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	3
CO3	3	2	2	1	3	1	-	-	-	-	-	-	-	3
Average	3	2	1.3	0.3	1	0.3	-	-	-	-	-	-	-	3
Level of Correlation	3	2	1	-	1	-	-	-	-	-	-	-	-	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech I Semester CSE (AI)

L	T	P	C
3	0	0	3

20ACA03: LINUX PROGRAMMING
(Professional Elective - I)

Course Outcomes:

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

1. Understand basic commands, Program arguments and Environment Variables
2. Design interactive shell scripts related to Linux Environment for solving specified computational problems.
3. Analyze system calls related to standard I/O library, formatted input, output, file and directory maintenance.
4. Apply the system calls for process management and signal handling.
5. Apply inter process communication and socket programming for developing client-server applications.

UNIT-I **9 Hrs**

INTRODUCTION TO LINUX AND LINUX ENVIRONMENT

The GNU project and the Free Software Foundation, Linux distributions, Programming Linux - Linux programs, Text editors, The C Compiler; Basic commands -- cat, tail, head , sort, nl, uniq, grep, cut, paste, join, tee, pg, comm, cmp, diff, cp, mv, ln, rm, unlink, tty, clear, date , cal, mkdir, rmdir, du, df, find, umask, ps, who, sed; Program arguments - getopt, getopt_long. Environment variables - Use of environment variables, The environ variable, Time and Date, User information, Host information.

UNIT-II **8 Hrs**

SHELL PROGRAMMING:

Necessity of shell programming, Pipes and redirection - Redirecting output, Redirecting input, Pipes, The Shell as a programming language - Interactive programs, Creating a script, Making a script executable, Shell syntax – Variables, Conditions, Control structures, Functions, Commands, Command execution.

UNIT-III **10 Hrs**

FILE SYSTEM STRUCTURE AND SYSTEM CALLS :

Linux File Structure and Commands: File structure - Directories, Files and devices, System calls and Device drivers; Library functions - Low-level file access, write, read and open commands, Initial permissions, Other system calls for managing files; File and directory maintenance commands - chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd.

Input-Output Commands: The standard I/O library commands - fopen, fread, fwrite, fclose, fflush, fseek, fgetc, getc, and getchar, fputc, putc and putchar, fgets and gets; Formatted input and output commands - printf, fprintf, sprintf, scanf, fscanf, sscanf.

UNIT-IV **9 Hrs**

PROCESS AND SIGNALS:

Process structure - Process table, Viewing processes, System processes, Process scheduling; Starting new processes - Waiting for a process, Zombie processes, Input and output redirection, Threads; Signals - Sending signals, Signal sets.

UNIT-V **9 Hrs**

INTER-PROCESS COMMUNICATION AND SOCKETS:

Inter-Process Communication: Pipe definition, Process pipes, Sending output to popen - Passing more data, popen, implementation, The pipe call; Parent and child processes - Reading closed pipes, pipes used as standard input and output; Named pipes – FIFOs, Accessing a FIFO, Client/Server using FIFOs.

Socket Connections: Socket attributes, Creating a socket, Socket addresses, Naming a socket, Creating a socket queue, Accepting connections, Requesting connections, Closing a socket, Socket communications, Host and network byte Ordering.

Total Hours: 45

TEXT BOOKS:

1. Neil Matthew and Richard Stones, Beginning Linux Programming, Wiley Dreamtech, 4th Edition, 2008.
2. Sumitabha Das, Your UNIX: The Ultimate Guide, Tata McGraw-Hill, 2007.

REFERENCE BOOKS:

1. Richard Petersen, Linux: The Complete Reference, Tata McGraw-Hill, Six Edition, 2007.
2. Yashwanth Kanitkar, Unix Shell programming, BPB Publications, 1st Edition.

ADDITIONAL LEARNING RESOURCES:

1. https://www.howtogeek.com/412055/37-important-linux-commands-you-should-know/
2. https://maker.pro/linux/tutorial/basic-linux-commands-for-beginners

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	1	-	-	-	-	-	-	-	3	-
CO2	2	2	-	3	1	-		-	-	-	-	-	3	-
CO3	2	3	1	3	1	-	-	-	-	-	-	-	3	-
CO4	3	2	2	2	3	-	-	-	-	-	-	-	3	-
CO5	2	2	3	3	3	-	-	-	-	-	-	-	3	-
Average	2.4	1.8	1.2	2.2	1.8								3	
Level of Correlation	2	2	1	2	2								3	

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech I Semester CSE (AI)-(Professional Elective - I)

L	T	P	C
3	0	0	3

20ACA04: ESSENTIALS OF NATURAL LANGUAGE PROCESSING

Course Outcome:

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

1. Understanding the concepts and basic features of Natural language Processing and Extracting Product features and Opinions.
2. Analyze the extracted features from text into numerical vectors, then build a binary classifier for tweets using a logistic regression.
3. Analyze Vector space models capture semantic meaning and relationships between words and Create word vectors that capture dependencies between words, then visualize their relationships in two dimensions using PCA.
4. Use and apply Bayes' rule for conditional probabilities, then apply it toward building a Naive Bayes tweet classifier
5. Use transform word vectors and assign them to subsets using locality sensitive hashing, in order to perform machine translation and document search.

UNIT-I: **9 Hrs**

Introduction to Natural Language Processing (NLP):

Concepts of NLP, Approaches that use NLP Techniques, Non-NLP Techniques, Range of Applications, Supporting Techniques, Extracting Product features and Opinion from reviews-Terminologies, OPINE Overview, The KnowitALL Systems, Finding Explicit Features, Explicit Feature extraction, finding implicit features, Finding Opinion Phrases and their polarity context.

UNIT-II **9 Hrs**

Sentiment Analysis with Logistic Regression:

Introduction to Sentiment Analysis, Supervised ML and Sentiment Analysis, Vocabulary and Feature Extraction, Negative and Positive Frequencies, Feature Extraction with Frequencies, Preprocessing, Logistic Regression, Overview of Logistic Regression: Training, Logistic Regression: Testing, Logistic Regression: Cost Function, implementing Logistic Regression

UNIT-III **9 Hrs**

Sentiment Analysis with Naïve Bayes:

Probability and Bayes' Rule, Bayes' Rule, Naïve Bayes Introduction, Laplacian Smoothing, Log Likelihood, Log Likelihood, Training Naïve Bayes, Testing Naïve Bayes, Applications of Naïve Bayes, Naïve Bayes Assumptions, Error Analysis, implementing Naive Bayes

UNIT-IV **9 Hrs**

Vector Space Models:

Vector space models, capture semantic meaning and relationships between words. create word vectors that capture dependencies between words, visualize their relationships in two dimensions using PCA. Vector Space Models, Word by Word and Word by Doc, Euclidean Distance, Cosine Similarity: Intuition, Cosine Similarity, Manipulating Words in Vector Spaces, Visualization and PCAPCA Algorithm.

UNIT-V **9 Hrs**

Machine Translation and Document Search:

Overview, Transforming word vectors, K-nearest neighbors, Hash tables and hash functions, Locality sensitive hashing, Multiple Planes, Approximate nearest neighbors, Searching documents, implementing Hashing and Machine Translation.

Total Hours: 45

TEXT BOOK:

1.Anee Kao and Stephen R. Poteet, " Natural Language Processing", ISBN-13: 978-1-84628-175-4, Springer-Verlag London Limited 2007.

REFERENCE BOOKS:

1. Sowmya Vajjala, Bodhisattwa Majumder, Anuj Gupta, Harshit Surana, "Practical Natural Language Processing: A Comprehensive Guide to Building Real-World NLP Systems" O'Reilly Publications, 2020.

2. Lewis Tunstall, Leandro von Werra, Thomas Wolf, "Natural Language Processing with Transformers," O'Reilly Media publications, Inc, ISBN: 9781098136796, Revised Edition, May 2022.

ADDITIONAL LEARNING RESOURCES:

1.https://www.coursera.org/programs/svec-mbu-faculty-learning-program-rj890?currentTab=CATALOG&eoc=true&productId=_ZpZKyTxEemb-BL8g3X_rg&productType=course&showMiniModal=true

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	1	-	-	-	-	-	-	-	3	2
CO2	3	2	3	3	1	1		1	-	-	-	-	3	2
CO3	3	3	2	3	-	-	-	-	-	-	-	-	3	2
CO4	3	2	3	-	3	-	-	-	-	-	-	-	3	2
CO5	2	2	3	3	3	1		1	-	-	-	-	3	2
Average	2.8	1.8	2.2	1.8	1.6	0.4		0.4					3	2
Level of Correlation	3	2	2	2	2	-		-					3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. Tech I Semester CSE (AI) - (Professional Elective - I)
IV B.Tech I Semester (Common to CSE & IT)

L	T	P	C
3	0	0	3

20ACS43: BIG DATA ANALYTICS

Course Outcomes:

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

1.Understand and Illustrate characteristics of big data and big data challenges in differentdomains including social media, transportation, finance and medicine.

2.Apply Hadoop framework to solve big data problem

3.Apply MapReduce, PIG scripts, HiveQL queries and HBase concepts to handle big data problems.

4.Understand stream processing into real time big data applications.

UNIT-I: Introduction to Big Data **6 Hrs**

Introduction to Big Data, Definition of analytics, Characteristics of Big Data – Analytics flow for big data – Big data stack, Architectural components and design styles, Load levelling with queues,Load balancing with multiple consumers, CAP, Bloom Filter, Lambda Architecture, Scheduler, Pipes & Filters.

UNIT II: Hadoop Framework: **9 Hrs**

Hadoop distributed File system: The design of HDFS, HDFS concepts, The Command Line Interface, Hadoop File systems, The Java Interface, Data flow, parallel copying with distcp, Hadoop archives.

UNIT III: Frameworks and Applications: **9 Hrs**

Introduction to MapReduce Framework, Anatomy of a MapReduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution. MapReduce Types and Formats: MapReduce Types, Input Formats, Output Formats. MapReduce Features: Counters, Sorting, Joins. Case study on Word Count program, Matrix Multiplication with MapReduce

UNIT IV: Data Analytic Tools: **10 Hrs**

Pig: Introduction to Pig, Pig Latin, Data processing operators. Hive: Hive installation, Running hive, Compare hive with traditional databases, HiveQL, Querying Data. HBase: Clients, Praxis. Zookeeper: The Zookeeper service, Sqoop: Introduction to Sqoop, Database Imports: A deeper look, Working with imported data.

UNIT V: Stream Processing: **8 Hrs**

Mining data streams: Introduction to Streams Concepts, Stream Data Model, Sampling Data in a Stream, Filtering Streams, Counting Distinct Elements in a Stream, Estimating Moments, Counting Oneness in a Window, Decaying Window. Case Studies – Recommendation Systems - Stock Market Predictions.

Total Hours: 45

TEXT BOOKS:

1. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and itsApplications (WILEY Big Data Series)", John Wiley & Sons,2014.
2. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'reilly Media, FourthEdition,2015.
3. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", CUP, 2012.

REFERENCE BOOKS:

1. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streamswith Advanced Analytics", John Wiley& sons,2012.
2. Paul Zikopoulos, DirkdeRoos, Krishnan Parasuraman, Thomas Deutsch, JamesGiles, DavidCorrigan, "Harness the Power of Big Data:The IBM Big Data Platform", Tata McGraw HillPublications,2012.
3. ArshdeepBahga and Vijay Madisetti, "Big Data Science & Analytics: A Hands On Approach", VPT,2016.
4. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing,2012.
5. https://file.techscience.com/uploads/attached/file/20210209/20210209005411_48715.pdf(Case study Reference)
6. https://lendap.wordpress.com/2015/02/16/matrix-multiplication-with-mapreduce/ (CaseStudy Reference)

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2										3	2
CO2	2	2	2	2	1								2	3
CO3	3	2	3	1	3								3	2
CO4	2	2	3	1	1								3	1
Average	2.5	2.25	2.5	1.33	1.66								2.75	2
Level of Correlation	3	2	3	1	2								3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. Tech I Semester CSE (AI)

L	T	P	C
3	0	0	3

20ACA05: AI IN VISUAL RECOGNITION
(Professional Elective - I)

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

1. Understand concepts of feed propagation prediction variables, activation functions and back propagation of deep learning.
2. Understand and Install PyTorch and implement basic operations neural networks.
3. Use PyTorch to build and apply deep Neural Network training datasets.
4. Apply Convolutional Neural Networks to classify images and Transfer Learning for Image Classification for facial key point detection.
4. Analyze the practical aspects of Image Classification training R-CNN-based custom object detectors and Training Fast R-CNN-based custom object detectors.

UNIT- I **10 Hrs**

Fundamentals of Deep Learning

Fundamentals of artificial neural network building blocks, Implementing feedforward propagation, Calculating the hidden layer unit values, Applying the activation function, Calculating the output layer values, Calculating loss values, Calculating loss during continuous variable prediction, Calculating loss during categorical variable prediction, Feedforward propagation in code, Activation functions in code, Loss functions in code Implementing backpropagation, Gradient descent in code, Implementing backpropagation using the chain rule

UNIT-II PyTorch Fundamentals **8 Hrs**

Installing PyTorch, PyTorch tensors, Initializing a tensor-Operations on tensors, Auto gradients of tensor objects-Advantages of PyTorch's tensors over NumPy's ndarrays, Building a neural network using PyTorchDataset, DataLoader, and batch size-Predicting on new data points, Implementing a custom loss function-Fetching the values of intermediate layers-Using a sequential method to build a neural network-Saving and loading a PyTorch model.

UNIT-III **9 Hrs**

Building a Deep Neural Network with PyTorch

Representing an image, leverage neural networks for image analysis, Preparing data for image classification, Training a neural network, Scaling a dataset to improve model accuracy, the impact of varying the batch size, the impact of varying the loss optimizer, impact of varying the learning rate, the impact of learning rate annealing, Building a deeper neural network, the impact of batch normalization, The concept of overfitting.

