ACADEMIC REGULATIONS - R20 COURSE STRUCTURE AND DETAILED SYLLABI

B.TECH REGULAR (FULL-TIME) FOUR YEAR DEGREE PROGRAMME

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

(INTERNET OF THINGS)



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (IOT) SRI VENKATESWARA COLLEGE OFENGINEERING 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-517127 (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 wintheconfidenceofalltheabovebodiesmonitoringthequalityineducation 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 area of contemporary technical education.

As a followup, 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 successfulimplementationoftheautonomoussysteminthelargerinterests of the college and brighter prospects of engineering graduates.

Principal

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

Department Vision:

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

Department Mission:

- Produce globally competent professionals in through delivering knowledge in emerging technologies of computer science to solve real world 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):

- 1. Pursuing their careers in the IT or ITES industry or progressing to higher education in Engineering or management.
- 2. Venture into entrepreneurship with a startup or an organization.
- 3. Continue to develop their professional knowledge and skills to be agile and relevant in the industry.



SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (AUTONOMOUS) R.V.S. NAGAR, CHITTOOR-517 127, ANDHRA PRADESH DEPARTMENTOFCOMPUTER SCIENCEANDENGINEERING (INTERNETOFTHINGS)

Program Specific Outcomes(PSOs) under R20

Regulations Program Specific Outcomes (PSOs):

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

- 1. Analyse and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.
- 2. Use theoretical and practical concepts in interdisciplinary domains to provide solution to new ideas and innovations.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY



(Autonomous)

R.V.S.Nagar, CHITTOOR-517127, A.P

www.svcetedu.org E-mail:principal@svcetedu.org

(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 2022-23)

and

B.Tech. (Lateral Entry Scheme)

(For the batches admitted from the academic year 2023-24)

- Applicability : All the rules specified here in, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2020-2021onwards. 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 here in 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 Councilis 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.

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3. Admission

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

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.

AdmissionProcedure:

As per the existing stipulations of A.P State Council of Higher Education (APSCHE), GovernmentofAndhraPradesh,admissionsaremadeintothefirstyearoffouryearB.Tech., Degree Program as follows:

Seatsundervarious categories are filled as per the normsprescribed by the Government of Andhra Pradesh.

Admissionintothesecondyear offour YearB.Tech.,DegreeProgram (Lateral Entry Scheme) in Engineering:

Eligibility:CandidatesqualifiedinECET(FDH)and/oradmittedbytheConvener,ECET (FDH).Inallsuchcasesforadmission,whenneeded,Permissionsfromthestatutorybodiesare to be obtained.

AdmissionProcedure:LateralEntryseatsarefilledasperthenorms

 $prescribed by the Government of {\it Andhra Pradesh} from time to time.$

4. ProgramsofstudyofferedleadingtotheawardofB.Techdegree:

- 1. B.Tech(CivilEngineering)
- 2. B.Tech(ElectricalandElectronicsEngineering)
- 3. B.Tech(MechanicalEngineering)
- 4. B.Tech(ElectronicsandCommunicationEngineering)
- 5. B.Tech(ComputerScienceandEngineering)
- 6. B.Tech(InformationTechnology)
- 7. B.Tech(ComputerScienceandEngineering(ArtificialIntelligenceandMachineLearning))
- 8. B.Tech(ComputerScienceandEngineering(DataScience))
- 9. B.Tech(ComputerScienceandEngineering(InternetOfThings))
- 10. B.Tech(ComputerScienceandEngineering(CyberSecurity))

5. Choice BasedCreditSystem:

TheIndian HigherEducationInstitutions(HEI's)arechangingfromtheconventional course structureto Choice BasedCredit System (CBCS) alongwithintroductionto semester system at first year itself. The semester system helps in accelerating the teaching-learning process and enables vertical and horizontal mobility in learning.

Thecreditbasedsemester systemprovidesflexibilityindesigningcurriculumandassigning creditsbasedonthecoursecontentandhoursofteaching.Thechoicebasedcreditsystem providesa'cafeteria'type approachinwhichthestudentscantakecoursesoftheirchoice,learn attheirownpace,undergoadditionalcoursesandadoptaninterdisciplinaryapproachtolearning. Choice Based Credit System (CBCS) is a flexiblesystem of learning and provides choice for studentstoselectfromtheprescribedelectivecourses. Acoursedefineslearningobjectives and learningoutcomesandcomprisesofLectures/Tutorials/LaboratoryWork/FieldWork/Project Work/MOOCS/Internship/ComprehensiveExamination/Seminars/Presentations/selfstudy etc.oracombinationofsome ofthese.

UndertheCBCS, the requirement for awarding a degree is prescribed interms of number of credits to be completed by the students.

TheCBCSpermitsstudentsto:

- 1. Chooseelectivesfromawiderangeofelectivecoursesofferedbythedepartments.
- 2. Undergoadditionalcoursesofinterest.
- 3. Adoptaninterdisciplinaryapproachinlearning.
- 4. Makethebestuseofexpertiseoftheavailablefaculty.

6. Mediumofinstruction:

The medium of instruction shall be English for all courses, examinations, seminar presentationsandprojectwork. The curriculum will comprise courses of study as given incourse structure, in accordance with the prescribed syllabi.

7. TypesofCourses:

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

Foundation/SkillCourse:

Foundationcoursesarethecoursesbaseduponthecontentleadstoenhancementofskill and knowledge. Skill subjects are those areas in which one needs to develop a set of skillsto learn anything at all. They are fundamental to learn any subject.

CoreCourse:

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.

Elective Course:

Electivesprovidebreadthofexperienceinrespectivebranchandapplicationsareas.

 ${\it Elective course is a course which can be chosen from a pool of courses. It may be:$

- Supportivetothedisciplineofstudy
- Providinganexpandedscope
- Enablinganexposuretosomeotherdiscipline/domain
- Nurturingstudent'sproficiency/skill.

Anelectivemaybedisciplinecentric(ProfessionalElective)focusingonthosecourseswhich add generic proficiency to the students or may be chosen from an interdisciplinary area called as "Open Elective".

Therearefiveprofessionalelectivegroups.Studentscanchoosenotmorethanoneelective fromeachofthefivegroups. Alsotherearefouropenelectivegroups,studentscanchoose not more than one elective from each of the four groups.

8. AcademicYear:

CourseDuration:

CoursedurationforB.Techprogramofstudyis4yearsandthemaximumduration to

complete the program is 8 years excluding the gap year.

Forlateral entrystudentsthecoursedurationis3yearsandthemaximumduration to

complete the program is 6 years excluding the gap year.

Eachacademicyearisdividedintotwosemestersandeachsemestershallhavea minimum of 16 Instructional Weeks.

9. Uniquecourseidentificationcode:

EverycourseoftheB.Techprogramwillbeplacedinoneoftheelevengroupsofcourses as listed in the table 1. The various courses and their two-letter codes are given below.

S.No.	Branch	Code
1	CivilEngineering	CE
2	ElectricalandElectronicsEngineering	EE
3	MechanicalEngineering	ME
4	ElectronicsandCommunicationEngineering	EC
5	ComputerScienceandEngineering	CS
6	InformationTechnology	IT
7	ComputerScienceandEngineering(ArtificialIntelligence and Machine Learning)	СМ

Table1:GroupofCourses

8	ComputerScienceandEngineering(DataScience)	CD
9	ComputerScienceandEngineering(CyberSecurity)	
10	ComputerScienceandEngineering(Internet ofThings)	СО
9	HumanitiesandBasicSciences	HS
10	MBA	MB
11	MCA	MC

10. CurriculumandCourseStructure:

The curriculum shall comprise Foundation / Skill Courses, Core Courses, Elective Courses, Laboratory Courses, Audit Courses, Mandatory Courses, Comprehensive Examination / Mini Project,InternshipandProjectwork.Thelistofelectivecoursesmayincludesubjectsfromallied 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 / week as follows.

- **Contactclasses(Theory):**1creditperlecturehourperweek.
- **LaboratoryHours(Practical):**1creditfor2Practicalhours,perweek.

CourseStructure:

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 categorieswithaveragecreditsaslistedintheTable 2.Inthis,astudenthastocarryoutamini project, project work and comprehensive Examination also.

S.No.	Category	SubjectAreaand% of Credits	AverageNo. of Credits
1	HumanitiesandSocialSciences	HS(05%to10%)	10.5
	(HS), includingManagementcourses	· · ·	
	BasicSciences(BS)including		
2	Mathematics, Physicsand Chemistry.	BS(15%to20%)	21
3	Engineering Sciences (ES), including Workshop, Drawing, BasicsofElectrical/Electronics/ Mechanical/ComputerEngineering.	ES(15%to20%)	24
4	Professional Subjects-Core (PC), relevanttothechosenspecialization /branch.	PC(30%to40%)	51

Table2:Categor	v-wiseDistributionofCredits
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5	ProfessionalElectiveCourses (PE), relevanttothechosen Specialization/branch.	PE(10%to15%)	15
6	OpenElectiveCourses(OE),from othertechnicaland/oremerging Subjectarea.	OE(05%to10%)	12
7	ProjectWork,Internship Mini Project / ComprehensiveExamination.	10%to15%	16.5
8	MandatoryCourses	MC	Non-credit
9	SkillOrientedCourses	SC	10
	TOTAL		160

There shall be mandatory student induction program for freshers, with a three-week durationbeforethecommencement offirstsemester.Physical activity,Creative Arts, Universal Human Values, Literary,ProficiencyModules, Lectures by Eminent People, Visitstolocal Areas, Familiarization to Dept./Branch & Innovations etc., as per the guidelines issued by AICTE.

All undergraduate students shall register for NCC / NSS activities. A student will be requiredtoparticipateinanactivityfortwohoursinaweekduringsecond andthirdsemesters. 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, heshall repeat the above activity in the subsequent semesters, inorder to complete the degree requirements.

Courseslike Environmental Science, UniversalHumanValues,Ethics,IndianConstitution, 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 studenthastosecure40%ofthemarksallottedintheinternalevaluationforpassingthecourse. No marks orletter grade shall be allotted for all mandatory non-credit courses.

There shall be 05 Professional Elective courses and 04 Open Elective courses. All the Professional&OpenElectivecoursesshallbeofferedfor03credits.AllOpenElectivesareoffered tostudentsofallbranchesingeneral.However,astudentshallchooseanopenElectivefromthe listinsuchamannerthathehasnotstudiedthesamecourseinanyformduringtheProgramme.

A student shall be permitted to pursue up to a maximum of two open elective courses underMOOCsduringtheProgrammeasmentionedincoursestructure.Eachofthecoursesmust be of minimum 8 - 12 weeksin duration. Attendance will not be monitored for MOOC courses. StudenthastopursueandacquireacertificateforaMOOCcourseonlyfromthe Organizations/agenciesapproved by the BoSinorderto earn the 3 credits. The Headof the department shall notify the list of such courses at the beginning of the semester.

IncaseastudentfailstocompletetheMOOC/MOOCsinthestipulatedsemesterhe has to reregister and complete the same. In case any provider discontinues the course, Institution shall allow the student to optfor any other course from the list provided by the department from time to time.

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.

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

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

Students shall undergo mandatory summer internships for a minimum of six weeks durationat the end ofsecond andthird year of the Programme. Thereshall alsobe mandatory full internship in the final semester of the Programme along with the project work.

Thereshallbe05skill-orientedcoursesofferedduringIIB.TechISemestertoIVB.TechI Semester.Amongthefiveskillcourses,fourcoursesshallfocusonthebasicandadvancedskills related to the domain courses and the remaining one shall be a soft skills course.

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. EvaluationMethodology:

TheoryCourse:

Eachtheorycoursewillbeevaluatedforatotalof100Marks,with40Marksfor Continuous Internal Assessment (CIA) and 60 Marks for Semester End Examination (SEE).

Continuous InternalAssessment(CIA):

ThedistributionofmarksforContinuousInternalAssessmentisasfollows: Two Sessional Examinations: 30 Marks

Five Assignments

:10Marks 40Marks

QuestionPaperPattern forSessionalExaminations:

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)eachcarrying5marksmaybegiven.Thequestionsmaybesetasper 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.

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.

SemesterEndExamination (SEE):

TheSEEisconductedfor60marksof3hoursduration.Thesyllabusforthetheory courseis divided into FIVE units. SEE Question Paper consists of two parts, Part A and Part B.

PartAconsistsof05shortanswertypequestions,eachcarries2marksforatotalof10 marks with no choice.

PartBConsistsof5questionswithonequestionfromeachofthe5unitswithinternal 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.

Laboratory Course:

EachLaboratoryCoursewillbeevaluatedforatotalof100marks,consistingof40marks forinternal assessment (CIA) and 60marks forsemesterendlabexamination. Out of 40marks ofCIA, continuouslabassessment (SEE)fordaytoday performancewillbedonefor20marks, finalinternallabexaminationcarries15marksandViva-Vocecarries5marks.Thesemesterend lab examination for 60 marks shall be conducted by two examiners, one of thembeing 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 studentsin advancebytheconcernedChairman,BOSanddisplayedinthelaboratoryduringthebeginningof the semester.

11.6.DrawingCourses:

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.

Questionpaperpatternfordrawingcourseswillbefollowedasmentionedinthe syllabus.

Thefollowingcourseisconsideredastheorysubject, butforall practical purposes examination will be conducted like practical.

 $i. Computer {\it Aided Engineering Drawing}$

MandatoryCourses:

Mandatory courses will not carry any credits; but, a pass in the examination during the programme shall be necessary requirement forstudentto qualifyfor the award ofDegree. 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 thecourse divided into FIVE units. The Question Paper consists of two parts, Part A and Part B.PartAconsists of 5 shortans werty pequestions, 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.

Community Service Project: Community Service Project should be an integral part of thecurriculum, 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.

ProjectWork:

There shall be a Project Work in the IV year second semester which carries 12 credits. Outof100marksallottedfortheprojectwork, 40marksshall beforInternal Evaluationand60 marks for the End Semester Examination (Viva –Voce).The Viva– Voceshallbeconductedby acommitteeconsisting of HOD, ProjectSupervisorandanExternal Examiner nominatedby the Principal from the panel of examiners recommended by Chairman, BOS. The Evaluation of projectworkshall beconducted attheendoftheIVyear–IIsemester.TheInternalEvaluation shall be made by the departmental committee, on the basis of two seminars given by each student on the topic of his project.

FrameworkforMandatoryInternships:

Twosummer internships eachwitha minimum of six weeks duration, done at the end ofsecond and third years, respectively are mandatory. The internship can be done by the students at local industries, Govt. Organizations, construction agencies, Industries, Hydel andthermal power projects and also in software MNCs.

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% weight ages respectively.

Inthefinalsemester, thestudentshouldmandatorilyundergointernshipandparallelly he should work on a project with well-defined objectives. At the end of the semester the candidate shall submit aninternship completioncertificate and a project report. Astudent shall also be permitted to submit projectreportonthe workcarriedout during the internship. The projectreportshallbeevaluatedwithanexternal examiner.

TheCollegeshall facilitateandmonitorthestudentinternshipprograms.Completionof internshipsis mandatory, if anystudentfailstocompleteinternship,hewillnotbe eligible fortheawardofdegree.Insuchcases,thestudentshallrepeatandcompletetheinternship.

FrameworkforSkillOrientedCourses:

Forskilloriented/skilladvancedcourses,onetheoryand2practicalhoursortwotheory hours may be allotted as per the decision of concerned BOS.

Out of the five skill courses two shall be skill-oriented courses from the same domain

andshallbecompletedinsecondyear.Oftheremaining3skillcourses,oneshallbenecessarily beasoftskillcourseandtheremaining2shallbeskill-advancedcourseseitherfromthesame domain or Job orientedskillcourses,whichcanbeofinter disciplinary nature.

A pool of interdisciplinary job-oriented skill courses shall be designed by a Common Board of studies bytheparticipatingdepartments/disciplinesandthesyllabusalong with theprerequisitesshallbeprepared foreachofthelaboratoryinfrastructure 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.

Thestudentshallbegivenanoption tochooseeithertheskillcoursesbeingofferedby thecollegeor tochoose a certificatecoursebeingofferedbyindustries/Professional bodies /APSSDCoranyotheraccreditedbodiesasapprovedbytheconcernedBoS.

The Board of studies of the concerned discipline of Engineering shall review the skill advanced courses being offered byeligibleexternalagenciesandprepareafreshlist every year incorporating latest courses based on industrial demand.

If a student chooses to take a Certificate Course offered by industries / Professional /APSSDCor bodies any otheraccredited bodies, inlieuof theskillad vanced course offered by the Department, the credits shall be awarded to the student upon producingthe Course CompletionCertificatefromtheagency/professionalbodiesasapprovedbytheBoardofstudi es.

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.

A committee shall be formedatthelevel ofthecollegetoevaluatethe 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.

GapYear:

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 yearatanytimeafterIIyeartopursueentrepreneurshipfulltime.Thisperiodmaybeextended totwoyearsatthemostandthesetwoyearswouldnotbecountedforthetimeforthemaximum time for graduation. The HOD of the respective department shall forward such proposals submittedbythestudentstothe Principal. Anevaluationcommitteeshall beconstitutedbythe 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.

FrameworkforMinorDegreeinaDiscipline(MinorDegree/Programme):

The concept of Minor degree is introduced in the curriculum of all B. Tech. programs offeringaMajordegree.ThemainobjectiveofMinordegreeinadisciplineistoprovideadditional 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

earn20extracredits,bystudyingFIVEcourseseachcarryingfourcredits(ineachcourse,three credits for theory and one credit for lab).

a) Students who are desires of pursuing their special interest areas other than the chosen disciplineofEngineeringmayoptforadditionalcoursesinminorspecializationgroupsofferedby 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.

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.

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.

StudentsaspiringforaMinordegreemustregisterfromIIB.TechII-Semesteronwards andmustoptforaMinorinadisciplineotherthanthedisciplineheisregisteredinoranyindustry relevant track of any branch.

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

Minimum strength required for offering a Minorina disciplineis considered as 20% of the class size and Maximum should be 80% of the class size.

MinordegreeprogramshouldbecompletedbytheendofIVB.TechI-Semester.

A student registered for Minor degree shall pass in all subjects that constitute the requirement for the Minor degree program. Noclass/division(i.e.,secondclass,firstclass and distinction, etc.) shall be awarded for Minor degree program.

The Minor degree shall be mentioned in the degree certificate as Bachelor of TechnologyinXXXwith MinorinYYY.For example,BachelorofTechnologyinComputerScience & Engineering with Minor in

Electronics & Communication Engineering or the chosen industry relevanttrack. This shall alsobereflected in the transcripts, along with the list of courses taken for Minor degree program with CGPA mentioned separately.

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:Interestedmeritoriousstudents shallbepermittedtoregistereither forMinor degreein adiscipline orindustry relevanttrack ofany branch(or)HonorsDegreeinadiscipline only, but not both.

FrameworkforHonorsDegreeinaDiscipline:

Thisconceptisintroduced in the curriculum for all conventional B. Tech. programmes.

ThemainobjectiveofHonorsdegreeinadisciplineistoprovideadditionallearningopportunities foracademically motivatedstudents anditisanoptionalfeature oftheB.Tech. programme. In order to earn a Honors degree in his/her discipline, a student has to earn 20 extra credits by studyingfiveadvancedcourseseachcarryingfourcreditsfor20creditsintheconcernedbranch of Engineering. In place of advanced courses, he can study equivalent MOOCcourses available underSWAYAM/Otherplatform,asdecidedbytheinstitutionfromtimetotime.TheEvaluation patternoftheorysubjectswillbesimilartotheregularprogrammeevaluation.Studentsaspiring forHonorsdegreemustregisterfromIIB.Tech, IISemester onwards. However, Honorsdegree registrations are not allowed before II B.Tech, II Semester and after III B.Tech, I Semester.

Students having a CGPA of 8.0 or above up to II year-I semester and without any backlog subjects will bepermitted toregisterfor degree with Honors. The SGPA and CGPA of

8.0has tobe 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:InterestedmeritoriousstudentsshallbepermittedtoregistereitherforHonorsdegree or Minor degree in a discipline or industry relevant track of any branch but not both.

12. AttendanceRequirementsandDetentionPolicy:

- 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.
- Condonationofshortageofattendanceinaggregateupto10%(65%andaboveandbelow 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.
- Shortage of Attendance below 65% in aggregate shall in no case be condoned and the candidate will be detained.
- Detained students are not eligible to take their end examination of that class and their registration shall stand cancelled.
- Astudentdetainedduetoshortageofattendance, will havetorepeatthat semesterwhen offered next.

13. Conduct ofSemesterEndExaminationandEvaluation:

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 State of the State

Subject Experts. Principal will decide the External and Internal subject experts.

Theanswerpapersofsemesterendexaminationshouldbeevaluatedexternally/ internally. Themarksfortheinternal evaluationcomponentswillbeaddedtotheexternal evaluation markssecuredintheSemester-Endexaminations,toarriveattotalmarksforanysubject in that semester.

Performance in all the subjects is tabulated program-wise and will be scrutinized by the

officeoftheControllerofExaminations.Totalmarksobtainedineachsubjectareconverted intolettergrades. Finally subject-wisemarksandgradesdetails,subject-wiseandbranch-wise pass percentages are calculated through software.

ResultsCommittee:

ResultsCommitteecomprisingofPrincipal,ControllerofExaminations,AdditionalController of Examinations (Confidential), One Senior Professor nominated by the Principaland the University Nominee will oversee the details of marks, grades and pass percentages of all the subjects and branch-wise pass percentages.

OfficeoftheControllerofExaminationswillgeneratestudent-wiseresultsheetsandthe same will be published through college website.

Student-wiseGradeSheetsaregenerated and issued to the students.

14. AcademicRequirementsforPromotion/CompletionofRegularB.Tech

Programme of Study:

Thefollowingacademicrequirementshavetobesatisfiedinadditiontotheattendance requirements for promotion / completion of regular B.Tech Program of study.

ForStudentsAdmittedinB.Tech(Regular)Program:

- i. Astudentshallbedeemedtohavesatisfiedtheminimumacademicrequirementsforeach theory, practical, design drawing subject or project, if he secures not less than 35% of marksintheSemesterEndexaminationandaminimumof40% of marksinthesumtotal of the internal evaluation and Semester-End examination taken together.
- **ii.** Astudentshallbepromotedfromsecondyeartothirdyearonlyifhefulfillstheacademic requirement of securing **33** credits from:
 - a) TwoRegularandtwoSupplementaryExaminationsofI-Year ISemester.
 - $b) \ Two Regular and one Supplementary Examinations of I-Year IIS emester.$
 - c) OneRegularandoneSupplementaryExaminationofII-YearIsemester.
 - d) OneRegularExaminationofII-YearIISemester.

IrrespectiveofwhetherthecandidateappearforSemester-EndExaminationornotas per the normal course of study.

- iii. AstudentshallbepromotedfromthirdyeartofourthyearProgramofstudyonlyifhe fulfills the academic requirements of securing **50** credits from:
 - a) ThreeRegularandThreeSupplementaryExaminationsofI-YearISemester.
 - b) ThreeRegularandTwoSupplementaryExaminationsofI-YearIISemester
 - $c) \ {\sf Two Regular and {\sf Two Supplementary Examination of II-Year ISemester}.$
 - d) TwoRegularandOneSupplementaryExaminationsII-YearIISemester.
 - e) OneRegularandOneSupplementaryexaminationofIII-YearISemester.
 - f) OneRegularExaminationofIII-YearIIsemester.

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 supplementaryexaminationsbeforethedateofcommencement ofclassworkforIIIYear I Semester or IV Year I Semester as the case may be.

- iv. Astudentshallregisterforallthe160creditsandearnallthe160credits. Marksobtained in all the160 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 seatin 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.

ForLateralEntryStudents:

- A student shall be deemed to have satisfied the minimum academic requirements for eachtheory,practical,design,drawingsubjectorprojectifhesecuresnotlessthan35% 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.** Astudentshallbepromotedfromthirdyeartofourthyearonlyifhefulfillstheacademic requirements of securing **34** credits from the following examinations.
 - $a) \ \ {\sf TwoRegularandTwoSupplementaryExaminationsofIIYearISemester}.$
 - b) TwoRegularandOneSupplementaryExaminationofIIYearIISemester.
 - $c) \quad One Regular and One Supplementary Examination of IIIY ear IS emester.$
 - d) OneRegularExaminationofIII-YearIISemester.

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 aboveexamsbeforethe dateofcommencement of classwork for IVY ear IS emester.

- iii. Astudentshallregisterforall121creditsandearnallthe121credits.Marksobtained in all121 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. AstudentwillbeeligibletogetundergraduatedegreewithHonoursoradditionalMinor
 Engineering, if he completes an additional 20 credits.
- vi. AstudentwillbepermittedtoregistereitherforHonoursdegreeoradditionalMinor Engineering but not both.

15. LetterGradesandGradePoints:

PerformancesofstudentsineachcourseareexpressedinLetterGradesbasedonabsolute gradingsystem.TheUGC recommendsa10-pointgradingsystemwiththefollowingletter grades as given in the Table 3.

Percentage of Marks	GradePoint	LetterGrade
90-100	10	S (Outstanding)
80-89	9	A+(Excellent)
70-79	8	A (VeryGood)
60-69	7	B+(Good)
50-59	6	B (AboveAverage)
45-49	5	C (Average)
40-44	4	D (Pass)
Below40	0	F (Fail)
Absent	0	N(Absent)

Table3:GradePointsScale(AbsoluteGrading)

A studentobtainingGradeFshallbeconsidered Failed andwillberequiredtore-appearin the examination.

Fornoncreditcourses, 'P' for'Satisfactory' or'F'for'NotSatisfactory'isindicated and this will not be counted for the computation of SGPA / CGPA.

Attheendofeachsemester, the institute is sues gradesheet indicating the SGPA and CGPA of the student. However, grade sheet will not be issued to the student if he has any outstanding dues.

ComputationofSGPAandCGPA:

TheSemesterGradePointAverage(SGPA)istheratioofsumoftheproductofthenumber of credits with the grade points scored by a student in all the courses taken by a student and thesumofthenumber of creditsofall thecoursesundergonebyastudent, i.e.

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

where, Ciis thenumberof creditsof theith subjectand Giisthe grade pointscored by the student in the ith course

TheCumulativeGradePointAverage(CGPA)willbecomputed in the same manner taking into account all the courses undergone by astudent over all the semesters of aprogram, i.e.

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

 $where `Si' is the {\sf SGPA} of the i^{th} semester and {\sf C} iis the total number of credits in that semester$

BothSGPAandCGPAshall be roundedoffto2decimal pointsandreportedintheGrade Sheets.

Whilecomputing the SGPA/CGPA, the subjects in which the student is a warded Zerograde points will also be included.

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

LetterGrade:Itisanindexoftheperformanceofstudentsinasaidcourse.Gradesare denoted by lettersS, A+, A, B+, B, C, D, F and N.

 $\label{eq:aspectation} A sperAICTE regulations, conversion of CGPA into equivalent percentage is as follows:$

EquivalentPercentage toSGPA=(SGPA-0.50)x10

EquivalentPercentagetoCGPA=(CGPA-0.50)x10

17. GradeSheet:

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

18. ConsolidatedGradeSheet:

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. AwardofDegree:

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

Eligibility:

A student shallbe eligible for theaward of B.Tech Degree if hefulfills allthefollowing conditions:

- Registeredandsuccessfullycompletedallthecomponentsprescribedintheprogram of study for which he is admitted.
- Successfullyacquiredtheminimumrequiredcreditsasspecifiedinthecurriculum corresponding to the branch of study within the stipulated time.
- ObtainedCGPAgreaterthanorequalto4.0(Minimumrequirementfordeclaringas passed.)

19.2.AwardofClass:

CumulativeGradePointAverage	Class
≥7.5	FirstClasswithDistinction
≥6.5and<7.5	FirstClass
≥5.5and<6.5	SecondClass
≥4.0and<5.5	PassClass

DeclarationofClassisbasedonCGPA

${\small 20. Personal Verification/Recounting/Revaluation/Final Valuation}$

PersonalVerificationofAnswerScripts:

Candidates appear in a particular semester end examinations may appeal for verification oftheiranswerscript(s)forarithmeticcorrectionintotalingofmarksandanyomission/deletion inevaluationasperthenotificationsissuedfromtimetotimeintheprescribedproformaandby paying the prescribed fee per answer script.

Itisclarifiedthatpersonalverificationofanswer scriptshallnottantamounttorevaluation of answer script. This is only a process of reverification by the candidate. Any mistake / deficiency with regard to arithmetic correctionintotaling of marks and any omission / deletion in evaluation if found, the institution will correct the same.

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 recountingorrevaluation, 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.

FinalValuation:

StudentsshallbepermittedforrequestforfinalvaluationoftheSemester–EndExamination answerscriptswithinastipulatedperiodafterthepublicationoftherevaluationresultsbypaying the necessary fee. The final valuation shall be carried out by an expert not less than Associate Professor asperthescheme ofvaluationsupplied bytheexaminationbranchinthe presenceof 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 betreatedasfinal.Ifthevariationofmarksafterfinalvaluationislessthan15%oftheprevious valuation marks, then the earlier valuation marks shall be treated as the final marks.

21. SupplementaryExaminations:

Inadditiontotheregularsemester-endexaminationsconducted, the collegemay 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. TerminationfromtheProgram:

Theadmissionofastudenttotheprogrammaybeterminatedandthestudentisasked to leave the institute in the following circumstances:

- a. Thestudentfailstosatisfytherequirementsoftheprogramwithinthemaximumperiod stipulated for the program.
- b. Thestudentfailstosatisfythenormsofdisciplinespecifiedbytheinstitutefromtimeto time.

23. With-HoldingofResults:

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. GraduationDay:

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 consultationwiththeUniversity andbyfollowingthe provisionsintheStatute.Thecollegeshall instituteprizes and medals tomeritorious students andaward them annually attheGraduation Day. This will greatly encourage the students to strive for excellencein their academic work.

25. Discipline:

Every student is required to observe discipline and decorum bothinside and outside the instituteandnottoindulgeinanyactivitywhichwilltendtobringdownthehonoroftheinstitute. If a student indulges in malpractice in any of the theory / practical examination, continuous assessmentexaminationsheshallbeliableforpunitiveactionasprescribedbytheInstitutefrom time to time.

26. GrievanceRedressalCommittee:

The institute shall form a Grievance Redressal Committee for each course in each departmentwiththeCourseTeacherand theHODasthemembers. ThisCommitteeshallsolve all grievances related to the course under consideration.

27. TransitoryRegulations:

Studentswho gotdetained forwant of attendance(or) who have notfulfilled academic requirements(or)whohavefailedafterhavingundergonethecourseinearlierregulations(or) havediscontinuedandwishtocontinuethecourseareeligibleforadmissionintotheunfinished semesterfromthedateofcommencementofclassworkwiththesame(or)equivalentsubjects as and when subjects are offered and they continue to be in the academic regulations of the batchthey joinlater. Aregular student hasto satisfy all theeligibility requirementswithin the maximumstipulatedperiod of eightyears, andalateral entry studentwithinsix years, forthe award of B.Tech Degree.

28. ModeofLearning:

Preferably50%courseworkfortheTheorycoursesineverysemestershall beconducted in the blended mode of learning. If the blended learning is carried outin online mode, then the total attendance of the studentshall becalculated considering the offline and online attendance of the student.

29. StudentTransfers:

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 areprescribedindifferentsemesters in the transferred institutions, the student has to study the substitute subjects as prescribed by concerned 'Board of Studies'.

30. GeneralInstructions:

- $i. \ The academic regulations should be read as a whole for purpose of any interpretation.$
- ii. DisciplinaryactionforMalpractice/improper conductinexaminationsisappended.
- iii. Wherethewords "he", "him", "his", occurintheregulations, they include "she", "her", "hers".
- iv. Inthecaseofanydoubtorambiguityintheinterpretationoftheaboverules,thedecision of the Principal is final.
- v. ThePrincipalmaychangeoramendtheacademicregulationsofcommonBOSorsyllabi atanytimeandthechangesoramendmentsshallbemadeapplicabletoallthestudentson rolls with effect from the dates notified by the Principal.
- vi. Theaboverulesandregulationsaretobeapproved/ratifiedbytheCollegeAcademicCouncil as and when any modification is to be done.

FAILURETOREADANDUNDERSTANDTHE REGULATIONSISNOTANEXCUSE

ANNEXURE – I COMMUNITYSERVICEPROJECT

AllocationofCommunityServiceProjectforthestudentswillbedone as per the decision of the concerned BOS Chairman

Introduction:

CommunityServiceProjectisanexperientiallearningstrategythatintegratesmeaningful community service withinstruction, participation, learning and community development.

CommunityServiceProjectinvolvesstudentsincommunitydevelopment andserviceactivities and applies the experience to personal and academic development.

Community Service Projectis meant tolink 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:

CommunityServiceProjectshouldbeanintegralpartofthecurriculum,asanalternativetothe2months of Summer Internships / Apprenticeships / On the Job Training, wheneverthereis anexigency when students cannot pursue their summer internships. The specific objectives are;

- Tosensitize the students to the living conditions of the people who are around them,
- Tohelpstudentstorealizethestarkrealitiesofthesociety.
- Tobringaboutanattitudinalchangeinthestudentsandhelpthemtodevelopsocietal consciousness, sensibility, responsibility and accountability.
- Tomakestudentsawareoftheirinnerstrengthandhelpthemtofindnew/outofbox solutions to the social problems.
- Tomakestudentssociallyresponsiblecitizenswhoaresensitivetotheneedsofthe disadvantaged sections.
- Tohelp students toinitiatedevelopmentalactivities in the community incoordination 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, publicadministrationsystemandtherolesandresponsibilitiesofdifferentpersons across different social systems.

ImplementationofCommunityServiceProject:

- Everystudentshouldputinaminimumof180hoursfortheCommunityServiceProject during the summer vacation.
- Eachclass/sectionshouldbeassignedwithamentor.
- Specific Departments could concentrate on their major areas of concern. For example, Dept.ofComputerSciencecantakeupactivitiesrelatedtoComputerLiteracytodifferent sections ofpeoplelike -youth,women, house-wives, etc
- Alogbookhastobemaintainedbyeachofthestudent,wheretheactivities undertaken/involved to be recorded.
- Thelogbookhastobecountersignedbytheconcernedmentor/facultyin-charge.
- Evaluationtobedonebasedontheactiveparticipationofthestudentandgradecouldbe awarded by the mentor/faculty member.
- Thefinalevaluationtobereflectedinthegradememoofthestudent.
- TheCommunityServiceProjectshouldbedifferentfromtheregularprogrammesof NSS / NCC / Green Corps / Red Ribbon Club etc.,
- Minorprojectreportshouldbesubmittedbyeachstudent.AninternalVivashallalsobe conducted by a committee constituted by the principal of the college.
- AwardofmarksshallbemadeaspertheguidelinesofInternship/apprentice/onthejob training

Procedure:

• A groupofstudentsorevenasinglestudentcouldbeassignedforaparticular habitation orvillage ormunicipalward, asfaras possible,inthe nearvicinity oftheir placeofstay, soastoenablethemtocommutefromtheirresidenceandreturnbackbyeveningorso. • TheCommunityServiceProjectisatwofoldone-

First, the student/scould conduct a survey of the habitation, if necessary, interms of their own domain or subject area. Or it can even be ageneral survey, incorporating all the different areas. A common survey form at could be designed. This should not be viewed as a duplication of work by the village or ward volunt eers, rather, it could be another primary source of data.