UNIT- IV Convolutional Neural Networks **10 Hrs**

The problem with traditional deep neural networks, Building blocks of a CNN, Implementing a CNN, Classifying images using deep CNNs, Implementing data augmentation, Visualizing the outcome of feature learning, Building a CNN for classifying real-world images.

Transfer Learning for Image Classification

Introducing transfer learning-Understanding VGG16 and ResNet architectures-Implementing facial key point detection-Multi-task learning: Implementing age estimation and gender classification-Introducing the torch_snippets library.

UNIT- V Practical Aspects of Image Classification **9 Hrs**

Generating CAMs: the impact of batch normalization and data augmentation, Practical aspects for model implementation, Creating a bounding box ground truth for training, concepts of region proposals, Concepts of IoU, non-max suppression, and mean average precision, Training R-CNN-based custom object detectors, Training Fast R-CNN-based custom object detectors.

Total Hours: 45

TEXT BOOKS:

1. V. Kishore Kumar and Yeshwanth Reddy, "Modern Computer Vision", ISBN No: 978-1-83921-347-2, Packt Publications, 2020.

REFERENCE BOOKS:

1. D. L. Baggio et al., "Mastering Open CV with Practical Computer Vision Projects", Packt Publishing, 2012.
2. Jan Erik Solem, ―Programming Computer Vision with Python: Tools and algorithms for analyzing images‖, O'Reilly Media, 2012.

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	2	2	-	-	-	-	-	-	-	3	3
CO2	3	2	-	2	2	1		1	-	-	-	-	3	3
CO3	2	3	2	2	3	-	-	-	-	-	-	-	3	3
CO4	3	2	-	2	3	-	-	-	-	-	-	-	3	3
CO5	2	2	3	3	2	1		1	-	-	-	-	3	3
Average	2.6	1.8	1	2.2	2.4	0.4		0.4	-	-	-	-	3	3
Level of Correlation	3	2	1	2	2	-	-	-	-	-	-	-	3	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. TECH I-SEMESTER CSE(AI)-(Open Elective -I)

III B. TECH II-SEMESTER (Common to CSE, IT, CSE (DS), CSE (AI & ML))

(Open Elective – II)

L	T	P	C
3	0	0	3

20AEC45 : MICROPROCESSORS AND INTERFACING

Course Outcomes:

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

1. Understand the architecture of microprocessors
2. Write the Various ALP's of microprocessors
3. Design Interfacing of different external peripheral devices with microprocessors andmicro controllers
4. Develop VLSI, Embedded systems, Industrial and real time application.

UNIT I 8086 MICROPROCESSORS **9 Hrs**

Evolution of microprocessors, memory segmentation,8086 Architecture, register organization, Flag Register, Pin Diagram of 8086- Minimum and Maximum mode 8086 systems, Timing Diagrams for Memory Read (MR), Memory Write (MW), IO Read (IOR) and IO Write (IOW) bus cycles.

UNIT II INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING OF 8086 **9 Hrs**

Addressing Modes-Instruction Set, Assembler Directives-Macros and procedures, assembly language programs for addition, subtraction, multiplication, division, GCD and LCM of two numbers, Evaluation of arithmetic expressions, largest and smallest numbers in an array, sorting an array, searching for a number in an array, programs using lookup tables.

UNIT-III INTERFACING WITH ADVANCED DEVICES **9 Hrs**

8086 System bus structure, Memory and I/O Interfacing with 8086, Interfacing through various IC Peripheral Chips, 8257 (DMA Controller), 8259 (Interrupt Priority Control).

Interfacing I/O Ports And Applications: Keyboard display controller (8279) and interfacing to 8086, PPI 8255 – various modes of operation and interfacing to 8086, Stepper Motor interfacing, D/A &A/D converter, trafficlight controller

UNIT-IV ADVANCED MICROPROCESSORS **9 Hrs**

Introduction to 80286, Salient Features of 80386, Real and Protected Mode Segmentation &Paging, Salient Features of Pentium, Branch Prediction and Overview of RISC Processors **UNIT V**

INTRODUCTION TO MICROCONTROLLERS **9 Hrs**

overview of 8051 microcontroller, Architecture, I/O ports, Memory organization, addressing modes and instruction set of 8051, Simple programs.

Total Hours: 45

TEXT BOOKS:

1. Advanced Microprocessor and Peripherals, A.K.Ray and K.M.Bhurchandi, TMH, 2000.
2. Micro Controllers, Deshmukh, Tata McGraw Hill Edition,2005.

REFERENCE BOOKS:

1. Micro Processors & Interfacing, Douglas V. Hall, 2007.
2. The 8088 and 8086 Micro Processors Walter, A.Triebel & Avtar Singh, 4th Edition – PHI, 2003.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design, Liuand G.A. Gibson, 2nd Edition, PHI, 1987.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		-	-	-	-	-	-	-	-	3	1
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3	1
CO3	3	3	3	3	-	-	-	-	-	-	-	-	3	1
CO4	3	3	3	3	3	-	-	-	-	-	-	-	3	1
Average	3	3	3	2.25	0.6	-	-	-	-	-	-	-	3	1
Level of Correlation	3	3	3	2	1	-	-	-	-	-	-	-	3	1

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. Tech I Semester (Common to CSE, IT, CSE(DS), CSE (AI &ML))-Open Elective-IV, CSE (AI)- Open Elective-I)

IV B.Tech I Semester ME, (Open Elective–III)

L	T	P	C
3	0	0	3

20ACE35: INTEGRATED WASTE MANAGEMENT FOR SMART CITY

Course Outcomes:

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

1. Understand the current issues and management in solid waste.
2. Apply basics of municipal solid waste management.
3. Apply various disposal methods of solid waste
4. Understand the construction and demolition waste management processes.
5. Explain management of electronic waste

UNIT-I **9 Hrs**

INTRODUCTIONTOSOLIDWASTEMANAGEMENT:

Municipal Solid Waste Sources; composition; generation rates Swachh Bharat Mission and Smart Cities Program, Current Issues in Solid Waste Management and Review of MSW Management Status in First List of 20 Smart Cities in the Country.

UNIT-II **9 Hrs**

MUNICIPALSOLIDWASTEMANAGEMENT:

Municipal Solid Waste, Characteristics and Quantities, Collection, Transportation, Segregation and Processing.

UNIT-III **9 Hrs**

DISPOSAL OF MUNICIPAL SOLID WASTE:

Landfill, Biochemical Processes and Composting, Energy Recovery from Municipal Solid Waste. Municipal Solid Waste (MSW)Rules2016.

UNIT-IV **9 Hrs**

CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT:

Overview of C&D Waste – Sources, Effects, and Regulations, Beneficial Reuse of C&D Waste Materials.

UNIT-V **9 Hrs**

ELECTRONIC WASTE (E-WASTE) MANAGEMENT:

Sources, Effects, Issues and Status in India and globally, controlling measures, E-Waste Management Rules 2016 and Management Challenges.

Total Hours: 45

TEXTBOOKS

1. William A Worrelland P. Aarne Veslind, “Solid Waste Engineering”, 2nd EditionCengageLearning,2012(ISBN-13:978-1-4390-6217-3)
2. George Tchobanoglous, Hilary Theisen and Samuel AVigil,“Integrated Solid Waste Management”, Tata McGrawHill,1993.
3. The Central Public Health and Environmental Engineering Organization (CPHEEO),“Manualon Solid Waste Management”, India, 2016.

REFERENCES

1."Municipal Solid Waste Management Rules2016", Central Pollution Control Board, Govt. of India,2016.
2."Electronic Waste Management Rules 2016", Central Pollution Control Board, Govt. ofIndia,2016.
3."Construction and Demolition Waste Management Rules 2016", Ministry of Environment and Forest and Climate Change, Govt. of India,2016.

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
CO2	3	-	-	-	-	3	3	-	-	-	-	-	3	3
CO3	3	-	-	-	-	3	3	-	-	-	-	-	3	3
CO4	3	-	-	-	-	3	3	-	-	-	-	-	3	3
CO5	3	-	-	-	-	3	3	-	-	-	-	-	3	3
AVG	3	-	-	-	-	3	3	-	-	-	-	-	3	3
Level of correlation of the course	3	-	-	-	-	3	3	-	-	-	-	-	3	3

3-Highmapping **2-MediumMapping** **1-LowMapping**

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B.Tech II Semester (Common to CSE,CSD,CSM, CE, & IT)(OE-II)
III B.Tech II Semester ME(PE-II)
III B. Tech I Semester CSE (AI)- (Open Elective-I)

L	T	P	C
3	-	-	3

20AME31: OPERATIONS RESEARCH

Course Outcomes:

At the end of the course, the student will be able to:

1. Summarize various LPP, TPP, AP, sequencing, replacement, game theory, project management, queuing models of operations Research.
2. Illustrate the application of OR models to identify solutions to industry.
3. Identify the optimum solutions with system approach to both industry and service sector.
4. Judge the advanced software tools for decision making with available sources for cost reduction and profit maximization with society concern.

UNIT- I Introduction and Liner programming 9 Hrs

Development – definition – characteristics and phases – types of Operations Research models – applications – limitations.

Linear Programming and its Applications: Linear Programming Problem – Graphical solution of LP Problems. Simplex method – artificial variables techniques - Two phase method, - Big M method

UNIT- II Transportation and Assignment problems 9 Hrs

Transportation: Introduction – Methods of basic feasible solution, Optimality test, Degeneracy in transportation problem, unbalanced transportation Problem, -- Assignment problem – Introduction – unbalanced model -- optimal solution – Hungarian method, - un-balanced assignment problems-travelling salesman problem.

UNIT- III Replacement and waiting line problems 9 Hrs

Replacement: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement, Waiting lines. Introduction, single channel Poisson arrival, exponential service time with finite population and infinite population.

UNIT IV Simulation and Theory of Games 9 Hrs

Simulation Definition – types of simulation models – phases of simulation – application of simulation

– inventory and queuing problems – merits and demerits -- simulation languages.

Theory of Games: Introduction – mini, max (max, mini) – criterion and optimal strategy-- to solve the rectangular two-person zero sum games, solution of rectangular games in terms of mixed strategies, solution of 2x2 games without saddle point, solution of a two person zero sum 2Xn game, Graphical method for 2Xn and nX2 games.

UNIT: V Network Models and Project Management 9 Hrs

Network models - Introduction, Rules for construction and errors. Shortest route - Dijkstra's algorithm, Minimal spanning tree - Kruskal's algorithm, Maximum flow models. Project management- CPM and PERT networks.

Total Hours: 45

TEXT BOOKS:

1. Taha, Introduction to Operations Research, New Delhi, 8th Edition, Printice Hall International Publisher, 2016.
2. A.M. Natarajan, P. Blalsubramani & A Tamilarasi, Operations Research, New Delhi. 1st Edition, Pearson Piblishers, 2005.

REFERENCE BOOKS:

1. Hiller & Liberman, Introduction to Operations Research, Noida RC, 7th Edition,Tata Mc Graw Hill publication
2. R. Panneerselvam, Operations Research, New Delhi, 2nd Edition, Prentice Hall International Publisher, 2006

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	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-	-	-
Average	3	3	0.75	0.75	-	-	-	-	-	-	-	-	-	-
Level of correlation	3	3	1	1	-	-	-	-	-	-	-	-	-	-

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech I Semester CSE (AI)

L	T	P	C
3	0	0	3

20ACO32: ARDUINO PROGRAMMING FOR IoT BOARDS

(Job Oriented Elective - I)

COURSE OUTCOMES:

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

1. Understand basics of sensors, its functioning, basics of co-processor and its ways to handle float values by its instruction set.
2. Apply execute basic and advanced assembly language programs for IOT Boards.
3. Analyze ways to interface I/O devices with processor for task sharing.
4. Understand the functionality of micro controller, latest version processors and its applications.
5. Understand design thinking capability, ability to design a component with realistic constraints, to solve real world engineering problems and analyse the results.

UNIT-I **9 Hrs**

INTRODUCTION TO SENSORS:

Transducers, Classification, Roles of sensors in IOT, Various types of sensors, Design of sensors, sensor architecture, special requirements for IOT sensors, Role of actuators, types of actuators.

UNIT -II **9 Hrs**

HARDWARE:

Physical device – Arduino Interfaces, Hardware requirement for Arduino, Connecting remotely over the network using VNC, GPIO Basics, Controlling GPIO Outputs Using a Web Interface, Programming, APIs / Packages- Quark SOC processor, programming, Arduino Boards using GPIO (LED, LCD, Keypad, Motor control and sensor)

UNIT -III **9 Hrs**

PLATFORMS:

History - Creative Coding Platforms - Open Source Platforms – PIC - Arduino, Sketch, Iterative coding methodology – Python Programming - Mobile phones and similar devices - Arm Devices - Basic Electronics (circuit theory, measurements, parts identification) Sensors and Software: Understanding Processing Code Structure, variables and flow control, Interfacing to the Real World

UNIT-IV **9 Hrs**

Programming an Arduino IoT Device:

Preparing the development environment (Arduino IDE), Exploring the Arduino language (C/C++) syntax, Coding, compiling, and uploading to the microcontroller, Working with Arduino Communication Modules: Bluetooth Modules, WiFi Modules and I2C and SPI, Interfacing arduino and Blynk via USB : LED Blinking, Controlling a Servomotor.