> Secondly,thestudent/scouldtakeupasocialactivity,concerningtheirdomainor subjectarea.Thedifferentareas,couldbelike-

- ✤ Agriculture
- Health
- Marketing and Cooperation
- ✤ AnimalHusbandry
- ✤ Horticulture
- Fisheries
- Sericulture
- RevenueandSurvey
- NaturalDisasterManagement
- Irrigation
- Law&Order
- ExciseandProhibition
- MinesandGeology
- Energy
- Internet
- ✤ FreeElectricity
- DrinkingWater

EXPECTED OUTCOMES:

BENEFITSOFCOMMUNITYSERVICEPROJECTTOSTUDENTS:

LearningOutcomes:

- Positiveimpactonstudents'academiclearning
- Improvesstudents'abilitytoapplywhattheyhavelearnedin"therealworld"
- Positiveimpactonacademicoutcomessuchasdemonstratedcomplexityofunderstanding, problem analysis, problem-solving, critical thinking, and cognitive development
- ImprovedabilitytounderstandcomplexityandambiguityPersonalOutcomes
- Greatersenseofpersonalefficacy, personalidentity, spiritual growth, and moral development
- Greaterinterpersonaldevelopment, particularly the ability towork well with others, and build leadership and communication skills Social Outcomes
- Reducedstereotypesandgreaterinter-culturalunderstanding
- Improvedsocialresponsibilityandcitizenshipskills
- GreaterinvolvementincommunityserviceaftergraduationCareerDevelopment
- Connectionswithprofessionalsandcommunitymembersforlearningandcareeropportunities
- Greateracademiclearning, leadershipskills, and personal efficacy can lead to greater Opportunity Relationship with the Institution
- Strongerrelationshipswithfaculty
- Greatersatisfactionwithcollege
- Improvedgraduationrates

BENEFITSOFCOMMUNITYSERVICEPROJECTTOFACULTYMEMBERS:

- Satisfactionwiththequalityofstudentlearning
- Newavenuesforresearchandpublicationvianewrelationshipsbetweenfacultyand community
- Providingnetworkingopportunities with engaged faculty in other disciplines or institutions
- Astrongercommitmenttoone'sresearch

BENEFITSOFCOMMUNITYSERVICEPROJECTTOTHEINSTITUTION:

- Improvedinstitutionalcommitment
- Improvedstudentretention
- Enhancedcommunityrelations

BENEFITSOFCOMMUNITYSERVICEPROJECTTOCOMMUNITY:

- Satisfactionwithstudentparticipation
- Valuablehumanresourcesneededtoachievecommunitygoals
- Newenergy, enthusias mandperspectives applied to community work
- Enhancedcommunity-universityrelations.

RULESFORDISCIPLINARYACTIONFORMALPRACTICE/IMPROPERCONDUCTIN EXAMINATIONS

	NatureofMalpractices/Improper	Punishment			
	Conduct Ifthecandidate				
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager,palmcomputersoranyotherformof 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)	Expulsionfromtheexaminationhalland 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 communicatesthroughcellphoneswithany candidateorpersonsinoroutsidetheexam hall in respect of any matter.	Expulsionfromtheexaminationhalland cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, hewill behandedovertothepoliceandacase is registered against him.			
2.	Hascopiedintheexaminationhall fromany 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.	Expulsionfromtheexaminationhalland cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and projectwork andshall notbepermitted to appear for the remaining examinations of the subjects of that Semester/year. TheHallTicketofthecandidateistobe cancelled.			
3.	Comesinadrunkenconditiontothe examination hall.	Expulsionfromtheexaminationhalland cancellation of the performance in that subjectandallothersubjectsthe candidate has already appeared includingpracticalexaminationsand projectworkandshallnotbepermitted to appear for the remaining examinationsofthesubjectsofthat 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.	Expulsionfromtheexaminationhalland cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and projectwork andshallnotbepermitted 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 regulationsinconnectionwithforfeiture 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.	Expulsionfrom 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 for feiture of seat.
6.	Possessanylethalweaponorfirearminthe examinationhall.	Expulsionfromtheexaminationhall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and projectwork andshall notbe permitted for the remaining examinations of the subjects of that Semester/year. The candidateisalsodebarredandforfeitsof seat.
7.	Impersonates any other candidate in connection with the examination.	Thecandidate whohas impersonated shallbeexpelledfromexaminationhall. The candidate is also debarred and forfeitstheseat.Theperformanceofthe original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) alreadyappearedandshallnotbe allowed toappearforexaminations of the remaining subjects of that semester/year. The candidate is also debarredfortwoconsecutivesemesters fromclassworkandallUniversity examinations.The continuationofthe coursebythecandidateissubjecttothe academicregulationsinconnectionwith forfeiture of seat.If the impostor isan outsider,he willbe handed overto thepoliceandacaseisregistered 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 towalk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of anyinjuryto hisperson ortoanyofhisrelationswhetherbywords, either spoken or written or by signs or by visible representation, assaults the officer-	In case of students of the college, they shallbeexpelledfromexaminationhalls and cancellationoftheir performancein 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 damagetoor destruction orproperty inthe examination hall or any part of the College campus or engages in any other act which intheopinionoftheofficerondutyamounts touseofunfairmeansormisconduct or has the tendency to disrupt theorderlyconductoftheexamination.	them.
9.	Ifstudentofthecollege, whoisnota 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.	Studentofthecollegesexpulsionfrom theexaminationhallandcancellationof the performance in that subject and all othersubjectsthecandidatehasalready appeared including practical examinationsandprojectworkandshall 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 theCollegewillbehandedover topolice and,apolicecasewill be registeredagainstthem.
10.	Uses objectionable, abusive or offensive languageintheanswerpaperorinletters totheexaminersorwritestotheexaminer requesting him to award pass marks.	Cancellationoftheperformanceinthat subject.
11.	Copyingdetectedonthebasisofinternal evidence,suchas,during valuation or during special scrutiny.	Cancellationoftheperformanceinthat subject and all other subjects the candidate has appeared including practicalexaminationsandprojectwork of that semester/year examinations.
12.	Ifanymalpracticeisdetectedwhichisnot covered in the above clauses 1 to 11 shall be reported to the Examination committee for further action to award suitable punishment.	



SRIVENKATESWARA COLLEGEOFENGINEERINGANDTECHNOLOGY (AUTONOMOUS) DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (INTERNET OF THINGS)

Induction Program: 3 weeks (CommonforAllBranchesofEngineering)

Semester-0

Regulations:R20

S.No	Category	Course code	Coursetitle	н	ours wee	ber k	Credits
				L	Т	Р	
1	MC		PhysicalActivitiesSports,Yoga and Meditation, Plantation	0	0	6	0
2	MC		CareerCounselling	2	0	2	0
3	MC		Orientationtoallbranches- -careeroptions,tools,etc.	3	0	0	0
4	EC		OrientationonadmittedBranch corresponding labs, tools andplatforms	2	0	3	0
	ES		ProficiencyModules&Productivity Tools	2	1	2	0
5	MC		Assessmentonbasicaptitude and mathematical skills	2	0	3	0
6	MC		RemedialTraininginFoundation Courses	2	1	2	0
7	MC		HumanValues&Professional Ethics	3	0	0	0
8	BS		CommunicationSkillsfocuson Listening, Speaking, Reading, Writing skills	2	1	2	0
9	ES		ConceptsofProgramming	2	0	2	0
	Total 20 3 22 0						



SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (AUTONOMOUS) DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (INTERNET OF THINGS)

Course Structure & Scheme of Examination

	IB.TechISemester-CSE(IOT)					ulati	ons:R20			
S.No	Category	Course Code	CourseTitle	Hoursper week		Credits	Scheme of Examination Max. Marks			
				L	Т	Ρ		CIA	SEE	Total
1	BS	20AHS02	DifferentialEquationsand Multivariablecalculus	3	1	0	3	40	60	100
2	BS	20AHS04	EngineeringPhysics	3	0	0	3	40	60	100
3	ES	20ACS01	CProgrammingand Data Structures	3	1	0	3	40	60	100
4	ES	20AME01	ComputerAidedEngineering Drawing	1	0	4	3	40	60	100
5	ES	20ACS02	ComputationalThinking	3	0	0	3	40	60	100
6	BS	20AHS07	EngineeringPhysicsLab	0	0	3	1.5	40	60	100
7	ES	20ACS03	CProgrammingand Data StructuresLab	0	0	3	1.5	40	60	100
8	ES	20AME02	EngineeringPracticeLab	0	0	3	1.5	40	60	100
9	MC	20AHS09	EnvironmentalSciences	2	0	0	-	100	00	100
TOTAL		L	15	2	13	19.5	420	480	900	

IB.TechIISemester-CSE(IOT) Regulations:R20

S.No	Category	Course code	Coursetitle	Hoursper week			Credits	SchemeofExamination Max. Marks		
				L	Т	Ρ		CIA	SEE	Total
1	HS	20AHS01	CommunicativeEnglish	3	0	0	3	40	60	100
2	BS	20AHS03	EngineeringChemistry	3	0	0	3	40	60	100
3	BS	20AHS08	AlgebraandTransformation Techniques	3	1	0	3	40	60	100
4	ES	20AEE05	BasicElectricalEngineering	3	1	0	3	40	60	100
5	ES	20ACS04	Problem Solving and ProgrammingusingPython	3	1	0	3	40	60	100
6	HS	20AHS05	CommunicativeEnglishLab	0	0	3	1.5	40	60	100
7	ES	20ACS05	Problem Solving and ProgrammingusingPython Lab	0	0	3	1.5	40	60	100
8	BS	20AHS06	EngineeringChemistryLab	0	0	3	1.5	40	60	100
9	MC	20AMB01	DesignThinking	2	0	0	-	100	00	100
10			NSS/NCC	0	0	2	-			
TOTAL				19	3	9	19.5	420	480	900
IIB.TechISemester-CSE(IOT)

Regulations:R20

S.NO	Category	Course code	CourseTitle	H	lourspo week	er	Credits	redits Scheme of Examination Max. Marks			
				L	Т	Р		CIA	SEE	Total	
1	BS	20AHS10	NumericalMethods	3	0	0	3	40	60	100	
2	PC	20ACS06	ComputerOrganizationand Architecture	3	0	0	3	40	60	100	
3	PC	20ACS07	ObjectOrientedprogramming through JAVA	3	0	0	3	40	60	100	
4	PC	20AIT01	Automata&CompilerDesign	3	0	0	3	40	60	100	
5	PC	20ACS08	Relational Database ManagementSystems	3	0	0	3	40	60	100	
6	PCLAB	20ACS09	ObjectOrientedProgramming through JAVALab	0	0	3	1.5	40	60	100	
7	PCLAB	20AIT02	Automata&CompilerDesignLab	0	0	3	1.5	40	60	100	
8	PCLAB	20ACS10	Relational Database ManagementSystemsLab	0	0	3	1.5	40	60	100	
9	SC	20ACS11	AndroidApplicationDevelopment	1	0	2	2	40	60	100	
10	MC	20AMB02	UniversalHumanValues-I	2	0	0-	Non- credit	100	00	100	
11	AC	20AHS11	QuantitativeAptitudeand Reasoning-I	2	0	0	Non- credit	-	-	-	
12	20ANSS1/2 0ANCC1	NSS/NCC		0	0	2	Non- credit	-	-	-	
TOTAL				20	00	13	21.5	460	540	1000	

II B.TechIISemesterCSE(IOT)

Regulations:R20

S.NO	Category	Course	CourseTitle	Hoursper week			Credits	Scheme of Examination Max. Marks			
		66		L	т	Р		CIA	SEE	Total	
1	BS	20AHS13	ProbabilityandStatistics	3	0	0	3	40	60	100	
2	ES	20AHS14	DiscreteStructuresandGraph Theory	3	0	0	3	40	60	100	
3	PC	20ACS12	DesignandAnalysisof Algorithms	3	0	0	3	40	60	100	
4	PC	20ACS13	OperatingSystems	3	0	0	3	40	60	100	
5	PC	20AIT04	SoftwareEngineering	3	0	0	3	40	60	100	
6	ES/PCLAB	20ACS14	DesignandAnalysisof Algorithms lab	0	0	3	1.5	40	60	100	
7	PCLAB	20ACS15	OperatingSystemsLab	0	0	3	1.5	40	60	100	
8	PCLAB	20AIT05	SoftwareEngineeringLab	0	0	3	1.5	40	60	100	
9	SC	20ACO01	UIdesign-Flutter	1	0	2	2	40	60	100	
10	AC	20AHS15	QuantitativeAptitudeand Reasoning -II	2	0	0	Non- credit	-	-	-	
TOTAL				18	00	11	21.5	360	540	900	
Honor	Degreehoursdi	stribution 4-0-	0-4								
${\sf MinorGeneralDegreehours distribution } \textbf{3-0-2-4} and {\sf MinorIndustrialRelevantTrackDegreehours distribution} and {\sf MinorGeneralDegreehours distribut$								4-0-0-	4		

Internship2Months(Mandatory)duringsummervacation/Community Serviceproject

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (AUTONOMOUS) DEPARTMENTOFCOMPUTERSCIENCEANDENGINEERING (INTERNET OF THINGS)

Course Structure & Scheme of Examination

III B.Tech. I Semester CSE (IOT)

Regulations:R20

S.NO	NO Category Course CourseTitle		H	oursp wee	er k	Credits	Schemeof Examination Max. Marks			
				L	Т	Ρ		CIA	SEE	Total
1	HSS	20AMB03	ManagerialEconomicsand Financial Analysis	3	0	0	3	40	60	100
2	PC	20ACS16	WebTechnologies	3	0	0	3	40	60	100
3	PC	20ACS17	ComputerNetworks	3	0	0	3	40	60	100
		Professional	ElectiveCourses-I							
		20ACO02	Sensorsand Actuators							
		20AIT13	SoftwareProjectManagement							
4	PE	20ACO03	DataScienceforEngineers	3	0	0	3	40	60	100
		20ACS21	ComputerGraphics							
		20ACO04	IoTAutomation							
		OpenElective	e/JobOrientedElective-I							
		20AEC31	DigitalLogicDesign							
		20AME18	RoboticsandArtificial intelligence							
5	OE/JOE	DE 20ACE35 IntegratedWasteManagement for Smart City	3	0	0	3	40	60	100	
		20ACS23	SocialNetworkAnalysis							
		20ACS24	Kivy-InteractiveApplications and Games in Python							
6	PCLAB	20ACS25	WebTechnologiesLab	0	0	З	1.5	40	60	100
7	PCLAB	20ACS26	ComputerNetworksLab	0	0	3	1.5	40	60	100
8	SC	20ACD22	Shellprogramming	1	0	2	2	40	60	100
9	MC	20AHS21	IndianConstitution	2	0	0	-	100	00	100
10	AC	20AHS17	QuantitativeAptitudeand Reasoning -III	2	0	0	-	-	-	-
		20AHS18	FrenchLanguage							
11	AC	20AHS19	GermanLanguage	2	0	0	-	-	-	-
		20AHS20	JapaneseLanguage							
12 20ACO05/20ACO06 SummerInternship/Community Service Project		0	0	0	1.5	40	60	100		
TOTAL			22	00	8	21.5	460	540	1000	
Honor	Degreehourso	listribution 3-1-	0-4							
MinorG	eneralDegree	hoursdistributio	n 3-0-2-4 andMinorIndustrialReleva	ntTrac	kDegr	eehou	ursdistributi	on	3-	1-0-4

III B.Tech, IISemester-CSE(IOT)

Regulations:R20

S.NO	Category	Course code	CourseTitle	H	oursp weel	er	Credits	Scheme of Examination Max. Marks			
				L	т	Р		CIA	SEE	Total	
1	PC	20ACO07	IoTcommunicationProtocol	3	0	0	3	40	60	100	
2	PC	20ACO08	ComputerVisionand Robotics	3	0	0	3	40	60	100	
3	PC	20ACO09	ProgrammingforIoTBoards	3	0	0	3	40	60	100	
		Professional	ElectiveCourses-II								
		20ACO10	ArchitectingSmartIoTDevices								
		20ACO11	SoftwareTestingMethodologies								
4	PE	20ACO12	DataAnalyticsfor IoT	3 (0	3	40	60	100	
		20ACO13	WirelessNetworks								
		20ACO14	MobileApplicationDevelopment for IoT								
		OpenElective	e/JobOrientedElective-II								
		20ACE36	DisasterManagement								
5	0E/10E	20AMB09	IntellectualPropertyRights	з	0	0	З	40	60	100	
5	02,502	20AME31	OperationsResearch	5	0	Ū	5			100	
		20ACM13	BusinessIntelligence								
		20ACS34	MachineLearning								
6	PCLAB	20ACO15	IoTcommunicationProtocol Lab	0	0	3	1.5	40	60	100	
7	PCLAB	20ACO16	ComputerVisionandRoboticsLab	0	0	3	1.5	40	60	100	
8	PCLAB	20AC017	ProgrammingforIoTBoardsLab	0	0	3	1.5	40	60	100	
9	SC	20AHS16	AdvancedEnglishCommunication skills	1	0	2	2	40	60	100	
10	MC	20AHS23	EssenceofIndianTraditional Knowledge	2	0	0	-	100	-	100	
	TOTAL			18	0	11	21.5	460	540	1000	
HonorDegreehoursdistribution3-1-0-4											
MinorG	eneralDegreel	hoursdistributio	n3-0-2-4andMinorIndustrialRelevantT	rackDe	greeho	oursdis	tribution		3-1-0-	4	
Industr	ial/ResearchInt	ternship(Mandato	ry)2Monthsduringsummervacation(tobeev	aluatedo	luringI	Vyear,	(Sem)				

IV B.Tech.I Semester CSE(IOT)

Regulations: R20

				Pe	riods n	per		Scheme of Examination		
S.No	Category	Course code	Course Title		week		Credits		Examina Max.Ma	tion rks
				L	Т	Ρ		CIA	SEE	Total
		Humanities an	d social science Elective							
		20AMB04	Creativity and Innovation							
		20AMB05	Leadership Essentials							
1	H &SSE	20AMB06	Law for Engineers	3	0	0	3	40	60	100
		20AMB07	Entrepreneurship Essentials							
		20AMB08	Essential of Management							
		Professional El	ective Courses-III							
		20ACO18		-						
		2040010	Software Configuration							
2	PF	20AC019	Management	3	0	0	з	40	60	100
		20ACO20	Cloud Computing and Virtualization		Ū	Ŭ	5	40	00	100
		20ACO21	Ad-hoc & Sensor Networks							
		20ACO22	Application of IoT in Robotics							
		Professional El	ective Courses-IV							
		20AECB7	Embedded Hardware Design							
3		20ACO23	Embedded Software Design				_			
5	PE	20ACM10	Augmented Reality& Virtual Reality	3	0	0	3	40	60	100
		20ACO24	Distributed Systems							
		20ACO25	Industrial IoT							
		Professional El	lective Courses-V							
		20AEEB8	Energy Sources and Power							
4		2040026	Management	-						
4	PE	20ACO20	Light weight Cryptography	3	0	0	3	40	60	100
		20ACO27	IoT Edge Computing	-						
		20ACO28	5G & IoT Technologies	-						
		20ACO29	Security & Privacy in IoT							
				_						
		20AI147	Mobile Computing in IoT							
	05/105	20AMB10	Industrial Marketing		0	_	2	40	60	100
5	OE/JOE	20AME54	Optimization Techniques	3	0	0	3	40	60	100
		20ACM26	Machine Learning Tools and Techniques							
		20ACS47	NoSQL Databases	-						
		Open Elective/	Job Oriented Elective-IV							
		20AEC51	Digital Image Processing							
6		20AMB11	Social Media Marketing							
Ű	OE/JOE	20AME20	Total Quality Management and Reliability Engineering	3	0	0	3	40	60	100
		20ACS48	Virtual Reality							
		20ACS49	DevOps							
7	SC	20ACS50	Source code management using Git and Github	1	0	2	2	40	60	100
8	MC	20AMB12	Professional Ethics	2	0	2	-	100	0	100
9	20AC031	•	Industrial/Research Internshin	0	0	0	3	40	60	100
	1	τοται		21	00	4	23	420	480	900
Honor	Degreehoursdist	ribution3 -1-0-4		1	1	I			ļ	
MinorG	eneralDegreehou	Irsdistribution3-0-	2-4 andMinorIndustrialRelevantTr	ackDec	Ireehou	rsdie	tribution		3 -1-0-4	
						. 5015				

IV B.Tech., II Semester CSE(IOT)

Regulations: R20

S.NO	Category	Course code	Course Title	Hours per week			urs per week Credits		Scheme of Examination Max. Marks			
				L	Т	Р		CIA	SEE	Total		
1	Major Project	20ACO31	Project work, Seminar and Internship in Industry	0	0	24	12	40	60	100		
	INTERNSHIP(6	MONTHS)										
TOTAL									12			

1.<u>HONORSDEGREE</u>:Studentshastoacquire20creditswith minimumonesubject fromeachpool@4 credits per subject.

Semester	Course Code	CourseName	L	Т	Р	С	PRE-REQ	Offering Department
	r		1	r —	1	1	Γ	r
	20ACS53	RealTimeSystems	3	1	0	4	NIL	CSE
11-11	20ACS54	SoftComputingandNeural Networks	3	1	0	4	NIL	CSE
H - H	20ACS55	AdvancedDatabases	3	1	0	4	NIL	CSE
	20ACS56	NaturalLanguageProcessing	3	1	0	4	NIL	CSE
	1			1	r	1		1
III-I	20ACS57	SentimentAnalysis	3	1	0	4	DWDM	CSE
(Any1	20ACS58	CyberSecurityEssentials	3	1	0	4	NIL	CSE
Course from	20ACS59	SecurityofCyber-Physical Systems	3	1	0	4	Statistics	CSE
POOL-II)	20ACS60	Internetworking withTCP/IP	3	1	0	4	Computer Networks	CSE
						•		
	20ACS61	RegressionModelling Strategies	3	1	0	4	Artificial Intelligence	CSE
	20ACS62	SecureCoding	3	1	0	4	Programming language	CSE
Course from	20ACS63	UbiquitousSensing, Computing and Communication	3	1	0	4	NIL	CSE
	20ACS64	Storage AreaNetworks	3	1	0	4	Computer networks	CSE
						•		
Ш-П	20ACS65	FuzzyLogic And KnowledgeBased Systems	3	1	0	4	Artificial Intelligence	CSE
(Any1 Course	20ACS66	VulnerabilityAssessment& Penetration Testing	3	1	0	4	Testing	CSE
from POOL-IV)	20ACS67	SpeechProcessing	3	1	0	4	Image Processing	CSE
	20ACS68	NetworkingEssentials	3	1	0	4	Computer networks	CSE
IV-I	20ACS69	NeuralNetwork	3	1	0	4	Machine	CSE
(Any1 Course	20ACS70	MalwareAnalysis	3	1	0	4	Security	CSE
from POOL-IV)	20ACS71	AdvancedComputerVision	3	1	0	4	Computer Vision	CSE
,	20ACS72	HighPerformance Computing	3	1	0	4	Computer networks	CSE

1. MinorDegree(IndustryrelevantTrack)AstudentcanoptFivesubjectsfromeachtrack@4credits per subject(offered to CSEonly)

BLOCKCHAIN

S.NO	Year & Sem	Course code	Subject	L	Т	Р	С	PRE-REQ	Offering Department
1	II-II	20ACS73	FundamentalsofBlockchain	3	1	0	4	Basics of cryptography	CSE
2	III-I	20ACS74	SmartContractsandSolidity	3	1	0	4	Fundamentals ofblockchain and Programming concepts	CSE
3	III-II	20ACS75	BlockchainPlatformsand Usecases	3	1	0	4	NIL	CSE
4	III-II	20ACS76	BlockchainSecurityand Performance	3	1	0	4	Security Concepts	CSE
5	IV-I	20ACS77	BlockchainandFinTech	3	3 1		4	NIL	CSE
			Total	Total					

DATASCIENCE

S.NO	Year & Sem	Course code	Subject	L	Т	Р	С	PRE-REQ	Offering Department
1	II-II	20ACD05	DataAnalytics	3	1	0	4	Python, DWDM	CSE
2	III-I	20ACD09	DistributedDatabase and Information Systems	3	1	0	4	Mathematics, statistics,Basicsof programming Knowledge	CSE
3	Ш-П	20ACD16	DataCentreand Networking Technologies	3	1	0	4	ComputerNetwork	CSE
4	Ш-П	20ACD18	Introductiontomachine learning: supervised learning	3	1	0	4	DWDM	CSE
5	IV-I	20ACD31	TextAnalytics	3	1	0	4	DWDM	CSE
			Total	•	20				

WEBDESIGNING

S.NO	Year & Sem	Course code	Subject	L	Т	Р	С	PRE-REQ	Offering Department
1	II-II	20ACS78	HTML5&CSS3	3	1	0	4	NIL	CSE
2	III-I	20ACS79	Web Application Developmentwith PHP	3	1	0	4	HTML5&CSS3	CSE
3	III-II	20ACS80	DjangoFramework	3	1	0	4	Python	CSE
4	III-II	20ACS81	FullstackReact	3	1	0	4	WebTechnologies	CSE
5	IV-I	20ACS82	Fullstack Developmentusing Node.js,Typescript	3	1	0	4	HTML5,PHP,JAVASCRIPT	CSE
			Total				20		

CYBERSECURITY

S.N O	Year & Sem	Course code	Subject	L	Т	Р	С	PRE-REQ	Offering Department
1	II-II	20ACS83	InformationTheory forCyberSecurity	3	1	0	4	CNS	CSE
2	III-I	20ACS84	Steganographyand Digital Watermarking	3	1	0	4	cryptography	CSE
3	III-II	20ACS85	SecurityPolicyand Governance	3	1	0	4	cryptography	CSE
4	111-11	20ACS86	Security Assessmentand Risk Analysis	3	1	0	4	SE,CRYPTOGRAPHY	CSE
5	IV-I	20ACS87	DatabaseSecurity andAccessControl	3	1	0	4	DBMS	CSE
			Total				20		

<u>MinorDegree:</u>astudenthastoearn20extracredits(BystudyingFIVEtheory andFIVELaboratory courses@ 4 credits)

S.NO	Year & Sem	Course Code	NameoftheSubjectandLab	L	Т	Р	С	Offering Department
1	п-п	20ACS88	OperatingsystemandSystem Programming	3	0	2	4	CSE
2	III-I	20ACS89	DatabaseManagementSystem	3	0	2	4	CSE
3	шп	20ACS90	RProgramming	3	0	2	4	CSE
4	111-11	20ACS91	JAVAprogramming	3	0	2	4	CSE
5	IV-I	20ACS92	AppDevelopmentUsing Android	3	0	2	4	CSE
		•	•		20			

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

Т Р L 20AHS02DIFFERENTIALEQUATIONSANDMULTIVARIABLECALCULUS

CourseOutcomes:

Aftersuccessfulcompletionofthecourse, the student will be able to

- 1. Classifyandinterpretthesolutionofordinarydifferentialequations.
- 2. Apply the principles of differential equations to the engineering and scientific problems.
- 3. Analyzethemaximaandminimaoffunctionsoftwoormorevariables.
- 4. Evaluatethedoubleandtripleintegraltofindsurfaceareaandvolumes.
- 5. Compute the derivatives and line integrals of vector functions and learn their applications.

UNIT-I DIFFERENTIALEQUATIONS:Exact differentialEquations -Linear DifferentialEquations -Bernoulli's Equations - Non-homogenousLinear Differentialequationofsecond and higher order with constant coefficients with R.H.S terms of the form e^{ax} , Sinax, Cosax, x^m , $e^{ax}V(x)$, $x^m V(x)$ and xV(x).

UNIT-II

9 Hours

APPLICATIONSOFDIFFERENTIALEQUATIONS: Orthogonal Trajectories (Cartesian andpolarforms)-Newton'slawofcooling-LawofnaturalGrowthandDecay-L-R-Ccircuits, Bending of beams- Mass spring System

UNIT-III

FUNCTIONSOFSEVERALVARIABLES: Partial derivatives-chainrule-Total derivative. Jocobian-Maxima and Minima for functions of two variables - Lagrange's method of multipliers of three variables only.

UNIT-IV

APPLICATIONSOFINTEGRATION:Lengthofanarcandareausingintegral.

MultipleIntegrals:DoubleandTripleIntegrals-Changeofvariables-Changeoforderof Integration (Cartesian and polar forms). Surface area and Volume of solid of revolution.

9 Hours

9 Hours

9 Hours

С 3 1 0 3

UNIT-V

9 Hours

VECTOR CALCULUS: Gradient, Divergence, Curl and their properties (withoutidentities). **Vector Integration**:LineIntegrals–Potentialfunctions–Area,SurfaceandVolumeintegrals–Green'stheorem-Stoke's theorem& Gauss Divergence theorems (without proof) – problems on Green's, Stoke's and Gauss's Theorem.

TextBooks:

- 1. HigherEngineeringMathematics,Dr.B.S.Grewal,KannaPublications,40thedition.
- 2. AText bookofEngineeringMathematics –I, T.K.V. Iyengar, B.KrishnaGandhiandothers, S.

Chand and company.

ReferenceBooks:

- 1. ErwinKreyszig, AdvancedEngineeringMathematics.JohnWiley&Sons.2016
- 2. Thomson, AText book of Engineering Mathematics, Book Collection
- 3. B.V.Ramana, ATextbook of Engineering Mathematics-I, TataMcGrawhill.

Mapping:

	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										
Levelof correlation	3	2		2										

3-HighMapping

2-MediumMapping

SRIVENKATESWARACOLLEGEOFENGINEERING&TECHNOLOGY (AUTONOMOUS) IB.TechISemester(CommontoEEE,CSE, IT,CSE(DS)&CSE(AI&ML)) I B.Tech II Semester (Common to CE, ME, ECE, CAI, CSC & CSO)

20AHS04	ENGINEERINGPHYSICS	L	Т	Р	С
CourseOutcomes:		3	0	0	3
Aftersuccessfulcompletionof	thecourse, the student will be able to				

• Demonstratestrongfundamentalknowledgeinoptic, lasers and optical fibers.

- o Comprehendand applyquantummechanicalprinciplestowardsthefree electrontheory.
- $\circ \quad Learnabout the crystal structure, magnetic materials, semiconductors, superconductors$
- o andtheirapplications.
- Proposepreparation methods fordifferent nanomaterials and relate structureofNanomaterials with their property.

UNIT-I

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

LASERS&FIBEROPTICS

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

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 - Crystalsystems –Bravais Lattice-StructureandpackingfractionofSimplecubicandbodycenteredcubic-MillerIndices-Bragg's

9 Hours

9Hours

9 Hours

law-X-raydiffractionbypowder 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

SEMICONDUCTORS&SUPERCONDUCTORS

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

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

UNIT-V

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 -Typesofnanomaterials -BallMilling-Chemical vapor deposition - Properties of nanomaterials, Optical and magnetic – application of Nano materials.

TextBooks:

- 1. EngineeringPhysics,ThyagarajanK,TataMcgrawHillPublishers,NewDelhi,2013.
- 2. ATextbookofEngineeringPhysics,AvadhanuluandKshirasagar,RevisedEdition,S.Chand,New Delhi, 2014.
- 3. GaurRKandGuptaSL,EngineeringPhysics,DhanpatRaiPublications,NewDelhi,2010.

ReferenceBooks:

- 1. SolidStatePhysics,Pillai.S.O,NewAgeInternational,NewDelhi,2005.
- 2. IntroductiontoNanoscienceandTechnology,ChattapadhyayK.K,BanerjeeA.N,New Delhi.
- 3. EngineeringPhysics, VijayakumaraK,S.Chand&CompanyLtd.,NewDelhi.

9Hours

9Hours

	N	1appi	ng:												
		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 correlati on		3	2		1	1									

3-HighMapping

2-MediumMapping

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (Autonomous)

IB.Tech ISemester(Commontoallbranches) **CPROGRAMMING&DATASTRUCTURES 20ACS01** L Т P C 3 1 0

CourseOutcomes:

AfterCompletionofthecoursethestudentwillbeableto

- 1. AnalyzethebasicconceptsofCProgramminglanguage.
- 2. DesignapplicationsinC, using functions, arrays, pointers and structures.
- 3. ApplytheconceptsofStacks andQueuesinsolvingtheproblems.
- 4. ExplorevariousoperationsonLinkedlists.
- 5. Demonstratevarioustreetraversalsandgraphtraversaltechniques.
- 6. Designsearchingandsortingmethods

UNIT-1

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-2

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 Multidimensional arrays, Strings: Defining and Initialization of Strings, NULL character, Reading and Writing a string, Processing the string, String handling functions.

UNIT-3

Pointers: Fundamentals, Pointer declarations, Pointers and One-dimensional array, Dynamic memory allocation, Operations on pointers, Structures and Unions: Declaration, Definition and Initialization of structures, Accessing structures, User defineddata type(typedef), EnumeratedData types, Nestedstructures, Array of structures, Structures and pointers, Passing structures to functions, Unions.

UNIT-4

DataStructures: Overview of data structures, stacks and queues, representation of a stack, operations on a stack, implementationofa stack, evaluation of arithmetic expressions, infix, prefix, and postfix notations, evaluation of postfix expression, conversionofexpressionfrominfixtopostfix, recursion, queues-various positions of queue, representation of

10hrs

8 hrs

10Hrs

7 hrs

3

queue, insertion, deletion, searching operations.

Linked Lists – Singly linked list, dynamically linked stacks and queues, polynomials using singly linked lists, using circularlylinkedlists,insertion,deletionandsearchingoperations,doublylinkedlistsanditsoperations,circularlinkedlists and its operations.

UNIT-5

9 hrs

Trees - Tree terminology, Binary trees, representation, binary tree traversals. Binary tree operations, Graphs - graph terminology, graphrepresentation, elementary graphoperations, BreadthFirstSearch(BFS) and DepthFirstSearch(DFS), connected components, spanning trees.

Searching and Sorting - sequential search, binary search, exchange (bubble) sort, selections ort, Insertions ort.

TextBooks:

- 1. BehrouzA.Forouzan, RichardF.Gilberg, CProgramming & DataStructures ||, IndiaEdition, Course Technology, 2010.
- 2. TheCProgrammingLanguage, BrianWKernighanandDennisMRitchie,SecondEdition,PrenticeHall Publication.
- $3. \ \ Fundamentals of Data Structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Computer Science Press.$
- 4. ProgramminginCandDataStructures,J.R.Hanly,AshokN.KamthaneandA.AnandaRao,PearsonEducation.
- B.A. ForouzonandR.F. Gilberg, "COMPUTERSCIENCE:AStructuredProgrammingApproachUsingC", Third edition, CENGAGE Learning, 2016.
- RichardF.Gilberg&BehrouzA.Forouzan, "DataStructures:APseudocodeApproachwithC", SecondEdition, CENGAGE Learning, 2011.

ReferenceBooks:

- 1. PradipDeyandManasGhosh,ProgramminginC,OxfordUniversityPress,2ndEdition2011.
- 2. E.Balaguruswamy, "CandDataStructures", 4thEdition, TataMcGrawHill.
- 3. A.K.Sharma, ComputerFundamentalsandProgramminginC, 2ndEdition, UniversityPress.
- 4. M.T.Somashekara, "ProblemSolvingUsingC", PHI, 2ndEdition2009.

Ma	pping	g:												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1 1	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-Highmapping

2-MediumMapping 1-LowMapping

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (AUTONOMOUS)

IB.TechISemester(CommontoEEE,CSE,IT,CSE(DS)&CSE(AI&ML)) I B.Tech II Semester (Common toCE, ME & ECE, CSO, CAI, CSC)

20 A	ME01	COMPUTERAIDEDENGINEERINGDRAWING	L	Т	Р	С
			1	0	4	3
Cou	rseOutcomess:					
Afte	rcompletionofthisco	urse, the student will be able to				
1.	Communicateidea	seffectivelybyusingAutoCAD software.				
2.	Projectthepoints,l	nes,planes,solidswithdigitalenvironment				

- 3. Representsectionalviewsofsolidsanddevelopthesectionedobject surfaces.
- 4. CommunicateideaseffectivelybyusingOrthographicProjectionsandIsometricViews

using computer software.

UNIT:I

Geometrical constructions of polygons (inscribing, circumscribing), special methods circle-tangents,

Conics-ellipse, parabola, hyperbola-properties of conics, special methods of construction.

UNIT:II

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

UNIT:III

Projectionsofplanes inclinedtoboththeprincipalplanes.Projectionofregularsolidsprisms,Pyramids, cylinders, tetrahedron and cones axis inclined to one plane.

UNIT:IV

Sectionsofsolidssuchasprisms, pyramids, cylinders, tetrahedronandcones (solids insimple position) True shape of the section.Development of surfaces of simple solids, as above and part solids.