UNIT-V **9 Hrs**

Programming ESP 8266 Module:

ESP8266 WiFi Serial Module: Overview, Setting Up the Hardware, Interfacing with Arduino, Creating an IoT Temperature and Humidity Sensor System, Overview of DHT-22 Sensor, Interfacing the Hardware: Arduino, ESP8266 WiFi Module, and DHT-22 Sensor, Checking Your Data via Thing Speak, Connecting Your Arduino Set-up to Blynk via WiFi

Total Hours: 45

TEXT BOOK:

1. Simon Monk, “Programming Arduino,” The McGraw-Hill Companies, 2012.

REFERENCE BOOKS:

1. Arsath Natheem , “GETTING STARTED WITH ARDUINO AND BASIC PROGRAMMING WITH PROJECTS” New Edition, 2022.
2. Turner, Ryan The Ultimate Beginner's & Intermediate Guide “

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	2	3	3	-	-	-	-	-	-	-	3	3
CO2	2	2	2	3	3	1		1	-	-	-	-	3	3
CO3	2	3	2	3	3	-	-	-	-	-	-	-	3	3
CO4	3	-	2	2	2	-	-	-	-	-	-	-	3	3
CO5	3	2	2	2	2	1		1	-	-	-	-	3	3
Average	2.6	5.4	2	2.6	2.6	0.4	-	0.4	-	-	-	-	3	3
Level of Correlation	3	5	2	3	3	-	-	-	-	-	-	-	3	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. TECH II-SEMESTER CSE[AI&ML] (Professional Elective -II)
III B. TECH I SEMESTER CSE (AI) (Job Oriented Elective - I)

L	T	P	C
3	0	0	3

20ACM10 : VIRTUAL AND AUGMENTED REALITY

Course Outcomes:
After successful completion of the course, the student will be able to :
1. Explain fundamental of Virtual Reality and its basic features.
2. Analyze the concept of Multiple Modals of I/O Interface, Interactive Techniques and frameworks in VR
3. Use Development Tools and Frameworks for creating simulated environments
4. Recognize the technologies used to manage the large-scale VR environment in real time applications.

UNIT-I FUNDAMENTALS OF VIRTUAL REALITY **9 Hrs**

Fundamental Concept and Components of Virtual Reality- Primary Features and Present Development on Virtual Reality – VR systems - VR as a discipline-Basic features of VR systems-Architecture of VR systems-VR hardware -VR input hardware: tracking systems, motion capture systems, data gloves-VR output hardware: visual displays.

UNIT-II I/O INTERFACE AND INTERACTIVE TECHNIQUES IN VIRTUAL REALITY **9 Hrs**

Multiple Modals of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video based Input, 3D Menus & 3DScanner etc. Output- Visual / Auditory / Haptic Devices. Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp.

UNIT-III GRAPHICS, DEVELOPMENT TOOLS AND FRAMEWORKS IN VIRTUAL REALITY **9 Hrs**

Fundamentals of Computer Graphics-Software and Hardware Technology on Stereoscopic Display-Advanced Techniques in CG: Management of Large-Scale Environments & Real Time Rendering - Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega, MultiGen, Virtoolsetc

UNIT-IV FUNDAMENTAL OF AUGMENTED REALITY **9 Hrs**

System Structure of Augmented Reality-Key Technology in AR-- AR software development - AR software. Camera parameters and camera calibration, Marker-based augmented reality, Pattern recognition, AR Toolkit

UNIT- V APPLICATIONS OF VIRTUAL REALITY **9 Hrs**

VR Technology in Film & TV Production VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.3D user interfaces - Why 3D user interfaces. Major user tasks in VE. Interaction techniques for selection, manipulation and navigation.3DUI evaluation.

Total Hours: 45

TEXT BOOK:

1. Sherman, William R. and Alan B. Craig. Understanding Virtual Reality – Interface,Application, and Design, Morgan Kaufmann, 2002.
2. Fei GAO. Design and Development of Virtual Reality Application System, Tsinghua Press, March 2012.

REFERENCE BOOKS

1. Guangran LIU. Virtual Reality Technology, Tsinghua Press, Jan. 2011.
2. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEEPress, 2003/2006.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	3	3
CO2	3	2	2	-	-	-	-	-	-	-	-	3	2
CO3	3	3	3	-	-	-	-	-	-	-	-	3	2
CO4	3	2	3	-	-	-	-	-	-	-	-	3	3
Average	3	2.25	2	-	-	-	-	-	-	-	-	3	2.5
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)

III B. Tech I Semester CSE (AI)

L	T	P	C
0	0	3	1.5

20ACA06: ARTIFICIAL INTELLIGENCE PRACTICE LAB

Course Outcomes:

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

1. Understand practical knowledge on intelligent agents, search and optimization algorithms for solving problems in the field of Artificial Intelligence.
2. Use advanced packages in Python for implementing heuristic search algorithms.
3. Analyze time series and continuous data using temporal models like Hidden Markov Model and kalman filter to search for optimal solutions.
4. Apply appropriate knowledge representation to build Bayesian network models to reason under uncertainty.
5. Work independently or in teams to solve problems with effective communication.

LIST OF EXPERIMENTS:

1. Design and implement agent programs for Table-driven agents using the agent function of vacuum-cleaner world. The agent cleans the current square if it is dirty, otherwise it moves to the other square.
2. Implement agent programs for Simple reflex agents and Model-based reflex agents using the agent function of vacuum-cleaner world.
3. Solve the travelling sales man problem using Hill Climbing search algorithm.
4. Design and implement solution for 8-puzzle problem using Greedy Best First Search.
5. Find the shortest path between a starting location and destination location in a graph using A* search algorithm.
6. Implement MiniMax algorithm for finding an optimal decision in a tic-toc game.
7. Implement Monte-Carlo Tree search intended to run on small game trees.
8. Solve the monty hall problem using Bayesian Network.

Game Description

The game involves three doors, given that behind one of these doors is a car and the remaining two have goats behind them. So you start by picking a random door, say #2. On the other hand, the host knows where the car is hidden and he opens another door, say #1 (behind which there is a goat). Here's the catch, you're now given a choice, the host will ask you if you want to pick door #3 instead of your first choice i.e. #2.

9. Implement Kalman Filter to track the aircraft by determining the position and velocity of aircraft.
10. Design and implement a stock prices forecasting model using Hidden Markov Model.

REFERENCE BOOKS:

1.Stuart Russell, Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 4th Edition, 2020.
2.Stephen Lucci , Danny Kopec, Artificial Intelligence in the 21st Century, Mercury Learning and Information, 3rd Edition,2018.

3.Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition, 2009.
4.Deepak Khemani, A First Course in Artificial Intelligence, McGraw Hill Education, 2017.
5.Saroj Kaushik, Artificial Intelligence, Cengage Learning, 2011.

SOFTWARE/Tools used:

Environment : Google CoLab
Programming Language : Python 3.8
Machine Learning Library : Tensor Flow 2.1 and Keras

ADDITIONAL LEARNING RESOURCES:

- https://searchenterpriseai.techtarget.com/definition/AI-Artificial-Intelligence
- http://aima.cs.berkeley.edu/
- https://ai.google/education/
- https://www.coursera.org/courses?query=artificial%20intelligence
- https://www.edureka.co/blog/artificial-intelligence-with-python/

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	3	-	-	-	-	-	-	-	3	3
CO2	3	3	2	3	3	-	-	-	-	-	-	-	3	3
CO3	3	3	2	3	3	-	-	-	-	-	-	-	3	3
CO4	3	3	2	3	3	-	-	-	-	-	-	-	3	3
CO5	-	-	-	-	-	-	-	-	3	3	-	-	-	-
Average	2.4	2.4	1.4	2	2.4	-	-	-	0.6	0.6	-	-	2.4	2.4
Level of Correlation	2	2	1	2	2	-	-	-	1	1	-	-	2	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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

L	T	P	C
0	0	3	1.5

20ACS26: COMPUTER NETWORKS LAB

Course Outcomes:

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

1. Implement various routing protocols from different layers.
2. Design, implement and test an efficient algorithmic solution for the give problem
3. Use Network programming concepts in distributed applications.
4. Analyze different networking protocols and its modeling concepts to evaluate networkperformances.

LIST OF EXPERIMENTS:

1. Implementation of the Data Link Layer Framing methods Character Stuffing and Bitstuffing.
2. Implementation of CRC polynomials, CRC 12, CRC 16 and CRC CCIP.
3. Implementation of Sliding Window Protocol Select Repeat ARQ.
4. Implementation of Dijkstra's algorithm for Shortest Path.
5. Implementation Link State routing algorithm.
6. Program to obtain Routing table for each node using the Distance Vector Routingalgorithm of a given subnet.
7. Implementation of encryption & decryption using DES algorithm.
8. Implementation of encryption & decryption mechanisms using RSA algorithm.
9. Configure Host IP, Subnet Mask and Default Gateway in a System in LAN (TCP/IPConfiguration).
10. Design and analyze the performance of a set of local area networks interconnected byswitches and hub.
11. Case studies: Implement transmission of ping messages/traceroute over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2	2	-	1	-	-	-	-	-	-	-	3	1
C02	3	3	3	3	-	-	-	-	-	-	-	-	3	1
C03	3	-	-	-	-	-	-	-	-	-	-	-	3	1
C04	3	3	3	2	2	-	-	-	-	-	-	-	3	2
Average	3	2.66	2.66	2.5	1.5	-	-	-	-	-	-	-	3	1.25
Level of Correlation	3	3	3	3	2	-	-	-	-	-	-	-	3	1

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech I Semester CSE (AI)

20ACA07: PATTERN RECOGNITION TOOLS

(Skill Course)

L	T	P	C
1	-	2	2

Course Outcomes:

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

1. Understand the metrics, the effect of parameters on the shape of the data distribution under various assumptions of densities for features representation.
2. Analyze the effect of parameters on the shape of the data distribution to visualize the nature of distribution using mean vector and the covariance matrix.
3. Apply Linear Perceptron Learning algorithm that uses gradient descent on a defined objective function and data Clustering to arrive at a solution.
4. Implement bayesian classification to classify the data, generate of Random Variables and learn the classifier from data.
5. Work independently or in teams to solve problems with effective communication.

LIST OF EXPERIMENTS:

1. **Feature Representation:** The representation of an object in computer plays the most critical role in our ability to distinguish it as a member of a class, and differentiate it from samples of other classes. In this experiment, implement a sequence of tasks that reveals the nature of different features and its effect on the feature space representation. To craft your own features and see how it affects the representation and the classification performance.

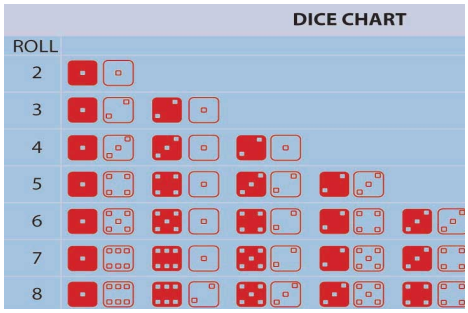
Objects in real world are complex multi-dimensional entities, characterized by their shape, color, texture, weight, chemical and physical composition, etc. In a feature representation, each object is reduced to a specific set of measurements that the designer deems to be important for the purpose of solving the (classification) problem.

2. **Mean and Covariance:** The locations at which the samples of a class can appear in the feature space can be statistically modeled using a distribution or density function. There are different properties of the density function that allows us to gain an understanding of the class under consideration. The most popular metrics are the mean and variance (or covariance matrix). In the case of normal densities, these two parameters completely characterize the density itself, and hence are denoted as the parameters of the density: N(mean,cov).

In this experiment, we will try to gain an understanding of these metrics. Specifically, we need to understand the effect of these parameters on the shape of the data distribution under various assumptions of densities. This will allow us to visualize the nature of distribution, given the mean vector and the covariance matrix.

3. **Linear Perceptron Learning:** Linear perceptron is one of the simplest learning algorithms for a two-class classifier. Given a set of data points in d-dimensions, belonging to two classes, C1 and C2, the algorithm tries to find a linear separating hyper-plane between the samples of the two classes. If the samples are in one, two or three dimensions, the separating hyperplane would be a point, line or a plane respectively. The specific algorithm that we look into is a special case of a class of algorithms that uses gradient descent on a carefully defined objective function to arrive at a solution.

4. **Generation of Random Variables:** Random numbers are the most important ways in which we model noise in real-world processes. The nature of randomness varies according to the actual phenomena that is causing the randomness. For example, if we roll a dice, the result can vary between 1 to 6, where all numbers are equally likely. But it we take the sum of rolling two dice, getting a 2 or 12 is less likely than getting a 7. See the image below to have an intuitive understanding as to why this happens. The variations in randomness is modeled using probability distribution functions or probability density functions.



Rolling 2 dice

Nature has its ways of generating randomness. However, computers are designed to be deterministic and hence generating randomness is not a simple task. In this experiment, we will try to gain an understanding of random numbers and how we can generate randomness of different properties (distributions). You need to carefully go through the introduction to random numbers and densities before attempting this experiment.

5. **Bayesian Classification:**Linear perceptrons allow us to learn a decision boundary that would separate two classes. They are very effective when there are only two classes, and they are well separated. Such classifiers are referred to as discriminative classifiers.

In contrast, generative classifiers consider each sample as a random vector, and explicity model each class by their distribution or density functions. To carry out the classification, we compute the likelihood that a given sample belong to each of the candidate classes, and assign the sample to the class that is most likely. In other words, we need to compute $P(\omega i/x)$ for each class ωi. However, the density functions provide only the likelihood of seeing a particular sample, given that the sample belongs to a specific class. i.e., the density functions provide us $p(x/\omega i)$. The Bayes rule provides us with an approach to compute the likelihood of the class for a given sample, from the density functions and related information.

6. **MLE: Learning the classifier from data:** In the previous experiment, we learned about how to generate a classifier, given models for each of the classes, using the Bayes Rule. The next goal is to learn such a classifier, automatically, given a set of labelled samples from each of the possible classes.

Before doing this experiment, you should ensure that you have understood the previous experiment on Bayesian Classification as well as the experiment on Mean and Covariance estimateion from Data.

The idea behind maximum likelihood parameter estimation is to determine the parameters that maximize the probability (likelihood) of the sample data. From a statistical point of view, the method of maximum likelihood is considered to be more robust (with some exceptions) and yields estimators with good statistical properties. In other words, MLE methods are versatile and apply to most models and to different types of data. In addition, they provide efficient methods for quantifying uncertainty through confidence bounds. Although the methodology for maximum likelihood estimation is simple, the implementation is mathematically intense. Using today's computer power, however, mathematical complexity is not a big obstacle.