10hours

10hours

10hours

10hours

UNIT:V

10hours

Principlesofisometricprojectionisometricscaleisometricprojectionofplanesandsolidsconversion of orthographic views into isometric views and vice-versa. Practice:

- 1. Geometrical constructions:
- a)Sketchingofpolygons-Triangles,Square,Rectangle,Pentagon,Hexagon,Circleatdifferent positions.
- SketchingofTangentstothecircles
- 2. Conics:
- ConstructionsofEllipse, Parabola, Hyperbola 3. Points:
- Drawing the quadrants and positioning of the points with reference to H. Pand V. Pwith dimensions.
- 4.Lines:
- Sketchingoflines when heyare
- 1. ParalleltobothH.P&V.P
- 2. ParalleltoV.P/H.PandperpendiculartoH.P/V.P
- 3. ParalleltoV.P/H.PandinclinedtoH.P/V.P
- 4. Inclined to both the planes
- a) Sketchingofthelinetomeasure truelength & true inclinations
- b) Sketchingofthelinetodeterminethetraces 5

Planes:

- Sketchingofthe planes when heyare
- a) PerpendiculartoV.P/H.PandparalleltoH.P/V.P
- b) InclinedtoV.P/H.PandperpendiculartoH.P/V.P
- c) PerpendiculartobothV.PandH.P.
- d) InclinedtobothV.PandH.P.
- 6 Solids:
- a) Sketchingof2Dshapesandconvertitto3Dsolids(Prisms, Pyramids, cube,cylinder,one, tetrahedron)

- b) Sketchingofprojectionsofsolidswhenthepositionofaxisis
 - i. PerpendiculartoV.P/H.PandparalleltoH.P/V.P.
 - ii. InclinedtoV.P/H.PandparalleltoH.P/V.P.
 - iii. ParalleltobothV.PandH.P.
- 7. Sectionsofsolids:
 - a) Differenttypesofhatchingonthepolygons.
 - b) Sketchingofsectionsofsolidswhenthesection/cuttingplaneis
 - i. ParalleltoV.P/H.PandperpendiculartoH.P/V.P.
 - ii. InclinedtoV.P/H.Pandperpendicularto H.P/V.P.
 - iii. Perpendicular tobothprincipalplanes.
 - c)Sketchingof sections when the cuttingplane passingthrough differentpositions-base, axis, corner, apex /vertex, generator, lateraledge.
- Sketchingoftrueshapes
- 8 Developmentofsurfaces:

Sketchingofdevelopedsurfacesof

- a) cylinder, prisms using parallelline method
- b) cone, pyramidsusingradiallinemethod
- c) truncatedsolidsandfrustum
- 9. Orthographic Projections:
- Sketchingof2D viewsoffront,topandsideviewsof3Dobjects.
- 10. Isometricprojections:
 - a) Settingofisometricgrid
 - b) Sketchingofisometricviewsof3Dmodels/shapes.

TextBook(s)

- 1. K.L.NarayanaandS.Bheemanjaneyulu,EngineeringDrawingwithAutoCAD2016,NewAge Publishers,NewDelhi,2017
- 2 BasantAgrawalandC.M.Agrawal,EngineeringDrawing,McGrawHillEducation2ndedition.

ReferenceBooks

K. Venugopal, Engineering Drawing and Graphics + AutoCad, NewAgeInternational (P) Ltd,

1 Publishers,NewDelhi,FourthEdition

SiddiqueeArshad.N.,ZahidA.Khan,MukhtarAhmad,EngineeringDrawing:

2 WithprimeronAUTOCAD,PHILearningPvt.Ltd.,

	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 correlati on	3	3	3		3				3	3				
3-H	ighm	appi	ng		2-M	ediur	nMap	ping		1-l	.owMa	apping	l	

Mapping:

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (Autonomous)

IB.TechISemester(CommontoCSE,IT,CSE(DS),CSE(AI&ML),CSC,CSO,CAI)

20ACS02	COMPUTATIONALTHINKING	L	Т	Р	С
		3	0	0	3

CourseOutcomes:

Attheendofthecoursethestudentwillbeableto:

1. UnderstandthecomputationalthinkingandMoore'slaw.

2. UnderstandtheBooleanlogicandapplicationsofpropositionallogic.

3. Applyactions and data organizations in real time applications.

4. Analyzesoftwarecorrection,testingandperformancemeasureusingcomputer.

UNIT-I

Computer, computerscience and computational thinking, From Abacustomachine, 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

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

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

UNIT-IV

vonNeumannArchitecture,Spreadsheets-Spreadsheetstructure,Formulas/Expressions,,TextProcessing-string basics, string operation, Patterns-how to write a pattern, Repetitions rules, character class rules

UNIT-V

Computer errors, software corrections, verification, software testing, white box testing, black box testing, boundaryvalueanalysis, Howiscapacitymeasured incomputer, an estimate of physical limitation, benchmarks, counting the performance, impractical algorithm, impossible algorithms

8 hrs

9 hrs

8 hrs

8 hrs

7 hrs

TextBooks:

1.Computationalthinkingformodernsolver, DavidRileyandKennyHuntChapman &Hall/CRC, 2014

ReferenceBooks:

1.HowtosolveitbyComputer,R.G.Dromey,PHI,2008

Mapping:

	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
Levelof Correlation	3	3	1	3									3	2

3-Highmapping

2-MediumMapping

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (AUTONOMOUS)

IB.TechISemester(CommontoEEE, CSE,IT, CSE(DS)&CSE(AI&ML) I B.Tech II Semester (Common to CE, ME & ECE)

20AHS07	ENGINEERINGPHYSICSLAB	L	Т	Р	С
		0	0	3	1.5

CourseOutcomes:

Aftercompletion of practical, student will be able to

- $1. \ Explore the knowledge of Spectrometer and other optical instruments.$
- 2. Applyconceptsofmagneticmaterials, lasers, semiconductor, and it's their relative parameters.
- 3. Access, process and analyses cientific information of optical communication.

Minimum of 10 experiments to be conducted during the academic year

- 1. Determinethewavelengthsofgivenlight source-Spectrometer.
- 2. Dispersivepowerofprism.
- 3. Determinethethickness ofthinwirebyInterference.
- 4. Determinethewavelengthofgivenlasersource-Diffractiongrating.
- 5. Determinetheradiusofcurvatureofgivenpiano convexlensbyformingNewtonRings.
- 6. Magneticfieldalongtheaxisofacurrentcarryingcoll-StewartandGee'smethod.
- 7. NumericalApertureofanopticalfiber.
- 8. BendinglossesInOpticalFiber.
- 9. DeterminethewavelengthofLasersourceusingopticalfiber.
- 10. DetermineHallCoefficientandCarrierconcentrationofthegivenSemiconductor.
- 11. Determine the energy loss offerromagnetic sample by plotting B-Hcurve.
- 12. Energygapofagivensemiconductor.
- 13. SolarCell: TostudytheV-ICharacteristicsofsolarcell.
- 14. Determinetheparticlesizeusinglasersource.

Ma	ap	pir	ng:
í.			-

	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									
Levelof correlation	3	1			2									

3-HighMapping

2-MediumMapping

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (Autonomous) IB.TechISemester(CommontoAllBranches)

20ACS03	C-PROGRAMMING&DATASTRUCTURESLAB	L	Т	Р	С
		0	0	3	1.5

CourseOutcomes:

 $\label{eq:completion} After completion of the course the student will be able to$

- $1. \ Demonstrate basic concepts of Cprogramming language.$
- $2. \ \ Develop C program susing functions, arrays, structures and pointers.$
- 3. ApplytheconceptsStacksandQueuesusingC Programming.
- 4. IlustrateoperationsonLinkedlists.
- 5. Developsearchingandsortingmethods.

Weekl

- a) ProgramsusingI/Ostatementsandexpressions.
- b) Programsusingdecision-makingconstructs.

Week2

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

- i) To findthefactorialofagiveninteger.
- ii) TosolveTowersofHanoiproblem.

Week3

- a) WriteaCprogramtofindboththelargestandsmallest numberinalistofintegers.
- b) WriteaCprogramthatusesfunctionstoperformthefollowing:i) AdditionofTwoMatricesii)MultiplicationofTwoMatrices

Week4

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

- i) Toinsertasub-stringintoagivenmainstringfromagivenposition.
- ii) Givenastring—a\$bcd./fg|finditsreversewithout changingthepositionofspecial characters. (Example input:a@gh%;j and output:j@hg%;a)

Week5

 $\label{eq:resonance} From a given paragraph perform the following using built-infunctions:$

- a. Findthetotalnumberofwords.
- b. Capitalizethefirstwordofeachsentence.
- c. Replaceagivenwordwithanotherword.

Week6

- a) WriteaCProgramtoperformvariousarithmeticoperationsonpointervariables.
- b) WriteaCProgramtodemonstratethefollowingparameterpassingmechanisms:
 - i) call-by-value ii)call-by-reference

Week7

Write C programs that implements tack (it soperations) using

- i) Arrays
- ii) Pointers

Week8

WriteCprogramsthatimplementQueue(itsoperations) using

- i) Arrays
- ii) Pointers

Week9

WriteaCprogramthat usesStackoperationstoperformthe following:

- i) Convertinginfixexpressionintopostfixexpression
- ii) Evaluatingthepostfixexpression

Week10

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

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

Week11

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

i) Creation ii)Insertion iii)Deletioniv)Traversal

Week12

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

i) Creation ii)Insertioniii) Deletioniv) Traversal

Week13

WriteaCprogramthat usesfunctionstoperform the following:

i) CreatingaBinaryTreeofintegers

 $ii)\ Traversing the above binary tree in preorder, in order and postor der.$

Week14

WriteCprogramsthatusebothrecursiveandnon-recursive functionstoperform the following searching operations for a key value in a given list of integers:

- i) Linearsearch
- ii) Binarysearch

Week15

WriteaCprogramthat implements the following sorting methods to sort a given list of integers in ascending order

- i) Bubblesort
- ii) Selectionsort

iii) Insertionsort

Week16(CaseStudy)

Createa-Railwayreservationsystem with the following modules

- i) Booking
- ii) Availabilitychecking
- iii) Cancellation
- iv) Preparechart

TextBooks:

- 1. ProgramminginCandDataStructures,J.R.Hanly, AshokN.KamthaneandA.AnandaRao, Pearson Education.
- 2. B.A.ForouzonandR.F.Gilberg, "COMPUTERSCIENCE: A StructuredProgrammingApproach Using C", Third edition, CENGAGE Learning, 2016.
- 3. RichardF.Gilberg&BehrouzA.Forouzan,"DataStructures:APseudocodeApproachwith C", Second Edition, CENGAGE Learning,2011.

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- 1. PradipDeyandManasGhosh,ProgramminginC,OxfordUniversityPress,2ndEdition2011.
- 2. E.Balaguruswamy, "CandDataStructures", 4thEdition, TataMcGrawHill.
- 3. A.K.Sharma, ComputerFundamentalsandProgramminginC, 2ndEdition, UniversityPress.
- 4. M.T.Somashekara, "ProblemSolvingUsingC", PHI, 2ndEdition2009.

Mapping:

	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 Correlat ion	3	3	2	3	3				2		2		3	3

3-Highmapping

2-MediumMapping

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (AUTONOMOUS)

IB.TechISemester(CommontoEEE,CSE,IT,CSE(DS)&CSE(AI&ML)) IB.TechIISemester(CommontoCE,ME&ECE,CE,ME,ECE,CSO,CAI,CSC)

ME02	EngineeringPracticelab	L	Т	Р	С
		0	0	3	1.5

CourseOutcomes:

20A

Aftercompletionofthiscourse, the student will be able to

- 1. Performadifferent prototype models in the carpentry trades uch as Mortise and tenonjoint, and Tablestandusing wood turning lathe.
- 2. Preparemodelssuch as Dovetailjoint and HalfRoundjoint using Fitting tools and rectangular tray, and funnel prototypes in the trade of Tinsmithy.
- 3.Perform various basic House Wiring techniquessuch Staircase wiring (i.e. control ofonelampbytwoswitchesfixedattwodifferentplaces),andwiringfortubelight (FluorescentLamp)/Focuslight.
- 4. Fabricated ifferent models in a foundry shops uch as single and two pieces pattrens and prototypes in the trade of Welding such as T-Joint and H-Joint.

TRADESFOREXERCISES:

a. Carpentryshop.

- 1. PrepareaMortiseand tenonjointfromagiven300 x40x25mmsoftwoodstock.
- PrepareaTablestand(desiredshape)byusingwoodturningLathefromagiven 300x 40x25mm soft wood stock.

b. Fittingshop

- 1. PrepareaDovetailjointfromagiven100x50x5mmM.S.stock.
- 2. PrepareaHalfRoundjointfromagiven100x50x5mmM.S.stock.

c. Sheetmetalshop

- 1. PrepareaFunnelfromgivenG.I.sheet.
- 2. PrepareaRectangularTrayfromgivenG.I.sheet.

d. House-wiring

- 1. Staircasewiring(i.e.controlofonelampbytwoswitchesfixedattwodifferent places).
- 2. Prepareawiringfortubelight("FluorescentLamp")/Focuslight

- 3. Prepareamouldforasinglepiecepattern(Connectingrod)
- 4. PrepareamouldforaDoublepiecepattern(SteppedPulley)

e.Welding

- 1. PrepareaT-JointfromgivenM.SFlatpatesusingArcWelding.
- 2. PrepareaH-JointfromgivenM.SFlatpatesusingArcWelding.

2. TRADESFORDEMONSTRATION:

- a) Plumbing
- b) MachineShop
- c) MetalCutting

Apartfromtheabovetheshoproomsshoulddisplaycharts, layouts, figures, circuits, handtools, hand machines, models of jobs, materials with names such as different woods, woodfaults, Plastics, steels, meters, gauges, equipment, CD orDVD displays, First aid, shop safetyetc. (though they may not be used forthe 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 thanskillacquiredinmaking the job.

ReferenceBooks

- ¹ WorkshopManual/P.Kannaiah/K.L.Narayana/SciTechPublishers.
- ² EngineeringPracticesLabManual,Jeyapoovan,SaravanaPandian,4/eVika0073
- ³ DictionaryofMechanicalEngineering,GHFNayler,JaicoPublishingHouse.
- ⁴ EngineeringWorkshopbyVishnu UniversalLearning.
- 5 EngineeringWorkshopbyGRIEinstitute.

Mapping:

	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					
Levelof correlati on	3	2	2		3				3					

3-Highmapping

2-MediumMapping

SRIVENKATESWARACOLLEGEOFENGINEERING&TECHNOLOGY (AUTONOMOUS)

IB.TechISemester(CommontoEEE,CSE,CSE(DS),CSE(AI&ML)&IT) I B.Tech II Semester (Common to CE, ME, ECE, CAI, CSC & CSO)

20AHS09

ENVIRONMENTALSCIENCES

L T P C 2 0 0 0

(MandatoryCourse)

CourseOutcomes:

Aftersuccessful completion of the course, the student will be able to

- 1. Awareofthecomplexrelationshipsbetweenenvironmentandhumansystem.
- 2. Develop criticalthinking (or)observationskillsand applythem intheanalysisofaproblem (or) question related to the environment.
- 3. Identify the major pollutants and a batement devices in order to protect the environment from pollution for effective environmental management.
- 4. Analyzeand interpret the fundamental physical, chemical, biological principles and social factors that govern natural process.

UNIT-I

5Hours

ECOSYSTEMSANDBIODIVERSITYANDITSCONSERVATION: Definition, scope and the second statement of the secon

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,speciesandecosystemdiversity-BiogeographicalclassificationofIndia.-Value ofbiodiversity:consumptiveuse,productiveuse,social,ethical,aestheticandoptionvalues-Indiaas a mega diversity nation - Hot-spotsofbiodiversity. - Threatsto 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 Hours

NATURALRESOURCES:

Forest resources - Use and over-exploitation – deforestation - case studies - Timber extraction – mining- dams and their effects on forests and tribal people. **Waterresources** - Useandover-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-casestudies. **Foodresources**-Worldfoodproblems-effectsofmodernagriculture

- fertilizers- pesticides problems. **Energy Resources** - Growing energy needs- renewable and nonrenewable 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

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 urbanand industrialwastes- Role of an individual inprevention of pollution-Pollutioncase studies -Disastermanagement:Floods,earthquake,cycloneandlandslides.

UNIT-IV

SOCIALISSUESANDTHEENVIRONMENT: Formunsustainabletosustainabledevelopment -Urban problems related to energy - Water conservation, rain water harvesting, water shed management - Resettlement and rehabilitation of people; its problems and concerns, case studies -Environmental ethics: issues and possible solutions - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies - Wasteland reclamation -Consumerism and waste products -Environment protection Act -Air (prevention and control of pollution) Act - Water (prevention and control of pollution) Act - Wildlife protection act - Forest conservation act - Issues involved in enforcement of environmental legislations - Public awareness. Visit to a localarea to document environment assetsriver / forest / grassland / hill / mountain.

UNIT-V

3 Hours

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 siteurban/rural/industrial/agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hills lopes, etc.

TextBooks:

- $1. \ Text book of Environmental studies, Erach Bharucha, UGC.$
- $2. \ \ Fundamental concepts in Environmental Studies, DDM is hra,, SC hand \& CoLtd$

ReferencesBooks:

- EnvironmentalScienceG.TylerMillerandScotttSpoolman,CengageLearningPublishers, 15lhEdition, 2015.
- EnvironmentalEncyclopediaCunningham,W. P,CooperT.H,Gorhani, Jaico publications,Mumbai, 2001.
- $\label{eq:constraint} 3. Environmental Chemistry, B.K. Sharma, Krishna Prakashan Media (p) Ltd, 2011.$

5Hours

5 Hours

	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							
Levelof correlation	2						3							

3-HighMapping

2-MediumMapping

SRIVENKATESWARACOLLEGEOFENGINEERING&TECHNOLOGY (AUTONOMOUS) IB.TechISemester(CommontoCE,ME,ECE,CAI,CSC&CSO)

IB.TechIISemester(CommontoEEE,CSE,IT,CSE (DS)&CSE(AI&ML))

20AHS01 COMMUNICATIVEENGLISH L T T C

3 0 0 3

CourseOutcomes:

Aftersuccessful completion of the course, the student will be able to

- 1. Developknowledgeofbasicgrammaticalconceptstounderstandaskingand answering general questions on familiar topics and making paragraphs.
- 2. Interpret context,topic,andpiecesofspecificinformationfromsocialor Transactional dialogues spoken by native speakers of English.
- 3. Examinelanguageaspectstodoroleplays,to studygraphicelementsand information transfer.
- 4. Demonstratediscoursemarkerstomakeeffectiveoralpresentationsandtowrite structured essays.

UNIT-I

EXPLORATION

LESSON: Aproposal to Girdle the Earth, Nellie Bly.

LISTENING:Identifyingthetopic,thecontextandspecificpiecesofinformationby listening to short audio texts and answering a series of questions.

SPEAKING: Askingandansweringgeneralquestionsonfamiliartopicssuchashome, family, work, studies and interests; introducing oneself and others.

READING:Skimmingtogetthemainideaofatext;scanningtolookforspecific pieces of information.

READINGFORWRITING: Beginningsandendingsofparagraphs- introducing the topic,

summarizing the main idea and/or providing a transition to the nextparagraph

GRAMMAR AND VOCABULARY: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentence.

UNIT-II

ONCAMPUS

LESSON: The District School As It Was by One Who Went It, Warren Burdon LISTENING: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

 $\label{eq:spectrum} \textbf{SPEAKING:} Discussion in pairs/small groups on specific topics followed by short$

10Hours

8 Hours

structuredtalks.

READING:Identifyingsequenceofideas;recognizingverbaltechniquesthat helpto linkthe ideas in a paragraph together.

WRITING:Paragraphwriting(specifictopics) usingsuitablecohesivedevices;mechanicsof writing - punctuation, capital letters.

GRAMMARANDVOCABULARY:Cohesivedevices-linkers,signpostsandtransition signals; use of articles and zero article; prepositions.

UNIT-III

11Hours

WORKINGTOGETHER

LESSON:TheFutureofWork

LISTENING: Listening for global comprehension and summarizing.

SPEAKING:Discussingspecifictopicsinpairsorsmallgroupsandreporting.

READING:Readingatextindetailbymakingbasicinferences-recognizingand interpreting specific context clues; strategies to use text clues for comprehension.

WRITING:Summarizing-identifyingmainidea/sandrephrasingwhatisread;avoiding redundancies and repetition

GRAMMARANDVOCABULARY:Verbs-tenses;subject-verbagreement;direct and indirect speech, reporting verbs for academic purposes.

UNIT-IV

FABRICOFCHANGE

LESSON: H.G. Wells and the Uncertainties of progress, Peter J. Bowler.

LISTENING:Makingpredictionswhilelisteningtoconversations/transactional dialogues without video; listening with video.

SPEAKING:RoleplaysforpracticeofconversationalEnglishinacademiccontexts (formal and informal) - asking for and giving information/direction.

 $\label{eq:resonance} \textbf{READING}: Studying the use of graphicelements intext stoconvey information,$

revealtrends/patterns/relationships,communicateprocessesordisplaycomplicateddata.

WRITING: Information transfer; describe, compare, contrast, identify significance/

trends based on information provided in figures/charts/graphs/tables.

GRAMMARANDVOCABULARY:Quantifyingexpressions-adjectivesandadverbs; comparing and contrasting;degrees of comparison; use of antonyms

UNIT-V

TOOLSFORLIFE

LESSON:LeavesfromtheMentalPortfolio ofaEurasian,SuiSanFar.

LISTENING:Identifyingkeyterms, understandingconceptsandansweringaseriesofrelevant questions that test comprehension.

 $\label{eq:spectrum} SPEAKING: Formal or al presentation sontopics from a cademic contexts-without the use of$

8 Hours

8 Hours

PPTslides.

READING:Readingforcomprehension.

WRITING: Writingstructuredessaysonspecifictopicsusingsuitableclaimsand evidences

GRAMMAR AND VOCABULARY: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

TextBooks

1.Englishallround:CommunicationSkillsforundergraduationLearnersVol.I, Orient Black Swan Publishers, First Edition2019.

ReferenceBooks

- 1. Academicwriting:Ahandbookforinternationalstudents,Bailey,Stephen,Routledge. 2014.
- Pathways:Listening,SpeakingandCriticalThinkingChase.BeckyTarver, Heinley ELT; 2nd Edition, 2018.
- SkillfulLevel2Reading&WritingStudent'sBookPack(B1)Macmillan Education.

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

Mapping:

3-HighMapping

2-MediumMapping

SRIVENKATESWARACOLLEGEOFENGINEERING&TECHNOLOGY (AUTONOMOUS)

IB.TechISemester(CommontoCE,ME,ECE,CAI,CSC&CSO) IB.TechIISemester(CommontoEEE,CSE,IT,CSE(DS)&CSE(AI&ML))

20AHS03	ENGINEERING CHEMISTRY	L	Т	Р	С
		3	0	0	3

CourseOutcomes:

Aftersuccessful completion of the course, the student will be able to

- 1. Understandtheimpactofhardwateranditsremoval, applytheconceptofestimation of hardness.
- 2. Analyzetheselectionofsuitableengineeringmaterials forspecificapplications.
- $\label{eq:constant} 3. \ Understand the Effect of corrosion and to know the designing of corrosion resistant articles.$
- 4. Apply suitablefuelsbasedonanalysis of coal, calorific value for a particular application, calculation of air requirements for combustion of fuel, types of various batteries.

UNIT-I

9 Hours

WATER TECHNOLOGY: Sources ofwater - impurities in water - Hardness ofWater 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 - ChlorinationOfDomestic Water Treatment - DesalinationofBrackish Water by Reverse Osmosis and electro dialysis methods.

UNIT-II

12Hours

MATERIALSCHEMISTRY:HighPolymers:Polymers–Definition-Nomenclatureofpolymers - Types of polymerization reactions addition, condensation and copolymerization with examples. Plastics: Thermoplastics and thermosetting plastics and differences between them - Preparation, PropertiesandEngineeringapplicationsofPE,PTFE,PVC,NylonandBakelite.Conductingpolymers - polyacetylene, polyaniline, polypyrroles - 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 ofLubricants (Viscosity, ViscosityIndex, Flash and fire point, Cloud andpourpoint,Anilinepoint,AcidvalueorNeutralizationnumber.**Refractories**:Importantproperties of refractories (Refractoriness, Refractoriness under Load, Porosity, Thermal spalling) and their applications.

UNIT-III

CHEMISTRY OF CORROSION: Introduction on corrosion - causes and consequences of corrosion -Types of corrosion - Dry, Wet, Galvanic, Differential Corrosion - MechanismofDryand 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

FUELS AND COMBUSTION: Fuels, Classification of Solid, Liquid and Gaseous fuels - Analysis of coal - Proximate and Ultimate analysis - Refining of Petroleum - Preparation of syntheticpetrol - 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.

 $\label{eq:combustion} Combustion: Calculation of air quantity requirement for Combustion-Numerical problems.$

UNIT-V

ELECTROCHEMICAL ENERGY SYSTEMS: Electrochemical Cells - Electrode potential - Standard electrodepotential-Nernst equation-cellpotentialcalculations-BasicconceptsofpHmetry,Potentiometry and Conductometric Titrations - Working principles and applications of different batteries - Dry cell, Lithiumion 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.

TextBooks:

- 1. A textbook of Engineering Chemistry, Jain& Jain, DhanpatRai 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.

ReferenceBooks:

- 1. EngineeringChemistry,Dr.K.B.Chandrasekhar,Dr.U.N.Dash,Dr.SujathaMishra, Scitech Publications (India) Pvt. Limited, Hyderabad, 2009.
- 2. AtextbookofEngineeringChemistry,Dr.K.RaviKrishnan,SriKrishnaPublications, Secunderabad, Telangana, New edition. July, 2015.
- 3. ChemistryofEngineeringMaterials,C.V.Agarwal,C.ParameswaraMurthyandAndra Naidu, BS Publications, Hyderabad, 9th edition, 2006.

9 Hours

11Hours

9Hours
Mapping:

	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-HighMapping

2-MediumMapping

1-LowMapping

SRIVENKATESWARACOLLEGEOFENGINEERING&TECHNOLOGY (AUTONOMOUS) IB.TechIISemester(CommontoAllBranches)

20AHS08 ALGEBRAANDTRANSFORMATIONTECHNIQUES L T P C

CourseOutcomes:

Aftersuccessful completion of the course, the student will be able to

- 1. Solvethesystemoflinearequationsand determinetheeigenvaluesandeigenvectors.
- 2. ApplytheLaplacetransformtechniquestosolveordinarydifferentialequations.
- 3. ApplyFourierseriestoexpandperiodicandelementaryfunctions.
- 4. EvaluateFourier sinandcosinetransformsforgivenfunctions.
- 5. Analyzetheprinciples of Z-transforms for solving the difference equation.

UNIT-I

MATRICES:Rankofamatrix byechelonform,normalform. Solvingsystemofhomogeneousand nonhomogeneous linear equations. Eigen values and Eigen vectors. Cayley- Hamiltontheorem (without proof) – Finding inverse and power of a matrix by Cayley-Hamilton theorem. Diagonalization of a matrix.

UNIT-II

 $\label{eq:laplacetransforms of standard functions-First Shifting Theorem$

- Transforms of derivatives and integrals-Units tep Function-Second Shifting Theorem

-LaplacetransformsofPeriodic functions –InverseLaplacetransforms-Convolutiontheorem. Applications of Laplace Transforms to ODE

UNIT-III

FOURIERSERIES:Determination of Fourier coefficients- Fourier series- Even and odd functions -Fourier series inanarbitrary interval -Half-range Fourier sine and cosine expansions.

UNIT-IV

FOURIERTRANSFORMS:Fourier integraltheorem(onlystatement)-Fouriersineandcosine integrals. Fourier Transforms - Fourier sine and cosine Transforms - properties -Inverse transforms - Infinite Fourier transforms.

10 Hours

10 Hours

3

1

0 3

10 Hours

10Hours

UNIT-V

10Hours

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

TextBooks:

- 1. HigherEngineeringMathematics, Dr.B.S.Grewal, 44/eKannaPublications, 2017.
- ATextbookofEngineeringMathematics–II,T.K.V.Iyengar, B.KrishnaGandhiand others, S. Chand and company. 8th Revised edition, 2013.

ReferenceBooks:

- 1. ATextBookofEngineeringMathematics-I,B.V.Ramana,,TataMcGrawhill
- 2. AdvancedEngineeringMathematics,ErwinKreyszig,JohnWiley&Sons-2016.
- 3. IntroductoryMethodsof NumericalAnalysisS.S.Sastry,PrinticeHall of India publications, 2012.

Mapping:

	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-HighMapping

2-MediumMapping

1-LowMapping

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (AUTONOMOUS)

IB.TechIISemester(CommontoCSE,IT,CSE(DS)&CSE(AI&ML)

20AEE05 BASICELECTRICALENGINEERING L T P C

3

0

0 3

CourseOutcomes:

 $\label{eq:approximation} After completion of this course the students will be able to:$

- 1. Evaluate the electrical circuits and networks parameters
- 2. EmphasistheRLCDesignmodels
- 3. Analyzethe conceptofalltypes of Electrical DCM achines
- 4. Analyzetheconceptofalltypes of Electrical ACM achines

UNITI:

D.C.Circuits:Ohm'sLawand Kirchhoff'sLaws - Analysisofseries, parallelandseries-parallelcircuits excited by independent voltage sources - Power and energy.

Electromagnetism:FaradaysLaws,Lenz'sLaw,Fleming'sRules, StaticallyanddynamicallyinducedEMF -Conceptsofselfinductance, mutualinductanceandcoefficient of coupling -Energystoredinmagnetic fields.

UNITII:ACCIRCUITS

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

UNITIII:DCMACHINES

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

UNITIV:ACMACHINESI

Transformers:Principleofoperationandconstructionofsinglephasetransformers-EMFequation–losses-efficiencyandvoltageregulation.

UNITV:ACMACHINESII

Conceptofrotating magnetic field -Principleofoperation-typesand constructional features -Slipand its significance - Applications of squirrel cage and slip ring motors – Stepper, Universal motor & Brushless DC Motor

Textbooks:

- $1. \quad V.K. Mehta \& Rohit Mehta, Principles of Electrical Engineering, S. Chandpublications$
- 2. D.P.KothariandI.J.Nagarath-"BasicElectrical&ElectronicsEngineering", Mc.Grawhill publications

ReferenceBooks:

- 1. H.Cotton, Electrical Technology, CBSPublishers & Distributors, 2004.
- 2. T.K.Nagasarkar, M.S.Sukhija, Basic Electrical Engineering, Oxford University press New Delhi, 2010

Mapping:

	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-HighMapping

2-MediumMapping

1-LowMapping

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (Autonomous)

IB.Tech IISemester(Commontoallbranches)

L Т P C **20ACS04 PROBLEM SOLVING AND** 3 1 0 3 PROGRAMMINGUSINGPYTHON

CourseOutcomes:

AfterCompletionofthecoursethestudentwillbeableto

- 1. DemonstrateknowledgeinBasicsofpythonprogramming
- 2. Usethedatastructurelists, DictionariesandTuples.
- 3. Solvetheproblemsbyapplyingthemodularityprinciple.
- 4. DemonstrateknowledgeinOOP.
- 5. DemonstratevariousmathematicaloperationsusingNumpy,AnalyzeDatausingPandas andvisualizations using Matplotlib.

UNIT-I

9 hrs

INTRODUCTIONTOPROBLEMSOLVING, EXPRESSIONANDDATATYPES

Fundamentals: whatiscomputer science-Computer Algorithms -Computer Hardware-Computer software-Computational problems of ving 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. Problemsolving: Restaurant Tabcalculation and Ageinseconds.

UNIT-II

CONTROLSTRUCTURES&COLLECTIONS

ControlStructures: Booleanexpressions, SelectioncontrolandIterativecontrol.Arrays-Creation, Behavior of Arrays, Operations on Arrays, Built-In Methods of Arrays. List -Creation, Behavior of Lists, Operations on $Lists, Built-In Methods of Lists. {\it Tuple-Creation}, Behavior of Tuples, Operations on Tuples, Built-In Methods of Lists, Content of Content$ 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. ProblemSolving: AFoodCo-op'sWorkerSchedulingSimulation.

UNIT-III

STRINGS, FUNCTIONSANDFILES

Strings-StringLiteral, AssigningStringtoavariable, MultilineStrings, StringSlicing, Built-inFunctions and

10hrs

Methods. **Functions** – Creating functions, calling a function, passing arguments to functions, function with returnstatement, Recursive function, Lambda Function. **Files** – File Handling, Create, Write, Read and Delete Files

UNIT-IV

OBJECTORIENTEDPROGRAMMINGANDEXCEPTIONS

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.
Problemsolving:Creditcardcalculation.

UNIT-V

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.

TextBooks:

1. IntroductiontoComputerScienceusingPython:AComputationalProblem-SolvingFocus,FirstEdition, CharlesDierbach, Wiley India , 2012.

2. ProgrammingPython,MarkLutz,O'ReillyPublications,FourthEdition,2011.

ReferenceBooks:

1. CorePythonProgramming,2ndedition,R.NageswaraRao,DreamtechPress,2018.

2. FundamentalsofPython,,ThirdEdition,KennethLambertandB.L.Juneja,Cengage Learning,2012.

Mapping:

	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

1-LowMapping

9 hrs

SRIVENKATESWARACOLLEGEOFENGINEERING&TECHNOLOGY (AUTONOMOUS) IB.Tech ISemester(CommontoCE,ME,ECE,CAI,CSC&CSO) IB.TechIISemester(CommontoEEE,CSE,IT,CSE(DS)&CSE(AI&ML))

20AHS05	COMMUNICATIVEENGLISH LAB	L	Т	Р	С
		0	0	3	1.5

CourseOutcomes:

 $\label{eq:construction} After successful completion of the course, the student will be able to$

- 1. RememberandunderstandthedifferentaspectsoftheEnglishlanguageproficiency with emphasis on LSRW skills
- 2. Developcommunicationskillsthroughdebates,oralpresentations,groupdiscussionsand various language learning activities
- 3. AnalyzetheEnglishspeechsounds,stress,rhythm, intonationandsyllabledivisionfor better listening and reading comprehension.
- 4. Evaluateandexhibitacceptableetiquetteessentialinsocialandprofessionalsettings.

UNIT-I

- 1. Phoneticsforlisteningcomprehensionofvariousaccents.
- 2. Reading comprehension
- 3. Describingobjects/places/persons

UNIT-II

- 1. JAM
- 2. Smalltalksongeneraltopics
- 3. Debates

UNIT-III

- 1. Situationaldialogues-GreetingandIntroduction
- 2. SummarizingandNotemaking
- 3. GroupDiscussion

UNIT-IV

- 1. AskingforInformationandGivingDirections
- 2. InformationTransfer
- 3. Non-verbalCommunication- DumbCharade

UNIT-V

- 1. OralPresentations
- 2. PrécisWritingandParaphrasing
- 3. ReadingComprehensionandspottingerrors

PRESCRIBEDSOFTWAREFORPRACTICE:

SkyPronunciation,Pro-power2&Globarena

ReferenceBooks

- 1. Academicwriting:Ahandbookforinternationalstudents,Bailey,Stephen, Routledge,2014.
- 2. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- 3. CambridgeAcademicEnglish(B2),Hewings,Martin.2012.
- $4. \ Effective Technical Communication, A shrif Rizvi, Tata McGrahill, 2011$
- TechnicalCommunicationbyMeenakshiRaman&SangeetaSharma, 3rdEdition, OUPress 2015.