The MLE is an important type of estimator for the following reasons:

a. The MLE implements the likelihood principle.

b. MLEs are often simple and easy to compute.

c. MLEs have asymptotic optimality properties (consistency and efficiency).

d. MLEs are invariant under reparameterization.

e. If an efficient estimator exists, it is the MLE.

f. In signal detection with unknown parameters (composite hypothesis testing), MLEs are used in implementing the generalized likelihood ratio test (GLRT).

7. **Data Clustering:** K-Means, MST-based: Data Clustering is the process of assigning the objects in the data into groups or clusters in a way that the objects in the same cluster are more similar than those in other clusters.A similarity measure is defined over the data to be clustered to calculate the proximity between pairs of objects. Then a clustering algorithm is chosen to perform the grouping of data. Based on the requirement the algorithm is either a hierarchical or partition based. Suitable algorithm needs to be chosen based on the type and size of data, hardware and software availability.The applications of data clustering are to several exploratory pattern-analysis, decision-making, grouping tasks, machine-learning situations, including data mining, pattern classification, document retrieval and image segmentation

REFERENCE BOOKS:

1. Christopher M. Bishop, "Pattern Recognition and Machine Learning", ISBN-13:978-0387-31073-2, Springer Science + Business Media Publications, 2006.

2. Joaquim P. Marques De Sa, " Pattern Recognition: Concepts, Methods, and Applications", Springer Berlin, Heidelberg Publicatons, 2001.

ADDITIONAL LEARNING RESOURCES:

https://cse20-iiith.vlabs.ac.in/List%20of%20experiments.html

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	1	3	-	-	-	-	-	-	-	3	3
CO2	2	3	2	3	3	-	-	-	-	-	-	-	3	3
CO3	2	3	2	3	3	-	-	-	-	-	-	-	3	3
CO4	2	3	2	3	3	-	-	-	-	-	-	-	3	3
CO5	-	-	-	-	-	-	-	-	3	3	-	-	-	-
Average	2	3	1.75	2.5	3	-	-	-	0.6	0.6	-	-	2.4	2.4
Level of Correlation	2	3	2	3	3	-	-	-	1	1	-	-	2.4	2.4

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

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

L	T	P	C
2	0	0	0

20AHS21: INDIAN CONSTITUTION

(Mandatory Course)

Course Outcomes:

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

1. Demonstrate the historical background of the constitution making and its importance for building democratic India.
2. Understanding the importance of Preamble of the Indian Constitution and Parliamentary Structure.
3. Analyse decentralization of power among central, state and local self-government.
4. Examine functioning of judiciary system, fundamental rights and duties of all India Services and international institutions.

UNIT- I Preamble and its Philosophy **5 Hrs**

Introduction to Indian Constitution, Evolution of Indian Constitution, preamble and its philosophy.

UNIT- II Union Legislature **5 Hrs**

The Parliament, Parliamentary Structure, Process of Legislation, President of India - Powers and Functions; Prime Minister and Council of Ministers; Constitution Amendment Procedure.

UNIT- III Federalism in India **5 Hrs**

Centre-State Administrative Relationship; Governors - Powers and Functions; State Legislature - Composition and powers; Chief Ministers - Powers and Functions; The Election Commission - Powers and Functions.

UNIT- IV Judiciary and Public Services **5 Hrs**

The Union Judiciary - Supreme Court and High Court; Fundamental Rights and Duties All India Services - Central Civil Services -State Services - Local Services.

UNIT- V International Participation **5 Hrs**

Foreign Policy of India; International Institutions Influence: UNO, WTO, WHO, SAARC, International Summits: BRICS, NSS, UNEP - India's Role in International Negotiations; Environmentalism in India.

Total Hours: 25

TEXT BOOKS:

1. Briji Kishore Sharma, Introduction to the Constitution of India, Prentice Hall of India, 2005.

REFERENCE BOOKS:

2. Mahendra Pal Singh, V. N. Shukla, Constitution of India, Eastern Book Company, 2011.
3. J. N. Pandey, Constitutional Law of India - Central Law Agency, 1998

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	3	2	-	-	-	-	-	2	2
CO2	-	-	-	-	-	3	3	-	-	-	-	-	2	1
CO3	-	-	-	-	-	3	3	-	-	-	-	-	2	1
CO4	-	-	-	-	-	3	2	3	-	-	-	-	2	1
Average	0.5	-	-	-	-	3	2.5	0.75	-	-	-	-	2	1.25
Level of Correlation	1	-	-	-	-	3	3	1	-	-	-	-	2	1

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

L	T	P	C
2	0	0	0

20AHS17: QUANTITATIVE APLITUDE REASONING-III

(Audit Course)

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 Reasoningproblems.
2. Solve campus placements aptitude papers covering Quantitative Ability and VerbalAbility.
3. Apply different placement practice techniques.

UNIT-I: QUANTITATIVE ABILITY V **6 Hrs**

Time and Work – Equal Efficiency – Different Efficiency – Combined work – Alternate work – Partial work – Negative work - Pipes and Cistern – Simple Interest – Compound Interest - Year Zero – Difference between SI and CI – Clocks – Angle of the Clock –Minutes hand Loss or Gain – Calendars – Leap Year – Non-Leap year – Odd days – Days of the week

UNIT-II: QUANTITATIVE ABILITY VI **6 Hrs**

Mensuration 2D – Area and Perimeter - Mensuration 3D – Volume - Total Surface area – Lateral Surface Area – Statistics- Mean - Mean Deviation – Median – Mode - Range – Variance – Standard Deviation - Set theory

UNIT-III: REASONING ABILITY III **6 Hrs**

Puzzles – Cubes & Dices – Algebra – Selection Decision table – Visual reasoning - Inequalities

UNIT-IV: VERBAL III **6 Hrs**

Vocabulary - Synonyms, Antonyms, One Word Substitution, and Spelling - Sentence Correction - Sentence Selection, Error Identification, Sentence Improvement, Sentence completion – Cloze Test, Types, Strategies - Para jumbles- Types, Strategies.

UNIT-V: SOFT SKILLS III **6 Hrs**

Written Communication - Listening Skills - Mentoring & Coaching - Decision Making - Competitiveness - Inspiring & Motivating.

Total Hours: 45

TEXT BOOKS:

1. Quantitative Aptitude, Logic Reasoning & Verbal Reasoning, R S Agarwal, S.ChandPublications.
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	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.3	1.6	-	-	-	-	-	-	-	-	-	-	-	-
Level of Correlation	2	2	-	-	-	-	-	-	-	-	-	-	-	-

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

L	T	P	C
2	0	0	0

20AHS18 : FRENCH LANGUAGE
(Audit Course)

COURSE OUTCOMES:

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

1. Demonstrate basic knowledge of French language and analyze several core competencies.
2. Develop and improve comprehensive capabilities and apply simple phrases & sentencesin real-life conversation.
3. Demonstrate ability to ask and answer questions about the self, personal interest, everyday life, and the immediate environment.
4. Apply the knowledge of tenses in making sentences for day-to-day conversations indifferent time frame.

UNIT-I INTRODUCTION & PRESENTATION: 6 Hrs

Conversation, Introduction, Alphabets & Accents Culture, Formal & Informal – Use of 'tu' and 'vous', Map of France: Geographical, Administrative Greeting, Presenting oneself & others, Asking & giving identity, Days of the week, Months of the year, Numbers, Nationality, Profession, Making a visiting card salutations, Gestures & Handshakes.

Grammar – Verb "appeller", 'avoir', 'etre' and Pronouns.

UNIT-II RENDEZVOUS: 6 Hrs

Conversation, approaching someone, Tele conversation, Buying a train ticket, Numbers the formula to write a post card, Culture and Life in France.

Grammar – Passe Compose, Verbs "aller", "partir", "venir", "prendre", Definite & Indefinite Articles.

UNIT-III AGENDA & INVITATION: 6 Hrs

Conversation, Time, Fixing a meeting, Alimentation, Moments of the day (from morning to night), Punctuality, Good moments of the day, Inviting someone, Accepting & Refusing Invitations, Family tree, Describing a house interior.

Grammar – Verbs "savoir", "vouloir" , "pouvoir", Future Proche, Pronom Tonique Consists of exercises and images to be used in the class by the students, Pronoun 'on', Expression of quantity with partitif article, Possessive Adjectives and Verbs "finir", "faire,".

UNIT-IV VACATION & SHOPPING: 6 Hrs

Describing an event, Reservations at a Hotel, Describing a person, Expressing opinion, Indication of time: Depuis & pendant, Gestures: Polite & Impolite, A French vacation,

Culture, Making a purchase, Choosing & Paying, Trying a dress on, Talking about weather, Understanding a Weather Bulletin, Comparison, Dress & weather, Dialogue between a client and an employee of a store and Money in everyday life in France: Parking ticket / telephone card. Grammar – Imparfait & Passe Compose and Adjectives.

UNIT-V ITINERARY, EXCURSION & WEEKEND: 6 Hrs

Asking for & giving directions, Giving order / advice / prohibition, Reservation at a restaurant, Taking an order, Asking for bill at a Restaurant, Expression of Quantity, Alimentation: Shopping list (portions), Making Suggestion & Proposal, Going for an outing, Acceptance & Refusal of an invitation, Giving arguments: favour & against, A French Weekend.

Grammar – Ordinal Verbs of Movement.

Total Hours:30

TEXT BOOKS:

1. CAMPUS 1 Methode de Francais, Jacques Pecheur et Jacky Girardet, CLE International Paris 2002.
2. La France de toujours, Nelly Mauchamp; CLE international.
3. Sans Frontireres - Vols. 1, 2, & 3 – Hachette.

REFERENCE BOOKS:

1. Declic 1; Jacques Balnc, Jean-Michel Cartier, Pierre Lederlion; CLE International.
2. Nouveau Sans Frontieres – Vols. 1, 2 & 3.
3. Cours de langue et de civilisation Francaise – Hachette.

CO-PO-PSO Mapping Table:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

L	T	P	C
2	0	0	0

20AHS19 : GERMAN LANGUAGE

(Audit Course)

Course Outcomes:

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

1. Demonstrate fundamental knowledge to learn German language, sounds,pronunciations, sentence structures and the verb conjugation.
2. Comprehend and apply the knowledge of vocabulary and phrases in day-to-day real-life conversation.
3. Apply various sentence structures by examining the rules of grammar inspeaking and writing.
4. Analyze and apply the various verb structures of English and Germanlanguage effectively in professional writing.

UNIT-I GERMAN SOUNDS **6 Hrs**

Vowels, consonants, diphthongs, umlaut, the nouns, gender distinctions, cases, definite and indefinite articles, conjugation of verbs, verbs with separable and inseparable prefixes, modal verbs, personal pronouns, possessive pronouns, reflexive pronouns, cases nominative, accusative and dative. Structure of sentence and categories of sentences, subordinate clause, causative and conditional sentences; A very interesting slideshow presentation is held to enlighten the students about the culture, people, and lifestyle in Germany.

UNIT-II SENTENCE FORMATION **6 Hrs**

Infinite sentences, use of conjunctive-I and conjunctive-II, plusquam perfect, modal verb, Conjunction, temporal, subordinate clauses & complex sentences.

UNIT-III GERMAN BASIC GRAMMAR **6 Hrs**

Verbs: Different forms, past tense and present perfect tense, adjectives and their declension, degrees of comparison; Prepositions, genitive case conjunctive. Different conjunctions (coordinating and subordinating), simple, complex and compound sentences, active and passive voice, relative pronouns.

UNIT-IV PURPOSE OF LANGUAGE STUDY **6 Hrs**

Pictures and perceptions, conflicts and solutions, change and the future, the purpose of the study of the German language, listening, understanding, reacting, speaking,

communicating, use of language, pronunciation and intonation, reading, reading and understanding, writing, text writing, text forming, use of language, language reflection, building up the language, language comparison, culture reflection, other cultures and cultural identity.

UNIT-V GERMAN ADVANCED COMMUNICATION LEVEL – 1 6 Hrs

The significance of language study, Speaking and thinking, Self – discovery, Communication, Language Competence, Language and culture, Language changes, Connection with other areas of study, The mother language and the other languages.

TEXT BOOKS:

1. Korbinian, Lorenz Nieder Deutschals Fremdsprache IA. usländer, "German Language", Perfect Paperback Publishers, 1st Edition, 1992.
2. Deutschals Fremdsprache, IB, Erganzungskurs, "German Language", Front Cover. Klett, Glossar Deutsch-Spanisch Publishers, 1st Edition, 1981.

REFERENCE BOOKS:

1. Griesbach, "Moderner Gebrauch der deutschen Sprache", Schulz Publishers, 10th Edition, 2011.
2. Anna Quick, Hermann Glaser U.A, "Intermediate German: A Grammar and workbook", Paperback, 1st Edition, 2006.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
CO1	2	-	-	-	-	1	-	-	-	3	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	3	-	-	-	-
CO3	3	-	-	-	-	2	-	-	-	3	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	3	-	-	-	-
Average	2.25	-	-	-	-	0.75	-	-	-	3	-	-	-	-
Level of Correlation	2	-	-	-	-	1	-	-	-	3	-	-	-	-

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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

L	T	P	C
2	0	0	0

20AHS20 : JAPANESE LANGUAGE
(Audit course)

Course Outcomes:

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

1. Remember and understand Japanese alphabet and demonstrate basic structures ofsentences in reading and writing.
2. Analyze the limitations of language by examining pronouns, verbs form, adjectives and conjunctions.
3. Demonstrate the skills of vocabulary and apply it to learn time and dates and express themin Japanese.
4. Analyze the formation of simple questions and answers in Japanese to know theJapanese culture and etiquette.

UNIT – I **6 Hrs**

INTRODUCTION TO JAPANESE SYLLABLES AND GREETINGS – Introduction of Japanese language, alphabets; Hiragana, katakana, and Kanji Pronunciation, vowels and consonants. Hiragana – writing and reading; Vocabulary: 50 Nouns and 20 pronouns, Greetings.

UNIT – II **6 Hrs**

DEMONSTRATIVE PRONOUNS, VERBS AND SENTENCE FORMATION
Grammar: N1 wa N2 desu, Japanese Numerals, Demonstrative pronoun - Kore, Sore, Are and Dore (This, That, Over there, which) Kono, sono, Ano and Dono (this, that, over there, which) Kochira, Sochira, Achira and Dochira. this way....) Koko, Soko, Asoko and Doko (Here, There,...location), Classification of verbs Be verb desu Present and Present negative Basic structure of sentence (Subject+ Object+ Verb) Katakana-reading and writing

UNIT – III **6 Hrs**

CONJUNCTION, ADJECTIVES, VOCABULARY AND ITS MEANING -
Conjunction-Ya…..nado Classification of Adjectives 'I' and 'na'-ending Set phrase – Onegaishimasu – Sumimasen, wakarimasen Particle –Wa, Particle-Ni 'Ga imasu' and 'Ga arimasu' for Existence of living things and non-living things Particle- Ka, Ni, Ga, Days/ Months /Year/Week (Current, Previous, Next, Next to Next); Nation, People and Language Relationship of family (look and learn); Simple kanji recognition.

UNIT – IV **6 Hrs**

FORMING QUESTIONS AND GIVING ANSWERS - Classification of Question words (Dare, Nani, Itsu, Doyatte, dooshite, Ikutsu, Ikura); Classification of Te forms, Polite form of verbs.

UNIT – V **6 Hrs**

EXPRESSING TIME, POSITION AND DIRECTIONS – Classification of question words (Doko, Dore, Dono, Dochira); Time expressions (Jikan), Number of hours, Number of months, calendar of a month; Visiting the departmental store, railway stations, Hospital (Byoki), office and University.

CO-PO-PSO Mapping Table:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B.Tech II Semester (Common to CSE,CSE(AI), IT)
III B.Tech II Semester (Professional Elective-II CSE(DS))

20ACS29 : DATA WAREHOUSING AND DATA MINING

L	T	P	C
3	-	-	3

Course Outcomes:

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

1. Define concepts of Data Warehousing architecture and implementation.
2. Apply data preprocessing techniques using modern tools.
3. Apply association rule for market basket analysis.
4. Design and deploy appropriate classification and cluster high dimensional data for betterorganization of data.
5. Evaluate various mining techniques on complex data objects.

UNIT-I **9 Hrs**

Data Warehousing and Business Analysis: Data warehousing Components –Building a Data warehouse – Data Warehouse Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis,ETL (Extract Transform-Load).

UNIT-II **9 Hrs**

Data Mining: Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation, Architecture Of a Typical Data Mining Systems, Classification of Data Mining Systems. Association Rule Mining: Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint, Based Association Mining.

UNIT-III **9 Hrs**

Classification and Prediction: Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT-IV **9 Hrs**

Cluster Analysis: Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density, Based Methods – Grid, Based Methods – Model, Based Clustering Methods – Clustering High, Dimensional Data – Constraint, Based Cluster Analysis – Outlier Analysis.

UNIT-V **9 Hrs**

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

Total Hours: 45

TEXT BOOKS

1. Jiawei Han, Micheline Kamber and Jian Pei"Data Mining Concepts and Techniques", ThirdEdition, Elsevier, 2011.

REFERENCE BOOKS

1. Alex Berson and Stephen J. Smith "Data Warehousing, Data Mining & OLAP", Tata McGraw –Hill Edition, Tenth Reprint 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta "Introduction to Data Mining with Case Studies", Easter Economy Edition, PrenticeHall of India, 2006.
4. Pang,Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education, 2007.

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2											3	3
CO2	3	3	1	1	2								3	3
CO3	3	2	2										3	3
CO4	3	3	3	2	2								3	3
CO5	3	3	3	2	3								3	3
Average	3	2.6	2.25	1.66	2.33								3	3
Level of Correlation	3	3	2	2	3								3	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech II Semester CSE, CSE (AI)

L	T	P	C
3	0	0	3

20ACS34: MACHINE LEARNING

Course Outcomes:

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

1. Understand the concept of Machine Learning and its classification.
2. Apply classification techniques to solve real world problems.
3. Apply artificial neutral network models to solve complex problems.
4. Apply Bayesian learning using bayes theorem, naive bayes classifier
5. Apply and evaluate the unsupervised machine learning models through various clustering algorithms andReinforcement learning.

UNIT-I **9 Hrs**

Introduction to machine learning- Supervised Learning- Unsupervised Learning - Reinforcement Learning - Probability Basics - Linear Algebra.

Statistical Decision Theory - Regression - Statistical Decision Theory – Classification- Bias- Variance- Linear Regression - Multivariate Regression-Dimensionality Reduction- Subset Selection - Shrinkage Methods - Principal Components Regression - Partial Least Squares

UNIT-II **9 Hrs**

Linear Classification - Logistic Regression- Linear Discriminant Analysis – Optimization- Perceptron Learning - SVM - Formulation - SVM - Interpretation & Analysis - SVMs for Linearly Non Separable Data - SVM Kernels - SVM - Hinge Loss Formulation

UNIT-III **9 Hrs**

Artificial Neural Network- Early Models - Backpropagation I - Initialization, Training & Validation- Maximum Likelihood Estimate - Priors & MAP Estimate - Bayesian Parameter Estimation- Regression Trees- Stopping Criteria & Pruning- Loss Functions for Classification - Categorical Attributes - Multiway Splits - Missing Values, Imputation & Surrogate Splits - Instability, Smoothness & Repeated Subtrees.

UNIT IV **9 Hrs**

Evaluation Measures - Bootstrapping & Cross Validation - Class Evaluation Measures- The ROC Curve - Minimum Description Length & Exploratory Analysis- Introduction to Hypothesis Testing - Basic Concepts - Sampling Distributions & the Z Test - Student\'s t-test - The Two Sample & Paired Sample t-tests - Confidence Intervals- Bagging, Committee Machines & Stacking – Boosting- Gradient Boosting - Random Forest-- Naive Bayes - Bayesian Networks - Undirected Graphical Models - Introduction -- Undirected Graphical Models - Potential Functions - Hidden Markov Models - Variable Elimination.

UNIT-V **9 Hrs**

Belief Propagation- Partitional Clustering- Hierarchical Clustering - Threshold Graphs – The BIRCH Algorithm - The CURE Algorithm- Density Based Clustering- Gaussian Mixture Models - Expectation Maximization- Expectation Maximization Continued- Spectral Clustering- Learning Theory- Frequent

Item set Mining - The Apriori Property- Introduction to Reinforcement Learning- RL Framework and TD Learning - Solution Methods & Applications - Multi-class Classification.

TEXT BOOKS

1. Introduction to Machine Learning by Prof. Balaraman Ravindran, Computer Science and Engineering, IIT Madras
   https://drive.google.com/file/d/1pJAMtgwNyfhVnP9nrQv_yVcrm6cBNLJH/view
2. Ethem Alpaydin, "Introduction to Machine Learning", 2nd Edition, 2015
3. Marco Gori , Machine Learning: A Constraint-Based Approach, Morgan Kaufmann. 2017

REFERENCE BOOKS

1. Miroslav Kubat, "Introduction to Machine Learning," 3rd Edition, Springer Cham Publications, ISBN: 978-3-319-20010-1, 2015

CO-PO-PSO Mapping Table:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2
CO1	3	2	2										3	3
CO2	3	3	3										2	1
CO3	3	2		2									3	2
CO4	3	3	2	1									2	1
CO5	3	3	3	3									3	
Average	3	2.6	2.5	2									2.6	1.75
Level of Correlation	3	3	3	2									3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech II Semester CSE (AI)

20ACA10: ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS

L	T	P	C
3	-	-	3

Course Outcomes:

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

1. Understand the fundamentals of neural learning and concepts of probability density estimation
2. Construct/ Design single or multi-layer neural networks for solving real time problems.
3. Use appropriate error functions and apply suitable optimization techniques to improve the performance of the model.
4. Solve the bias-variance tradeoff issues using techniques including regularization and pruning algorithms.

UNIT–I: INTRODUCTION **9 Hrs**

Fundamentals of Neural Learning - Classification and regression, Pre-processing and feature extraction, The curse of dimensionality, Polynomial curve fitting, Model complexity, Multivariate non-linear functions, Bayes' theorem, Decision boundaries, Minimizing risk; **Probability Density Estimation**- Parametric methods, Maximum likelihood, Bayesian inference.

UNIT–II: SINGLE LAYER NETWORKS **9 Hrs**

Linear discriminant functions, Linear separability, Generalized linear discriminants, Least-squares techniques, The perceptron, Fisher's linear discriminant.

Gradient based Strategies: Learning Rate Decay, Momentum-Based Learning, Parameter-Specific Learning Rates, Cliffs and Higher-Order Instability, Gradient Clipping, Second-Order Derivatives, Polyak Averaging, Local and Spurious Minima.

UNIT–III: MULTI-LAYER PERCEPTRON & RADIAL BASIS FUNCTIONS **8 Hrs**

Multi-Layer Perceptron - Feed-forward network mappings, Threshold units, Sigmoidal units, Weight-space symmetries, Error back-propagation.

Radial Basis Functions - Radial basis function networks, Network training.

UNIT–IV: ERROR FUNCTIONS **10 Hrs**

Sum-of-squares error, Minkowski error, Input-dependent variance, Modelling conditional distributions, Estimating posterior probabilities,Sum-of-squares for classification, Cross-entropy for two classes, Multiple independent attributes, Cross-entropy for multiple classes, Entropy;Parameter Optimization Algorithms - Gradient descent.

UNIT–V: LEARNING AND GENERALIZATION **9 Hrs**

Bias and variance, Regularization, Training with noise, Soft weight sharing, Growing and pruning algorithms, Committees of networks, Mixtures of experts.

Total Hours: 45

TEXT BOOK:

1. Christopher M. Bishop, Neural Networks for Pattern Recognition, OXFORD, 1995.

REFERENCE BOOK:

1. Simon Haykin, Neural Networks and Learning Machines, Pearson, 2016.
2. Francois Duval , "Artificial Neural Networks: Concepts, Tools and Techniques Explained for Absolute Beginners Data Sciences Series, CreateSpace Independent Publishing Platform publications, ISBN-198513456X, 9781985134560, 2018

ADDITIONAL LEARNING RESOURCES:

- https://www.coursera.org/projects/basic-artificial-neural-networks-in-python
- https://www.udemy.com/course/introduction-to-artificial-neural-network-and-deep-learning/

CO-PO-PSO Mapping Table

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	-	-	-	-	-	-	-	-	-	-	3
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	3
CO3	3	3	2	-	-	-	-	-	-	-	-	-	-	3
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	3
Average	3	2.5	1.5	-	-	-	-	-	-	-	-	-	-	3
Level of Correlation	3	3	2	-	-	-	-	-	-	-	-	-	-	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. Tech II Semester CSE (AI)- (Professional Elective -II)

20ACA11: GAME THEORY

L	T	P	C
3	-	-	3

COURSE OUTCOMES:

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

1. Understand a game situation from a pure individual's decision problem, theory rational choice
2. Understand concepts of players, strategies, payoffs, rationality, equilibrium, and describe sequential games using game trees, and to use the backward induction to solve such games
3. Analyze simple simultaneous, move games using game tables, and to dominant, dominated, and rationalizable strategies, pure and mixed strategies
4. Understand the concepts of dominant strategy equilibrium(nash), conditional games, Bayesian games –illustration actions & juries
5. Understand the concepts of rationlizability and evolutionary equilibrium to analyze simple signaling games, asymmetric equilibria and variations on a theme.

UNIT I: **9 Hrs**

Introduction: Concepts of game theory, history of game theory, John von Neumann, The theory of rational choice, Coming attractions.

Games with Perfect Information: Nash Equilibrium: Theory, Strategic games, Example: the Prisoner's Dilemma, Nash equilibrium, Studying Nash equilibrium experimentally, Examples of Nash equilibrium, Equilibrium in a single population: symmetric games and symmetric equilibria. Nash Equilibrium: Illustrations, Cournot's model of oligopoly, Bertrand's model of oligopoly.

UNIT II: **9 Hrs**

Mixed Strategy Equilibrium: Introduction, Strategic games in randomize, Mixed strategy Nash equilibrium, Dominated actions, Pure equilibria when randomization is allowed, Equilibrium in a single population, Illustration: Reporting a crime: social psychology and game theory, Extension: mixed strategy Nash equilibria & games

Extensive Games with Perfect Information: Theory Introduction, Extensive games with perfect information, Strategies and outcomes, Nash equilibrium, Subgame perfect equilibrium, Finding subgame perfect equilibria of finite horizon games: backward induction

Ticktacktoe, chess, and related games

UNIT III: **9 Hrs**

Extensive Games with Perfect Information: Illustrations- Introduction, The ultimatum game and the holdup game, Stackelberg's model of duopoly, Buying votes, A race.

Extensive Games with Perfect Information: Extensions and Discussion: Allowing for simultaneous moves, **Illustration:** entry into a monopolized industry, electoral competition with strategic voters, exit from a declining industry -Allowing for exogenous uncertainty, Discussion: subgame perfect equilibrium and backward induction.

UNIT IV: **9 Hrs**

Coalitional Games and the Core: Coalitional games, The core **Illustration:** ownership and the distribution of wealth, exchanging homogeneous & heterogeneous horses, voting, matching.

Games with Imperfect Information: Bayesian Games- Introduction, General definitions, Illustration: Cournot's duopoly game with imperfect information, Illustration: auctions, Auctions of the radio spectrum, Illustration: juries

UNIT V: **9 Hrs**

Variants and Extensions: Strictly Competitive Games and Max-minimization, Definitions and examples- Strictly competitive games. **Rationalizability-** Iterated elimination of strictly & weekly dominated actions. **Evolutionary Equilibrium**-Monomorphic pure strategy equilibrium, Mixed strategies and polymorphic equilibrium, Asymmetric equilibria, Variation on a theme: sibling behavior, Variation on a theme: nesting behavior of wasps.