Mapping:

	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		
Levelof correlation	3	2							3	3		2		

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (Autonomous)

IB.Tech-IISemester(CommontoallBranches)

20ACS05PROBLEM SOLVING AND PROGRAMMING
USINGPYTHONLABLTPC0031.5

CourseOutcomes:

AfterCompletionofthecoursethestudent willbeableto

- 1. Write, Testand Debug Python Programs
- 2. ImplementConditionalsandLoopsforPythonPrograms
- 3. UsefunctionsandrepresentCompounddatausingLists,TuplesandDictionaries
- 4. Read and writedatafrom&tofilesinPython

WEEK1

a. Writeapythonscripttodisplayasimplemessage

b. Writeapythonscripttoperformbasicarithmeticoperationsontwovalueswhichare

accepted from the user.

WEEK2

a. Writeapythonscriptto calculatethefactorialofagivennumber.

- b. Writeapythonscripttocalculatesumofindividualdigitsofagivennumber.
- $c.\ Write a Python program that prompts the user for two floating-point values and displays the result$

of the first number divided by the second with exactly six decimalplaces displayed.

WEEK3

 $a.\ Write a pythons cript to find the largest number among three numbers and display them in$

ascending order using if-else construct.

b. WriteapythonscripttodisplayFibonaccisequenceofnumbersusingwhileloop,forloop and dowhile loop constructs.

c. Writeapythonscripttodisplaytheprimenumber seriesuptothegiven N Value.

WEEK4

a. WriteaPythonprogram

i. Tocalculatesumalltheitemsinalist. ii .

To remove duplicates from a list.

iii. Tofindthelistofwordsthat arelongerthannfromagivenlistofwords.

iv. Togetthedifferencebetweenthetwolists.

v. Toappendalisttothesecond list.

b. WriteaPythonprogramtoprint aspecified list afterremovingthe0th,4thand5thelements.

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

ExpectedOutput:['Green','White','Black']

c. Write a pythons cript to arrange the given list of elements in a scending or descending or der.

WEEK5

a. Towriteapythonprogramtocreate, slice, change, deleteandindexelementsusingTuple.

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

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

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

WEEK6

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

WEEK7

- a. WriteaPythonprogram
 - i. Tocreateaset.
 - ii. Toremoveitem(s)fromaset.
 - iii. Toremoveanitemfromasetifitispresentintheset.
 - iv. Tocreateaunionandintersectionofsets.
 - v. Tocreatesetdifference.

WEEK8

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

Sample String: google.com'

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

c. WriteaPythonprogramtoreverseastring.

SampleString:"1234abcd"

ExpectedOutput:"dcba4321"

d. WriteaPythonscriptthattakesinput from the user and displays that in put back in upper and lowercases.

e. WriteaPythonscript togetastring madeof4copiesofthelast twocharactersofaspecified string(length must be at least 2).

SampleInput/Output

Input:Python-Output:onononon

Input:Exercises-Output:eseseses

 $f.\ Write a Python function that checks whether a passed string is palindromeor not.$

WEEK9

 $a.\ Write a pythons cript to find GCD of two numbers using recursive and nonrecursive$

functions.

b. Writeapythonscripttoconvertthefollowingusingfunctions:

- i. FahrenheittoCelsiustemperature.
- ii. CelsiustoFahrenheittemperature.

WEEK10

a. WriteapythonscripttodemonstratetheExceptionHandling.

WEEK11

a. Writeaprogramthat inputs atext file. Theprogramshould print alloftheunique words in the filein alphabetical order

b. Writeascript named copyfile.py. Thisscript should prompt theuserforthe names of two text files. The contents of the first file should be the input that to be written to the second file.

WEEK12

- a. Writeaprogram todemonstratea)arraysb)array indexingsuchasslicing,integerarray indexing and Boolean array indexing along with their basic operations in NumPy.
- b. Writeaprogramtocomputesummarystatisticssuchasmean, median, mode, standard deviation and variance of the given different types of data.

WEEK13

- a. Writeapythonscripttoimplementinheritance.
- b. Writeapythonscripttoimplementconstructor.

	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

Mapping:

3-Highmapping

2-MediumMapping

1-LowMapping

SRIVENKATESWARACOLLEGEOFENGINEERING & TECHNOLOGY (AUTONOMOUS)

IB.TechISemester(CommontoCE,ME,ECE,CAI,CSC&CSO) IB.TechIISemester(CommontoEEE,CSE,IT,CSE(DS)&CSE(AI&ML))

20AHS06	ENGINEERING CHEMISTRY LAB	\mathbf{L}	Т	Р	С
		0	0	3	1.5

CourseOutcomes:

Aftersuccessful completion of the course, the student will be able to

- 1. Estimatetheamountofmetalions,hardnessofwater,chlorides inwater,acidity,alkalinity, dissolved oxygen in water by using volumetric analysis.
- 2. Demonstrate the importance of viscosity index, flashpoint and firepoint of lubricants and to prepare a polymer.
- 3. ApplypHmeter,conductivitymeterandpotentiometertofindthenormalityandamountsof substances in solution

Any **TEN** of the following experiments

- 1. EstimationofHardnessofwaterbyEDTAmethod.
- 2. EstimationofChloridesinWatersample.
- 3. DeterminationofacidstrengthbyusingapH meter(I)StrongacidVSStrongbase(II)WeakacidVs Strong base.
- 4. EstimationofCopperusingEDTAbycomplexometricmethod.
- 5. Determination of effect of temperature on absoluteandkinematicviscosity of oils through Redwood viscometer No.1.
- $6. \ Estimation of Ferrous Ion by Potentiometry using standard Potassium Dichromateina Red ox reaction.$
- 7. Determinationofrateofcorrosionbyweightlossmethod.
- 8. DeterminationofacidstrengthbyConductometricmethod-Strongacid VSStrongbase.
- 9. DeterminationofAlkalinityofwatersample.
- 10. DeterminationofAcidityofwatersample.
- 11. Estimation of Dissolved Oxygeninwaterby Winkler's method.
- 12. Estimation of Ferrous Ion by Potassium Dichromatemethod.
- 13. DeterminationofFlashand FirepointbyusingPenskyMarten's apparatus.
- 14. PreparationofPhenol-Formaldehyderesin.
- 15. Determinationofmoisturecontentinacoalsample

TextBooks:

- Chemistrypre-labmanualbyDrK.N.JayaveeraandK.B.ChandraSekhar,S.M. EnterprisesLtd., 2007.
- 2. Vogel'StextbookofQuantitativeInorganicAnalysis,ELBSEdition,1994.

EquipmentRequired:

- 1. Glassware:Burettes,Pipettes,StandardFlasks,Beakers,Measuringjars,BODbottlesand Reagent bottles.
- 2. Analyticalbalance,
- 3. PenskyMarten'sapparatus
- 4. Redwoodviscometer,
- 5. Conductometer,
- 6. Potentiometer.

Mapping:

	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-HighMapping

2-MediumMapping

1-LowMapping

SRIVENKATESWARACOLLEGEOFENGINEERINGANDTECHNOLOGY (Autonomous) IB.TechISemester(CommontoCE,ME,ECE,CAI&CSC&CSO)

IB.TechIISemester(CommontoEEE,CSE,IT,CSE(DS)&CSE(AI&ML)

20AMB01

DESIGNTHINKING (Mandatorycourse)

L T P C 2 0 0 0

COURSEOUTCOMES:

Aftercompletionofthecoursethestudentwillbeableto

 $1. \ Explain design thinking concepts and models to be used to perform human centered$

design

(Understanding).

- 2. Applydesignthinkingtoolstechniquestoproducegooddesign(Applying).
- 3. Developinnovativeproductsorservicesforacustomer(Creating).
- 4. Buildprototypesforcomplexproblemsusinggathereduserrequirements(Creating).

UNITI:INTRODUCTIONTODESIGNTHINKING:

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

UNITII:EMPATHIZE:

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.

UNITIII:IDEATION:

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.

UNITIV:PROTOTYPING:

Whatisaprototype?-Prototypingasamindset,prototypeexamples,prototypingforproducts;Whyweprototype?Fidelityforprototypes,Processofprototyping-MinimumViableprototype.

UNITV:TESTINGPROTOTYPES:

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.

TEXTBOOKS:

- S.Salivahanan,S.Suresh Kumar,D.Praveen Sam, "IntroductiontoDesign Thinking",TataMc Graw Hill, First Edition,2019.
- 2. KathrynMcElroy, "PrototypingforDesigners:DevelopingthebestDigitaland PhysicalProducts", O'Reilly,2017.

REFERENCEBOOKS:

- 1. <u>MichaelG.Luchs,ScottSwan,AbbieGriffin</u>,"DesignThinking–NewProduct Essentialsfrom PDMA", Wiley, 2015.
- VijayKumar, "101DesignMethods: AStructuredApproachforDrivingInnovationinYour Organization", 2012.

ADDITIONALLEARNINGRESOURCES:

- 1. <u>https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process</u>
- 2. https://www.ibm.com/design/thinking/page/toolkit
- 3. <u>https://www.interaction-design.org/literature/article/define-and-frame-your-design-challenge-by-creating-your-point-of-view-and-ask-how-might-we</u>
- 4. <u>https://hbr.org/2018/09/design-thinking-is-fundamentally-conservative-and-</u> 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. <u>https://nptel.ac.in/courses/109/104/109104109/</u>
- 9. https://nptel.ac.in/courses/110106124/

Mapping:

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 correlationof the course		2	3	2							3			

(Autonomous)

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

	20AHS10	NUMERICAL METHODS	\mathbf{L}	Т	Р	С
Course Outcomes			3	0	0	3

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 multistep methods.
- 5. Solve real world problems using solutions of partial differential equations.

UNIT-I 10 Hours 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

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

UNIT-IV

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.

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS: Taylor's series-Picard's method of successive Approximations -Euler's and Modified Euler's Method- Problems onsingle step methods-

10 Hours

8 Hours

8 Hours

Runge – Kutta Methods – Predictor – corrector method-Milne's method.

UNIT-V

9 Hours

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.

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.
- 4. T.K.V. Iyengar, B. Krishna Gandhi and Others, A Text Book of Engineering Mathematics–I, S. Chand and Company.

References:

- 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 ageInternational Publishers.
- 3. N. Bail, M.Goyal & C.Walking, A Text Book of Advanced Engineering Mathematics-AComputerApproach.
- 4. Pal, Mathematical Methods, Oxford University Press, 2009.
- 5. S.S. Sastry, Introductory Methods of Numerical Analysis, Printice Hall of India publications, 2011

CO/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	РО 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 corelation	3	2												

Mapping:

3- High mapping

2-Medium Mapping

1- Low Mapping

(Autonomous)

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

20ACS06COMPUTER ORGANIZATION AND ARCHITECTURELTPC3003

Course Outcomes:

After 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 problems complying 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

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

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

MICRO PROGRAMMED CONTROL: Control memory, address sequencing, micro program example, anddesign of control unit. Computer Arithmetic: Fixed point representation of numbersalgorithms for arithmetic operations: multiplication (Booths, Modified Booths) - division (restoring and non-

8 hrs

7 hrs

restoring) - Floating point representation with IEEE standards and algorithms for common arithmetic operations- Representation of non-numeric data (character codes).

UNIT IV

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

8 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.

Text Books:

1. M. Morris Mano, Computer System Architecture, 3rdedition, PHI, India, 2006.

2. Carl Hamacher, ZvonksVranesic, SafeaZaky, Computer Organization, 5th edition, McGraw Hill, New Delhi, India, 2010.

Reference Books:

1. William Stallings, Computer Organization and Architecture, designing for performance, 8 th edition, 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.

	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	3	3	1	2									3	2
	· .				<i>.</i>		<u> </u>				•			

Mapping :

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)

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

20ACS07OBJECT ORIENTED PROGRAMMING THROUGH JAVALTPC3003

Course Outcomes:

After 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

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, StringBuffer class, String Builder.

UNIT –II

UNIT-I

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

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

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.

6 hrs

9 hrs

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.

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.

happing .			-		-									
	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

Mapping :

3- High mapping

2-Medium Mapping

1- Low Mapping

(Autonomous)

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

С AUTOMATA AND COMPILER DESIGN \mathbf{L} Т Р **20AIT01** 3 0 0 3

Course Outcomes:

At the end 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

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 **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

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.

8 hrs

10 hrs

UNIT-IV

INTERMEDIATE CODE GENERATION

statements, Back patching, procedure calls.

CODE OPTIMIZATION AND CODE GENERATION:

UNIT-V

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.

Intermediate code - abstract syntax tree, translation of simple statements and control flow

Text Books:

1. Compilers Principles, Techniques and Tools, Alfred V.Aho and Jeffrey D.Ullman, Ravi sethi, 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 Learning Publisher, New Delhi.
- 3. Principles of Compiler Design 3rd Edition, Balakrishnan S, Sai Publishers.

Papping.														
	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 Correlatio n	3	2	2										2	2

Mapping:

3- High mapping

2-Medium Mapping

1- Low Mapping

8 hrs

(Autonomous)

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

20ACS08RELATIONAL DATABASE MANAGEMENT SYSTEMSLTPC3003

Course Outcomes:

At the end 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 RDBMS and 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

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

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

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

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.

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.

9 hrs

9 hrs

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

Марр	ing:													
	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 Correlati on	3	3	3	2	3								3	3
3	B- Hig	h map	oping		2	-Medi	ium N	lappi	ng	1- Low Mapping				

(Autonomous)

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

20ACS09OBJECT ORIENTED PROGRAMMING THROUGH JAVA LABLTPC0031.5

Course Outcomes:

At the end 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 $ax^2 + bx + c = 0$. 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 program to 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

a) 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 that each 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

Mappi	ing:													
	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	3	3	3	3	3				2				3	2
Correlati														
on														

3- High mapping

- 2-Medium Mapping
- 1- Low Mapping

(Autonomous)

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

20AIT02AUTOMATA AND COMPILER DESIGN LABLTPC0031.5

Course Outcomes:

At the end 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.

Mapping:

	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
2 Iliah	mon	ina		2	Madi		[onnin	10	1	Low	Manni	na		

3- High mapping

2-Medium Mapping 1- Low Mapping

(Autonomous)

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

20ACS10 RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB L T P C 0 0 3 1.5

Course Outcomes:

At the end 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.**

Марр	ing:													
	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 Correlatio	3	3	3	2	3				1			1	3	2
n														
3. High n	nanni	nσ		2-1	Aedin	m Ma	nninc	5	1.	LowN	Iannin	σ		

3- High mapping

2-Medium Mapping 1- Low Mapping

(Autonomous)

II B.Tech I Semester CSO (Common to CSE)

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

20ACS11ANDROID APPLICATION DEVELOPMENTLTPC1022

Course Outcomes:

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

- 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 alongwith 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. Createa 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:

- 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.
- J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580
- Anubhav Pradhan, Anil V Deshpande, "Composing Mobile Apps" using Android, Wiley 2014, ISBN: 978-81-265-4660-2

Mapping :

	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 CSO (Common to CE, EEE, ME, ECE, CSE, IT, CSE(DS) ,CSE(AI &ML) ,CAI , CSC)

20AMB02	UNIVERSAL HUMAN VALUES-I	L	Т	Р	С
		2	0	0	0

(Mandatory course)

Course Outcomes:

After completion of the course students 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 Value Education

Purpose and motivation for the course, recapitulation from Universal Human Values-I; Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validationas 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 andmanagers

b. At the level of society: as mutually enriching institutions and organizations.

Textbooks:

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

Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2.

Reference Books:

- 1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
- N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004. The Story of Stuff (Book).
- 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.
- 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).

Mapping :

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	2	-	-	-		
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 CSO (Common to All Branches)

20AHS11	QUANTITATIVE APTITUDE AND REASONING-I	L	Т	Р	С
		2	0	0	0

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.

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

UNIT-I

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

UNIT-III

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

UNIT-IV

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 Time and Preposition of Duration - Articles - Usage of a, an, the, Omission of articles - Sentences - Pattern and Types. **UNIT-V** 9 Hours

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

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

9 Hours

9 Hours

9 Hours

9 Hours

Mapping :

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

3-High Mapping

2- Medium Mapping

1-Low Mapping

SRI VENKATESWARA COLLEGE OFENGINEERING & TECHNOLOGY (AUTONOMOUS)

II B. Tech - II Semester CSO (Common to CE, ME, CSE, CSE(AI&ML) & IT)

20AHS13	PROBABILITY	AND	STATISTICS	L	Т	Р	С
				3	1	0	3

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 Hours

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

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

TEST OF HYPOTHESIS: Null Hypothesis-Alternative Hypothesis-Critical region – Level of Significance-Type I 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

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, χ^2 -Chi-square test for goodness of fit and test for attributes.

ANALYSIS OF VARIANCE - One way and Two way Classifications

8 Hours

9 Hours

9 Hours

UNIT-V

8 Hours

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.

Text Books:

- 1. Miller and John Freund. E, Probability & Statistics for Engineers, New Delhi, PearsonEducation, 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/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	3												
CO2	3	3		1										
CO3	3	2												
CO4	3	2												
Aveerage	3	2.5		1										
Level of correlation	3	3		1										

Mapping:

3-High Mapping

2- Medium Mapping

1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

II B.Tech, II Semester CSO (Common to CSE, CSD, CSM &IT)

20AHS14DISCRETE STRUCTURES & GRAPH THEORYLTPC3003

Course Outcomes:

After 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 in switching and logical design.

UNIT-I:

9 Hours

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:

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:

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

UNIT-IV:

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

9 Hours

9 Hours

9 Hours

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

UNIT-V:

9 Hours

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 Algorithms of Trees - DFS, BFS.

Text Books:

- 1. Trembly J.P. & Manoha. P, Discrete Mathematical Structures with applications to computer science TMH. 2017.
- 2. Dr D.S. Chandrasekhara, Mathematical Foundations of computer science Prism books Pvt Ltd.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.

Mapping:

CO/POS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	PO1 2	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- Me	edium	Мар	ping	•		1-Lo	w Ma	pping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

20ACS12: DESIGN AND ANALYSIS OF ALGORITHMS L Т Р С 3 3

Course Outcomes

1. Analyze the complexity of algorithms by applying the knowledge of asymptotic notations and recurrence methods.

2. Analyze the given problem and identify appropriate algorithm design technique for problem solving.

3. Perceive and apply different algorithm design paradigms to find solutions for computing problems.

4. Apply the knowledge of NP-hard and NP-Complete complexity classes to classify decision problems.

UNIT-I

Basics of Algorithms and Mathematics:

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 `

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

Dynamic Programming: Introduction, General method with Examples, Multistage Graphs Transitive Closure: Warshall"s Algorithm All Pairs Shortest Paths: Floyd's Algorithm, Optimal

8 hrs

0

0

9 hrs

Binary Search Trees, Knapsack problem, Bellman-Ford Algorithm, Travelling Sales Person problem.

UNIT-IV

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

Introduction, General Template The naive 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.

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.

Mapping :

	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 Correlati on	3	3	2	2									3	2
		3- High mapping					2-Me	dium	Mapp	ing	1- Low Mapping			

8 hrs

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

20ACS13	OPERATING SYSTEMS	L	Т	Р	С
		3	0	0	3

Course Outcomes:

After 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

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

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

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.

8 hrs

8 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

UNIT IV

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.

Text Books:

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

Reference Books:

1. RamezElmasri, A Carrick, David Levine, Operating Systems, A Spiral Approach - McGrawHill Science Engineering Math (2009).

Mapping:

	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	3	2	1	3	1								3	2
Correlation														

3- High mapping

2-Medium Mapping

1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

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

20AIT04	SOFTWARE ENGINEERING	L	Т	Р	С
		3	0	0	3

Course Outcomes:

At the end 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

9 Hours

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.

$\mathbf{UNIT} - \mathbf{II}$

7 Hours

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

12 Hours

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

$\mathbf{UNIT} - \mathbf{IV}$

9 Hours

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 Hours

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.

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

Online Learning Resources:

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

Mapping:

	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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

20ACS14 DESIGN & ANALYSIS OF ALGORITHMS LAB L T P C 0 0 3 1.5

Course Outcomes:

After 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's algorithm.
- 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

Mapping :

	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 Correlati on	3	3	2	2	3								3	2

3- High mapping

1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

20ACS15	OPERATING SYSTEMS LAB	L	Т	Р	С
		0	0	3	1.5

Course Outcome:

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

- 1. Execute the basic command in UNIX operating system and shell program.
- 2. Design the principles of CPU scheduling concepts.
- 3. Design and symbolize the principles of synchronization and contiguous memory allocation technique.
- 4. Simulate the principle of page replacement algorithm
- 5. 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

Mapping :

	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- H i	igh ma	apping	g		2-Med	lium N	/Iappi	ng	1	- Low I	Mappin	ıg	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

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

20AIT05SOFTWARE ENGINEERING LABLTPC0031.5

Course Outcomes:

At the end 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
- Diagnose any risk using Ishikawa Diagram (Can be called as Fish Bone Diagram or Cause& Effect Diagram)
- 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

References :

- 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

Online Learning Resources/Virtual Labs:

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

Mapping :

	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-M	ediun	n Map	ping	•	1- Lo	w Maj	oping	•	•

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) II B.Tech II Semester CSO

20ACO01	UI Design with Flutter	\mathbf{L}	Т	Р	С
		1	0	2	2

Course outcomes:

At the end of the course the student will be able to learn and explore the:

- 1. Fundamentals of UI
- 2. Exploring Widgets
- 3. Stateless vs Stateful Widgets
- 4. Playing with Rows & Columns
- 5. Scrollable UI
- 6. Material Widgets
- 7. Widgets for Inputs

List of Experiments

1. Layouts:

Stateless vs Stateful, Column, Row, Column & Row Together, Stack, ListView, GridView, SingleChildScrollView.

2. Material Widgets:

Buttons, AppBar, Drawer, Tabbar, Bottom Navigation, Popup Menu

3. Inputs:

TextField, Switch, Checkbox, Radio Button, Slider, Dropdown Button

4. Project : Grocery App:

Project Introduction, Setting up environment, Adding Required, Assets, Welcome Screen Design, Welcome Screen Code Optimise, Login Page Design, Register Page Design, Working with TabsPage, Account Screen Design, Edit Profile, Address Screen Design, Manage Address Screen, Orders Screen, Order Detail Screen, Cart Page Design, Home Screen Design, Optimising Home Screen.

TEXT BOOK:

1. Beginning App Development with Flutter by Rap Payne.

REFERENCE BOOKS:

- Beginning Flutter: A Hands On Guide to App Development by Marco L. Napoli.
- 2. Flutter Apps Development: Build Cross-Platform Flutter Apps with Trust by Mouaz M. Al-Shahmeh.
- 3. Flutter Complete Reference 2.0 by Alberto Miola.
- 4. Flutter: Développez vos applications mobiles multiplateformes avec Dart by

Julien Trillard.

5. Flutter for Beginners by Thomas Bailey and Alessandro Biessek.

N	Маррі	ng:												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3										3	2
CO2	3	3	2	1	3								3	2
CO3	3	3	2	2									3	2
CO4	2	2	2										3	2
Average	2.5	2.5	2.25	0.75	0.75								3	2
Level of	3	3	2	1	1								3	2
Correlation														

3- High mapping

2-Medium Mapping

1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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

20AHS15QUANTITATIVE APTITUDE AND REASONING-IILTPC2000

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

UNIT-II

9 Hours

9 Hours

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

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-III

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

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

UNIT V

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

9 Hours

9 Hours

9 Hours

Text Books:

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

Mapping :

	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 CSO, EEE, CSE, IT, CSE (AI&ML), & CSE (DS)

20AMB03MANAGERIAL ECONOMICS AND
FINANCIAL ANALYSISLTPC3003

Course Outcomes:

After the completion of the course 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 financial statements.

UNIT -I INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics: Definition, Nature and Scope –Demand analysis: Law of demand, Demand determinants, Elasticity of Demand: Definition, Types, Measurement and 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

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 AND BUSINESSORGANIZATIONS:

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:

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 ANALYSISTHROUGH RATIOS:

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), CapitalStructure Ratios (Debt-Equity Ratio and Interest Coverage Ratio) and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratio and EPS).

Text Books:

- 1. Aryasri A. R., Managerial Economics and Financial Analysis, 4/E, TMH, 2009.
- 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 Ageinternational, 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. Mapping :

	P01	PO2	PO3	P04	P05	P06	P07	PO8	PO9	PO10	P011	P012	PSO1	PSO2
CO1						2					3			
CO2			2											
CO3						2					3			
CO4											3			
CO5											3			
Average			2			2					3			
Level o orrelation f th ourse	1		2			2					3			

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

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

20ACS16	WFR TECHNOLOGIES	L	Т	Р	С
2040510		3	0	0	3

Course Outcomes:

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

- 1. Apply HTML Structure Elements to create web page and apply CSS to styling Web Pages.
- 2. Design Client-Side programs using JavaScript and Server-Side programs using PHP to construct dynamic WebPages.
- 3. Understand and implement Object Oriented Programming capabilities of PHP
- 4. Apply intermediate and advanced web development practices.

UNIT-I

Introduction to HTML: HTML, HTML Syntax, Semantic Markup, Structure of HTML Documents, HTML Elements, HTML5 Semantic Structure Elements. HTML Tables and Forms, Introducing Tables, Styling Tables, Introducing Forms, Form Control Elements, Table and Form Accessibility, Micro formats.

UNIT-II

Introduction to CSS: CSS Syntax, Location of Styles, Selectors, The Cascade: How Styles Interact, The Box Model, CSS Text Styling.

Advanced CSS: Layout, Normal Flow, Positioning Elements, Floating Elements, Constructing Multicolumn Layouts, Approaches to CSS Layout, Responsive Design, CSS Frameworks.

UNIT-III

JavaScript: Fundamentals, Ways to JavaScript can be linked to an HTML page, Variables and data types, Conditional, Loops, Arrays, Objects, Functions, Object Prototypes, The Document Object Model (DOM), Modifying the DOM, Events, Event Types, Forms.

9 Hrs

9 Hrs

9 Hrs

JavaScript frameworks: Node.js, MongoDB, AngularJS.

Extending JavaScript with jQuery: jQuery Foundations, Event Handling in jQuery, DOM Manipulation, Effects and Animation, AJAX, Asynchronous File Transmission,

UNIT-IV

PHP: PHP Tags, Comments, Variables, Data Types, and Constants, Writing to Output, printf, Program Control, Functions, Arrays and Superglobals, Arrays, \$GET and \$POST Superglobal Arrays, \$SERVER Array, \$Files Array, Reading/Writing Files.

PHP Classes and Objects: Object-Oriented Overview, Classes and Objects in PHP, Object Oriented Design, Error Handling and Validation, Errors and Exceptions, PHP Error Reporting, PHP Error and Exception Handling.

Working with Databases: SQL, NoSQL, Database APIs, Managing a MySQL Database, Accessing MySQL in PHP.

UNIT-V

Managing State: The Problem of State in Web Applications, Passing Information via Query Strings, Passing Information via the URL Path, Cookies, Serialization, Session State, HTML5 Web Storage, Caching.

XML Processing and Web Services: XML Processing, JSON, Overview of Web Services. Content Management Systems, Search Engines, Social Networks and Analytics.

TEXT BOOK:

 Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development", 2nd Edition, Pearson Education India, 2018.

REFERENCE BOOKS:

- 1. Robin Nixon, "Learning PHP, MySQL &JavaScript with jQuery, CSS and HTML5", 4thEdition, O'Reilly Publications, 2015. (ISBN:978-9352130153)
- Luke Welling, Laura Thomson, "PHP and MySQL Web Development", 5th Edition, Pearson Education, 2016. (ISBN:978-9332582736)
- Nicholas C Zakas, "Professional JavaScript for Web Developers", 3rd Edition, Wrox/Wiley India, 2012. (ISBN:978-8126535088)
- David Sawyer Mcfarland, "JavaScript & jQuery: The Missing Manual", 1st Edition, O'Reilly/Shroff Publishers & Distributors Pvt Ltd, 2014 (ISBN: 978-9351108078)

9 hrs

9 Hrs

5. Zak Ruvalcaba Anne Boehm, "Murach's HTML5 and CSS3", 3rdEdition, Murachs/Shroff Publishers & Distributors Pvt Ltd, 2016. (ISBN:978-9352133246)

Mapping :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3	3	1	3								3	2
C02	3	2	3	2	3								3	2
C03	3	3	1	1	3								3	3
C04	3	3	2	3	1								3	1
Average	3	2.75	2.25	1.75	2.5								3	2
Level of Correlati on	3	3	2	2	3								3	2

3- High mapping

2-Medium Mapping

1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) III B.Tech I Semester CSO (Common to CSE, IT, CSE (DS), CSE (AI & ML)) III B.Tech I Semester EEE(Open Elective-I) IV B.Tech I Semester ME(Open Elective-I)

20ACS17	COMPUTER NETWORKS	L	Т	Р	С
		3	0	0	3

Course Outcomes:

At the end 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

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

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

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

10 hrs

13 hrs

UNIT-IV

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

UNIT-V

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

TEXT BOOK:

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

REFERENCE BOOKS:

- Data Communications and Networking, Fifth Edition, Behrouz A. Forouzan, Tata McGraw Hill,2012.
- Computer Networking: A Top ,Down Approach Featuring the Internet, Six Edition, James F. Kurose, K.W. Ross, Pearson Education,2013
- Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning, 2001.

Mapping :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3												3	2
C02	3	3	2										3	1
C03	3	3	3	1									3	2
C04	3	3	3	1									3	2
C05	3	3											3	1
Average	3	3	2.66	1									3	2
Level of Correla Tion	3	3	2	1									3	2

3- High mapping

2-Medium Mapping

1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) III B.Tech I Semester CSO

20ACO02SENSORS AND ACTUATORSLTPC(Professional Elective -I)3003

Course Outcome:

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

1. Classify different Sensors & Actuators based on various physical phenomena and differentiate their performance characteristics

2. Analyze the working principles of thermal, optical & electric sensors and actuators to interpret their mathematical model

3. Interpret the functional principles of magnetic, thermal & Chemical sensors and actuators to interpret their mathematical model

4. Select the relevant sensors and actuators to design real-time data acquisition from ambience via case studies.

UNIT – I Overview of Sensors and Actuators

The five senses: vision, hearing, smell, taste, and touch – Definitions: Sensors & Actuators – Overview of Sensor and Actuator classifications – Performance characteristics of Sensors & Actuators: Transfer Function, Range, Span, Input and Output Full Scale, Resolution, and Dynamic Range - Calibration & Reliability

Temperature Sensors and Thermal Actuators: Thermoresistive sensors: Thermistors, Resistance temperature, and silicon resistive sensors – Thermoelectric sensors – Other Temperature sensors: Optical and Acoustical – Thermomechanical Sensors and Actuators – Case study: Breath analyzer using temperature.

UNIT – II Optical Sensors and Actuators

Principles of Optics: Optical units – Quantum effects – Quantum-based Optical sensors – Photoelectric sensors – Charge coupled device (CCD) based – Thermal-based Optical sensors – Active infrared (AFIR) sensors – Optical Actuators – Case study: Liquid Level Indicator using Optical Sensors

Electric and Magnetic Sensors and Actuators: Principles of Electric and Magnetic fields: Basic units – The Electric field: Capacitive Sensors & Actuators – Magnetic sensors and actuators – Magnetoresistance – Magnetostrictive Sensors and Actuators – Magnetometers – Magnetic actuators: Voice Coil Actuators, Motors as Actuators & Magnetic Solenoid Actuators and Magnetic Valves – Case Study: Speed sensing and odometer in a car using smart sensors.

UNIT – III Mechanical Sensors and Actuators

Definitions and units – Force Sensors: Strain Gauges, Semiconductor Strain Gauges & Tactile Sensors – Accelerometers: Capacitive Accelerometers, Strain Gauge Accelerometers & Magnetic Accelerometers – Pressure Sensors: Mechanical, Piezo resistive, Capacitive & Magnetic – Velocity sensing – Inertial sensors and actuators: Mechanical or Rotor & Optical Gyroscopes – Case study: Tire-pressure monitoring system using smart sensors.

UNIT – IV Acoustic Sensors and Actuators

Definitions and units – Elastic waves and their properties – Microphones: Carbon, Magnetic, Ribbon and Capacitive Microphones – Piezoelectric effect – Piezoelectric Sensors – Acoustic Actuators: Loudspeakers, Headphones and Buzzers - Magnetic and Piezoelectric – Ultrasonic sensors and actuators – Case Study: Ultrasonic parking system.

10 Hrs

10 Hrs

9 Hrs

9 Hrs

UNIT – V Chemical Sensors and Actuators

Chemical units and Definitions – Electrochemical sensors: Metal Oxide Sensors and Solid Electrolyte Sensors – Potentiometric smart sensors: Glass Membranes, Soluble Inorganic Salt Membrane and Polymer - Immobilized Ionophore Membranes sensors – Thermochemical, Optical, Mass humidity gas sensors – Chemical Actuators: The Catalytic Converter - The Airbag System using smart sensors – Case study: Water quality monitoring system - Contemporary Issues.

TEXT BOOKS:

1. Nathan Ida, "Sensors, Actuators and their Interfaces - A Multidisciplinary Introduction", 2020, 2nd Edition, IET, United Kingdom.

REFERENCE BOOKS:

- 1. Jacob Fraden, "Handbook of Modern Sensors Physics, Designs, and Applications", 2016, 5th Edition, Springer, Switzerland.
- 2. Subhas Chandra Mukhopadhyay, Octavian Adrian Postolache, Krishanthi P. Jayasundera, Akshya K. Swain, "Sensors for Everyday Life Environmental and Food Engineering", 2017, Volume 23, Springer, Switzerland.

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

MAPPING

3-High mapping

2-Medium Mapping

1-Low Mapping

9 Hrs

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

III B.Tech I Semester CSO (Common to CSE,IT,CSO,CSD)

20AIT13SOFTWARE PROJECT MANAGEMENTLTPC3003

COURSE OUTCOMES:

After Completion of the course the student will be able to:

1.Implement a project to manage project schedule, expenses and resources of application.

2.Obtain adequate knowledge about software process models and software effort estimation techniques.

3.Design and develop project plans to address real-world management challenges.

4.Aware of project management theories, tools, techniques and methods to manage the software projects at each stage of software development life cycle.

5.Understand modern software project management principles as a member and leader in a team to manage the projects.

UNIT I : INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9 Hrs

Manage your people – Managing project culture – Managing good people – Making good peoplebetter – Leading good people – Implement your process – Putting a process in implementing a process – Adopting an agile process – Assessing a process – Leverage your tools – Choosing tools –Training to use tools – Leveraging tools – Use your measurements – Selecting measurements – Planning measurement – Leveraging measurement.

UNIT II PROJECT LIFE CYCLE ANDEFFORTESTIMATION

Software process and Process Models – Choice of Process models - Rapid Application development – Agile methods – Dynamic System Development Method – Extreme Programming–Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II - a Parametric Productivity Model.

12Hrs

UNIT III ARTIFACTS OF THE PROCESS AND MODEL BASED SOFTWARE ARCHITECTURES 10 Hrs

The artifact sets - Management artifacts - Engineering artifacts - Programmatic artifacts - Model based software architectures - A management perspective and technical perspective - Workflows of the process - Software process workflows - Iteration workflows - Check points of the process - Major milestones - Minor milestones - Periodic status assessments.

UNIT IV ITERATIVE PROCESS PLANNING- PROJECT ORGANIZATIONS ANDRESPONSIBILITIES 12 Hrs

Work breaks down structures - Planning guidelines – The cost and schedule estimating process – The iteration planning process - Pragmatic planning -Line of business organizations - Project organizations – Evolution of organizations – Process automation-Automation building blocks-The project environment.

UNIT V PROJECT CONTROL AND PROCESSINSTRUMENTATION 9Hrs

The seven-core metrics - Management indicators - Quality indicators - Life cycle expectations - pragmatic software metrics - Metrics automation - Tailoring the process - Process Discriminates-Example.

TEXT BOOKS:

- 1. Software Project Management, 1/e, Walker Rayce, 1998, PEA, NewDelhi.
- 2. Software Project Management, 2/e, Henrey, 2009, Pearson Education, NewDelhi.

REFERENCE BOOKS:

1. Software Engineering Project Management, 2/e, Richard H. Thayer, 1997, IEEE Computer Society, US.

- 2. Software Engineering and Management, 2/e, Shere K. D 1998, PHI, NewDelhi.
- 3. Software Project Management: A Concise Study, 2/e, S. A. Kelkar ,2009, PHI, NewDelhi.
- 4. Software Project Management, 5/e, Hughes Cotterell, 2011, TMH, India.
- 5. Software Project Management, 1/e, Mohapatra S 2011, Penguin Books Ltd, London, UK.