Total Hours: 45

TEXT BOOK:

1. An Introduction to Game Theory by Martin J. Osborne, Oxford University Press, First Edition,2012.

REFERENCE BOOK:

1. Game Theory An Introduction by E.N. Barron-2013
2. Game Theory An Introduction by Steven Tadelis-2013
3. Strategy : An Introduction to Game Theory-3rd edition by Joel Watson

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	3
CO2	2	3	-	-	-	-	-	-	-	-	-	-	-	3
CO3	2	3	2	1	-	-	-	-	-	-	-	-	-	3
CO4	3	3	3	1	-	-	-	-	-	-	-	-	-	3
CO5	2	3	2	-	-	2	-	-	-	-	-	-	-	3
Average	2.4	2.8	1.4	0.4	-	0.4	-	-	-	-	-	-	-	3
Level of Correlation	2	3	1	0	-	-	-	-	-	-	-	-	-	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. Tech II Semester CSE (AI)- (Professional Elective -II)

20ACA12: PROGRAMMING USING R

L	T	P	C
3	-	-	3

Course Outcomes:

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

1. Understand R programming concepts Run R, Interactive Mode, Batch Mode, data structures, R Programming Structures concepts, Control Statements, Arithmetic and Boolean Operators and Values.
2. Use R tool to perform Vectors, Structures, Data Frames, Factors and Tables for statistical data analysis and modelling.
3. Design and Develop R programs using Input/output and String Manipulation functions.
4. Analyze and apply Graphics functions for visualizing data and model output.
5. Select and apply S3 and S4 Classes to develop object-oriented concepts in R.

UNIT-I: OVERVIEW OF R AND VECTORS **9 Hrs**

OVERVIEW OF R: Run R, Interactive Mode, Batch Mode, Basic R Session, Functions, R Data Structures, help() Function, example() Function.

VECTORS: Scalars, Vectors, Arrays, and Matrices, Declarations, Recycling, Common Vector Operations, Vectorized Operations, NA and NULL Values, Filtering.

UNIT-II: MATRICES, ARRAYS and LISTS **9 Hrs**

MATRICES AND ARRAYS: Creating Matrices, General Matrix Operations, Applying Functions to Matrix Rows and Columns, Adding and Deleting Matrix Rows and Columns.

LISTS: Creating Lists, General List Operations, Accessing List Components and Values, Applying Functions to Lists, Recursive Lists.

UNIT-III: DATA FRAMES, FACTORS AND TABLES **9 Hrs**

DATA FRAMES: Creating Data Frames, Other Matrix-Like Operations, Merging Data Frames.

FACTORS AND TABLES: Factors and Levels, Common Functions Used with Factors, Working with Tables, Other Factor- and Table-Related Functions.

UNIT-IV: R PROGRAMMING STRUCTURES **9 Hrs**

R PROGRAMMING STRUCTURES: Control Statements, Arithmetic and Boolean Operators and Values. Default Values for Arguments, Return, Functions Are Objects, No Pointers in R, Recursion, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions, Sorting, Linear Algebra Operations on Vectors and Matrices, Set Operations, Simulation Programming in R.

UNIT-V: OBJECT-ORIENTED PROGRAMMING, INPUT/OUTPUT, STRING MANIPULATION AND GRAPHICS **9 Hrs**

OBJECT-ORIENTED PROGRAMMING: S3 Classes, S4 Classes, S3 Versus S4, Managing Objects.

INPUT/OUTPUT : Accessing the Keyboard and Monitor, Reading and Writing Files,

STRING MANIPULATION: String-Manipulation Functions- grep(), nchar(), paste(), sprintf(), substr(), strsplit(), regexpr(), gregexpr()

GRAPHICS: Creating Graphs, The plot() Function The abline() Function, The points() Function, The legend() Function, The text() Function, Customizing Graphs, Saving Graphs to Files

TEXT BOOK:

1. Norman Matloff, "The Art of R Programming", William Pollock, 2011.

REFERENCE BOOKS:

1. "Beginning R the statistical programming language" Dr. Mark Gardener, Wiley Publications, 2015.
2. Hands-On Programming with R Paperback by Grolemund (Author) , Garret t (Author), SPD,2014.

ADDITIONAL LEARNING RESOURCES:

An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team. Version 3.0.1 (2013-05-16). URL: https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf

CO-PO-PSO Mapping Table

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	3	-	-	-	-	-	-	-	3	3
CO2	2	2	3	3	3	-	-	-	-	-	-	-	3	3
CO3	3	2	3	2	3	-	-	-	-	-	-	-	3	3
CO4	1	3	3	-	3	-	-	-	-	-	-	-	3	3
CO5	-	3	3	3	3	-	-	-	-	-	-	-	3	3
Average	1.8	2.4	3	2.8	3	-	-	-	-	-	-	-	3	3
Level of correlation of the course	2	4	3	3	3	-	-	-	-	-	-	-	3	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech II Semester CSE (AI)- (Professional Elective -II)

20ACA13: NATURAL LANGUAGE PROCESSING MODELS

L	T	P	C
3	-	-	3

Course Outcomes:

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

1. Understanding NLP Fundamentals and principles of Natural Language Processing, linguistic theories, syntax, semantics, and pragmatics.
2. Use Data Preprocessing and Feature Engineering techniques to preprocess and clean data, and to perform feature engineering to extract relevant information for building intelligent systems.
3. Understand Equivalence with Other Models of Computation between SK-languages and other models of computation, such as Turing machines, and the implications of this equivalence.
4. Apply the new mathematical model to real-world web-related data and problems, demonstrating its efficacy.
5. Understand fundamentals of databases, relational database management systems, data structures, and query languages.

UNIT-I NATURAL LANGUAGE PROCESSING SYSTEMS 9 Hrs

The Models of Types 1–5, The Significance of the Models for the Design of Linguistic Processors, The Context of Cognitive Linguistics for the Formal Study of Natural Language, Early Stage of Natural Language Formal Semantics, The Significance of Highly Expressive Formal Systems of Semantic Representations, The Basic Principles of Integral Formal Semantics of Natural Language, Basic Principles, The Notion of a Broadly Applicable Conceptual Meta grammar.

UNIT-II APPLIED INTELLIGENT SYSTEMS 9 Hrs

Global Task Statement, Local Task Statement, Basic Denotations and Auxiliary Definitions, General Mathematical Denotations, The Preliminary Definitions from the Theory of Formal Grammars and Languages, The Used Definitions from the Theory of Algebraic Systems, The Basic Ideas of the Definition of a Sort System, The Formal Definition of a Sort System, Types Generated by a Sort System, The Concretization Relation on the Set of Types.

UNIT-III A STUDY OF THE EXPRESSIVE POSSIBILITIES OF SK-LANGUAGES 9 Hrs

A Convenient Method of Describing Events, Formalization of Assumptions About the Structure of Semantic Representations of Sets, Semantic Representations of Questions with the Role Interrogative Words, Semantic Representations of Questions About the Quantity of Objects and Events, Semantic Representations of Questions with an Interrogative Pronoun Attached to a Noun, Semantic Representations of General Questions, Describing Semantic Structure of Commands.

UNIT-IV NEW MATHEMATICAL MODEL FOR WEB SCIENCE 9 Hrs

The Problem of Semantic Data Integration, The Purpose of Semantic Data Integration in E-Science and Other E-Fields, Ontologies in Modern Information Society, The Language UNL and the Problem of Sharing Knowledge, Building Semantic Annotations of Web Data, Conceptual Descriptions of Visual Images, Representation of Knowledge in Biology and Ecology, Representation of Knowledge in Medicine, Representation of Semantic Content in Business, SK-Languages as a Tool for Building E-Contracts, Formal Languages for E-Contracting.

UNIT-V A MATHEMATICAL MODEL OF A LINGUISTIC DATABASE 9 Hrs

The Principles of Designing Semantics, Oriented Linguistic Processors, Morphological Bases, Text-Forming Systems, Lexico-semantic Dictionaries, Dictionaries of Verbal, Prepositional Semantic, Syntactic Frames, The Dictionaries of Prepositional Frames, Linguistic Bases, Semantic Information Associated with the Role Interrogative Words, The Notion of a Linguistic Basis.

Total Hours: 45

TEXT BOOK

1. Vladimir Fomichov A., "Semantics-Oriented Natural Language Processing Mathematical Models and Algorithms", Springer Publications, ISBN 978-0-387-72926-8, 2010.

REFERENCE BOOK:

1. Sowmya Vajjala , Bodhisattwa Majumder, Anuj Gupta, "Practical Natural Language Processing: A Comprehensive Guide to Building Real-World NLP Systems" 1st Edition, O'Reilly Publications, 2018.

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	2	3
CO2	2	3	2	2	3	-	-	-	-	-	-	-	2	3
CO3	3	3	2	1	-	-	-	-	-	-	-	-	2	3
CO4	3	3	3	2	3	-	-	-	-	-	-	-	2	3
CO5	3	3	2	-	-	-	-	-	-	-	-	-	2	3
Average	2.8	2.8	1.8	1	1.2	-	-	-	-	-	-	-	2	3
Level of Correlation	3	3	2	1	1	-	-	-	-	-	-	-	2	3

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

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SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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

L	T	P	C
3	0	0	3

20ACS47: NoSQL DATABASES

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

1. Execute the application and Integration of NoSQL Databases
2. Explain performance tune of Key-Value Pair NoSQL databases.
3. Apply Nosql development tools on different types of NoSQL Databases
4. Develop basic applications using NoSQL

UNIT-I **9 Hrs**

NoSQL, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration. Aggregate Data Models, Aggregates, Example of Relations and Aggregates, Consequences of Aggregate Orientation, Key-Value and Document Data Models, Column- Family Stores, Relationships, Graph Databases, Schemaless Databases, Materialized Views, Modeling for Data Access.

UNIT-II **8 Hrs**

Distribution Models: Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication.

Consistency: Update Consistency, Read Consistency, Relaxing Consistency, The CAP Theorem, Relaxing Durability, Quorums.

UNIT-III **10 Hrs**

Map-Reduce, Basic Map-Reduce, Partitioning and Combining, Composing Map-Reduce Calculations, A Two Stage Map-Reduce Example, Incremental Map-Reduce

Document Database: Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E-Commerce Applications, When Not to Use, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure.

UNIT-IV **10 Hrs**

Introducing MongoDB, MongoDB Design Speed, Scalability, and Agility , Non-Relational Approach JSON-Based Document Store, Performance vs. Features, Running the Database Anywhere

The MongoDB Data Model :The Data Model, JSON and BSON, The Identifier, Capped Collection, Polymorphic Schemas, Object-Oriented Programming, Schema Evolution.

Using MongoDB Shell: Basic Querying, Create and Insert, Explicitly Creating Collections, Inserting Documents Using Loop, Inserting by Explicitly Specifying _id , Update, Delete, Read, Using Indexes, Stepping Beyond the Basics, Using Conditional Operators, Regular Expressions, Map Reduce, aggregate( ), Designing an Application's Data Model, Relational Data Modeling and Normalization, Mongo DB Document Data Model Approach.

UNIT-V **8 Hrs**

MongoDB Architecture Core Processes,Mongod, mongo, mongos MongoDB Tools, Standalone Deployment, Replication, Master/Slave Replication, Replica Set, Implementing Advanced Clustering with Replica Sets, Sharding, Sharding Components, Data Distribution Process, Data Balancing Process.

Total Hours: 45

TEXT BOOK:

1. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of PolyglotPersistence, Wiley Publications,1st Edition ,2019.

REFERENCE BOOKS:

1. Meier, Andreas, and Michael Kaufmann. SQL & NoSQL databases. Springer FachmedienWiesbaden, 2019.

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	2
CO2	3	3	3	3	1	-	-	-	-	-	-	-	3	2
CO3	3	3	3	3	2	-	-	-	-	-	-	-	3	2
CO4	3	3	3	2	2	-	-	-	-	-	-	-	3	3
Average	3	3	3	2.75	2								3	2.25
Level of Correlation	3	3	3	3	2								3	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. Tech II Semester CSE (AI)- (Professional Elective -II)

20ACM22 : AI IN SPEECH PROCESSING

L	T	P	C
3	-	-	3

Course Outcomes:

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

1. Analyze digital models of speech signals for various losses in vocal tract by articulators and estimate pitch period and cepstrum.
2. Understand the operation of different types of synthesizers for speech synthesis.
3. Apply coding using different types of vocoders for speech coding.
4. Use Hidden Markov Model in speech recognition and speaker identification to classify speech for authentication.

UNIT-I: DIGITAL MODEL FOR THE SPEECH SIGNAL 10 Hrs

The process of speech production - the mechanism of speech production, acoustic phonetics. The Acoustic theory of speech production- sound propagation, uniform lossless tubes, Effect of losses in the vocal tract, Effect of radiation at the lips, Vocal tract transfer functions for vowels, the effect of nasal coupling, Excitation of sound in the vocal tract, Digital models for speech signals.

UNIT II: TIME DOMAIN MODELS FOR SPEECH PROCESSING 10 Hrs

Introduction, Window considerations, Short time energy and average magnitude, Short time average zero crossing rate, Speech vs silence discrimination using Average energy and zero crossing, Pitch period estimation using parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Cepstral Analysis of Speech.

UNIT-III: SPEECH SYNTHESIS 07 Hrs

History of speech synthesis, Formant synthesizers, Linear predictive synthesizers, Copy synthesis, Phoneme synthesis, Concatenation of multi-phonemic units, Text-to-speech synthesis, Articulatory speech synthesis.

UNIT-IV: SPEECH CODING 07 Hrs

Sub-band coding, Transform coding, Channel Vocoder, Formant vocoder, Cepstral vocoder, linear predictive vocoders, The LPC-10 algorithm, Multi-pulse and RELP vocoders, Vector quantizer coders.