Mapping:

РО	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO														
CO1	3	3	3	3	-	-	-	-	-	-	-	-	2	2
CO2	3	3	-	-	-	-	-	-	-	-	-	-	2	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	2	3
CO4	3	3	3	3	2	-	-	-	-	-	-	-	3	2
CO5	2	2	-	-	_	_	_	_	_	-	-	_	2	2

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) III B.Tech I Semester CSO

20ACO03

DATA SCIENCE FOR ENGINEERS

L T P C 3 0 0 3

(Professional Elective -I)

Course Outcomes:

1. Describe a flow process for data science problems (Remembering)

2. Classify data science problems into standard typology (Comprehension)

3. Develop R codes for data science solutions (Application)

4. Correlate results to the solution approach followed (Analysis)

5. Assess the solution approach (Evaluation)

Unit I:

9 hours

Introduction to DS,ML and AI:- Definitions of DS and MI,What is learntt in ML algorithms? How does learning happen in ML? Decision making in ML.Discussion on AI.Why are ML & AI Techiniques effective? **DS & ML Fundamental Concepts:-**Classification and Function Approximation, Model Forms, Training Philosophy. Generality of Data Science/Machine learning Solutions'

Examples of Function approximation:

i)Predicting materials property for different chemicals.

ii)Predicting scores in a game of cricket

Examples of Classification Problem:

i)Fraud detection in credit card transaction

ii) Distinguishing objects - in a self driven cars.

Data classification & Data Imputation

Unit II:

9 hours

Linear algebra for DS & ML:-Matrices as a concept for data Organization, Matrix view of Linear Algebra, Fundamental Subspaces, Dat science and fundamental, Solving Linear equations – Multiple views, orthogonality Projections and Hyper plans. Eigen valves, Eigen vectors and SVD.

Unit III:

Optimization for DS and ML:- Elements of optimization formulation Discussion on objective functions for classification.First and second order analytical conditions for optimalityof unconstrained NLPs,Numerical approaches to solve optimization problem,Alternate learning algorithm.,Impact of non convexityon ML Algorithms. Handling constraints,Dynamic Programming

Unit IV:

Statistical foundations for DS and ML:-Decomposition of Data Matrix into Model and uncertainty matrices,Uncertainty Characterization,Random variables and probability Mass functions,Deriving Model Probablity Distribution function.Prperties of probability distribution function,Qualitative validation of random variables.Estimating parameters of distribution.

Unit V:-

Sampling Distributions:- Important Sampling Distributions, Determining quality of Estimates, Hypothesis testing. Distributions of multiple related random Variables. Function approximation methods (PCA & K-NN)

9 hours

9 hours

9 hours

Text Book:-

1. Data Science for Engineers:-Rengaswamy, Raghunathan, Suresh,

Reference Books:-

- 1. INTRODUCTION TO LINEAR ALGEBRA BY GILBERT STRANG
- 2. APPLIED STATISTICS AND PROBABILITY FOR ENGINEERS BY DOUGLAS MONTGOMERY

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2											3	1
CO2	3	3	2	2	2								3	
CO3	3												3	2
CO4	3	3											3	1
Average	3	2.66	2	2	2								3	1.33
Level of Correlati on	3	3	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 CSO (Common to CSE,IT)-PE-I III B.Tech I Semester ME(Open Elective-I) III B.Tech II Semester CE(Open Elective-II)

20ACS21	COMPUTER GRAPHICS	L 3	Т 0	Р 0	С 3

(Professional Elective -I)

COURSE OUTCOMES:

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

- 1. Demonstrate different computer graphics applications and standards.
- 2. Design algorithms to render different geometric shapes like line, circle, and ellipse and Appreciate illumination and color models.
- 3. Analyze the issues in projecting graphical objects and identify solutions
- 4. Compare different 2D, 3D viewing and clipping techniques.
- 5. Develop solutions to problems related to computer graphics and animations by creating, rendering and projecting the Graphical object.

UNIT-I

Introduction: Basic concepts, Application areas of Computer Graphics, overview of graphics systems, Video-display devices, Raster-scan systems, Random-scan systems, Graphics monitors and work stations and input devices, graphics standards.

UNIT-II

Output primitives: Points and lines, line drawing algorithms – DDA, Bresenham's, midpoint circle Generating Algorithm-Ellipse Generating Algorithms, Filled area primitives, Scan line polygon fill algorithm, inside-outside tests, boundary-fill and flood-fill algorithms.

UNIT-III

2D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2D viewing: The viewing pipeline, Window-to-Viewport coordinate transformation, viewing functions, Cohen-Sutherland line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT-IV

Three Dimensional Concepts: 3,D Display method, 3,D object representation: Polygon surfaces, Curved lines and surfaces, quadric surfaces, spline representation, Bezier curve and

8 Hrs

10 Hrs

10 Hrs

10 Hrs

B-spline curves, Beizer and B-spline surfaces, Hermite curve.

3D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3D Viewing: Viewing pipeline, viewing coordinates, projections, clipping.

UNIT-V

8Hrs

Color Model and its Applications: RGB Color Model, YIQ Color Model, CMY Color Model ,HSV Color Model .**Computer animation:** Design of animation sequence, General Computer animation Function, Raster animations, Key-Frame Systems, Morphing, motion specifications, Direct Motion specifications , Kinematics and Dynamics.

TEXT BOOKS:

1. Donald Hearn and M.Pauline Baker,"*Computer Graphics C version*",2ndedition,

, PearsonEducation,1997.

2. Foley, VanDam, Feiner and Hughes ,"*Computer Graphics Principles & practice*", second editionin C, Pearson Education,1995.

REFERENCE BOOKS:

1. Steven Harrington," Computer Graphics", TMH, 1983

2. Zhigandxiang, Roy Plastock ,"Computer Graphics Second edition", Schaum's

outlines, Tata Mc, Graw hill edition, 2000.

Mapping:

СО	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO
	1	2	3	4	5	6	7	8	9	0	1	2	1	2
CO1	3	2											3	1
CO2	3	3	3										3	
CO3	3	3	2	2									3	1
CO4	3	3	1	1									2	2
CO5	3	2	2	2	2								3	3
Average	3	2.6	2	1.67	2								2.8	1.75
Level of Correlati on	3	3	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 CSO**

IOT AUTOMATION

(Professional Elective -I)

20ACO04

Course Outcomes:

- 1. Discover key IIoT concepts including identification, sensors, localization, wireless protocols, data storage and security
- 2. Explore IoT technologies, architectures, standards, and regulation
- 3. Realize the value created by collecting, communicating, coordinating, and leveraging the data from connected devices
- 4. Examine technological developments that will likely shape the industrial landscape in the future
- 5. Understand how to develop and implement own IoT technologies, solutions, and applications

UNIT - I: Introduction & Architecture:

What is IIoT and the connected world? the difference between IoT and IIoT, Architecture of IIoT, IOT node, Challenges of IIOT. Fundamentals of Control System, introductions, components, closed loop & open loop system.

UNIT - II: IIOT Components:

Introduction to Sensors (Description and Working principle): What is sensor? Types of sensors, working principle of basic Sensors -Ultrasonic Sensor, IR sensor, MQ2, Temperature and Humidity Sensors (DHT-11). Digital switch, Electro Mechanical switches.

UNIT - III: Communication Technologies of IIoT: 10 Hrs

Communication Protocols: IEEE 802.15.4, ZigBee, Z Wave, Bluetooth, BLE, NFC, RFID Industry standards communication technology (LoRAWAN, OPC UA, MQTT), connecting into existing Modbus and Profibus technology, wireless network communication.

UNIT – IV: Visualization and Data Types of IIoT:

Front-end EDGE devices, Enterprise data for IIoT, Emerging descriptive data standards for IIoT, Cloud database, Cloud computing, Fog or Edge computing. Connecting an Arduino/Raspberry pi to the Web: Introduction, setting up the Arduino/Raspberry pi development environment, Options for Internet connectivity with Arduino, Configuring your Arduino/Raspberry pi board for the IoT.

UNIT - V: Retrieving Data: Extraction from Web:

Grabbing the content from a web page, Sending data on the web, Troubleshooting basic Arduino issues, Types of IoT interaction, Machine to Machine interaction (M2M). Control & Supervisory Level of Automation: Programmable logic controller (PLC), Real-time control system, Supervisory Control & Data Acquisition (SCADA). HMI in an automation process, ERP MES.

10 Hrs

LTPC

0 3

3 0

9 Hrs

12 Hrs

12 Hrs

- 1. The Internet of Things in the Industrial Sector, Mahmood, Zaigham (Ed.) (Springer Publication)
- 2. Industrial Internet of Things: Cyber manufacturing System, Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat (Springer Publication)
- 3. Industrial IoT Challenges, Design Principles, Applications, and Security by Ismail Butun (editor)

REFERENCE BOOK:

1. Jerker Delsing, IoT Automation: Arrowhead Framework, CRC Press.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	2								3	1
CO2	3	3	2	2	3								3	2
CO3	3	3	2	2	3								3	3
Average	3	2.66	2	1.66	2.66								3	2
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) III B.Tech I Semester CSO (Common to CSE,IT,CSE(DS),CSE(AI &ML))

20AEC31

DIGITAL LOGIC DESIGN

L T P C 3 0 0 3

(Open Elective I)

Course outcomes:

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

- 1. understand the number system and boolean algebra functions.
- 2. Implement various logic gates using boolean expressions.
- 3. Design combinational and sequential circuits for various Digital IC applications.
- 4. LSI and MSI circuits using programmable logic devices (PLDs)

UNIT- I NUMBER SYSTEM & BOOLEAN ALGEBRA

Digital systems, Binary Numbers, Octal Numbers, Hexadecimal Numbers, Number base conversions, complements of numbers, Signed Binary numbers, Binary Arithmetic: addition, subtraction, multiplication, division Binary codes. Boolean algebra – Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, other logic operations & Digital logic gates.

UNIT-II GATE LEVEL MINIMIZATION

The map method, four variable K-map, five variable K-map, POS & SOP Simplification, Don't care conditions, NAND & NOR Implementation, other two-level Implementations, Exclusive-OR Function.

UNIT-III COMBINATIONAL CIRCUITS

Combinational circuits, Analysis & Design procedure, Binary Adder and Subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers, De-multiplexers, Code Converters, priority encoders, Realization of Switching Functions Using PROM, PAL and PLA

UNIT-IV SEQUENTIAL CIRCUITS

Sequential Circuits, Latches, Flips-Flops, Conversion of Flip Flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters –Registers, Shift Registers, Ripple Counters, Synchronous counters, Design of modulo-N Counters, Ring and Johnson Counters

UNIT-V MEMORIES

Random - Access Memory, Memory Decoding, Error Detection and correction, Read - OnlyMemory, Programmable Logic Array(PLA), Programmable Array Logic(PAL), Sequential Programmable Devices.

TEXT BOOKS:

- 1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.
- 2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

- 1. Digital Logic and Computer Design, M.Morris Mano, PEA.
- 2. Digital Logic Design, Leach, Malvino, Saha, TMH.
- 3. Modern Digital Electronics, R.P. Jain, TMH.

mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2												
CO2	2	2	3	1										
CO3	3		2											
CO4	2	2	1	3										
Average	2.5	2	2	2										
Level of Correlation	3	2	2	2										

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech - I – Semester ECE (OE-III) III B.Tech I Semester CSO (Common to CSE, IT,CSD , CSO,CSM & EEE) III B.Tech - I – Semester ME (PE-I)

20AME18 ROBOTICS AND ARTIFICIAL INTELLIGENCE L T P C 3 0 0 3

(Open Elective I)

Course Outcomes:

After completion of the course, the students will be able to

- 1. Demonstrate the knowledge in an application of AI, and select strategies based on application requirement.
- Describe the basic concepts of robotics and its importance in the modern world and classification of robots and its end effectors for typical manufacturing industry and service sector.
- 3. Summarize the perception about robot components, actuators, sensors and machine vision.
- 4. Analyze the manipulator kinematics, dynamics for typical robots which will be used for complex operations and analyze the path planning for typical robots.
- 5. Choose a program that the robot can integrate with the manufacturing system to produce quality products with minimum cost with optimum usage of resources.

UNIT: I Introduction of AI

Artificial Intelligence: Introduction to Artificial Intelligence (AI), History. AI techniques, LISP programming, AI and Robotics, LISP in the factory, sensoring and digitizing function in machine vision, image processing and analysis, training and vision system. Intelligent Agents: Agents and Environments, the Concept of Rationality, the Nature of Environments, the Structure of Agents.

UNIT: II Introduction to Robotics

Automation versus Robotic technology, Laws of robot, Progressive advancements in Robots, Robot Anatomy, Classification of robots-coordinate method, control method; Specification of robots. Classification of End effectors – Tools as end effectors, Mechanical-adhesive -vacuum-magnetic-grippers.

UNIT: III Robot Actuators, Sensors and Machine Vision 12 hours

Robot Actuators and Feedback Components: Actuators - Pneumatic and Hydraulic actuators, electric & stepper motors, comparison. Position sensors, resolvers, encoders, velocity sensors, tactile sensors, Proximity sensors, Slip Sensor, Range Sensor, Force Sensor.

Machine Vision: Camera, Frame Grabber, Sensing and Digitizing Image Data Signal Conversion, Image Storage, Lighting Techniques, Image Processing and Analysis-Data Reduction, Segmentation,

10 hours

10 hours

Feature Extraction, Object Recognition, Other Algorithms, Applications, Inspection, Identification,

Visual Serving and Navigation.

UNIT:4 Manipulator Kinematics and Trajectory Planning 10 hours

Mathematical representation of Robots - Position and orientation, Homogeneous transformations - D-H notation, Forward and inverse kinematics. Manipulator dynamics, Differential transformation, Jacobeans.

Trajectory planning and avoidance of obstacles, path planning, joint integrated motion – straight line motion, basics of trajectory planning, polynomial trajectory planning.

UNIT:5 Robot Applications and Programming

Robot Application in Manufacturing: Material Transfer, Material handling, loading and unloading, Processing, spot and continuous arc welding & spray painting, Assembly and Inspection.

Robot Programming: Types, features of languages and software packages.

Textbook(s)

- 1. M.P. Groover, Industrial Robotics, Second Edition, New Delhi, Tata McGraw Hill, 2017.
- 2 R.K. Mittal & I.J.Nagrath, Robotics and Control, New Delhi, 3rdEdition, Tata McGraw Hill, 2017.
- 3 John J.Craig, Introduction to Robotics Mechanics and Control, Third edition, Pearson Education, 2009.

Reference Books

1 Ashitava Ghoshal, Robotics-Fundamental Concepts and Analysis', Oxford University Press, Sixth impression, 2010.

K.S. Fu, Robotics, New Delhi, 3rd Edition, Tata McGraw Hill, 2008.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3												2	1
CO2	3												2	
CO3	3	3	3											
CO4	3	3	3	3										
CO5	3	3												
Aver a ge	3	1.8	1.2	0.6									2	1
Leve l of corre l ation	3	2	1	1									2	1

Mapping:

3-High mapping

2-Medium Mapping

1- Low Mapping

8 hours

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS) III B.Tech –I Semester (CSE,IT,CSE(DS), CSE (AI&ML) & CSO

20ACE35INTEGRATEDWASTE MANAGEMENT FOR SMART CITYLTPC3003

(Open Elective – I)

Course Outcomes:

After the completion of the course, the students will be able to

- 1. Comprehend the current issues and management in solid waste.
- 2. Choose the best method of managing the Municipal solid waste.
- 3. Analyse the various disposal methods of solid waste to choose the best method.
- 4. Appreciate various processes of Managing the construction and demolition waste.
- 5. Explicate into the issues and scope of electronic waste management

UNIT I INTRODUCTION TO SOLID WASTE MANAGEMENT

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 MUNICIPAL SOLID WASTE MANAGEMENT

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

UNIT III DISPOSAL OF MUNICIPAL SOLID WASTE

Landfill, Biochemical Processes and Composting, Energy Recovery from Municipal Solid Waste. Municipal Solid Waste (MSW) Rules 2016.

UNIT IV 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 ELECTRONIC WASTE (E-WASTE) MANAGEMENT

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

- 1. William A Worrell and P. AarneVeslind, "Solid Waste Engineering", 2nd Edition Cengage Learning,2012(ISBN-13:978-1-4390-6217-3)
- 2. George Tchobanoglous, Hilary Theisen and Samuel A Vigil, "Integrated Solid Waste Management", Tata Mc GrawHill, 1993.
- 3. The Central Public Health and Environmental Engineering Organization (CPHEEO), "Manualon Solid Waste Management", India, 2016.

REFERENCES

- 1. "MunicipalSolidWasteManagementRules2016", CentralPollutionControlBoard, 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 EnvironmentandForest and Climate Change, Govt. ofIndia, 2016.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	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	
Average	3					3	3					3	3	
Level of Correlation of the Course	3					3	3					3	3	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) III B.Tech I Semester CSO & CSE IV B.Tech I Semester IT(Honors degree)

20ACS23

SOCIAL NETWORK ANALYSIS

L T P C 3 0 0 3

(Job Oriented Elective I)

Course Outcomes:

After completion of this course, students will be able to:

- 1. Understand the concept of semantic web and related applications.
- 2. Learn knowledge representation using ontology.
- 3. Understand human behaviour in social web and related communities.
- 4. Learn visualization of social networks.

UNIT I INTRODUCTION

Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web -Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis -Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities - Web-based networks.

UNIT II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation - Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships -Aggregating and reasoning with social network data - Advanced representations

UNIT III EXTRACTION AND MINING COMMUNITIES IN SOCIAL NETWORKS

9 hrs

9 hrs

9hrs

Extracting evolution of Web Community from a Series of Web Archive – Detecting communities in social networks - Definition of community – Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities - Decentralized online social networks - Multi Relational characterization of dynamic social network communities.

UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

9 hrs

Understanding and predicting human behaviour for social communities - User data management -Inference and Distribution - Enabling new human experiences - Reality mining - Context -Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation – Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

UNIT VVISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS 9 hrs

Graph theory - Centrality - Clustering - Node-Edge Diagrams – Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams – Hybrid representations - Applications - Cover networks - Community welfare -Collaboration networks - Co-Citation networks.

TEXT BOOKS:

Peter Mika, "Social Networks and the Semantic Web", First Edition, Springer 2007. (UNIT I,II)
Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition,
Springer, 2010. (UNIT III,IV,V)

REFERENCES:

1. Guandong Xu , Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition Springer, 2011.

2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.

3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social

Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.

4. John G. Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009

Mapping:

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3											3	1
CO2	3	3											3	1
CO3	3	3											3	2
CO4	3	3	1	1	1								3	2
Average	3	3	1	1	1								3	1.5
Level of Correlatio n	3	3	1	1	1								3	2

3-High mapping

2-Medium Mapping

1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) III B.Tech I Semester CSO & CSE

20ACS24 Kivy-INTERACTIVE APPLICATIONS AND L T P C GAMES IN PYTHON 3 0 0 3 (Job Oriented Elective-I)

Course Outcomes:

After completion of the course the student will be able to

- 1. Apply basic widget and binding actions to build an interface
- 2. Understanding basic shapes to create an effective graphics canvas
- 3. Apply the screen manager techniques to improve user experience on multitouching.
- 4. Apply the Invaders Revenge to build an interactive multitouch game.

UNIT-I GUI BASICS AND GRAPHICS 6 hrs

Basic widgets- labels and buttons, Layouts, Embedding Layouts, Comic creator. Basic shapes, Images, Colors and backgrounds, Rotating, translating and scaling; comic creator- PushMatrix and PopMatrix.Case study on "Building a clock App".

UNIT-II WIDGET EVENTS-BINDING ACTIONS 8 hrs

Attributes, id and root; Basic widget event- dragging the stickman; Localizing coordinates – adding stickmen; Binding and unbinding events- sizing limbs and heads; Binding events in the Kivy languge; Creating your own events- the magical properties; Kivy and properties. Case study on "Building a Paint App"

UNIT-III IMPROVING THE USER EXPERIENCE 9 hrs

Screen manager – selecting colours for the figures; Colour control on the canvas- colouring figures; stencil View-limiting the drawing space;scatter-multitouching to drag, rotate and scale; Recording gestures-line, circles and cross; Simple gestures-drawing with the finger, Behaviors-enhancing widget's functionality, style-decorating the interface, Factory-replacing a vertex instruction. Case study on "Kivy Networking"

UNIT-IV INVADERS REVENGE-AN INTERATIVE MULTITOUCH GAME 9 hrs

Invaders Revenge – an animated multitouch game; Atlas-efficient management of images; Boom-Simple sound effects, Ammo – Simple Animation; Invader – transitions for animations; Dockautomatic binding in the kivy language; Fleet-Infinite concatenation of animation; Scheduling events with the clock; Shooter-multitouch control; Invasion – moving the shooter with the keyboard; Combining animation with '+' and '&'.Case study on "Making a remote desktop APP".

UNIT-V KIVY PLAYER

Video-Play, pause and stop, Asyncimage- creating a cover for the video, Subtitles – tracking the video progression, Control bar- adding buttons to control the video, Slider-including a progression bar, Animation-hiding a widget, Kivy inspector-debugging interface, Actionbar-a responsive bar, LoadDialog-displaying a directory of files, scrollview-displaying a list of videos.Search-query the TED developer API. Case study on "Making the 2048 game".

TEXT BOOKS:

1. Kivy–Interactive Applications and Games in Python. Ulloa, Roberto. Packt Publishing Ltd, 2015.

2. Kivy: interactive applications in python. Ulloa, Roberto Packt Publishing Ltd, 2013.

3. Beginning Python Games Development: With Pygame. McGugan, Will, and Harrison Kinsley. Apress, 2015.

REFERENCE BOOKS:

1. A python book: Beginning python, advanced python, and python exercises. Kuhlman, Dave. Lutz:

Dave Kuhlman, 2009.

2. The quick Python book. Ceder, Naomi. Simon and Schuster, 2018.

3. Making Games with Python & Pygame. Sweigart, Al. 2012.

Mapping:

CO/P OS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	3	3											2	1
CO2	3	3	2	1	2								2	2
CO3	3	2	1	2	2								3	
CO4	3	2	1	-	2-								2	2
Average	3	2.5	1.33	1.5	2								2.25	1.66
Level of Correla tion	3	3	1	2	2								2	2

3 -High mapping

1- Low Mapping

9 hrs

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLO (AUTONOMOUS) III B.Tech I Semester CSO (Common to CSE, IT, CSE (DS), CSE (AI & ML)) 20ACS25 WEB TECHNOLOGIES LAB L T P C

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3

1.5

Course Outcomes:

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

- 1. Design web pages using HTML and CSS.
- 2. Create dynamic webpage by applying server and server side scripting languages
- 3. Apply database connectivity for storing and retrieving data from database through Web page

LIST OF EXPERIMENTS

Week 1:

1. Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient.

Week 2:

2. Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.

Week 3:

3. Write a JavaScript code that displays text TEXT-GROWING with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays TEXTSHRINKING in BLUE color. Then the font size decreases to 5pt.

Week 4:

4. Develop and demonstrate a HTML5 file that includes JavaScript script that uses functions for the following problems:

- 1. Parameter: A string
- 2. Output: The position in the string of the left-most vowel
- 3. Parameter: A number
- 4. Output: The number with its digits in the reverse order

Week 5:

5. Design an XML document to store information about a student in SVCET College. The information must include USN, Name, and Name of the College, Programme, Year of Joining, and

email id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.

Week 6:

6. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.

Week 7:

7. Write a PHP program to display a digital clock which displays the current time of the server.

Week 8:

8. Write the PHP programs to do the following:

- 1. Implement simple calculator operations.
- 2. Find the transpose of a matrix.
- 3. Multiplication of two matrices.
- 4. Addition of two matrices.

Week 9:

9. Write a PHP program named states.py that declares a variable states with value "Mississippi Alabama Texas Massachusetts Kansas". Write a PHP program that does the following:

1. Search for a word in variable states that ends in xas. Store this word in element 0 of a list named statesList.

- 2. Search for a word in states that begins with k and ends in
- 3. Perform a case-insensitive comparison. [Note: Passing re.Ias a second parameter to method compile performs a case-insensitive comparison.] Store this word in element1 of statesList.
- 4. Search for a word in states that begins with M and ends in
- 5. Store this word in element 2 of the list.
- 6. Search for a word in states that ends in
- 7. Store this word in element 3 of the list.

Week 10:

10. Write a PHP program to sort the student records which are stored in the database using selection sort.

Week 11:

11. Case Study Schemas (i.e., the tables and their relationships)

- 1. Travel Photo Sharing Database
- 2. Art database schema
- 3. Book CRM Database

Week 12:

12. Case studies:- Practice sessions on Node.js and AngularJS.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3	3	2	2								3	
C02	3	3	3	2	1								2	1
C03	3	3	3										3	
Average	3	3	3	2	1.5								2.66	1
Level of Correlati on	3	3	3	2	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 CSO (Common to CSE, IT, CSE (DS), CSE (AI & ML))

20ACS26

COMPUTER NETWORKS LABLTPC0031.5

Course Outcomes:

At the end 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 network performances.

LIST OF EXPERIMENTS

- 1. Implementation of the Data Link Layer Framing methods Character Stuffing and Bit stuffing.
- 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 Routing algorithm 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/IP Configuration).

10. Design and analyze the performance of a set of local area networks interconnected by switches 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.

Mapping:

	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 Correlati on	3	3	3	3	2								3	1

3 -High mapping

2-Medium Mapping 1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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

20AHS16 ADVANCED ENGLISH COMMUNICATION SKILLS L T P C 1 0 2 2

Course Outcomes:

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

- 1. Understand language fluency through conversational practices and demonstrate appropriate body language during communication.
- 2. Apply synonyms, antonyms, one-word substitutes, prefixes and suffixes to develop vocabulary to comprehend 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 & Phrases and Collocations.

UNIT-II

READING COMPREHENSION: General vs. Local Comprehension, Reading for Facts,

Guessing meanings from Context, Skimming, Scanning and inferring meaning.

UNIT-III

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

9 Hours

9 Hours

9 Hours

9 Hours

UNIT-V Hours

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

References:

- Kumar Sanjay, Pushpa Lata. English for Effective Communication,Oxford University Press, 2015.
- Konar Nira, English Language Laboratories A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011.

Mapping:

	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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS) III B. Tech I Semester (Common to All Branches)

20AHS21	INDIAN CONSTITUTION	L	Т	P	С
		2	0	0	0

Course Outcomes:

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

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

UNIT-I

Hours

PREAMBLE AND ITS PHILOSOPHY: Introduction to Indian Constitution, Evolution of Indian Constitution, preamble and its philosophy.

UNIT-II

Hours

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

UNIT-III

Hours

FEDERALISM IN INDIA: 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

Hours

JUDICIARY AND PUBLIC SERVICES: The Union Judiciary - Supreme Court and High Court; Fundamental Rights and Duties All India Services - Central Civil Services -State Services

5

5

6

6

- Local Services.

UNIT-V

Hours

INTERNATIONAL PARTICIPATION: 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.

TEXT BOOK:

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

REFERENCE BOOKS:

1. Mahendra Pal Singh, V. N. Shukla, Constitution of India, Eastern Book Company, 2011.

2. J. N. Pandey, Constitutional Law of India - Central Law Agency, 1998

Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	2					3								
CO2						3								
CO3						3								
CO4						3		3						
Average	2					3		3						
Level of correlation	2					3		3						

3-High Mapping

2- Medium Mapping

1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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

С Т Р L 20AHS17 **QUANTITATIVE APTITUDE AND REASONING-III** 0 2 0 0

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

QUANTITATIVE ABILITY V: 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 9 Hours **UNIT-II**

QUANTITATIVE ABILITY VI: 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: Puzzles - Cubes & Dices - Algebra - Selection Decision table - Visual reasoning - Inequalities

UNIT-IV

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

Text Books:

1. Quantitative Aptitude, Logic Reasoning & Verbal Reasoning, R S Agarwal, S. Chand Publications.

9 Hours

9 Hours

9 Hours

9 Hours

2. Quantitative Aptitude for Competitive Examinations, R S Agarwal, S. Chand Publications

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1								-				
CO2	2	2								2				
CO3	2									2				
Average	2	1.5								2				
Level of correlation	2	2								2				

3-High Mapping LowMapping 2- Medium Mapping 1-

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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

20AHS18	FRENCH LANGUAGE	L	Т	P	С
		2	0	0	0

Course Outcomes:

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

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

UNIT-I

INTRODUCTION & PRESENTATION: 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.

UNIT-II **RENDEZVOUS:** Conversation, approaching someone, Tele conversation, Buying a train ticket, Numbers the formula to write a post card, Culture and Life in France.

UNIT-III

AGENDA & INVITATION: 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.

UNIT-IV

VACATION & SHOPPING: 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. **UNIT-V 10 Hours**

ITINERARY, EXCURSION & WEEKEND: Asking for & giving directions, Giving order / advice

9 Hours

8 Hours

8Hours

10 Hours

/ 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: favor & against, A French Weekend. **Text Books:**

- 1. CAMPUS 1 Method de Francais, Jacques Pecheur et Jacky Girardet, CLEInternational 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.

MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3								3	3				
CO2	2								3	3				
CO3	2								3	3				
Average	2								3	3				
Level of correlatio n	2.25								3	3				

3-High Mapping

2- Medium Mapping

1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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

20AHS19	GERMAN LANGUAGE	L	Т	Р	С
		2	0	0	0

Course Outcomes:

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

- 1. Understand fundamental knowledge to learn German language, sounds, pronunciations, sentence structures and the verb conjugation.
- Comprehend and apply the knowledge of vocabulary and phrases in day-to-day reallifeconversation.
- 3. Analyze various sentence structures by examining the rules of grammar in speaking andwriting.
- 4. Demonstrate various verb structures of English and German languageeffectively in professional writing.

UNIT-I

GERMAN SOUNDS: 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.

UNIT-II

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

UNIT-III

GERMAN BASIC GRAMMAR: 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: 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

10 Hours

8 Hours

9 Hours

8 Hours

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

10 Hours

GERMAN ADVANCED COMMUNICATION LEVEL – 1: 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:

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

Reference Books:

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					1				3				
CO2	2									3				
CO3	3					2				3				
CO4	2									3				
Average	2.25					1.5				3				
Level of correlation	2					2				3				

Mapping:

3-High Mapping

2-Medium Mapping

3-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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

20AHS20	JAPANESE LANGUAGE	L	Т	Р	С
		2	0	0	0

Course Outcomes:

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

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

UNIT-I

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 20pronouns, Greetings.

UNIT-II

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

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 'Gaarimasu' 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.

8 Hours

10 Hours

8 Hours

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

9 Hours

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.

Mapping:

	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 correlati on	3									3				
	8-High	Марр	ing		2	- Medi	ium Ma	apping	3	3-Low	Mapp	ing		

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

III B.Tech II Semester CSO IV B Tech I Sem Professional Elective-V CSE(DS), CSE(AI& ML)

20ACO07	IOT COMMUNICATION	LTI	2 (
	PROTOCOL	3 0 0) 3

Course Outcomes:

1. Understand fundamentals of IoT architecture outline and standards.

2. Understand and analyze different architectural views.

3. Understand the importance of IoT Data Link Laver & Network Laver Protocols.

4. Understand the importance of Iot Transport & Session Layer Protocols.

UNIT – I

Introduction: IoT architecture outline, standards - IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service (XaaS), M2M and IoT Analytics.

Unit – II

Iot Reference Architecture: Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant Architectural views. Real-World Design Constraints-Introduction, Technical Design constraints.

UNIT – III 5Hrs IoT Data Link Layer: PHY/MAC Layer (3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART, ZWave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7

UNIT – IV

Network Layer Protocols: Network Layer-IPv4, IPv6, 6LoWPAN, 6TiSCH, ND, DHCP, ICMP, RPL, CORPL, CARP.

UNIT - V

IOT Transport & Session Layer Protocols: Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) - Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT.

TEXT BOOKS:

1. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications ,2016

2. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David

6Hrs

7Hrs

9Hrs

9Hrs

Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",1st Edition, Academic Press, 2015.

REFERENCE BOOKS:

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016.

2. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.

MAPPING

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3											3	3
CO2	3	3	3		1								3	2
CO3	3	3	3		2								3	2
CO4	3	3	3										3	2
Average	3	3	3		1.5								3	2.25
Level of Correlat ion	3	3	3		2								3	2
3-High Mapping			2	2-Mee	dium	Марр	oing	3-L	ow Ma	pping				

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

III B.Tech II Semester CSO

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

20ACO08	COMPUTER VISION AND ROBOTICS	L	Т	Р	С
		3	0	0	3

Pre-Requisites: UG level Course in Linear Algebra and Probability. **Course Outcome:**

1. Implement fundamental image processing techniques required for computer vision.

2. Implement boundary tracking techniques.

3. Apply chain codes and other region descriptors, Hough Transform for line, circle, and ellipse detections.

4. Apply 3D vision techniques and Implement motion related techniques.

5. Develop applications using computer vision techniques.

UNIT – I

CAMERAS: Pinhole Cameras. Radiometry - Measuring Light: Light in Space, Light Surfaces, Important Special Cases. Sources, Shadows, And Shading: Qualitative Radiometry, Sources and Their Effects, Local Shading Models, Application: Photometric Stereo, Interreflections: Global Shading Models. Color: The Physics of Color, Human Color Perception, Representing Color, A Model for Image Color, Surface Color from Image Color.

UNIT – II

Linear Filters: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates. Edge Detection: Noise, Estimating Derivatives, Detecting Edges. Texture: Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesis by Sampling Local Models, Shape from Texture.

The Geometry of Multiple Views: Two Views. Stereopsis: Reconstruction, Human Stereposis, Binocular Fusion, Using More Cameras. Segmentation by Clustering: What Is Segmentation? Human Vision: Grouping and Getstalt, Applications: Shot Boundary Detection and Background Subtraction, Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering.

UNIT – IV

UNIT – III

Segmentation by Fitting a Model: The Hough Transform, Fitting Lines, Fitting Curves, Fitting as a Probabilistic Inference Problem, Robustness. Segmentation and Fitting Using Probabilistic Methods: Missing Data Problems, Fitting, and Segmentation, The EM Algorithm in Practice. Tracking With Linear Dynamic Models: Tracking as an Abstract Inference Problem, Linear Dynamic Models, Kalman Filtering, Data Association, Applications and Examples.

UNIT – V

Geometric Camera Models: Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations. Geometric Camera Calibration: Least-Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account, Analytical Photogrammetry, An Application: Mobile Robot Localization. Model-Based Vision: Initial Assumptions, Obtaining Hypotheses by Pose Consistency, Obtaining Hypotheses by pose Clustering, Obtaining Hypotheses Using Invariants, Verification, Application: Registration In Medical Imaging Systems, Curved Surfaces and Alignment.

9Hrs

9Hrs

9Hrs

9Hrs

9Hrs

TEXT BOOKS:

1. David A. Forsyth and Jean Ponce: Computer Vision – A Modern Approach, PHI Learning (Indian Edition), 2009.

REFERENCE BOOKS:

1. E. R. Davies: Computer and Machine Vision – Theory, Algorithms and Practicalities, Elsevier (Academic Press), 4th edition, 2013.

2. R. C. Gonzalez and R. E. Woods "Digital Image Processing" Addison Wesley 2008.

3. Richard Szeliski "Computer Vision: Algorithms and Applications" Springer-Verlag London Limited 2011.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2											3	2
CO2	3	3	1	1	2								3	2
CO3	3	2	2										3	1
CO4	3	3	3	2	2								3	2
CO5	3	3	3	2	3								3	2
Average	3	2.6	2.25	1. 66	2.33								3	1.8
Level of Correlation	3	3	2	2	3								3	2

3- High mapping

2-Medium Mapping

1- Low Mapping
20ACO09	Programming for IoT Boards	L	Т	Р	С
		3	0	0	3

Course Outcome:

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

1. Investigate various challenges and explore open source hardware prototyping platforms for designing IoT devices

2. Understand basic circuits, sensors and interfacing, data conversion process and shield libraries to interface with the real world

3. Program SBC by exploring protocols, data conversion process, API and expansion boards for practical IoT devices using Python

4. Learn embedded programming constructs and constraints in real time systems for real world socio-economic problems

Unit 1: IoT Ecosystem

Challenges and Levels of implementation - Enabling Technologies - Overview of Processing Elements and Peripherals, Programming for Prototyping Boards, Environment: Board, IDE, shields - Programming: syntax, variables, types, operators, constructs and functions -Sketch: skeleton, compile and upload, accessing pins - debugging: UART communication protocol and serial library

Unit 2: Interfacing for Prototyping Boards

Circuits: design, wiring, passive components - sensors and actuators: interfacing, read and write - software libraries - shields - interfacing and libraries - Programming for Single Board Computers - Board schematic - setup - configure and use - OS implications: linux - basics, file system and processes - shell CLI - GUI - Programming API's - RPi.GPIO - PWM library to access pins -Tkinter.

Unit 3: Interfacing with Single Board Computers

Networking - Internet Connectivity - Standard Internet Protocols - MQTT - CoAP -Networking Socket Interface - Cloud - Public APIs and SDK's for accessing cloud services - Social Network APIs - Interfacing - sensors and actuators - Pi Camera - Servo - APIs for data conversion.

Unit 4: Embedded Programming and RTOS

MCU - GPIO - WDT - timers/counters - I/O - A/D - D/A - PWM - Interrupts - Memory serial communication UART - I2C - SPI - Peripheral Interfacing OS - basics - types - tasks - process - threads (POSIX Threads) - thread preemption - Preemptive Task Scheduling Policies - Priority Inversion - Task communication - Task Synchronization issues - racing and deadlock - binary and counting semaphores (Mutex example) - choosing RTOS

9 hours

9 hours

9 hours

9 hours

9 hours

IoT Integrated Primary Health Care - Face Detection by AI - Cloud IoT Systems for Smart Agriculture - Smart Home Gadgets - Autonomous Car Features – speed and horn intensity control - Contemporary Issues 2 hours

Text Book(s)

Yamanoor, Sai, and Srihari Yamanoor. Python Programming with Raspberry Pi, 2017,
 1st edition, Packt Publishing Ltd,. UK

Reference Books

1.Donald Norris, The Internet of Things: Do-It-Yourself Projects with Arduino, Raspberry Pi, and BeagleBone Black, 2015, 1st edition, McGraw Hill Education, India

2. Marco Schwartz, Home Automation with Arduino, 3rd edition, Open Home Automation

2014. Schwartz, Marco. Internet of things with arduino cookbook, 2016, 1st edition, Packt Publishing Ltd., UK

3.Kooijman, Matthijs. Building Wireless Sensor Networks Using Arduino, 2015, 1st edition, Packt Publishing Ltd., UK

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1										3	1
CO2	3	3	3	2	3								3	2
CO3	3	3	2	2	3								3	2
CO4	3	1											3	1
Average	3	2.25	2	2	3								3	1.5
Level of Correlation	3	2	2	2	3								3	2

3- High mapping

2-Medium Mapping

20ACO10ARCHITECTING SMART IOT DEVICESLTPC3003

(Professional Elective -II)

Course Outcome:

1. Understand how the IoT is different from traditional systems.

2. Demonstrate the revolution of internet in mobile and cloud.

3. Examine the architecture and operation of IoT.

4. Explore various tools and programming paradigms for IoT applications.

5. Develop an IoT prototype for real time scenario.

UNIT – I

Design Principles of IoT: Design principles of connected devices, data acquiring organizing and analytics in IoT, system architecture of IoT.

UNIT – II

Prototyping the Embedded Devices for IoT: System hardware and prototyping, sensors and actuators for IoT, Radio module and wireless sensor network, gateways internet and web, software components.

UNIT – III

Embedded Programming for IoT: Programming connected devices, C and python for IoT, Case study: Temperature controller, Smart irrigation system.

$\mathbf{UNIT} - \mathbf{IV}$

Embedded RTOS: Program structure and real time, multitasking and scheduling, RTOS services, signals, semaphores, Nucleus SE, application timers, interrupts in nucleus ES, Nucleus SE initialization and starn1p.

UNIT – V

Tools for IoT: Introduction, chef puppet, NETCONF - YANG case studies. loT physical Devices: Basic building blocks of an IoT device and endpoints, family of ploT devices, pcDuino, Beagle bone black, cubie board, domain specific IoTs.

TEXT BOOKS:

1. Raj Kamal, Internet of Things, Architecture and Design Principles, lst edition, McGraw Hill Education, May 2017.

2. Arsheep Baga and Vijay Madisetti, Internet of Things: A Hands-On Approach, 1st Edition, Universities press, 2015.

REFERENCE BOOKS:

1. David Etter, IoT (Internet of Things Programming: A simple and fast way of Learning IoT, Kindle

edition 2016.

2. Fei HU, Security and Privacy in Internet of Things (loTs): Models, Algorithms, and

10 Hrs

10 Hrs

13 Hrs

7 Hrs

Implementations, 1st Edition, CRC Press, 2016.

3. Colin Walls, Embedded RTOS Design Insights and Implementation. 1st edition. Elsevier. December 2020.

MAPPING

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

3 -High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND **TECHNOLOGY (AUTONOMOUS)**

III B.TECH II SEMESTER CSO

LTPC 20ACO11 SOFTWARE TESTING METHODOLOGIES

COURSE OUTCOMES:

After Completion of the course the student will be able to:

- 1. Design and develop the best test strategies in accordance to the development model.
- 2. Implement a project to manage project schedule, expenses and resources of application.
- 3. Obtain adequate knowledge about software process models and software effort estimation techniques.
- 4. Design and develop project plans to address real-world management challenges.
- 5. Aware of project management theories, tools, techniques and methods to manage the software projects at each stage of software testing life cycle.

Unit-1 Introduction

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Unit-2 Transaction Flow Testing

Transaction Flow Testing: transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

Unit-3 Paths

Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection. Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

Unit-4 State

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

Unit-5 Graph Matrices and Application

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

Text Books:

- 1. Software Testing techniques Baris Beizer, Dreamtech, second edition.
- 2. Software Testing Tools Dr. K. V. K. K. Prasad, Dreamtech.

References:

- 1. The craft of software testing Brian Marick, Pearson Education.
- 2. Software Testing Techniques SPD(Oreille)
- 3. Software Testing in the Real World Edward Kit, Pearson.

9 hours

9 hours

9 hours

9 hours

9 hours

3 0 0 3

- 4. Effective methods of Software Testing, Perry, John Wiley.5. Art of Software Testing Meyers, John Wiley.

Mapping

РО	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO	Ì													
CO1	3	3	3	3	-	-	-	-	-	-	-	-	2	2
CO2	3	3	-	-	-	-	-	-	-	-	-	-	2	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	2	3
CO4	3	3	3	3	2	_	_	_	_	_	_	_	3	2
CO5	2	2	-	-	-	-	-	-	-	-	-	-	2	2

20ACO12	Data Analytics for IoT	\mathbf{L}	Т	Р	С
	-	3	0	0	3
	(Professional Elective -II)				

Course Outcomes:

1. Understand the fundamentals of IoT Analytics and Challenges

2. Understand and analyze IoT Devices and Networking Protocols

3. Apply IoT Analytics for the Cloud

4. Understand exploring and visualizing data

UNIT - I:

Defining IoT Analytics and Challenges: Introduction to IoT, applications, IoT architectures, introduction to analytics, IoT analytics challenges.

UNIT - II:

IoT Devices and Networking Protocols: IoT devices, Networking basics, IoT networking connectivity protocols, IoT networking data messaging protocols, Analyzing data to infer protocol and device characteristics.

UNIT - III:

IoT Analytics for the Cloud: Introduction to elastic analytics, Decouple key components, Cloud security and analytics, Designing data processing for analytics, Applying big data technology to storage.

UNIT - IV:

Exploring IoT Data: Exploring and visualizing data, Techniques to understand data quality, Basic time series analysis, Statistical analysis.

UNIT - V:

Data Science for IoT Analytics: Introduction to Machine Learning, Feature engineering with IoT data, Validation methods, Understanding the bias-variance tradeoff, Use cases for deep learning with IoT data.

TEXT BOOK:

1. Minteer, Andrew, Analytics for the Internet of Things (IoT), Packt Publishing Ltd. July 2017, ISBN 9781787120730.

REFERENCE BOOKS:

1. Kai Hwang, Min Chen, Big-Data Analytics for Cloud, IoT and Cognitive Computing, Wiley.

- 2. Hwaiyu Geng, Internet of Things and Data Analytics Handbook, Wiley.
- 3. John Soldatos, Building Blocks for IoT Analytics Internet-of-Things Analytics, River

7Hrs

7Hrs

7Hrs

5Hrs

Publishers Gerardus Blokdyk.

4. IoT Analytics A Complete Guide, 5starcooks.

MAPPING:

	PO1	PO2	РО	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO
			3	4	5	6	7	8	9	0	1	2	1	2
CO1	3	2											3	1
CO2	3	3	1										3	1
CO3	3	3	3										3	1
CO4	3	3											1	1
Average	3	2.75	2										2.5	2
Level of Correlation	3	3	2										3	2

3 –	- High Mapping	2 - Me
v	ingn mapping	

Medium Mapping

20ACO13

WIRELESS NETWORKS

С L Т Ρ 3 0 0 3

(Professional Elective -II)

Course Outcomes:

1. Students will be able to understand the basis of Ad-hoc wireless networks.

2. Students will be able to understand design, operation and the performance of MAC layer protocols of Ad Hoc wireless networks.

3. Students will be able to understand design, operation and the performance of routing protocol of Ad Hoc wireless network.

4. Students will be able to understand design, operation and the performance of transport layer protocol of Ad Hoc wireless networks.

5. Students will be able to understand sensor network Architecture and will be able to distinguish between protocols used in Adhoc wireless networks and wireless sensor networks.

UNIT - I:

Wireless LANs and PANs: Introduction, Fundamentals of WLANS, IEEE 802.11 Standards,

HIPERLAN Standard, Bluetooth, Home RF. Ad-Hoc Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks.

UNIT - II:

MAC Protocols: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT - III:

Routing Protocols: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols.

UNIT - IV:

Transport Layer Protocols: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks.

UNIT - V:

9Hrs

9Hrs

Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, Data

9Hrs

9Hrs

Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI.

2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - Jagannathan

Sarangapani, CRC Press.

REFERENCE BOOKS:

1. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh, 1st Ed. Pearson Education.

2. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.

MAPPING:

	PO1	PO2	PO	PO	PO	PO	РО	PO	РО	PO1	PO1	PO1	PSO1	PSO2
			3	4	5	6	7	8	9	0	1	2		
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

MOBILE APPLICATION DEVELOPMENT FOR IOT

20ACO14	(Professional Elective -II)	L	Т	Р	С
		3	0	0	3

Course Outcomes:

1. Understand significance of IoT programming fundamentals.

2. Understand and analyze IoT programming applications.

3. Develops IoT applications using standardized hardware.

4. Discuss concepts of IoT Advance Wireless Interfaces and IoT Production System.

UNIT – I

IoT Product Conceptualization: IoT Product Development Lifecycle, IoT Product Conceptualizations IoT Programming Fundamentals: Getting Started, IoT Programming setup for LED flashing, Program to display message on screen, Program to read LDR level and display on screen, Android APK to perform read write operation, Particle android APK to control LED intensity, LED switching with HTML interface, Cloud based motion detection, Displaying temperature sensor data on terminal, Publishing sensor values on the cloud, Performing computation on sensor values.

UNIT – II

IoT Programming Applications: Gas level detection using MQ2 sensor, Blink Android Application for controlling LED from mobile, Integration of Temperature and Gas Sensor with Blynk Mobile Application, Printing real-time Date and Time values on serial terminal, Display temperature value on serial terminal, Display temperature values on 16*2 LCD display

Interfacing: Interfacing of Nokia 5110 display, display image on Nokia 5110, Particle Electron displaying battery charging level status, GPS tracking device interface to get coordinates.

UNIT – III

IoT Product Hardware Development: Product realization, Connection diagram of IoT product,

Engineering board development, Product board customization and optimization, Flowchart of IoT warehouse monitoring system, Wireless communication between the multiple kits, Particle cloud IDE.

UNIT – IV

IoT Advance Wireless Interfaces: Bluetooth communication between master and slave module, Data visualization on ThingSpeak cloud using webhook services, Storing data into google excel sheet and sending the sheets to emails.

UNIT – V

IoT Production System: IoT Warehouse Monitoring System, IoT Product Packaging, Future of IoT Product Development.

7Hrs

7Hrs

9Hrs

9Hrs

TEXT BOOK:

1. IoT Product Development with Programming: Stepwise programming approach with Particle

Development board Kindle Edition by Mahesh Jadhav and Tejas Sarang Patil.

REFERENCE BOOKS:

1. Kale, Vivek. Parallel Computing Architectures and APIs: IoT Big Data Stream Processing 1st edition, CRC Press, 2019.

2. IoT Product Development with Programming: Stepwise programming approach with Particle

Development board Kindle Edition by Mahesh Jadhav and Tejas Sarang Patil.

MAPPING

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	3	2								3	1
CO2	3	2	1	2	1								3	1
CO3	2	2	2	3	1								3	
CO4	1	2	1	2	1								3	
CO5	1	2	1	2	1								2	1
Average	1.6	1.8	1.4	2.4	1.2								2.8	1.5
Level of Correlation	2	2	2	3	2								3	2

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

20ACE36

DISASTER MANAGEMENT

(Open Elective -II)

COURSE OUTCOMES:

At the end 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 and vulnerability
- 4. Involve in the process of disaster management
- 5. Plan the strategies for risk reduction in schools and communities.

UNIT – I

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 Tsunamihazards along the Indian coast– land slides.

UNIT – II

Man Made DisasterAnd Their Management Along With Case Study Methods Of The Following: Firehazards–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

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.

$\mathbf{UNIT}-\mathbf{IV}$

Role of Technology In Disaster Managements: Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations-roads and bridgesmitigation programme for earth quakes –flowchart, geospatial informationin agriculture drought assessment-multimedia technology in disaster risk management and training transformable indigenous knowledgein disaster reduction.

9 hrs

9 hrs

9 hrs

9 hrs

L T P C 3 0 0 3

UNIT V

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.

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 Hill Education 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.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3					3		3	3		3	3	
CO2	2	2					2		3	3		3	3	
CO3	2	2					2		3	3		3	3	
CO4	2	2					2		3	3		3	3	
CO5	2	2					2		3	3		3	3	
Averag e	2	2					2		3	3		3	3	
Level of Correlation	2	2					2		3	3		3	3	

MAPPING

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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) **III B.Tech II Semester CSO** (Common to ME, CSE, IT, CE, EEE, CSE (AI&ML) & CSE (DS)) **III B.Tech I Semester**

20AMB09	INTELLECTUAL PROPERTY RIGHTS	L	Т	Р	С
	(Open Elective -II)	3	0	0	3

COURSE OUTCOMES:

After completion of the course, the students will be able to

- 1. Outline different types of intellectual properties.
- 2. Distinguish the crucial role of IP in organizations of different industrial sectors for thepurposes 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 property lawcontext.

UNIT - I: UNDERSTANDING AND OVERVIEW OF IPR: 7Hrs

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

UNIT-II: COPYRIGHT ACT, 1957:

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

UNIT-III: TRADEMARKS ACT, 1999:

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:

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.

7Hrs

7Hrs

UNIT-V: DESIGNS ACT, 2000:

7Hrs

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

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.

REFERENCES:

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

Mapping:

	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 o Orrelation			3								3			

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

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

20AME31	Operations Research	LTP	C
	(Open Elective – II)	3 0 0	3

Course Outcomes:

After completion of the course, the students 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

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

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

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

 $Simulation \ Definition \ - \ types \ of \ simulation \ models \ - \ phases \ of \ simulation \ - \ application \ of \ simulation- \ inventory \ and \ queuing \ problems \ - \ merits \ and \ demerits \ -- \ simulation \ languages.$

12 Hours

12 Hours

12 Hours

12 Hours

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: VNetwork Models and Project Management12 Hours

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.

Textbook(s)

- 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
- R. Panneerselvam, Operations Research, New Delhi, 2nd Edition, Prentice Hall International
 Publisher, 2006

	DO1	DOA	DO1	DO 4	DOS		DOT	DOO	DOO	DO10	DO11	PO12	PSO1	PSO2
	POI	POZ	POS	PO4	P05	PO6	PO7	PUð	PO9	POIU	POII	1012	1901	1502
CO1	3	3												
CO2	3	3												
CO3	3	3	3											
CO4	3	3		3										
Average	3	3	3	3										
Level of correlation	3	3	3	3										

Mapping

3-High Mapping

2- Medium Mapping

20ACM13	BUSINESS INTELLIGENCE	L	Т	Р	С
	(Job Oriented Elective -II)	3	0	0	3

Course Outcome

On completion of the course, student will be able to:

- 1. Explain the basics of Analytics and Business Intelligence.
- 2. Define Framework elements, Phases and Development stages in Business Intelligence Life Cycle.
- 3. Analyze the issues and critical challenges in Business Intelligence for creating user friendly BI solutions.
- 4. Determine different BI strategies for planning and implementing effective BI solutions.

Unit -I **Introduction to Business Intelligence**

Introduction-Data, Information Vs Intelligence- Components of Business Intelligence Architecture-Business Query and Reporting- A Business view of the Data-Production Reporting-Online Analytical Processing (OLAP)-Microsoft Office-dashboards-Scorecards- Analytic Applications-Measures of BI Success -Emerging BI Modules.

Unit -II **Business Intelligence Life Cycle**

Introduction, Business Intelligence Lifecycle, Enterprise Performance Life Cycle (EPLC) Framework Elements, Life Cycle Phases, Human Factors in BI Implementation, BI Strategy, Objectives and Deliverables, Transformation Roadmap, Building a transformation roadmap, BI Development Stages and Steps, Parallel Development Tracks, BI Framework.

Unit-III Business Intelligence User Model

Introduction, Evolution of Business Intelligence, Business Intelligence Opportunity Analysis Overview, Content Management System, End User Segmentation, Basic Reporting and Querying, Online Analytical Processing, OLAP Techniques, OLAP Applications, Applying the OLAP to Data Warehousing, Benefits of using OLAP, Dashboard, Advanced/Emerging BI Technologies, Future of Business Intelligence.

Business Intelligence Issues and Challenges Unit-IV

Critical Challenges for Business Intelligence success, Cross-Organizational Partnership, Business Sponsors, Dedicated Business Representation, Availability of Skilled Team Members, Business

9hrs

9hrs

9hrs

9hrs

Intelligence Application Development methodology, Planning the BI Projects, Business Analysis and Data Standardization, Affect of Dirty Data on Business profitability, Importance of Meta-Data, Silver Bullet Syndrome, Customer Pain Points, Creating Cost Effective Enterprise friendly BI solution

Unit-VBusiness Intelligence Strategy and Road Map9hrs

Planning to implement a Business Intelligence Solution, Understand Limitations of Business Intelligence, Business Intelligence Usage, Best use of Business Intelligence, The Advantages of BI with Sales- BI used for the rescue, Organization Culture, Managing Total Cost of Ownership for Business Intelligence, Total Cost of Ownership and Business Intelligence, Managing the TCO of the Business Intelligence, Factors that Affect Total Cost of Ownership.

Text books

- Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision support and Business Intelligence Systems", Pearson-9th Edition, 2011.
- 2. Cindi Howson, "Successful Business Intelligence", Tata McGraw-Hill Edition, 2008.

Reference Books

- 1. Grossmann W, Rinderle-Ma," Fundamental of Business Intelligence", Springer, 2015.
- 2. Foster Provost and Tom Fawcett, "Data Science for Business: What you need to know about data mining and data analytic thinking",2013.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2										3	2
CO2	3	3	1										3	3
CO3	3	3	1										2	2
CO4	3	3	2										3	1
Average	3	3	1.5										2.75	2
Level of correlation	3	3	2										3	2
3-	3- High mapping					2-Medium Mapping					1- Low Mapping			

Mapping:

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

III B.Tech II Semester CSO & CSE III B.Tech II Semester ME(Open Elective-II)

20ACS34	MACHINE LEARNING	L	Т	Р	С

(Job Oriented Elective -II)

COURSE OUTCOMES:

At the end 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 and Reinforcement learning.

UNIT I

9hrs

3 0 0

3

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

9hrs

9hrs

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

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

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 &

9hrs

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

9hrs

Belief Propagation- Partitional Clustering- Hierarchical Clustering - Threshold Graphs - TheBIRCH 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

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

References

1. Introduction to Machine Learning, Third Edition, by <u>Kubát</u> & <u>Miroslav</u>, 2nd edition.

Mapping

СО	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO1	PSO2
	1	2	3	4	5	6	7	8	9	0	1	2		
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					

20AC015IOT COMMUNICATION PROTOCOL LABLTPC0031.5

Course outcomes:

To get familiar with the IoT keychain value:

- 1. From the device to the cloud
- 2. Implement interfacing of various sensors with Arduino/Raspberry Pi.
- 3. Show an ability to upload/download sensor data on cloud and server.

List of Experiments:

- Message Queuing Telemetry Transport (MQTT)
- Get started with Scaleway IoT Hub
- MQTT Explorer
- Microcontroller
- Connecting your ESP8266 to Scaleway IoT Hub
- Control a LED and display temperature
- Humidity and Temperature
- Interact with the LED

Reference: https://github.com/luisomoreau/IoT-Communication-Protocols-Lab-1

Mapping:

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

3- High mapping

2-Medium Mapping

20ACO16	Computer Vision and Robotic Lab	L	Т	Р	С
		0	0	3	1.5

Course Outcomes:

The students will be able to

- 1. use fundamental and technical knowledge of robot Programming
- 2. learn Robot Programming using teach Pendant for various applications
- 3. use RAPID Language and AML
- 4. Program using Robot studio software

LIST OF EXPERIMENTS

1. Robot Programming using Flex Pendant- Lead through programming including Coordinate systems of Robot,

2. Wrist Mechanism-Interpolation-Interlock commands

3. VAL language commands motion control, hand control, program control, pick and place applications,

- 4. Palletizing applications using VAL,
- 5. Object detection and Sorting
- 6. Robot welding application using VAL program
- 7. RAPID Language and AML
- 8. Programming using Robot studio software

Mapping:

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

3- High mapping

2-Medium Mapping

20AC017PROGRAMMING FOR IOT BOARDS LABLTPC0031.5

Course Outcomes:

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

1. Use open-source hardware prototyping platform and peripherals for building digital devices and interactive objects that can sense and control the physical world.

2. Program SBC for practical IoT devices using Python and explore protocols, data conversion process, API's and

3. Expansion boards for real world interaction.

List of Experiments

1.Introduction to IoT Development Kit and Development Environment
2.Internet Controlled LEDs
3.Temperature Logger
4.Home Automation
5.Soil Moisture Sensor
6.Light Color Control
7.Home Security System
8.Parking Sensor
9.Motor Control
10.Water Level Control
11.Street Light Control

Text Book(s)

1.Yamanoor, Sai, and Srihari Yamanoor. Python Programming with Raspberry Pi, 2017,1st edition, Packt Publishing Ltd, UK.

2.Donald Norris, The Internet of Things: Do-It-Yourself Projects with Arduino, Raspberry Pi, and BeagleBone Black, 2015,1st edition, McGraw Hill Education, USA. Reference Books

1.Schwartz, Marco. Home Automation with Arduino: Automate your Home using Open-Source Hardware. 2013, 1st Edition, CreateSpace Independent Publishing, USA.

2.Kooijman, Matthijs. Building Wireless Sensor Networks Using Arduino, 2015, 1st edition, Packt Publishing Ltd, UK.

Mapping:

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

3-High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

III B.Tech II Semester

L T P C 1 0 2 2

20AIT19 INTRODUCTION TO PROGRAMMING AND ANIMATION WITH ALICE (Skill Course)

COURSE OUTCOMES:

After Completion of the course the student will be able to:

- **CO1**: Understand the overview of Alice and moving objects controls
- **CO2**: Construct and designing the storyboard
- CO3: Understand the object movement with different orientations
- CO4: Understanding the Practicing Random Numbers and Variables
- **CO5**: Identify the Guessing Game with arrays

LIST OF EXPERIMENTS

- 1. Adding Objects to a Scene
- 2. Moving Objects Around: Controls, Keys, and One-shot (Mac version
- 3. Build a Simple World
- 4. More Control and Comparing Instructions
- 5. Implementing the Storyboard
- 6. Object Control Document
- 7. How Objects and Parts Turn and Roll
- 8. BunnyHop Multiple Ways

TEXT BOOK:

 ALICE 3 IN ACTION: COMPUTING THROUGH ANIMATION", Second Edition by Joel Adams Cengage Learning, 15-Jan-2014

		2.												
	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

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

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

20AHS23 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE L T P C

2 0

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Course Outcomes:

At the end of the Course, Student will be able to:

Identify various aspects of Traditional knowledge and its importance.
 Explain briefly to understand the needs and importance of protecting traditional knowledge.

3. Analyze the various systems, concepts and strategies of traditional knowledge.

4. Apply the concepts of traditional knowledge in different sectors.

UNIT I

INTRODUCTION TO TRADITIONAL KNOWLEDGE 7Hrs

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 7Hrs

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 7Hrs

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 PROPERTY7Hrs

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

7Hrs

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.

Text Book:

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 Kapoor1, Michel Danino2.

Web Links:

1. <u>https://www.youtube.com/watch?v=LZP1StpYEPM</u>

2.http://nptel.ac.in/courses/121106003/

Mappping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3					3	3							
CO2	2					3	3							
CO3						3	3							
CO4	3					3	3							
Average	2.67					3	3							
Level of correlation	3					3	3							

3-High Mapping

2- Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) **IV B.Tech I Semester CSO** (Common to CE, EEE, ME, ECE, CSE, IT, CSE (AI&ML) & CSE (DS))

20AMB04	CREATIVITY AND INNOVATION	L	Т	Р	С
		3	0	0	3

Course Outcomes:

After the completion of the course student will be able to

- Explain innovation and creativity management from the perspective of obtaining a 1. sustainable competitive advantage and integrating innovation into the business strategy.
- Explain the attributes of successful innovation strategies including an in-depth 2. understanding of the dynamics of innovation
- Identify the role that innovation plays in the competitive dynamics of industries and how 3. these innovations affect society.
- Explain the factors and drivers that predict creativity and innovation of individuals, groups, 4. and organizations
- 5. Design a creative business concept and develop a business plan.

Unit I: Creativity:

Concept - Convergent and Divergent Thinking -Creative Intelligence - Enhancing Creativity Intelligence -Determinants of Creativity - Creativity Process - Roots of Human Creativity -Biological, Mental, Spiritual and Social -Forms of Creativity - Essence, Elaborative and Expressive -Existential, Entrepreneurial and Empowerment.

Unit II: Creative Personality:

Creative Personality Traits Congenial to Creativity - Motivation and Creativity - Strategies for changing Motivation - Creativogenic Environment - Formative Environment and Creativity - Adult Environment - Environmental Stimulants - Blocks to Creativity- Strategies for unblocking Creativity.

Unit III: Organizational Creativity:

Creative Manager - Techniques of Creative Problem Solving - Creative Encounters and Creative Teams - Perpetual Creative Organizations - Creative Management Practices - Human Resource Management, Marketing Management, Management of Operations, Management of Product Design and Growth Strategies-Issues and Approaches to the Design of Creative Organizations Policy frameworks - Organizational Design for Sustained Creativity - Mechanism for Stimulating Organizational Creativity - Creative Diagnosing - Creative Societies - Necessity Model of a Creative Society

Unit IV: Management of Innovation:

7Hrs

Nature of Innovation- Concept of Innovation- Historic Retrospective-Typology of Innovations-Innovation Process- Macroeconomic View of Innovation Approaches to Innovations-Assumptions and Barriers to Innovations- Innovation Sources. -Technological Innovations and their Management-Training for Innovation - Management of Innovation-Agents of Innovation -Skills for Sponsoring Innovation.

7Hrs

7Hrs

Unit V: Innovation Entrepreneurship:

7Hrs

Concept of Entrepreneurship- Entrepreneurial opportunities, attitude, traits and tendencies-Design of a Successful Innovative Entrepreneurship- Idea generation & Prototype Development- Social Innovation and Entrepreneurship-Intellectual Property Right (IPR)-Commercialization of Innovations-Startupand Venture Development-Pre- incubation and Incubation Stages-Govt. Schemes and funding support to ideas, innovations, and startup-Current trends, development and generalawareness on Innovation and startup.

Text Books:

- 1. Kandwalla, P. N. (2004). Lifelong creativity: an unending quest. Tata Mcgraw-Hill..
- 2. Khandwalla, P. N. (2022). Corporate Creativity: The Winning Edge (1st ed.). McGraw Hill India.
- 3. Lalitha Krishnamacharyulu.(2010).- Innovation Management, Himalaya PublishingHouse, Edition: 2, 2010

Reference Books:

- 1. Rastogi, P. N. (2009). Management of technology and innovation: Competing through technological excellence. SAGE Publishing India.
- 2. Plucker, J. A. (2021). Creativity and innovation: Theory, research, and Practice. Routledge.

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

Mapping:

3-High Mapping

2- Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)

IV B.Tech I Semester

(Common to CE, EEE, ME, ECE, CSE, IT, CSE (AI&ML), CSE (DS), CAI, CSC & CSO)

20AMB05	LEADERSHIP ESSENTIALS	L	Т	Р	С
		2	Δ	Δ	2

Course Outcomes:

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

- 1. Identify the concepts and theories of leadership and analyze its relevance to theorganizations.
- 2. Analyze various sources of power, politics and conflict management.
- 3. Adapt theories of leadership to cases and contexts in organization.
- 4. Interpret change, sustainable development and implications of cultural factors inorganizations.
- 5. Develop leadership potential and practices in organizations.

Unit I- Overview and Introduction of Leadership:

concepts and functions of leadership; Leadership, Role and Functions of a Leader, Leadership Motives Characteristics of anEffective Leader, Leadership as a Process - the Complexities of Leadership - Effective Leadership Behaviours and Attitudes - Emerging Approaches of leadership.

Unit II- Leadership and Power:

Sources of Power, The link between Politics, Power and Conflict, Power and Conflict; Coercion, Trait Approach, Ohio State Leadership Study, The University of Michigan Study, Blake and Mouton's Managerial Grid.

Unit III- Leadership theories and styles:

Contingency Theories of Leadership -, The Path-Goal Theory, Transactional Leadership Style Charismatic Leadership. Servant Leadership, Leadership Ethics.

Unit IV- Fostering Organizational Culture and Climate: 7Hrs

Vision Building; Developing Strategic Thinking; strategies in developing a culture conducive to change; handling change; Cultural Factors Influencing Leadership Practice.

Unit V- Developing Future Leaders:

Strategic Leadership Competencies; 360° Leadership Assessment; The Myers-Briggs Type Indicator (MBTI); developing global leadersin organization.

Textbooks:

1. Peter Guy Northouse. (2021). Introduction to leadership : concepts and practice (5thed.). Sage.

7Hrs

7Hrs

7Hrs

7Hrs

3 0 0 3

2. Humphrey, R. H. (2014). Effective leadership : theory, cases, and applications. Sage.

References Books:

1. Bratton, J., Grint, K., & Nelson, D. L. (2005). Organizational leadership.Thomson/South-Western.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1											3			
CO2									3		3			
CO3											3			
CO4									3		3			
CO5									3		2			
Average									3		2.8			
Levelof orrelation									3		3			

3-High Mapping

2- Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)

IV B. Tech I Semester

(Common to CE, EEE, ME, ECE, CSE, IT, CSO, CSE (AI&ML) & CSE (DS)) LAW FOR ENGINEERS 20AMB06 LT P C

Course Outcomes:

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

- 1. Explain the essential principles of the law relevant to engineering practice
- 2. Apply the relevant provisions of contract law
- 3. Use effective contract laws for decision making and problem-solving techniques indifferent scenarios
- 4. Recognize and explore key legal requirements for engineering including health &safety, privacy, and professional indemnity.
- 5. Discuss about the industrial dispute settlement mechanism

UNIT- I: THE NATURE AND SOURCES OF LAW:

Definition and nature of law, definition law and morality, classification of law, Overview of

Business laws in India - Sources of business law.

UNIT- II: LAW OF CONTRACT:

Contract-Essential features of a valid contract - Performance of a contract - Breach of contract and its remedies.

UNIT- III: SPECIAL CONTRACTS:

Quasi Contracts - Contingent Contracts - Indemnity and Guarantee - Contract of Agency -Bailment and Pledge.

UNIT- IV: LAW OF TORT:

Definition of Tort, Fundamental Purpose Development of Law of Torts-Specific Torts, Negligence,

Nervous Shock, Nuisance, Trespass, Defamation False Imprisonment and Malicious Prosecution Purpose.

UNIT- V INDUSTRIAL DISPUTE & SETTLEMENT MECHANISM: 7Hrs Employee Grievances Collective Bargaining- Industrial Disputes and Resolution Mechanism; **Overview on IPR.**

Text Books:

- 1. Kapoor, N. D. (1983). Elements of mercantile law: including company law and industrial law. Sultan Chand & Sons.
- 2. Kunwar Arora, Vibha Arora. (2017). Law for Engineers. Central Law Publications.

Reference Books:

1. Gulshan, S. S. (2009). Business law. Excel Books.

5Hrs

7Hrs

0 3

3 0

7Hrs

2. Mulheron, R. (2020). Principles of Tort Law. Cambridge University Press.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	3	-	-	-	-	-	-	-	-
CO2	-	-	-	3	-	3	-	-	-	-	-	-	-	-
СО3	-	-	-	-	-	3	-	-	-	-	3	-	-	-
CO4	-	-	-	-	-	3	-	-	-	-	3	-	-	-
CO5	-	-	-	-	-	3	-	-	-	-	2	-	-	-
Average	3	-	-	3	-	3	-	-	-	-	2.6	-		
Levelof orrelation	3	-	-	3	-	3	-	-	-	-	3	-	-	-
	3-High Mapping						2- Me	lium	Марр	ing	1-Low Mapping			

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester (Common to CE, EEE, ME, ECE, CSE, IT, CSE (AI&ML) CSE (DS) ,CAI, CSC & CSO)

20AMB07	ENTREPRENEURSHIP ESSENTIALS	L	Т	Р	С
		3	0	0	3

Course Outcomes:

After completion of the course, the students will be able to

- 1. Explain the Fundamentals and specifics of Entrepreneurship.
- 2. Apply theoretical concepts in developing an idea and startup a new technology-based company.
- 3. Prepare marketing and financial plans that are viable in nature.
- 4. Apply marketing research methods and tools to forecast and to analyze the trend.
- 5. Develop innovative business solutions with a holistic perspective from concept to reality.

UNIT-I: BASIC ENTREPRENEURSHIP:

Entrepreneurial traits, true motivation & leadership, understanding of Entrepreneurial process, understanding of personal aspirations, Entrepreneurial personality development, Entrepreneurial communication, Entrepreneurship in Indian Scenario, Future prospects in India and emerging economies.

UNIT-II: MARKETING AND MARKET RESEARCH:

Market dynamics, Market segmentations and creation of derivatives, Marketing Research methodologies, trend, assessment, analysis and forecasting, structural aspects of market. Identification of overall market, addressable market and serviceable market for product and services.