UNIT-V: SPEECH AND SPEAKER RECOGNITION SYSTEMS 11 Hrs

Basic pattern recognition approaches, parametric representations of Speech recognition, Speech recognition system- isolated digit recognition system. Speaker Verification vs. recognition, features that distinguish speaker, Speaker recognition system-speaker verification system, speaker identification systems, Hidden Markov models, Word recognition using HMMs, Training hidden Markov models.

Total Hours: 45

TEXT BOOKS:

1. L.R. Rabiner and R.W. Schafer, Digital processing of speech signals, Pearson Education, 2006.
2. F. J. Owens, Signal Processing of Speech, Macmillan, 1993.

REFERENCE BOOKS:

1. Douglas O Shaughnessy, Speech Communications, Oxford University Press, 2nd Edition, 2000.
2. L R Rabiner, BH Juang, B Yegnanarayana, Fundamentals of Speech Recognition, Pearson Education, 2009.

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	-	-	-	-	-	-	-	3	3
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	3
CO3	3	2	1	2	3	1	1	1	-	-	-	-	3	3
CO4	3	2	1	2	3	1	1		-	-	-	-	3	3
Average	3	2.25	1	1.5	2	0.5	0.5	0.25	-	-	-	-	3	3
Level of Correlation	3	2	1	2	2	1	1	-	-	-	-	-	3	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech II Semester (Common to CSE(AI) (Open Elective-II) and ECE (Professional Elective-II))

20AEC37: WIRELESS COMMUNICATION SYSTEMS

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Demonstrate the functioning of wireless communication system and evolution differentwireless communication systems and standards.
2. Analyze the Mobile radio propagation, fading and diversity.
3. Apply the multiple access techniques i.e. TDMA, CDMA, FDMA
4. Use the knowledge of design considerations, architecture, design challenges, constraintsand security issues to develop different wireless communication systems

UNIT-I INTRODUCTION TO WIRELESS COMMUNICATION SYSTEM 9 Hrs

Advancement of mobile communications, Comparison of common wireless systems, Recent trends in Cellular radio and personal communication. Types of Technologies: Second Generation (2G), Third Generation (3G), Fourth Generation (4G) Wireless Networks.

UNIT-II PROPAGATION MODEL, SMALL SCALE FADING AND DIVERSITY 9 Hrs

Study of indoor and outdoor propagation models, Small scale fading and multi-path Small- scale multi-path propagation, parameter of multi-path channels, types of small-scale fading, Raleigh and Ricean distribution.

UNIT-III MULTIPLE ACCESS TECHNIQUES 9 Hrs

Introduction to spread spectrum, TDMA, CDMA, FDMA, OFDM, ALOHA, CSMA Protocols and comparison.

UNIT-IV WIRELESSSYSTEMS 9 Hrs

Introduction to GSM system architecture, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, Architecture of IS-95 CDMA system, Air interface, CDMA forward channels & reverse channels, Architecture of IMT-2000/UMTS, air Interface, forward and reverse channels in W-CDMAand CDMA 2000.

UNIT-V RECENTTRENDS IN WIRELESS COMMUNICATION SYSTEMS 9 Hrs

Introduction to Wi-Fi, WiMAX, Bluetooth, ZigBee, Software Defined Radio, UWB Radio, Ad-hoc Network, Sensor Networks, Security issues, challenges and applications.

Total Hours:45

TEXT BOOKS:

1. Wireless Communication, Theodore S. Rappaport, Prentice Hall
2. Wireless Communications and Networking, Vijay Garg, Elsevier
3. Adhoc Mobile Wireless network, C.K. Toh Pearson

REFERENCE BOOKS:

1. Wirelessdigital communication, Kamilo Feher, PHI
2. Mobile Communications Engineering, WilliamC. Y. Lee, Mc Graw Hill Publications
3. Mobile and personal Communication system and services by Rajpandya, IEEE press(PHI). Wireless Communications-T.L. Singh-TMH
4. Young Kyun Kimand Ramjee Prasad, ―4 G Roadmap and Emerging CommunicationTechnologies, Artech house.

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	1	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	1	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	1	-	-	-	-	-	-	-	-	-	-
Average	3	3	2.25	1	-	-	-	-	-	-	-	-	-	-
Level of Correlation	3	3	2	1	-	-	-	-	-	-	-	-	-	-

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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

L	T	P	C
3	-	-	3

20AMB09: INTELLECTUAL PROPERTY RIGHTS

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

1. Outline different types of intellectual properties.
2. Distinguish the crucial role of IP in organizations of different industrial sectorsfor the purposes of product and technology development.
3. Formulate designs, patent and copyright for their innovative research works.
4. Apply intellectual property law principles of Trademarks to real problems.
5. Examine ethical and professional issues which arise in the intellectual propertylaw context.

UNIT - I: UNDERSTANDING AND OVERVIEW OF IPR 9 Hrs

Introduction- meaning- nature- forms of intellectual property- types of intellectual property-industry property- International conventions.

UNIT-II: COPYRIGHT ACT, 1957 9 Hrs

Meaning –Nature and object of copyright-origin and development of copyright law in India-salient features of copyright act,1957-Definitons- originalitymaterial-rights of reproduction.

UNIT-III: TRADEMARKS ACT, 1999 9 Hrs

Salient features of Trademarks Act, 1999-Meaning- objectives and functions of trademark-Definition of Trademark- trademark protection- - acquisition of Trademark rights-protectable matter-trademark registration process.

UNIT-IV: PATENT ACT, 1970 9 Hrs

Meaning –definition of patent-history and concept of patent law-salient features of the patent act-Definition-kinds of patents and advantages- rights and obligations of patentee- Process of obtaining a patent.

UNIT-V: DESIGNS ACT, 2000 **9 Hrs**

Meaning –definition- Salient features of Designs-Registration of Designs-Rights granted to design holders -Infringement of Design.

Total Hours: 45

TEXT BOOKS:

1. Narayanan, P.(Revised 2017, Reprint 2018).Patent Law. Eastern Law House.
2. Acharya, N.K. (2021). Intellectual Property Rights: Scandinavian Languages Edition.
3. Chowdhary, R., S.K. & Other. Law of Trademark, Copyrights, Patents and Designs.
4. Reddy, G.B., Intellectual Property Rights and the Law, Gogia Law Agency.
5. Holyoak, J. &Torremans, P. Intellectual Property Law.

REFERENCE BOOKS:

1. Bouchoux, E.B. Intellectual Property Rights, Cengage Learning.
2. Ganguli, P. Intellectual Property Rights– Unleash my KnowledgeEconomy. TataMcGraw Hill Publishing Company Ltd.
3. Wadhera, B.L. Intellectual Property Law, Universal Publishers.

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			
CO3			3								3			
CO4			3								3			
CO5			3								3			
Average			3								3			
Level of correlation			3								3			

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B.Tech II Semester (CSE(AI) (OE-II)
III B.Tech I – Semester (ME)

20ACE36: DISASTER MANAGEMENT

L	T	P	C
3	0	0	3

Course Outcomes:

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

1. Understand about the natural hazards and its management
2. Explain the effect of the fire hazards and solid waste management
3. Interpret the regulations of building codes and land use planning related to risk andvulnerability
4. Involve in the process of disaster management
5. Plan the strategies for risk reduction in schools and communities

UNIT – I **9 Hrs**

Natural Hazards and Disaster Management: Introduction of DM–Inter disciplinary-nature of the subject–Disaster Management cycle–Five priorities for action. Case study methods of the following: floods, draughts – Earth quakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast– landslides.

UNIT-II **9 Hrs**

Man Made Disaster and Their Management Along with Case Study Methods of The Following: Fire hazards–transport hazard dynamics–solid waste management–post disaster– bio terrorism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases &Aids and their management

UNIT-III **9 Hrs**

Risk and Vulnerability: Building codes and land use planning–social vulnerability– environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition– financial management of disaster – related losses.

UNIT-IV **9 Hrs**

Role of Technology in Disaster Managements: Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations-roads and bridges-mitigation programme for earth quakes –flowchart, geospatial information in agriculture drought assessment-multimedia technology in disaster

risk management and training transformable indigenous knowledge in disaster reduction.

UNIT-V **9 Hrs**

Education and Community Preparedness: Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management and social capital-Designing resilience building community capacity for action.

Total Hours:45

TEXT BOOKS:

1. Rajib shah & R R Krishnamurthy "Disaster Management"–Global Challenges and Local Solutions' Universities press.(2009),
2. Tushar Bhattacharya, "Disaster Science & Management" Tata Mc Graw HillEducation Pvt. Ltd., New Delhi.
3. Jagbir Singh "Disaster Management"–Future Challenges and Opportunities' IK International Publishing House Pvt.Ltd. (2007)

REFERENCE BOOKS:

1. Harsh.K.Gupta " Disaster Management edited ", Universities press, 2003.

CO-PO-PSO Mapping Table:

	PO 1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO11	PO1 2	PSO1	PSO2
CO1	3	3	-	-	-	-	3	-	3	3	-	3	-	-
CO2	2	2	-	-	-	-	2	-	3	3	-	3	-	-
CO3	2	2	-	-	-	-	2	-	3	3	-	3	-	-
CO4	2	2	-	-	-	-	2	-	3	3	-	3	-	-
CO5	2	2	-	-	-	-	2	-	3	3	-	3	-	-
Average	2.2	2.2	-	-	-	-	2.2	-	3	3	-	3	-	-
Level of Correlation	2	2	-	-	-	-	2		3	3	-	3	-	-

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B.Tech I Semester (CSE(AI))- (Job Oriented Elective -II)

L	T	P	C
3	0	0	3

20ACA14 : MATLAB PROGRAMMING FOR ENGINEERS

Course Outcomes:

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

1. Generate arrays and matrices for numerical problems solving.
2. Represent data and solution in graphical display.
3. Write scripts and functions to easily execute series of tasks in problem solving.
4. Use arrays, matrices and functions in Engineering applications
5. Design GUI for basic mathematical applications.

UNIT-I **10 Hrs**

Introduction: Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types. MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays – manipulation Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file. Programming Basics: Data Types-Operators –Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, ifelseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT-II **8 Hrs**

Scripts and Functions Script Files, Function Files, Debugging methods in MATLAB.

Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options Multiple plots-subplots-specialized 2D plots: stem-, bar, hist, pi, stairs, loglog, semilog, polar, comet 3D plots: Mesh,Contour,Surf,Stem3,ezplot.

UNIT-III **9 Hrs**

Numerical Methods Using MATLAB Numerical Differentiation, Numerical integration-NewtonCotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration. Linear Equations- Linear algebra in MATLAB, solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations, Advanced topics.

UNIT-IV **9 Hrs**

Nonlinear Equations System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions ployval and polyfit, cubic fit using least square method. Finding roots of a polynomial - roots function, Newton-Raphson Method.

UNIT-V **9 Hrs**

Solution of Ordinary differential Equations (ODEs)-The 4th order Runge-kutta Method, ODE Solvers in MATLAB, Solving First –order equations using ODE23 and ODE45. Structures and Graphical user interface (GUI): Advanced data Objects, how a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Total Hours: 45

TEXT BOOKS:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt. Ltd.

REFERENCE BOOKS:

1. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.

2. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen, Elsevier-18th April 2014.
3. https://nptel.ac.in/courses/103106118/2
4. https://www.udemy.com/numerical-methods

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3	3	-	-	-	-	-	-	-	3	3
CO2	2	3	3	3	3	-	-	-	-	-	-	-	3	3
CO3	2	3	3	3	3	-	-	-	-	-	-	-	3	3
CO4	2	3	3	3	3	-	-	-	-	-	-	-	3	3
Average	2	3	3	3	3	-	-	-	-	-	-	-	3	3
Level of Correlation	2	3	3	3	3	-	-	-	-	-	-	-	3	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B.Tech II Semester (Common to CSE(AI)- (Professional Elective -II), CSE, IT)
IV B Tech I Sem CSE(DS), CSE (AI& ML), Professional Elective-V, ME, ECE- Open Elective-IV

L	T	P	C
3	-	-	3

20ACS28: INTERNET OF THINGS

Course Outcomes:
After successful completion of the course, the student will be able to :
1. Understand the fundamentals of IoT, its applications.
2. Understand and analyze various tools for design of IoT system.
3. Analyze the Raspberry Pi tool and its features.
4. Deploy an IoT application and connect to the cloud.

UNIT-I **10 Hrs**

Introduction and Concepts: Introduction to Internet of Things, Physical Design of IoT, Logical Design of IoT – IoT Enabling Technologies – IoT levels & Deployment Templates.

Domain Specific IoTs: Introduction – Home Automation – Cities, Environment – Energy – Retail, Logistics – Agriculture, Industry, Health & Lifestyle.

UNIT-II **13 Hrs**

IOT and M2M: Introduction – M2M, Difference between IoT and M2M, SDN and NFV for IoT, IoT System management with NETCONF, YANG, Need for IoT Systems Management –Simple network Management protocol(SNMP) – Network operator requirements, NETCONF,YANG, IOT systems management with NETCONF,YANG – NETOPEER.

UNIT-III **9 Hrs**

Developing Internet Of Things: IoT Platforms Design Methodology, Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring – Motivation for Using Python – IoT Systems, logical Design using Python, installing Python, Python Data Types & Data Structures, Control flow, functions, Modules, Packages, File Handling, Data/Time Operations, Classes, Python Packages of Interest for IoT.

UNIT-IV **9 Hrs**

Iot Physical Devices & Endpoint: What is an IOT devices, Exemplary Devices: Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry Pi withPython – Other IoT Devices.

UNIT-V **8 Hrs**

Iot Physical Servers & Cloud Offerings: Introduction to Cloud Storage Models & Communication APIs, WAMP, AutoBahn for IoT, Xively Cloud for IoT, Python Web Application Framework, Django, Designing a RESTful Web API, Amazon Web services for IoT, SkyNet IoT Messaging Platform.

Total Hours: 45

TEXT BOOK:

1. Arshdeep Bahga, Vijay K.Madisetti, “Internet of Things”, A HANDS ON APPROACH, Universities Press, 2014

REFERENCE BOOKS:

1. Adrian Mcewen, Hakin Cassimally, "Designing The Internet of Things", WEILEY Publications,2015

2. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, David Boyle, StamatisKarnouskos, "From Machine-to-Machine to the Internet of Things", Academic Press, 2014.

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO2	2	3	-	-	-	-	-	-	-	-	-	-	-	2
CO3	2	3	2	1	-	-	-	-	-	-	-	-	-	2
CO4	3	3	3	1	-	-	-	-	-	-	-	-	-	2
CO5	2	3	2	-	-	2	-	-	-	-	-	-	-	2
Average	2.4	2.8	1.4	0.4	-	0.4	-	-	-	-	-	-	-	-
Level of Correlation	2	3	1	-	-	-	-	-	-	-	-	-	-	-

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B.Tech II Semester (Common to CSE, IT, CSE(AI))

L	T	P	C
-	-	3	1.5

20ACS35 : DATA WAREHOUSING AND DATA MINING LAB

Course outcomes:

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

1. Identify different attributes of credit assessment and develop a decision tree.
2. Derive associations from dataset and do clustering using weka.
3. Develop appropriate solutions using classification algorithms.

LIST OF EXPERIMENTS

Description: The business of banks is making loans. Assessing the credit worthiness of an applicantis of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

a. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try torepresent her knowledge in the form of production rules.
b. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance.Translate this knowledge from text form to production rule form.
c. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can beused to judge the credit worthiness of a loan applicant.
d. Case histories. Find records of actual cases where competent loan officers correctly judged when,and when not to, approve a loan application. The German

Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here isone such data set, consisting of 1000 actual cases collected in Germany. Credit dataset (original) Excel spreadsheet version of the German credit data (Down load from web).In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks andacts like a quarter).
- owns telephone. German phone rates are much higher than in Canada so fewer people owntelephones.
- foreign_worker. There are millions of these in Germany (many from Turrkey). It is very hard toget German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant intoone of two categories, good or bad. **Subtasks : (Turn in your answers to the following tasks)**

1. List all the categorical (or nominal) attributes and the real, valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree , train a Decision Tree using the completedataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why or Why not?
6. One approach for solving the problem encountered in the previous question is using cross validation? Describe what cross, validation is briefly. Train a Decision Tree again using cross, validation and report your results. Does your accuracy increase/decrease? Why?
7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or" personal, status" (attribute 9). One way to do this (perhaps rather simpleminded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in data mining tool. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes inproblem 7. Remember to reload the Arff data file to get all the attributes initially before you start selecting the ones you want.)
9. sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case

(say cost 5) and lower

cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross, validation results. Are they significantly different fromresults obtained in problem 6 (using equal cost)?

10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning, Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

12. (Extra Credit): How can you convert a Decision Tree into "if, then, else rules". Make up your own small Decision Tree consisting of 2,3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules, one such classifier in data mining tools is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attributethat might be in this dataset? One R classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rankthe performance of j48, PART and one R.

13. Derive association rules from the following dataset.

Outlook	Temperature	Humidity	Windy	Play
Sunny	Hot	High	False	No
Sunny	Hot	High	True	No
Overcast	Hot	High	False	Yes
Rainy	Mild	High	False	Yes
Rainy	Cool	Normal	False	Yes
Rainy	Cool	Normal	True	Yes
Overcast	Cool	Normal	True	Yes
Sunny	Mild	High	False	No
Sunny	Cool	Normal	False	Yes
Rainy	Mild	Normal	False	Yes
Sunny	Mild	Normal	False	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Rainy	Mild	High	True	No

14. Perform Clustering on Weather nominal data set

i. Open data mining tool and Load the data set editor. Get familiarize with the editor operations.

a. Load the weather. Nominal dataset. Use the filter, Unsupervised, instance. Remove with

Values to remove all instances in which the humidity attribute has the value high. To do this, first make thefield next to the Choose button show the text Remove with Values. Then click on it to get the Generic Object.Editor window, and figure out how to change the filter settings appropriately.

ii. Choosing k-means clustering algorithm for clustering use the Weather nominal data set (.arff) performs clustering with a Euclidean distance functions and visually inspect the nature of the clusters.

15. Classification: Choosing an appropriate filter for classification use the Weather nominal data set(.arff) perform classification and visualize the classification tree.

Task Resources:

Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)

- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2							1				3	3
CO2	3	3	2	1	3								3	3
CO3	3	3	3	2	3								3	3
Average	3	2.66	2.5	1.5	3				1				3	3
Level of Correlation	3	3	3	2	3				1				3	3

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

III B. Tech II Semester CSE (AI)

20ACA15: MACHINE LEARNING 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. Analyze the given problem and identify appropriate machine learning technique to provide an intelligent solution.
2. Design and implement machine learning solutions for classification, regression, and clustering problems.
3. Develop intelligent solutions to solve societal problems related to computer vision, information security, healthcare and other areas.
4. Work independently to solve problems with effective communication.

LIST OF EXPERIMENTS:

1. Solve classification problem by constructing a feed forward neural network using Back propagation algorithm. (Wheat Seed Data)
2. Implement ID3 (information gain) algorithm for decision tree learning for transforming continuous variables into discrete variables.
3. Explore the problem of over fitting in decision tree and develop solution using pruning technique.
4. Build a neural network that will read the image of a digit and correctly identify the number.
5. Implement k-NN algorithm to solve classification problem.
6. Use Naïve Bayes classifier to solve the credit card fraud detection problem over a skewed dataset.
7. Design and implement a radial basis function neural network to solve function approximation or regression problem.
8. Compare and analyze the performance of optimal Bayes classifier and Naïve Bayes using simulated Gaussian Data.
9. Train an SVM based classifier to predict whether the cancer is malignant or benign.
10. Solve the stock price forecasting problem using statistical techniques – Maximum Likelihood estimation after understanding the distribution of the data.

REFERENCE BOOKS:

1. Sebastian Raschka, Vahid Mirjalili, Python Machine Learning, Packt Publishing, 3rd Edition, 2019.
2. Aurelien Geron, Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, 2nd Edition, O'Reilly, 2019.

SOFTWARE/TOOLS:

- Python
- Scikit-learn/Keras/TensorFlow

ADDITIONAL LEARNING RESOURCES:

- https://www.coursera.org/learn/machine-learning
- https://nptel.ac.in/courses/106106202/

CO-PO-PSO Mapping Table:

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3	3	-	-	-	-	-	-	-	3	3
CO2	1	3	3	3	3	-	-	-	-	-	-	-	3	3
CO3	1	3	3	3	3	3	-	-	-	-	-	-	3	3
CO4	-	-	-	-	-	-	-	-	3	3	-	-	-	-
Average	1	2.25	2.25	2.25	2.25	0.75	-	-	0.75	0.75	-	-	2.25	2.25
Level of Correlation	1	2	2	2	2	-	-	-	1	1	-	-	2	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

III B. Tech I Semester CSE (AI)

L	T	P	C
-	-	3	1.5

20ACA16 : ARTIFICIAL NEURAL NETWORKS LAB

Course outcomes:

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

1. Implement the fundamentals of neural learning.
2. Build a single or multi-layer neural network to solve real time problems.
3. Implement appropriate error functions and apply suitable optimization techniques to improve the performance of the model.
4. Solve the bias-variance tradeoff issues using techniques including regularization and pruning algorithms.
5. Work independently or in team to solve problems with effective communication.

LIST OF EXPERIMENTS:

1. Classify spectral remote sensing data using Ordinary Least Squares and estimate the confusion matrix.
2. Fit, evaluate, and make predictions with the Linear Discriminant Analysis model. Also tune the hyperparameters of the model.
3. Implementing the Perceptron Algorithm for binary classification task and plot the decision boundary.
4. Build an employee churn prediction model using Multi-layer perceptron and evaluate the model performance with different learning rate.
5. Analyze the efficiency of a Radial Basis function network for a classification task and assess its convergence ability.
6. Evaluate the cross entropy error functions and compare its performance with the Log Loss.
7. Analyze the efficiency of L1 and L2 regularization techniques in resolving overfitting issues in multi-layer neural network model.
8. Investigate the efficiency of SGD in terms of convergence speed and accuracy with different learning rate and momentum values.
9. Using stacked generalization, an ensemble method build a new model to best combine the predictions from multiple existing models.
10. Using pruning algorithm reduce the complexity of a trained neural network.

REFERENCE BOOKS:

1. Christopher M. Bishop, Neural Networks for Pattern Recognition, OXFORD, 1995.
2. Simon Haykin, Neural Networks and Learning Machines, Pearson, 2016.

SOFTWARE/Tools used:

Environment : Google CoLab
Programming Language : Python 3.8
Machine Learning Library : Tensor Flow 2.1 and Keras

ADDITIONAL LEARNING RESOURCES:

1. https://www.coursera.org/projects/basic-artificial-neural-networks-in-python
2. https://www.udemy.com/course/introduction-to-artificial-neural-network-and-deep-learning/

CO-PO-PSO Mapping Table

Course Outcome	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO 8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PSO2
CO1	3	2	-	-	3	-	-	-	-	-	-	-	3	3
CO2	3	3	2	-	3	-	-	-	-	-	-	-	3	3
CO3	3	3	2	-	3	-	-	-	-	-	-	-	3	3
CO4	3	2	-	-	3	-	-	-	-	-	-	-	3	3
CO5	-	-	-	-	3	-	-	-	3	3	-	-	-	-
Average	2.4	2	0.8	-	3	-	-	-	0.6	0.6	-	-	2.4	2.4
Level of Correlation	2	2	1	-	3	-	-	-	1	1	-	-	2	2

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

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

L	T	P	C
1	0	2	2

20AHS16 : ADVANCED ENGLISH COMMUNICATION SKILLS
(Skill Course)

Course outcomes:

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

1. Understand language fluency through conversational practices and demonstrate appropriate bodylanguage during communication.
2. Apply synonyms, antonyms, one-word substitutes, prefixes and suffixes to develop vocabulary tocomprehend oral and written communication.
3. Analyze reading and writing techniques in preparing letters, resumes and technical reports by examining and applying guessing meaning, scanning, skimming and interfering meaning.
4. Demonstrate ability to function effectively as an individual and as a member in diverse teams examining and applying skills in Oral presentations, Interviews and Group Discussions.

UNIT-I

INTER-PERSONAL COMMUNICATION AND BUILDING VOCABULARY

Starting a conversation, Responding appropriately and relevantly, Using appropriate Body language, Role play in Different situations, Synonyms and antonyms, One-word substitutes, Prefixes and suffixes, Idioms & Phrasesand Collocations.

UNIT-II

READING COMPREHENSION: General vs. Local Comprehension, Reading for Facts, Guessing meanings from Context, Skimming, Scanning and inferring meaning.

UNIT-III 9 Hours

WRITING SKILLS: Structures and Presentation of different types of writing – Letter writing, Resume writing,e-correspondence and Technical report writing.

UNIT-IV

PRESENTATION SKILLS: Oral Presentations (individual or group) through JAM Sessions/Seminars/PPTs and Written Presentations through Posters/Projects/Reports/e-mails/Assignments, etc

UNIT-V

GROUP DISCUSSION AND INTERVIEW SKILLS: Dynamics of Group discussion, Intervention, Summarizing, Modulation of voice, Body Language, Relevance, Fluency and organization of ideas and rubrics of evaluation, Concept and Process of interviews, Pre-

interview planning, opening strategies, Answering Strategies, Interview through Tele-conference & Video-conference and Mock Interviews.

Suggested Software:

- Sky Pronunciation
- Pro-power 2
- Globarena Software

REFERENCE BOOKS:

1.Kumar Sanjay, Pushpa Lata. English for Effective Communication, Oxford University Press, 2015.

2. Konar Nira**,** English Language Laboratories – A Comprehensive Manual, PHI LearningPvt. Ltd., 2011.

CO-PO-PSO Mapping Table:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

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

L	T	P	C
2	0	0	0

20AHS23 : ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE
(Mandatory Course)

Course outcomes:

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

- **CO1.** Identify various aspects of Traditional knowledge and its importance.
- **CO2.** Explain briefly to understand the needs and importance of protecting traditional knowledge.
- **CO3.** Analyze the various systems, concepts and strategies of traditional knowledge.
- **CO4.** Apply the concepts of traditional knowledge in different sectors.

UNIT I INTRODUCTION TO TRADITIONAL KNOWLEDGE 10 Hrs

Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, Indigenous Knowledge (IK), characteristics, traditional knowledge vis-a-vis indigenous knowledge, traditional knowledge Vs western knowledge.

UNIT II PROTECTION OF TRADITIONAL KNOWLEDGE 10 Hrs

The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT III LEGAL FRAMEWORK AND TRADITIONAL KNOWLEDGE 10 Hrs

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights)Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016.

UNIT IV TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY 10 Hrs

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge.

UNIT V TRADITIONAL KNOWLEDGE IN DIFFERENT SECTORS 10 Hrs

Traditional knowledge and engineering, Traditional medicine system, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Total Hours: 45

TEXT BOOK(S)

1. Traditional Knowledge System in India, by Amit Jha, 2009.

REFERENCE BOOKS

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.
2. Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino.

ADDITIONAL LEARNING RESOURCES:

1. https://www.youtube.com/watch?v=LZP1StpYEPM
2. http://nptel.ac.in/courses/121106003/

CO-PO-PSO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	-	-	-	-	3	3	3					1	1
CO2	2	-	-	-	-	3	3	2					1	1
CO3	-	-	-	-	-	3	3	-					1	
CO4	3	-	-	-	-	3	3	3					1	
Average	2	-	-	-	-	3	3	2					1	0.5
Level of Correlation	2	-	-	-	-	3	3	2					1	1

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