UNIT-III: ENGINEERING DESIGN PROCESS:

Introduction to Engineering Design Process; Design Approaches - Forward and Reverse Engineering; Reverse EngineeringProcess – Definition and goal of Reverse engineering (RE); Theory of inventive problem solving (TRIZ): Fundamentals, methods and techniques, inventive design strategies and Simulation in Engineering Design - Computer Aided Engineering and Simulation; Engineering Manufacturing and Materials; Sustainability and Design: Recyclability;Reliability and Lean Design Engineering; Interface with Industrial design; Economic considerations in design; Eco Design and Green Engineering Product Development

7Hrs

7Hrs
UNIT – IV: FINANCIAL AND LEGAL ASPECTS OF BUSINESS: 7Hrs Process for effective financial planning, types of budgets preparation, overview of specific ratios to measure financial performance, liquidity, asset management, profitability, leverage and comparative analysis, business laws enshrined in the Indian constitution, the policies of the state, Income tax structure, the labor laws.

UNIT –V: MANAGEMENT OF GROWTH VENTURE: 7Hrs

Importance of Innovation as a differentiator in growth venture, Underlying opportunities, Strategic management for Launching process of growth ventures, understanding organizational & institutional aspects of growth ventures, Exit strategies of Growth ventures, Future prospects of venture financing of growth venture firms.

TEXT BOOKS:

- 1.Allen, K. R. (2018). LaunchingNewVentures:AnEntrepreneurialApproach. UnitedStates: Cengage Learning.
- 2. Khanka, S. S. (2006). Entrepreneurial Development. India: S. Chand Limited.
- Nelson, A. J., Byers, T. H., Dorf, R. C. (2018). Technology Ventures: From Idea toEnterprise. United Kingdom: McGraw-Hill Education.

REFERENCES:

- Harrington, H. J. (2018). Creativity, Innovation, and Entrepreneurship: The OnlyWay to Renew Your Organization. United States: Taylor & Francis.
- Smith, A., Pigneur, Y., Papadakos, T., Osterwalder, A., Bernarda, G. (2015). ValueProposition Design: How to Create Products and Services Customers Want. Germany: Wiley.
- Allen, K. R. (2010). Entrepreneurship for Scientists and Engineers. UnitedKingdom: Pearson Prentice Hall.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1											3			
CO2											3			
CO3		1	1								3			
CO4		1	1								3			
CO5		1	1								3			
Average		1	1								3			
Level of correlatio f the course		1	1								3			

3-High Mapping

2- Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

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

20AMB08	ESSENTIALS OF MANAGEMENT SCIENCE	L	Т	Р	С
	(Common to All Branches)	3	0	0	3

Course Outcomes

After completion of the course student will be able to

- 1. Apply various areas of functional management for the prospects of business organization.
- 2. Apply management principles for decision making.
- 3. Apply various functions of Hr manager.
- 4. Use tools and techniques to become an effective manager.
- 5. Apply production tools and techniques in every area of business

UNIT-I INTRODUCTION TO MANAGEMENT:

Nature, importance and Functions of Management, Approaches to Management - Taylor's Scientific Management - Henry Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Leadership Styles .

UNIT-II INTRODUCTION TO ORANISATION:

Types of Mechanistic and organic structures. Delegation, Decentralization - Formal and Informal Organization

UNIT III OPERATIONS MANAGEMENT:

Principles and Types of Plant Layout - Methods of production (Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement

UNIT IV MATERIALS MANAGEMENT:

Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records, Marketing: Functions of Marketing, Marketing Mix, Product Life Cycle and Channels of Distribution.

UNIT V HUMAN RESOURCES MANAGEMENT (HRM): 7Hrs

Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Wage and Salary Administration, Job Evaluation and Merit Rating, Performance Appraisal

7Hrs

7Hrs

7Hrs

Text Books:

1. Aryasri, Management Science, TMH, 4 th Edition, 2009.

2. Stoner, Freeman, Gilbert, Management, Pearson Education, New Delhi, 6th Edition, 2004.

3. PannerSelvem, Production and Operations Management, Prentice Hall of India, 3rd Edition, 2012

Reference Books:

1. Kotler Philip & Keller Kevin Lane, Marketing Management, PHI, 12th Edition, 2005.

2. Koontz & Weihrich, Essentials of Management, TMH, 6 th Edition, 2005.

3. SubbaRao. P, Personnel and Human Resource Management, Himalaya Publishing House,2000

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1									3		3		3	3
CO2									3		3		2	1
CO3									3		3		2	2
CO4									3		3		3	2
CO5									3		3		2	2
Average									3		3		2.4	2
Level o orrelation)								3		3		2	2
	2 Ц;	ah M	onnir	NG	•	•	2	Modi	ium N	Ionnin	a	1		onnino

3-Hign Mapping

2- Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.TECH I SEMESTER Common to CSO, CSE, IT CSE(DS), CSE(AI & ML)

20ACO18	IOT SYSTEM ARCHITECTURES	LTPC
	(Professional Elective Course-III)	3 3

Course Outcomes:

1. Understand IoT applications and IoT Architectures.

- 2. Learn about IoT devices and event driven analysis
- 3. Understand and analyze IIoT.
- 4. Understand safety and security testing of IoT systems

UNIT - I:

The IoT Landscape: What Is IoT? Applications, Architectures, Wireless Networks, Devices, Security and Privacy, Event-Driven Systems. IoT System Architectures: Introduction, Protocols Concepts, IoTOriented Protocols, Databases, Time Bases, Security.

UNIT - II:

IoT Devices & Event-Driven System Analysis: The IoT Device Design Space, Cost of Ownership and Power Consumption, Cost per Transistor and Chip Size, Duty Cycle and Power Consumption, Platform Design. Event-Driven System Analysis: Introduction, Motivating Example, IoT Network Model, Events, Networks, Devices and Hubs, Single-Hub Networks, Multi-hub Networks, Network Models and Physical Networks, IoT Event Analysis, Event Populations, Stochastic Event Populations, Environmental Interaction Modeling, Event Transport and Migration.

UNIT – III

Industrial Internet of Things: Introduction, Industry 4.0, Industrial Internet of Things (IIoT), IIoT Architecture, Basic Technologies, Applications and Challenges.

UNIT - IV:

Security and Safety: Introduction, Systems Security, Network Security, Generic Application Security, Application Process Security and Safety, Reliable-and-Secure-by-Design IoT Applications, Run-Time Monitoring, The ARMET Approach, Privacy and Dependability.

UNIT - V:

Security Testing IoT Systems: Introduction, Fuzz Testing for Security, White-Box Fuzzing, Black-Box Fuzzing, Fuzzing Industrial Control Network Systems, Fuzzing Modbus, The Modbus Protocol, Modbus/TCP Fuzzer.

7Hrs

7Hrs

7Hrs

7Hrs

1. Dimitrios Serpanos, Marilyn Wol, Internet-of-Things (IoT) Systems Architectures, Algorithms, Methodologies, ISBN 978-3-319-69714-7.

REFERENCE BOOKS:

1. Internet of Things – A hands-on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press,2015.

2. The Internet of Things – Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012 (for Unit 2).

3. "From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence", Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle and Elsevier, 2014.

4. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017.

	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	3								3	1
CO2	2	3	3	-	2								2	
CO3	2	3	3	-	3								2	
CO4	2	3	3	-	2								1	
CO5	3	3	-	2	3								3	
Average	2.4	2.8	3	2	2.6								2.75	1
Level of correlation	3	3	3	2	3								3	1
3-Hig	sh Mar	•	2- M	ediun	n Maj	pping	5	3-Lo	w Ma	ppin	g			

Mapping:

1. Brad Appleton, Kyle Brown, Stephen P. Berczuk, "Software Configuration Management

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester (Common to CSO, CSE, IT, DS, AI&ML) IV B.Tech I Semester ME(Open Elective-III)

20ACO19

SOFTWARE CONFIGURATION MANAGEMENT (Professional Elective -III)

COURSEOUTCOMES:

Identify the need for engineering approach to software development and various processes of requirements analysis for software

1. Analyze various software engineering models and apply methods for design and development of software projects

2. Work with various techniques, metrics and strategies for Testing software projects

3. Understand the SCM standards and controls.

4. Apply the SCM tools and implementation.

UNIT I

UNIT II

UNIT III

Overview of software configuration management - SCM: Concepts and definitions - SDLC phases - Pitfalls in the software development process - Need and importance of SCM - Benefits of SCM

Phases of SCM implementation - Objectives of SCM implementation - SCM system design – plan preparation - team organization - infrastructure setup - team training - system implementation system operation and maintenance - system retirement - SCM tool retirement

Impact of configuration item selection - item description - Configuration control - Change initiation - classification - Evaluation/analysis - disposition - implementation - verification change control – Problem reporting and tracking. Defect classification - severity – prevention. Status accounting – information gathering – database – reports. Configuration verification and audits

Version control - System building - Release management - Interface control - Software library. SCM standards - Military standards - International/commercial standards

UNIT V

UNIT IV

Capability Maturity Model - Maturity Model Integration - SCM plan and the incremental approach - SCM tools -- standards -- Audit. SCM organization -- SCM tools. Documentation management and control and product data management - SCM implementation - SCM operation and maintenance -SCM in special circumstances

TEXT BOOKS

1. Alexis Leon, "Software Configuration Management Handbook", Artech House Publishers, 2004

2. Sean Kenefick, "Real World Software Configuration Management", Apress, 2008

REFERENCE BOOKS

7Hrs

7Hrs

7Hrs

LTPC 3 - - 3

7Hrs

Patterns : Effective Teamwork, Practical Integration", Addison-Wesley, 2002

- 2. Stephen P. Berczuk "Software Configuration Management Patterns: Effective Teamwork", Practical Integration. Addison-Wesley, 2003.
- 3. Alexis Leon. Software Configuration Management Handbook (2nd Ed.). Artech House, 2005.
- 4. Jalote, Pankaj, An integrated Approach to Software Engineering, Narosa (2005)

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3	2	3	2	-	-	-	-	-	-	-	3	2
C02	3	3	2	2	1	-	-	-	-	-	-	-	3	2
C03	2	3	2	3	2	-	-	-	-	-	-	-	2	3
C04	2	2	1	3	1	-	-	-	-	-	-	-	2	2
CO5	2	3	2	1	1	1	-	-	-	-	-	-	1	2

3-High Mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

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

20ACO20 **CLOUD COMPUTING AND VIRTUALIZATION** LTPC 3 0 0 3 (Professional Elective -III)

Course Outcomes:

- 1. Knowledge on distributed system models.
- 2. Understand the concepts of cloud computing.
- 3. Explore several services provided by cloud.
- 4. Understand different types of virtualizations.

UNIT – I

Systems Modeling, Clustering and Virtualization: Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

UNIT – II

Foundations: Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

UNIT – III

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS): Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing. Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds.

UNIT – IV

Virtualization - Hardware virtualization, Full virtualization, Para virtualization, Hypervisor, hardware assisted virtualization, emulator.

UNIT - V

Migration, operating system virtualization, application virtualization, memory virtualization, storage virtualization, network virtualization, network function virtualization.

TEXT BOOKS:

1. Cloud Computing and Virtualization, Dac-Nhuong Le, Raghvendra Kumar, Gia Nhu Nguyen,

Jyotir Moy Chatterjee, Wiley.

2. T. Erl, R. Puttini, Z. Mahmood, Cloud Computing: Concepts, Technology & Architecture,

Prentice Hall, 2013.

REFERENCE BOOKS:

1. Balwinder Singh Sodh, IIT Ropar, Topics in virtualization and cloud computing.

2. T. Mather, S. Kumaraswamy, S. Latif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, O'Reilly Series, 2009.

3. Controlling data in the cloud: outsourcing computation without outsourcing control. In

7Hrs

7Hrs

7Hrs

7Hrs

Proceedings of the 2009 ACM workshop on Cloud computing security (CCSW '09). ACM, New York, NY, USA, 85-90, 2009.

MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2									3	1
CO2	3	3	3	2									3	1
CO3	3	3						1					3	2
CO4	3	3	3	3	3								3	2
Average	3	3	2.66	2.33	3			1					3	1.5
Level of	3	3	3	3	3			1					3	2
Correlation														

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

IV B.TECH I SEMESTER - CSE (IoT)

20ACO21	ADHOC & SENSOR NETWORKS	L	Т	Р	С
	(Professional Elective Course-III)	3	0	0	3

Course Outcomes:

- 1. Ability to understand the state-of-the-art research in the emerging subject of Adhoc and Wireless Sensor Networks
- 2. Ability to solve the issues in real-time application development based on ASN.

Introduction to Ad Hoc Networks - Characteristics of MANETs, Applications of MANETs and Challenges of MANETs. Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms-Proactive: DSDV; Reactive: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms-Location Services-DREAM, Quorum-based; Forwarding Strategies: Greedy Packet, Restricted Directional Flooding-DREAM, LAR.

UNIT – II

UNIT - I

Data Transmission - Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbor Knowledge-based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AMRoute, MCEDAR.

UNIT – III

Geocasting: Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR. TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT – IV

Basics of Wireless, Sensors and Lower Layer Issues: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT - V

Upper Layer Issues of WSN: Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

TEXT BOOKS:

1. Ad Hoc and Sensor Networks - Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981–256–681–3.

2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman).

7Hrs

7Hrs

7Hrs

9Hrs

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2										3	1
CO2	3	2	2										3	2
CO3	3	-	2										3	1
CO4	3	2	3										3	2
Average	3	2.33	2										3	1.5
Level of correlation	3	2	2										3	2

3- High mapping

2-Medium Mapping 1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IVB.TECH I SEMESTER - CSE(IoT)

20ACO22 APPLICATION OF IOT IN ROBOTICS 1 U T P C 3 0 0 3 (Professional Elective Course-III)

Course Outcomes:

1. Ability to understand the state-of-the-art research in the application of IoT in robotics.

2. Ability to solve the issues in real-time robotics application development based on IoT.

Unit 1:

Introduction to Mobile Robots - Tasks of mobile robots, robots manufacturers, type of obstacles and challenges, tele-robotics, philosophy of robotics, service robotics, types of environment representation. Ground Robots: Wheeled and Legged Robots, Aerial Robots, Underwater Robots and Surface Robots. Kinematics and Dynamics of Wheeled Mobile Robots (two, three, four - wheeled robots, omni-directional and macanum wheeled robots).

Unit 2:

Sensors for localization: magnetic and optic position sensor, gyroscope, accelerometer, magnetic compass, inclinometer, GNSS and Sensors for navigation: tactile and proximity sensors, ultrasound rangefinder, laser scanner, infrared rangefinder, visual system, Kinect. Localization and Mapping in mobile robotics.

Unit 3:

Motion Control of Mobile Robots (Model and Motion based Controllers): Lyapunov-based Motion Control Designs and Case Studies. Understand the current application and limitations of Mobile Robots. Introduction to Mobile Manipulators and Cooperative Mobile Robots. Microrobotics: Introduction, Task specific definition of micro-robots - Size and Fabrication Technology based definition of microrobots - Mobility and Functional-based definition of microrobots.

Unit 4:

Applications for MEMS based micro-robots. Implementation Of Microrobots: Arrayed actuator principles for micro-robotic applications – Micro-robotic actuators - Design of locomotive micro-robot devices based on arrayed actuators. Micro-robotics devices: Microgrippers and other micro-tools - Micro-conveyors - Walking MEMS Micro-robots.

7Hrs

7Hrs

7Hrs

Unit 5:

7Hrs

Multi-robot system: Micro-robot powering, Micro-robot communication. Microfabrication And Microassembly: Micro-fabrication principles - Design selection criteria for micromachining - Packaging and Integration aspects – Micro-assembly platforms and manipulators.

TEXT BOOKS:

1. AI and IoT-Based Intelligent Automation in Robotics by Ashutosh Kumar Dubey, Abhishek Kumar, S. Rakesh Kumar, N. Gayathri, Prasenjit Das, wiley online library, 2021.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2										3	1
CO2	3	2	2										3	2
CO3	3	-	2										3	1
CO4	3	2	3										3	2
Average	3	2.33	2										3	1.5
Level of correlation	3	2	2										3	2

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester CSO

20AECB7 EMBEDDED HARDWARE DESIGN

(Professional Elective Course-IV)

Course Outcomes:

- 1. Understand and analyze Forth/Open Firmware, interaction with hardware and memory.
- 2. Discussion on how to add Peripherals Using SPI and I2C.
- 3. Understand the significance of serial ports, IrDA and USB.
- 4. Understand various microcontrollers.

UNIT – I

An Introduction to Computer Architecture - Processors, Basic System Architecture, Interrupts, CISC and RISC, Digital Signal Processors, Memory and its types, Input/Output, DMA, Parallel and Distributed Computers, Embedded Computer Architecture. Forth/Open Firmware - Introducing Forth, String Word, Stack Manipulation, Creating New Words, Comments, if...else, Loops, Data Structures, Interacting with Hardware and Memory, Forth Programming Guidelines.

UNIT – II

Building Hardware - Tools, Soldering, Quick Construction, Printed-Circuit Boards, Building it, JTAG Adding Peripherals Using SPI - Serial Peripheral Interface, SPI-Based Clock/Calendar, SPI-Based Digital Potentiometer. Adding Peripherals Using I2C – Overview of I2C, Adding a Real-Time Clock with I2C, Adding a Small Display with I2C.

UNIT – III

Serial Ports – UARTs, Error Detection, Old Faithful: RS-232C, RS-422, RS-485. IrDA -Introduction to IrDA, An IrDA Interface, Other Infrared Devices. USB – Introduction to USB, USB Packets, Physical Interface, Implementing USB Interface.

$\mathbf{UNIT} - \mathbf{IV}$

Networks – Controller Area Network (CAN), Ethernet. Analog – Amplifiers, A to D conversion, Interfacing an External ADC, Temperature Sensor, Light sensor, Accelerometer, Pressure Sensor, Magnetic-Field Sensor, D to A conversion, PWM, Motor Control. The PIC Microcontrollers - A Tale of Two Processors, Starting simple, A Bigger PIC, Motor control with a PIC.

UNIT –V

The AVR Microcontrollers - The AVR Architecture, The ATtiny15 Processor, Downloading Code, A Bigger AVR, Bus interfacing. 68000-Series Computers – Architecture, A Simple 68000-Based Computer. DSP-Based Controllers - The DSP56800, A DSP56805-Based Computer, JTAG.

TEXT BOOK:

1. Designing Embedded Hardware, 2nd Edition by John Catsoulis, O'Reilly Media, Inc.

REFERENCE BOOK: K. Shibu, Introduction to Embedded Systems, McGraw Hill Education. **Mapping:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2											3	
CO2	3	3	3	2									3	1
CO3	3	2	2	1									3	1
CO4	3												2	
CO5	3	3	3	3	2			1					3	1
Average	3	2.5	2.66	2	2			1					2.8	1
Level of	3	3	3	2	2			1					3	1
Correlati														
on														

3- High mapping

1- Low Mapping

7Hrs

7Hrs

7Hrs

7Hrs

7Hrs

L T P C 3 - - 3

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester(Common to CSE,CSO, IT,CSE(DS),CSE(AI &ML)

Т Р С EMBEDDED SOFTWARE DESIGN L 20ACO23

(Professional Elective Course-IV)

Course Outcomes:

1. Understand requirements for real time software design method for embedded systems. 2. Understand and analyze overview of Real-Time Software Design Method for Embedded Systems.

3. Discussion on State Machines for Real-Time Embedded Systems with examples.

4. Understand the importance of software architectural Patterns for Real-Time Embedded Systems.

UNIT - I

Introduction - Real-Time Embedded Systems and Applications, Characteristics of Real-Time Embedded Systems, Distributed Real-Time Embedded Systems, Cyber-Physical Systems, Requirements for Real-Time Software Design Method for Embedded Systems, COMET/RTE: A Real- Time Software Design Method for Embedded Systems.

UNIT – II

Visual Modeling Languages: UML, SysML, and MARTE. Real-Time Software Design and Architecture Concepts - Object-Oriented Concepts, Information Hiding, Inheritance, Active and Passive Objects, Concurrent Processing, Cooperation between Concurrent Tasks, Information Hiding Applied to Access Synchronization, Runtime Support for Real-Time Concurrent Processing, Task Scheduling, Software Architecture and Components.

UNIT – III

Overview of Real-Time Software Design Method for Embedded Systems - COMET/RTE System and Software Life Cycle model, Phases in COMET/RTE Life Cycle model. Structural Modeling for Real-Time Embedded Systems with SysML and UML - Static Modeling Concepts, Categorization of Blocks and Classes using Stereotypes, Structural Modeling of the Problem Domain with SysML, Structural Modeling of the System Context, Hardware/Software Boundary Modeling, Structural Modeling of the Software System Context, Defining Hardware/Software Interfaces, System Deployment Modeling. Use Case Modeling for Real-Time Embedded Systems.

UNIT – IV

State Machines for Real-Time Embedded Systems- State Machines and examples, Events and Guard Conditions, Actions, Hierarchical State Machines, Cooperating State Machines, Inherited State Machines, Developing State Machines from Use Cases. Object and Class Structuring for Real-Time Embedded Software- Object and Class Structuring Criteria, Object and Class Structuring Categories, Object Behavior and Patterns, Boundary Classes and Objects, Entity Classes and Objects, Control Classes and Objects, Application Logic Classes and Objects. Dynamic Interaction Modeling for Real-Time Embedded Software - Object Interaction Modeling, Message Sequence Description, Approach for Dynamic Interaction Modeling, Modeling: Microwave Oven System.

UNIT - V

Software Architectures for Real-Time Embedded Systems- Overview of Software Architectures, Multiple Views of a Software Architecture, Transition from Analysis to Design, Separation of Concerns in Subsystem Design, Subsystem Structuring Criteria, Decisions about

9Hrs

9Hrs

7Hrs

9Hrs

7Hrs

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3

Message Communication between Subsystems. Software Architectural Patterns for Real-Time Embedded Systems - Software Design Patterns, Layered Software Architectural Patterns, Control Patterns for Real-Time Software Architectures, Client/Service Software Architectural Patterns, Basic Software Architectural Communication Patterns, Software Architectural Broker Patterns, Group Message Communication Patterns.

TEXT BOOK:

1. Real-Time Software Design for Embedded Systems by Hassan Gomaa. **REFERENCE BOOK:**

1. K. Shibu, Introduction to Embedded Systems, McGraw Hill Education.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3	2	3	2								3	2
C02	3	1	2	2	1								3	1
C03	2	2	2	3	1								3	2
C04	2	2	1	3	1								3	2
Average	2.5	2	1.8	2.8	1.3								3	1.75
Level of Correlation	3	2	2	3	2								3	2

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester CSO

20ACM10

AUGMENTED REALITY ANDLTVIRTUAL REALITY30(Professional Elective-IV)30

Course Outcomes:

1. Describe how AR systems work and list the applications of AR.

2. Understand and analyze the hardware requirement of AR.

3. Describe how VR systems work and list the applications of VR.

4. Understand the design and implementation of the hardware that enables VR systems tobe built.

UNIT - I:

Introduction to Augmented Reality: What Is Augmented Reality - Defining augmented reality, history of augmented reality, The Relationship Between Augmented Reality and Other Technologies-Media, Technologies, Other Ideas Related to the Spectrum Between Real and Virtual Worlds, applications of augmented reality Augmented Reality Concepts- How Does Augmented Reality Work? Concepts Related to Augmented Reality, Ingredients of an Augmented Reality Experience.

UNIT - II:

AR Devices & Components: AR Components – Scene Generator, Tracking system, monitoring system, display, Game scene. AR Devices – Optical See- Through HMD, Virtual retinal systems, Monitor bases systems, Projection displays, Video see-through systems.

UNIT - III:

Introduction to Virtual Reality: Defining Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual Reality Experience, Virtual Reality System, Interface to the Virtual World-Input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality

UNIT - IV:

Representing the Virtual World: Representation of the Virtual World, Visual Representation in VR, Aural Representation in VR and Haptic Representation in VR, Case Study: GHOST (General HapticsOpen Software Toolkit) software development toolkit.

UNIT - V:

Visual Perception & Rendering: Visual Perception - Perception of Depth, Perception of Motion, Perception of Color, Combining Sources of Information, Visual Rendering -Ray Tracing and Shading Models, Rasterization, Correcting Optical Distortions, Improving Latency and Frame Rates.

TEXT BOOKS:

1. Allan Fowler-AR Game Development^{||}, 1st Edition, A press Publications, 2018, ISBN 978-1484236178

2. Augmented Reality: Principles & Practice by Schmalstieg / Hollerer, Pearson Education India; First edition (12 October 2016), ISBN-10: 9332578494

REFERENCE BOOKS:

1. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016.

2. Understanding Virtual Reality: Interface, Application and Design, William R Sherman and Alan

B Craig, (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002.

3. Developing Virtual Reality Applications: Foundations of Effective Design, Alan B Craig,William

R Sherman and Jeffrey D Will, Morgan Kaufmann, 2009.

4. Designing for Mixed Reality, Kharis O'Connell Published by O'Reilly Media, Inc., 2016, ISBN:

7Hrs

9Hrs

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7Hrs an Ph

7Hrs

9781491962381.

5. Sanni Siltanen- Theory and applications of marker-based augmented reality. Julkaisija – Utgivare Publisher. 2012. ISBN 978-951-38-7449-0.

6. Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach", 2005.

Mapping:

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2											3	1
C02	3	2	1										3	1
C03	3	2											3	1
C04	3	2											3	2
C05	3	2											3	1
Average	3	2	1										3	1.2
Level of Correlation	3	2	1										3	1

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester CSO

20ACO24	DISTRIBUTED SYSTEMS	L	Т	Р	С
		3	0	0	3
	(Professional Elective Course-IV)				

Course Outcomes:

1. Ability to understand Transactions and Concurrency control.

2. Ability to understand Security issues.

3. Understanding Distributed shared memory.

4. Ability to design distributed systems for basic level applications.

UNIT – I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models -Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication, Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI

UNIT – II

Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture.

UNIT – III

Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore. Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks,logical time and logical clocks, global states, distributed debugging. Coordination and Agreement- Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

$\mathbf{UNIT} - \mathbf{IV}$

Transactions and Concurrency Control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering. Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

UNIT – V

Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data. Distributed shared memory, Design and Implementation issues, Consistency models.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth

7Hrs

7Hrs

9Hrs

9Hrs

Edition, Pearson Education.

2. Distributed Systems, S. Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

1. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.

2. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and Mukesh Singhal, Cambridge, rp 2010.

Mapping

	PO1	PO2	PO	PO	PO	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO	PSO
			3	4	5								1	2
CO1	3	2											3	2
CO2	3	2		1									3	2
CO3	3	2	2										3	2
CO4	3	2			2								3	2
CO5	3	2			2								3	2
Average	3	2	2	1	2								3	2
Level of	3	2	2	1	2								3	2
Correlatio														
n														

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

IV B.Tech I Semester

Common to CSE(IoT) (PROFESSIONAL ELECTIVE-IV) &CSE(AI)(JOB ELECTIVE - IV)

20ACO25

INDUSTRIAL IOTL T P C(Professional Elective Course-IV)3 - - 3

Course Outcomes:

1. Identify the Key opportunities and benefits in Industrial IoT.

2. Apply virtual network to demonstrate the use of Cloud in Industrial IoT.

3. Analyze industrial IoT Three tier topology and data management system.

4. Summarize Legacy Industrial and Modern Communication Protocols.

5. Describe Middleware Architecture, LoRaWAN- and Augmented reality.

UNIT - I:

7Hrs

7Hrs

Introduction to Industrial Internet and Use-Cases: Industrial Internet- Key IIoT Technologies-Innovation and the IIoT -Key Opportunities and Benefits -The Digital and Human Workforce

- Logistics and the Industrial Internet- IOT Innovations in Retail.

UNIT – II:

The Technical and Business Innovators of The Industrial Internet: Cyber Physical Systems (CPS) – IP Mobility – Network Virtualization - SDN (Software Defined Networks)- The

Cloud and Fog – Role of Big Data in IIOT - Role of Machine learning and AI in IIOT.

UNIT - III:

IIOT Reference Architecture: Industrial Internet Architecture Framework (IIAF) -Industrial Internet Viewpoints -. Architectural Topology: The Three-Tier Topology- Key System Characteristics- Data Management- Advanced data analytics.

UNIT - IV:

Protocols for Industrial Internet Systems: Legacy Industrial Protocols - Modern Communication Protocols-Proximity Network Communication Protocols- Wireless Communication Technologies-Gateways: industrial gateways - CoAP (Constrained Application Protocol) - NFC.

UNIT - V:

Middleware Software Patterns and IIOT Platforms: Publish/Subscribe Pattern: MQTT, XMPP, AMQP, DDS- Middleware Architecture- SigFox- LoRaWAN Augmented reality-Real-World Smar Factories Application of IIOT: Case study: Health monitoring, Iot smart city, Smart irrigation, Robot surveillance.

TEXT BOOKS:

1. Gilchrist, Alasdair, "Industry 4.0 The Industrial Internet of Things", Apress, 2017.

2. Zaigham Mahmood, "The Internet of Things in the Industrial Sector: Security and Device connectivity, smart environments and Industry 4.0 (Springer), 2019.

REFERENCE BOOKS

1. Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat "Industrial Internet of Things: Cyber manufacturing Systems" (Springer), 2017.

7Hrs

7Hrs

7Hrs

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2. Industrial IoT Challenges, Design Principles, Applications, and Security by Ismail Butun (editor)

3. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014

4. Michahelles, "Architecting the Internet of Things", ISBN 978-3- 642-19156-5 e-ISBN 978-3-642-19157-2, Springer

5. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 20132 Cuno Pfister, Getting Started with the Internet of Things, O" Reilly Media, 2011, ISBN: 978-1-4493-9357-1

E-BOOK:

1. https://www.apress.com/gp/book/9781484220467

Mapping:

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

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

IV B.Tech I Semester (Common to CSO, CSE & IT)

20AEEB8

ENERGY SOURCES AND POWER MANAGEMENT LTPC 3 - - 3 (Professional Elective course –V)

Course Outcomes:

1. Understand conventional energy sources and energy management systems.

- 2. Understand the significance of intelligent electronic devices.
- 3. Knowledge on distribution management system.
- 4. Understand the importance of smart meters.

UNIT – I

Introduction to Energy Sources: Conventional energy sources---Thermal, Hydel, Nuclear, Gas power stations (Single line diagrams –qualitative approach only).

UNIT – II

Renewable energy sources--Solar, wind, Tidal, wave, OTEC, Fuel cells, Geothermal, Energy Storage.

UNIT – III

Energy Management System: Energy Management System (EMS) - SMART GRID -Smart Grid Concept - Definitions and Need for Smart Grid – Functions – Opportunities – Benefits and challenges, Difference between conventional & Smart Grid, Smart substations - Substation Automation - Feeder Automation, SCADA - Remote Terminal Unit -Intelligent Electronic Devices - Protocols, Phasor Measurement Unit - Wide area monitoring protection and control, Smart integration of energy resources

UNIT – IV

Distribution Management System: Distribution Management System (DMS) - Volt / VAR control -Fault Detection, Isolation and Service Restoration, Network Reconfiguration, Outage management System, Customer Information System, Geographical Information System, Effect of Plug in Hybrid Electric Vehicles

UNIT – V

Smart Meters: Introduction to Smart Meters – Advanced Metering infrastructure (AMI), AMI protocols - Standards and initiatives. Demand side management and demand response programs, Demand pricing and Time of Use, Real Time Pricing, Peak Time Pricing.

TEXT BOOKS:

1. Stuart Borlase 'Smart Grid: Infrastructure, Technology and Solutions', CRC Press 2012. 2. Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama,

'SmartGrid: Technology and Applications', Wiley, 2012.

3. Generation, distribution and utilization of Electric power, C.L. Wadhwa, New Age Publications.

4. Renewable sources and emerging technologies, D. P. kothari, K.C. iSingal, Rakesh Ranjan, PHI 2/e.

9Hrs

7Hrs

7Hrs

7Hrs

REFERENCE BOOKS:

1. Mini S. Thomas, John D McDonald, 'Power System SCADA and Smart Grids', CRC Press,2015

2. Kenneth C. Budka, Jayant G. Deshpande, Marina Thottan, 'Communication Networks for Smart Grids', Springer, 2014.

E BOOKS:

1. https://books.google.co.in/books?isbn=1119969093

2. https://books.google.co.in/books?isbn=135123093X

Mapping:

	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	3	2	3	1	2								3	2
Correlati														
on														

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

IV B.Tech I Semester (Common to CSO, CSE, & IT)

LIGHTWEIGHT CRYPTOGRAPHY LTPC 20ACO26 3 - - 3 (Professional Elective course –V)

Course Outcomes:

- 1. Ability to learn Cryptographic based solutions, attacks and intrusions.
- 2. Understand security and privacy issues in radio frequency identification (RFID) systems.
- 3. Understanding multiple ways to attack and defend in industrial systems.

UNIT – I

Anti-counterfeiting and RFID - Anti-Counterfeiting and Supply Chain Security, Networked RFID Systems, PC Network Architecture, A Security Primer.

UNIT – II

Security and Privacy Current Status - Addressing Insecurities and Violations of Privacy, RFID Tag Vulnerabilities in RFID Systems, From Identification to Authentication - A Review of RFID Product Authentication Techniques.

UNIT – III

Network Based Solutions - EPC System for a Safe & Secure Supply Chain and How it is Applied, The Potential of RFID and NFC in Anti-Counterfeiting. Improving the Safety and Security of the Pharmaceutical Supply Chain.

UNIT - IV

Cryptographic Solutions - Product Specific Security Based on RFID Technology, Strengthening the Security of Machine-Readable Documents, Enhancing Security of Class I Generation 2 RFID against Traceability and Cloning.

UNIT - V

Low-cost Cryptographic Solutions: A Random Number Generator for Application in RFID Tags, A Low-Cost Solution to Cloning and Authentication Based on a Lightweight Primitive, Lightweight Cryptography for Low Cost RFID.

TEXT BOOK:

1. Networked RFID Systems and Lightweight Cryptography by Peter H. Cole · Damith C. Ranasinghe First edition, Springer publication 2008.

REFERENCE BOOKS:

1. RFID Security and Privacy by Yingjiu Li, Robert H. Deng.

2. RFID HANDBOOK by Klaus Finkenzeller, Third edition Wiley Publications.

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Map	ping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	1	1	2	3	2								2	2
C02	3	2	1	2	1								1	2
C03	2	2	2	3	1								3	3
C04	1	2	1	2	1								1	2
Average	1.8	1.8	1.5	2.5	1.3								1.75	2.25
Level of Correlation	2	2	2	3	2								2	2

3- High mapping

7Hrs

7Hrs

7Hrs

7Hrs

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) **IV B.Tech I Semester CSO**

20ACO27

IOT EDGE COMPUTING (Professional Elective course –V)

Course Outcomes:

- 1. Understand use of the IoT architecture with its entities and protocols, from the IoT devices.
- 2. Security and privacy issues related to the area of edge computing and IoT.
- 3. Understand the RaspberryPi architecture and its components.
- 4. Work with RaspberryPi components and evaluate its performance.

UNIT – I

IoT and Edge Computing Definition and Use Cases: Introduction to Edge Computing Scenario's and Use cases - Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, Edge platforms, Edge vs Fog Computing, Communication Models - Edge, Fog and M2M.

UNIT – II

IoT Architecture and Core IoT Modules-A connected ecosystem.IoT versus machine-to-machine versus, SCADA, The value of a network and Metcalfe's and Beckstrom's laws, IoT and edge architecture, Role of an architect, Understanding Implementations with examples-Example use case and deployment, Case study - Telemedicine palliative care, Requirements, Implementation, Use case retrospective.

RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout and Pinouts, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi, ConnectingRaspberry Pi via SSH, Remote access tools, Interfacing DHT Sensor with Pi, Pi as Webserver, PiCamera, Image & Video Processing using Pi.

UNIT – IV

UNIT – III

Implementation of Microcomputer RaspberryPi and device Interfacing, Edge to Cloud Protocols-Protocols, MOTT, MOTT publish-subscribe, MOTT architecture details, MOTT state transitions, MQTT packet structure, MQTT data types, MQTT communication formats, MQTT 3.1.1 working example.

UNIT - V

Edge computing with RaspberryPi, Industrial and Commercial IoT and Edge, Edge computing and solutions.

TEXT BOOKS:

1. IoT and Edge Computing for Architects - Second Edition, by Perry Lea, Publisher: Packt

Publishing, 2020, ISBN: 9781839214806.

2. Raspberry Pi Cookbook, 3rd Edition, by Simon Monk, Publisher: O'Reilly Media, Inc., 2019,

ISBN: 978149204322.

REFERENCE BOOKS:

1. Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana Srirama, wiley publication, 2019, ISBN: 9781119524984.

2. David Jensen, "Beginning Azure IoT Edge Computing: Extending the Cloud to the Intelligent Edge, MICROSOFT AZURE.

7Hrs

7Hrs

LTPC

3 - - 3

7Hrs

7Hrs

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2	2										3	2
C02	3	3	2										3	1
C03	3	3	3										3	
C04	3	2	2	1									3	1
C05	3	3	3										3	
Average	3	2.6	2.4	1									3	1.33
Level of Correlatio n	3	3	3	1									3	1

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) **IV B.Tech I Semester CSO**

5G AND IOT TECHNOLOGIES LTPC 3 - - 3(Professional Elective -V)

Course Outcomes:

20ACO28

- 1. Able to understand the application areas of IoT.
- 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
- 3. Able to understand building blocks of Internet of Things and characteristics.
- 4. Understand IoT and M2M.

UNIT - I

Overview of 5G Broadband Wireless Communications: Evolution of mobile technologies 1G to 4G (LTE, LTEA, LTEA Pro), An Overview of 5G requirements, Regulations for 5G, Spectrum Analysis and Sharing for 5G.

UNIT – II

The 5G wireless Propagation Channels: Channel modeling requirements, propagation scenarios and challenges in the 5G modeling, Channel Models for mmWave MIMO Systems, 3GPP standards for 5G,IEEE 802.15.4

UNIT – III

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs, IoT enabled Technologies -Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT – IV

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT. Basics of IoT System Management with NETCOZF, YANGNETCONF, YANG, SNMP NETOPEER

UNIT - V

IoT Physical Devices and Endpoints - Introduction to Raspberry PI - Interfaces (serial, SPI, I2C).

Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

7Hrs

7Hrs

7Hrs

7Hrs

TEXT BOOKS:

 Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547

 Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOKS:

1. Jonathan Rodriguez, "Fundamentals of 5G Mobile Networks", John Wiley & Sons.

2. Amitabha Ghosh and Rapeepat Ratasuk "Essentials of LTE and LTE-A", Cambridge University Press.

3. Athanasios G. Kanatos, Konstantina S. Nikita, Panagiotis Mathiopoulos, "New Directions in Wireless Communication Systems from Mobile to 5G", CRC Press.

4. Theodore S. Rappaport, Robert W. Heath, Robert C. Danials, James N. Murdock "Millimeter

Wave Wireless Communications", Prentice Hall Communications.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	1	1	2	3	2								2	2
C02	3	2	1	2	1								1	2
C03	2	2	2	3	1								3	3
C04	1	2	1	2	1								1	2
Average	1.75	1.75	1.5	2.5	1.25								1.75	2.25
Level of Correlation	2	2	2	3	1								2	2

3- High mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) **IV B.Tech I Semester CSO**

20ACO29

SECURITY AND PRVIVACY IN IOT

L Т Р С 3 0 0 3

(Professional Elective –V)

Course Outcome

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

1. Identify different Internet of Things technologies and their applications.

2. Assess the need for Privacy and security model for the Internet of Things.

3. Explore various Trust Model for IoT and customize real time data for IoT applications.

4. Design security framework and solve IoT security issues.

Unit:1 Security in IoT

IoT security: Vulnerabilities, Attacks and Countermeasures - Security Engineering for IoT development - IoT security lifecycle. Network Robustness and Malware Propagation Control in IoT, Network Robustness - Fusion Based Defense Scheme - Sequential Defense Scheme -Location Certificate Based Scheme - Sybil node detection scheme - Formal Modeling and Verification -Sybil Attack Detection in Vehicular Networks - Performance evaluation of various Malware Dynamics Models - Analysis of Attack Vectors on Smart Home Systems.

Blockchain Technology in IoT Unit:2

Technical Aspects - Integrated Platforms for IoT Enablement - Intersections between IoT and Distributed Ledger - Testing at scale of IoT Blockchain Applications - Access Control Framework for Security and Privacy of IoT - Blockchain Applications in Healthcare.

Privacy Preservation in IoT Unit:3

Privacy Preservation Data Dissemination: Network Model, Threat Model - Problem formulation and definition - Baseline data dissemination - Spatial Privacy Graph based data dissemination -Experiment Validation - Smart building concept-Privacy Threats in Smart Building - Privacy Preserving Approaches in Smart Building - Smart Meter Privacy Preserving Approaches. 9 hours

Privacy Protection in IoT Unit:4

Lightweight and Robust Schemes for Privacy Protection in IoT Applications: One Time Mask Scheme, One Time Permutation Scheme - Mobile Wireless Body Sensor Network - Participatory Sensing, Trust Models for IoT, Trust Model Concepts - Public Key Infrastructures Architecture Components - Public Key Certificate Formats - Design Considerations for Digital Certificates -Public Key Reference Infrastructure for the IoT - Authentication in IoT - Computational Security for IoT.

Security Protocols for IoT Access Networks Unit:5

Time Based Secure Key Generation -Security Access Algorithm: Unidirectional, Bidirectional Transmission - Cognitive Security - IoT Security Framework - Secure IoT Layers - Secure Communication Links in IoT - Secure Resource Management, Secure IoT Databases. **Contemporary Issues**

Text Book(s)

1. Hu, Fei. Security and Privacy in Internet of Things (IoTs): Models, Algorithms, and Implementations, 2016, 1st edition, CRC Press, USA.

Reference Books

- 2. Russell, Brian and Drew Van Duren. Practical Internet of Things Security, 2016,1st edition, PACKT Publishing Ltd, UK
- 3. Kim, S., Deka, G. C., & Zhang, P. (2019). Role of blockchain technology in IoT applications. Academic Press.
- Whitehouse O Security of things: An Implementers' guide to cyber-security for internet 4. of things devices and beyond, 2014, 1st edition, NCC Group, UK.

Mapping:

9 hours

9 hours

9 hours

9 hours

CO/PO	PO1	PO2	PO	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	PSO	PSO
			3							0	1	2	1	2
CO1	3	3	2										3	3
CO2	3	2	2										3	2
CO3	3	2	2										2	1
CO4	3	2	2										2	2
Average	2	2	2										2.5	2
Level of correlation	2.8	2.2	2										3	2
3-Hig	gh Ma	pping				2-N	lediur	n Map	oping		1-Lo	w Map	oping	

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester CSE(IoT)

20AEC57

MOBILE COMPUTING

Т Р С L 3 3 0 0

(Open Elective –III)

Course Outcomes

Students will be able to:

• Develop a strong grounding in the fundamentals of mobile Networks

• Apply knowledge in MAC, Network, and Transport Layer protocols of Wireless Network

• Comprehend, design, and develop a lightweight network stack

Unit I:

Introduction to Wireless Networks - Applications - History - Simplified Reference Model -Wireless transmission - Frequencies - Signals - Antennas - Signal propagation - Multiplexing -Modulation - Spread spectrum - Cellular Systems: Frequency Management and Channel Assignment - types of hand-off and their characteristics.

Unit II:

MAC - Motivation - SDMA - FDMA - TDMA - CDMA - Telecommunication Systems - GSM: Architecture Location tracking and call setup - Mobility management - Handover - Security -GSM - SMS - International roaming for GSM - call recording functions - subscriber and service data management - DECT - TETRA - UMTS - IMT-2000.

Unit III:

Wireless LAN - Infrared vs. Radio transmission - Infrastructure - Adhoc Network - IEEE 802.11WLAN Standards - Architecture - Services - HIPERLAN - Bluetooth Architecture & protocols.

Unit IV:

Mobile Network Layer - Mobile IP - Dynamic Host Configuration Protocol - Mobile Transport Layer - Traditional TCP - Indirect TCP - Snooping TCP - Mobile TCP - Fast retransmit/Fast recovery - Transmission/Time-out freezing - Selective retransmission - Transaction Oriented TCP.

Unit V:

WAP Model - Mobile Location based services - WAP Gateway - WAP protocols - WAP user agent profile caching model - wireless bearers for WAP - WML - WML Scripts - WTA iMode

- SyncML

REFERENCES

1. Jochen Schiller, "Mobile Communication", Second Edition, Pearson Education, 2008.

2. Theodore, S. Rappaport, "Wireless Communications, Principles, Practice", Second Edition, PHI, 2010.

3. C. Siva Ram Murthy, B. S. Manoj, "Adhoc Wireless Networks: Architectures and Protocols", Second Edition, Pearson Education, 2008.

4. Vijay. K. Garg, "Wireless Communication and Networking", First Edition, Morgan Kaufmann Publishers, 2008.

9Hrs

9Hrs

7Hrs

7Hrs

Mapping:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2										3	3
CO2	3	2	2										3	2
CO3	3	2	2										2	1
CO4	3	2	2										2	2
Average	2	2	2										2.5	2
Level of	2.8	2.2	2										3	2
correlation														

3-High Mapping

2-Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester CSO (Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS))

20AMB10

INDUSTRIAL MARKETINGL T PC3 0 03(Open Elective -III)

Course Outcome:

After completion of the course, the students will be able to

- 1. Describe key concepts of industrial marketing.
- 2. Prepare proper segmentation and positioning for various industrial products.
- 3. Formulate robust marketing strategies for variety of situations in Indian and global context.
- 4. Apply and integrate Business-to-Business marketing theory with practice in a business context.
- 5. Explain the industrial marketing mix strategies apply this knowledge to real cases.

UNIT-I:

The Industrial Marketing system and the Industrial Marketing concept, Industrial goods demand and product characteristics market levels and product types, the industrial customer, buyer motives business and institutional buyers.

UNIT-II:

Organizational Buying: BUYGRID MODEL, phases in purchasing decision process & their marketing implications, Buying centers, value analysis & vendor analysis.

UNIT-III

Industrial market segmentation, bases for segmenting industrial market-macro and micro variables. Targeting the industrial product, positioning the industrial product. Industrialproduct life cycle, product mix, Service component the provision of parts, technicalassistance, terms of sales.

UNIT – IV

The distribution channel component—Industrial distributors, Formulation of channel strategyconditions influencing channel structure. Brief introduction to Marketing Logistics. The price component-conditions affecting price competition, cost factor, the nature of demand, pricing policies.

7Hrs

7Hrs

9Hrs

The promotional component, advertising functions-establishing recognition, supporting and motivating salesmen and distributors measurement of advertising effectiveness. Personal selling-Personnel profiles selection and training, supervisions compensation sales promotion and public relations-Trade shows and exhibits, promotional novelties.

TEXT BOOKS:

- 1. Havaldar, K. K. (2005). Industrial Marketing: Text and Cases. India: Tata McGraw-Hill.
- 2. Phadtare, M. T. (2014). Industrial Marketing. India: PHI Learning.
- Govindarajan, M. (2009). Industrial Marketing Management. India: Vikas Publishing House Pvt Limited.

REFERENCES:

- 1. Stacey, N., Wilson, A. (2014). Industrial Marketing Research (RLE Marketing): Management and Technique. United Kingdom: Routledge.
- 2. Chisnall, P. M. (1985). Strategic Industrial Marketing. United Kingdom: Prentice-Hall.
- Brierty, E. G., Reeder, B. H., Reeder, R. R. (1991). Industrial Marketing: Analysis, Planning, and Control. United Kingdom: Prentice-Hall International.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1											3			
CO2											3			
CO3									2		3			
CO4									2		3			
CO5									2-		3			
Average									2		3			
Level orrelation	0								2		3			
	3-High	Mappi	ng	•	•	2-M	edium	Map	ping	1-	Low M	apping		

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester (Common to CE, CSE, CSO, CSD,CSM,IT)-(OE-III), EEE(OE-IV)& ME(PE-V)

20AME54	Optimization Techniques	L	Т	Р	С
	(Open Elective -III)	3	0	0	3

Course Outcomes:

After completion of the course, the students will be able to

- 1. Formulate unconstrained optimization techniques in the engineering application.
- 2. Formulate constrained optimization techniques for various application.
- 3. Implement neural network technique and swarm optimization to real world design problems.
- 4. Apply genetic algorithms and multi objective optimization to the complex engineering problems.
- 5. Evaluate solutions by various optimization approaches for structural and dynamic problem.

UNIT: I Unconstrained Optimization Techniques

Introduction to optimum design - General principles of optimization – Problem formulation & their classifications - Single variable and multivariable optimization, Techniques of unconstrained minimization – Golden section, Random, pattern and gradient search methods – Interpolation methods.

UNIT: II Constrained optimization techniques

Optimization with equality and inequality constraints - Direct methods – Indirect methods using penalty functions, Lagrange multipliers - Geometric programming.

UNIT: III Artificial Neural Networks and Swarm intelligence 10 Hours

Introduction – Activation functions, types of activation functions, neural network architectures, Single layer feed forward network, multilayer feed forward network, Neural netwok applications. Swarm intelligence - Various animal behaviors, Ant Colony optimization, Particle Swarm optimization.

UNIT: IV Advanced Optimization Techniques

Multistage optimization – dynamic programming; stochastic programming; Multi objective optimization, Genetic algorithms and Simulated Annealing technique.

UNIT: V Static and Dynamic Applications

Structural applications – Design of simple truss members – Design of simple axial, transverse loaded members for minimum cost, weight – Design of shafts and torsionally loaded members – Design of springs.Dynamic Applications – Optimum design of single, two degree of freedom systems, vibration absorbers. Application in Mechanisms – Optimum design of simple linkage mechanisms.

10 Hours

10 Hours Julti obje

10 Hours

10 Hours
Textbook(s)

- 1. Kalyanmoy Deb, "Optimization for Engineering Design: Algorithms and Examples", PHI Learning Private Limited, 2nd Edition, 2012.
- 2 Rao Singiresu S., "Engineering Optimization Theory and Practice", New Age International Limited, New Delhi, 3rd Edition, 2013.
- 3 Rajasekaran S and VijayalakshmiPai, G.A, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2011

Reference Books

- 1 Goldberg, David .E, "Genetic Algorithms in Search, Optimization and Machine Learning",
- ¹ Pearson, 2009.
- 2 Srinivasan G, "Operations Research Principles and Applications", PHI, 2017.

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

Mapping of COs with POs & PSOs

3-High Mapping

2- Medium Mapping

1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

IV B.Tech I Semester (Common to CSE(AI & ML), CSE, CSO &IT)

20ACM26 MACHINE LEARNING TOOLS AND TECHNIQUES L T P C (Job Oriented Elective -III) 3 0 0 3

COURSE OUTCOMES

On completion of the course, student will be able to

- 1. Describe the basics of Data mining process and machine learning models.
- 2. Use different knowledge representation techniques.
- 3. Apply different validation and selection models to improve the performance.
- 4. Analyze different machine learning tools for implementing real-world applications.

UNIT 1 INTRODUCTION

Fielded Applications, The Data Mining Process, Machine Learning and Statistics, Generalization as Search, Data Mining and Ethics, Input: concepts, instances, attributes, Preparing the Input, output: Knowledge representation- Tables, Linear Models, Trees, Rules, Instance-Based Representation, Clusters.

UNIT 2 KNOWLEDGE REPRESENTATION

Tables, Linear Models, Trees, Rules, Instance-Based Representation, Clusters, Algorithms: the basic methods, Inferring Rudimentary Rules, Simple Probabilistic Modeling, Divide-and-Conquer: Constructing Decision Trees, Covering Algorithms: Constructing Rules, Mining Association Rules, Linear Models, Instance-Based Learning, Clustering, Multi-Instance Learning.

UNIT 3 CREDIBILITY

Training and Testing, Predicting Performance, Cross-Validation, Other Estimates, Hyperparameter Selection, Comparing Data Mining Schemes Predicting Probabilities, Counting the Cost, Evaluating Numeric Prediction, The Minimum Description Length Principle, Applying MDL to Clustering, using a Validation Set for Model Selection.

UNIT 4 TREES AND RULES

Decision Trees, Classification Rules, Association Rules, extending instance-based and linear models- Instance-Based Learning, Extending Linear Models, Numeric Prediction with Local Linear

9Hrs.

9Hrs.

9Hrs.

9Hrs.

Models, WEKA Implementations. Data transformations- Attribute Selection, Discretizing Numeric Attributes, Projections, Sampling, Cleansing, Transforming Multiple Classes to Binary Ones, Calibrating Class Probabilities.

UNIT 5 MACHINE LEARNING TOOLS

Knime, Accord. net, Scikit-Learn, TensorFlow, Pytorch, RapidMiner, Google Cloud AutoML, Jupyter Notebook, Apache Mahout, Azure Machine Learning studio, MLLIB, Orange3, IBM Watson, Pylearn2

Max.45Hrs.

TEXT/REFERENCEBOOKS

- Datamining machine learning tools and techniques, Chris Pal, Ian Witten, Eibe Frank, Mark Hall, 2011.
- 2. Machine Learning the art of science and algorithms that make sense of data, peter, flach,2012.
- 3. Machine Learning for Absolute Beginners, Oliver Theobald, 2021.
- 4. Interpretable Machine Learning, Christoph Molnar, 2020.
- 5. Data Mining: Practical Machine Learning Tools and Techniques, Ian H. Witten, Eibe Frank, Mark A. Hall,2011.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO11	PO12	PSO1	PSO2
CO1	3	2	1									3	2
CO2	3	1	1									3	2
CO3	3	1	1									2	1
CO4	3	2	2									2	2
Average	3	1.5	1.25									2.5	1.75
Level of correlation	3	2	1									3	2

3-High Mapping

2-Medium Mapping

1-Low Mapping

9Hrs.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester (Common to CSE,CSE(DS),CSE(AI & ML) & CSO)

20ACS47	NoSQL Databases	LT P C
	-	3003
	(Job Oriented Elective -III)	

Course outcome:

- 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

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

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

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

8Hrs

10Hrs

Analytics or Real-Time Analytics, E-Commerce Applications, When Not to Use, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure.

UNIT-IV

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

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.

Text book:

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

Reference Books:

Meier, Andreas, and Michael Kaufmann. SQL & NoSQL databases. Springer Fachmedien

Wiesbaden, 2019.

CO-PO MAPPING:

	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	3
CO3	3	3	3	3	2								3	2
CO4	3	3	3	2	2								3	3
Average	3	3	3	2.75	2								3	2.5
Level of Correlati on	3	3	3	3	2								3	3

SRI VENKATESW	ARA COLLEGE OF ENGINEERING AN (AUTONOMOUS)	D TECH	INO	LOG	Y
IV B. Tech I Semester	ECE (Professional Elective-IV)				
IV B.Tech I Semester	(Common to ECE, CSE, IT, CSM, CSD &	k CSO)			
	DIGITAL IMAGE PROCESSING	L	Т	Р	С
20AEC51	(Open Elective -IV)	3	0	0	3

Course Outcomes:

After successful completion of the course the student will be able to CO1: Explain fundamentals of Digital Image Processing CO2: Analyze image transforms and enhancement CO3: Apply various coding and segmentation techniques in image processing

UNIT-I FUNDAMENTALS OF DIGITAL IMAGE PROCESSING: 7Hrs

Digital Image representation – Digital image processing System –Visual Perception- Sampling and

Quantization - Basic relationships between pixels, and imaging geometry.

UNIT-II IMAGE TRANSFORMS:

Discrete Fourier Transform – Properties of 2 – D Fourier Transform – Fast Fourier Transform, Walsh, Hadamard, Discrete cosine transforms.

UNIT-III IMAGE ENHANCEMENT:

Image Enhancement in Spatial Domain, Enhancement Through Point Operation, Types of Point Operation, Histogram Manipulation, gray level Transformation, local or neighborhood operation, median filter, spatial domain high-pass filtering, Enhancement in frequency Domain, Image smoothing, Image sharpening, Color imagesImage Restoration: Degradation model, Algebraic approach to restoration – Inverse filtering– Least Mean Square filters, Constrained Least square restoration

UNIT-IV IMAGE CODING:

Fidelity criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding,

Transform Based Compression, JPEG 2000 Standards.

UNIT-V IMAGE SEGMENTATION:

Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation

TEXT BOOKS:

1.R. C .Gonzalez & R.E. Woods, "Digital Image Processing", Addison Wesley/Pearson education, 3rd Edition, 2010.

2.A.K. Jain, "Fundamentals of Digital Image processing", PHI.

REFERENCE BOOKS:

1.Rafael C. Gonzalez, Richard E woods and Steven L.Eddins, "Digital Image processing using MATLAB", Tata McGraw Hill, 2010.

7Hrs

7Hrs

7Hrs

2.S Jayaraman, S Esakkirajan, T Veerakumar, "Digital Image processing", Tata McGraw Hill. 2010.

Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	1											
CO 2	2	1	2	2										
CO 3	3	1												
Average	2.66	1.33	1.5	2										
Level of Correlatio n	3	1	1	2										

3- High mapping

2-Medium Mapping

1- Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester CSO (Common to CSO, CSE, IT, CSE(AI&ML) & CSE(DS))

20 A M (D 11	SOCIAL MEDIA MARKETING	L	Т	Р	С
ZUANIBII	(Open Elective -IV)	3	0	0	3

COURSE OUTCOMES:

After completion of the course, the students will be able to

- 1. Explain the required terminology and components of Social Media tactical and strategic plans.
- 2. Identify the place social media marketing has within the context an organizations / business unit's/product's overall marketing strategy.

3. Evaluate an organizations effective engagement in social media to meet marketing objectives.

4. Measure the effectiveness of social media for marketing purposes and draft a social media strategy for a specific product.

5. Evaluate customer satisfaction level.

UNIT-I: INTRODUCTION:

Social Media, Historical Evolution of Social Media Marketing; Understanding the concept of Social Media; Increasing Visibility, Engagement; Bringing Targeted traffic; Converting traffic into leads; Understanding conversion process;

UNIT-II: UNIT-II: CONTENT MARKETING-I:

Developing a Content Marketing Strategy, Content Strategies- Building audience; Facebook: Creating groups and pages - Posts – Events - Ad campaigns – Objective, Managing Audience, Budget, scheduling and Ad Delivery; Twitter: Microblogging; Creating campaignson Twitter – Clients- Set-up and usage– Tips.

UNIT-III: CONTENT MARKETING-II:

Blogs: Introduction – History – Blogging; Forums; Ratings and Reviews; Introduction to SEO: What is SEO? History and Growth of SEM; How it is determined? Introduction to Google Ad words and PPC; YouTube: Long-form video platforms- Setting up a channel - Managing content.

UNIT-IV: TRENDS IN SOCIAL MEDIA MARKETING:

LinkedIn: Promoting Business with LinkedIn; Using LinkedIn as a Content Platform; Instagram: Create and Usage; Brand advertising on Instagram; Pinterest: Set-up and management – Driving traffic with Pinterest.

UNIT-V: MEASURING RESULTS:

Metrics – Goal Setting; Analyzing Content-Sharing Metrics; Analyzing Twitter & Face book Metrics; Measuring Other Social Media Networks. ROI: Measuring ROI – Financial - Customer Satisfaction – Awareness.

9Hrs

8Hrs

9Hrs

8Hrs

TEXT BOOKS:

1. Jan Zimmerman, Deborah Ng, Social Media Marketing All-in-One For Dummies, 3rd Edition, John Wiley and Sons, 2015.

2. Dan Zarella, The Social Media Marketing, O'Reilly Media, 2011, ISBN: 978-0-596-80660-

REFERENCES:

1. Erik Qualman, Socialnomics: How Social Media Transforms the Way We Live and Do Business -2nd Edition, 978-1118232651.

2. Eric Schwartzaman, Social Marketing to the Business Customer: Listen to Your B2B Market, Generate Major Account Leads, and Build Client Relationships, John Wiley & Sons, 978-0470639337.

3. Dave Evans, Social Media Marketing, The Next Generation of Business Engagement.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1					1						2			
CO2					1						2			
CO3					3						2			
CO4					3						2			
CO5					3						2			
Average					2.2						2			
Level of correlation of the course					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 ME(PE-I), ECE(OE-I)

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

20AME20Total Quality Management & ReliabilityL T P C20AME20Engineering (Open Elective -IV)3 0 0 3

Course Outcomes:

After completion of the course, the students will be able to

- 1. Develop action plans for customer centric business on the basis of various quality philosophies.
- 2. Select the best solution for problem solving using QC tools, QFD model, JIT method.
- 3. Solve industry problems with available sources, software tools, modern TQM techniques with system approach.
- 4. Establish quality management system and environmental management system for product and service industries.
- 5. Design systems with a focus on enhancing reliability and availability.

UNIT: I Introduction

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality, Employee involvement, Quality Awards.

UNIT: II TQM Principles

Quality circles - PDCA cycle, Control Charts - Process Capability – Problem solving - Quality Function Development (QFD) - Taguchi quality loss function – Total Productive Maintenance - Concepts, improvement needs - Performance measures. Poka-yoke, Kaizen , JIT, Terotechnology.

UNIT: III TQM Tools and Technique

The seven traditional tools of quality - New management tools - Six sigma: Concepts, DMAIC, Methodology, applications to manufacturing, service sector including IT - Bench marking -Reason to bench mark, Bench marking process - FMEA - Stages, Fault tree analysis.

UNIT: IV Quality Systems

Need for ISO 9000 - ISO 9001-2008 Quality System - Elements, Documentation, Accounting Systems, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors.

10 hours

10 hours

10 hours

8 hours

UNIT: V Fundamental concepts of Reliability

Reliability definitions, failure, failure density, failure Rate, hazard rate, Mean Time To Failure (MTTF), Mean Time Between Failure (MTBF), maintainability, availability, safety and reliability, product liability, importance of reliability. Problem solving. Business process re-engineering (BPR) principles, applications.

Textbooks

- 1. Dale H. Besterfiled, et at., "Total quality Management", Third Edition, Pearson Education Asia, Indian Reprint, 2006
- 2 Dr.K.C.Arora, "Total Quality Management", 4th Edition, S. K. Kataria & Sons, 2009.

Reference Books

- James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012 1
- Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006. 2

mapping or	CUS		U 5 u	1903										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3					3	3				1			
CO2	3	3				3	3				1			
CO3	3	3				3	3				1			
CO4	3					3	3				1			
CO5	3					3	3				1			
Average	3	1.2				3	3				1			
Level of correlation	3	1				3	3				1			

Manning of COs with POs & PSOs

3-High Mapping

2- Medium Mapping

1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester (Common to CSE, CSO & IT)

20ACS48	Virtual Reality	L	Т	Р	С
	(Job Oriented Elective –IV)	3	0	0	3

Course Outcomes:

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

1. Describe how VR systems work and list the applications of VR.

2. Use the design and implementation of the hardware that enables VR systems to be built.

3. Describe the system of human vision and its implication on perception and rendering.

4. Explain the concepts of motion and tracking in VR systems

Unit I

Introduction: What is Virtual Reality - Modern VR Experience - Bird's - Eye View - Hardware -

Software - Human Physiology and Perception

Unit II

The Geometry of Virtual Worlds: Geometric Models - Changing Position and Orientation - Axis-

Angle Representations of Rotation - Viewing Transformations - Chaining the Transformations

The Physiology of Human Vision: From the Cornea to Photoreceptors – From Photoreceptors to the Visual Cortex - eye movements - implications for VR.

Unit III

Visual Perception: Perception of Depth- Perception of Motion,- Perception of Color- Combining Sources of Information

Visual Rendering: Ray Tracing and Shading Models – Rasterization - Correcting Optical Distortions - Improving Latency and Frame Rates – Immersive Photos and Videos

Unit IV

Motion in Real and Virtual Worlds: Velocities and Accelerations - The Vestibular System - Physics in the Virtual World - Mismatched Motion and Vection

Tracking: Tracking 2D Orientation – Tracking 3D Orientations- Tracking Position and Orientation - Tracking Attached Bodies – 3D Scanning of Environments

9Hrs

8Hrs

10Hrs

will be ab nd list the

Unit V

8Hrs

Interaction: Motor Programs and Remapping – Locomotion – Manipulation - Social Interaction – Additional Interaction Mechanism

Evaluating VR Systems and Experience: Perception Training - Recommendations for Developers – Comfort and VR Sickness – Experiments on Human Subjects

Text Books:

1. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016

Reference Books:

1. Understanding Virtual Reality: Interface, Application and Design, William R Sherman and Alan B Craig, (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002

2. Developing Virtual Reality Applications: Foundations of Effective Design, Alan B Craig, William R Sherman and Jeffrey D Will, Morgan Kaufmann, 2009.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	1	1	2	3	2								2	2
C02	3	2	1	2	1								1	2
C03	2	2	2	3	1								3	3
C04	1	2	1	2	1								1	2
Average	1.75	1.75	1.5	2.5	1.5								1.75	2.25
Level of Correlation	2	2	2	3	2								2	3

Mapping:

3- High mapping

2-Medium Mapping

1-Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester (Common to CSE, CSE(AI & ML) & CSO)

DEVOPS	L	Т	Р	C
(Job Oriented Elective -IV)	3	0	0	3

Course Outcomes:

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

- 1. Articulate the main concepts of DevOps
- 2. Learn the key and enabling technologies of DevOps CI/CD Pipeline.
- 3. Learn some advances in DevOps
- 4. Design and Implement the Security in DevOps

UNIT I - Introduction

Getting Started with DevOps – Implementing CI/CD and Continuous Deployment – Understanding IaC Practices – What is DevOps? – Looking at DevOps Capabilities – Adapting DevOps – Looking at How Cloud Accelerates DevOps – Using DevOps to Solve New Challenges – Making DevOps Work

UNIT II - DevOps CI/CD Pipeline Overviewing Git and its Command Lines - Understanding the Git Process and Git Flow Patterns -The CI/CD Principles – Using a Package Manager – Using Jenkins – Using Azure Pipeline – Using

Git Lab CI.

UNIT III – Centralized Applications

Containerized Applications with Docker and Kubernetes - Installing Docker - Creating a Docker File - Building and Running a Container on a Local Machine - Pushing an Image to Docker Hub -Deploying a Container to ACI with CI/CD Pipeline.

UNIT IV – Containers

Example of Kubernetes Application Deployment – Using HELM as a package manager – Using AKS – Creating a CI/CD Pipeline for Kubernetes with Azure Pipelines – Testing APIs with Postman - Creating a Postman Collection with Requests - Using Environment and Variables to dynamize Request - Running the Newman Command Line.

UNIT V – Security in DevOps

Testing Azure Infrastructure Compliance with Chef InSpec – Using the Secure DevOps – Kit for Azure – Preserving data with HashiCrop's Vault – Reducing Deployment Downtime with Terraform- Understanding Blue-Green Deployment Concepts and Patterns - Applying Blue -Green Deployment on Azure.

9 hrs

9 hrs

9 hrs

9 hrs

9 hrs

20ACS49

TEXT BOOKS:

- 1. Mikael Krief, "Learning DevOps", Packt Brimingham Mumbai, 2019.
- 2. Sanjeev Sharma, Bernie Coyne, "DevOps for Dummies", 2nd IBM Edition, 2020

REFERENCE BOOKS:

 Gene Kim, Jez Humble, Patrick Debois, John Willis, "The DevOps Handbook", IT Revaluation Press, LLC, 2018

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2				1			1					1	2
CO2	2				2								1	2
CO3	2				1								1	3
CO4	2			1	2			1					1	2
Average	2			1	1.5			1					1	2.25
Level of Correlation	2			1	2			1					1	2

3– High Mapping

- 2 Medium Mapping
- 1 Low Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester CSE & CSO

201 (550	SOURCE CODE MANAGEMENT USING GIT	L	Т	Р	С
20AC530	AND GITHUB (Skill Course)	1	0	2	2

Course Outcome:

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

- 1. Understand fundamental tools for coding and collaboration
- 2. Install and run Git on your local machine
- 3. Use and interact with GitHub
- 4. Collaborate with others through remote repositories

LIST OF EXPERIMENTS

- 1. Basic Installation of GIT and GITHUB
- 2. Basic Commands on GIT (GIT cheat sheet)
- 3. Basic Commands on GITHUB (GITHUB Cheat sheet)
- 4. Create a "repository" (project) with a git hosting tool (like Bitbucket)
- 5. Copy (or clone) the repository to your local machine
- 6. Add a file to your local repo and "commit" (save) the changes
- 7. "Push" your changes to your main branch
- 8. Make a change to your file with a git hosting tool and commit
- 9. "Pull" the changes to your local machine
- 10. Create a "branch" (version), make a change, commit the change
- 11. Open a "pull request" (propose changes to the main branch)
- 12. "Merge" your branch to the main branch

Textbook

1. Scott Chacon and Ben Straub, Pro Git book, second Edition.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO
CO1	2				1								1	2
CO2	2				2								2	2
CO3	2				1								3	2
CO4	2			1	2								1	3
Average	2			1	1.5								1.75	2.25
Level of correlati on	2			1	2								2	2

3 – High Mapping 2 – Medium Mapping

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS) IV B.Tech I Semester ,CSE (Common to CE, EEE, ME, ECE, CSE, IT, CSE(AI&ML) & CSE(DS))

20AMB12

PROFESSIONAL ETHICS L T P C 2 0 0 0

COURSE OUTCOME

After completion of this course students will be able to:

- 1. Identify and analyze an ethical issue in the relevant field.
- 2. Apply specific ethical theories to current social issues.
- 3. Identify significant problems in contemporary professional ethics.
- 4. Explain the ethical roles of engineers in industry and society.
- 5. Explain moral and ethical obligations toward the environment.

UNIT I

INTRODUCTION: Professionalism-models of professionalism-Ethics-Types of ethics and morality-Engineering ethics-Positive and negative faces of ethics-Responsibility for safety-Technology pessimism and perils of technological optimism.

UNIT II

ETHICAL CONCEPTS: Human Values – morals-integrity-work ethics-Respect for others-respect for authority-conflicts of interests-moral dilemmas-honesty- courage- cooperation-valuing time-commitment-collegiality-loyalty-self -interest-Professional accountability-royalty-Problem of bribery, extortion and grease payments-problem of nepotism, excessive giftsconfidentiality-uses of ethical theories-Kohlberg's Theory- Gilligan's Theory-Ethical codes of IEEE and Institution of Engineers.

UNIT III

ENGINEERS ROLE IN SAFETY: Safety and risks-risk and costs-risk benefit analysis-Testing methods for safety-The promise of technology-Computer Technology Privacy-Social policy-Engineering standards-the standards care-Social and value dimensions of technologycommunicating risk and public policy-occupational crime-professional rights and employee rightswhistle blowing.

UNIT IV

ROLES OF ENGINEERS: Engineers as managers, Advisors, Consultants, Experts and witnesses-Engineers role in industry and society- models of professional roles-Theories about right action-

9Hrs

7Hrs

9Hrs

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paternalism-different business practices-Moral leadership- Cases - Bhopal gas tragedy, Nuclear power plant disasters.

UNIT V

7Hrs

ENVIRONMENTAL ETHICS:Global Issues-Multinational corporations-Living in harmony with NATURE-Holistic technology-Eco friendly production system-sustainable technology and development-weapon development-Four orders of living, their interconnectedness-Eco system-Ozone depletion-pollution

TEXT BOOKS:

1. Subramanian R, Professional Ethics, 1st Edition, Oxford University Press. 2013.

2.Naagarazan , R.S., A Textbook on Professional Ethics and Human Values,1st edition, New Age International (P) Limited, Publishers New Delhi.,2014

3. R.R.Gaur, R.Sangal and G.P.Bagaria, Human Values and Professional Ethics:, EecelBooks, New Delhi. 2010.

REFERENCE BOOKS:

1 .Fundamentals of Ethics for scientists and Engineers, Edmond G Seebauer and Robert L. Barry, 1st edition Oxford University Press, 2008.

2. Professional Ethics and Human Values – M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi.

3. Professional Ethics and Human Values: Prof. D.R. Kiran, TATA McGraw Hill Education, 2007.

4. Charles D Fleddermann, "Engineering Ethics", Prentice Hall.

5. Charles E Harris, Micheal J Rabins, "Engineering Ethics, Cengage Learning.

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

Mapping

3 – High Mapping

2 – Medium Mapping

3 – Low Mapping